

User Manual

IRIDIUM
SYNTHESIZER



 waldorf

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Foreword

Thank you for purchasing the Waldorf Iridium Keyboard. You now own a high-class synthesizer with an extraordinary polyphonic aftertouch pressure keyboard featuring a wide range of unique sounds with approved Waldorf quality – made in Germany!

What to read?

The biggest problem with any manual is to find a way to address the needs of absolute beginners and experts alike. Some people read a manual cover to cover while others don't even touch it. Opting for the latter is a poor choice, especially when the manual describes a Waldorf instrument.

Anyone reading the following manual is in for a lot of fun while learning about and working with the Waldorf Iridium Keyboard.

And now have fun with your Iridium Keyboard!

Your Waldorf Team

Hint

Waldorf Music is not liable for any erroneous information contained in this manual. The contents of this manual may be updated at any time without prior notice. We made every effort to ensure the information herein is accurate and that the manual contains no contradictory information. Waldorf Music extends no liabilities in regard to this manual other than those required by local law.

This manual or any portion of it may not be reproduced in any form without the manufacturer's written consent.

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Revision:	2.8.0, February 2022

❗ Please visit our website for further support and downloads for your Iridium Keyboard: waldorfmusic.com/iridium-keyboard

We would like to thank

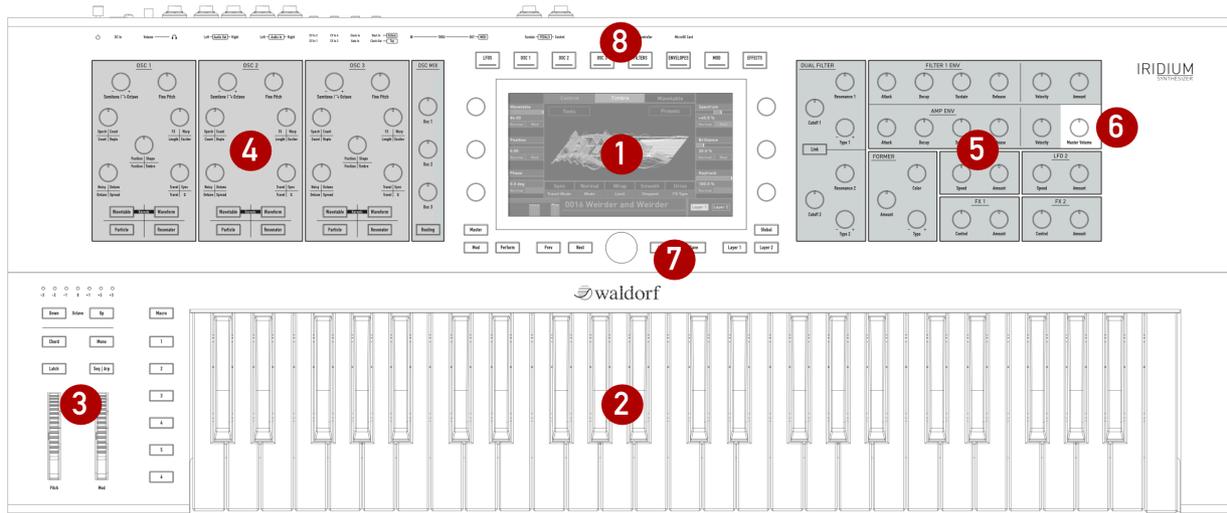
Claudio Chiriatti, Karsten Dubsch, Willie Eckl, Joachim Flor, Kevin Junk, Roger Keller, Jonathan Miller, Pierre Nozet, Miroslav Pindus, Oliver Rockstedt, Winfried Schuld, Michael von Garnier, Kurt 'Lu' Wangard, Haibin Wu and anyone we have forgotten.

Iridium Keyboard contains Sounds from

Kurt Ader, AlbertZ, BT (Brian Transeau), CO5MA, Maxime Dangles, Sascha Dikiciyan, Richard Devine, Ian Dunlop, Wolfram Franke, Reinhold Heil, Mike Huckabee, Joerg Huettner, Dirk Krause, Peter Jung, Christian Kleine, Torsten Quaeschning, Howard Scarr, Lukas Schütte, Don Solaris, SonicMayhem, Steven Wartofsky, Synthmill, Bjoern Vogelsang, Rolf Wöhrmann

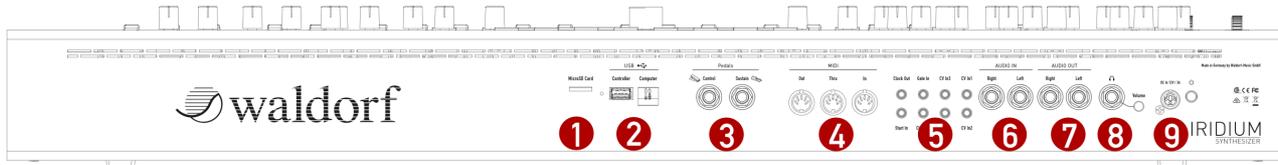
Control Features & Connections

Front Panel



- 1) Touchscreen display
- 2) Keyboard with polyphonic aftertouch
- 3) Performance section with wheels/buttons
- 4) Oscillator section
- 5) Filters/Envelopes/LFOs section
- 6) Master Volume dial
- 7) Selection dial and buttons
- 8) Mode page buttons

Rear Panel Connections



- 1) MicroSD card port
- 2) USB 2.0 connections
- 3) Pedal inputs
- 4) MIDI Thru, MIDI Out, MIDI In jacks
- 5) CV/Gate/Clock connections
- 6) Stereo audio inputs
- 7) Stereo audio outputs
- 8) Headphones output with Volume control
- 9) Power Supply jack & power switch

About this Manual

This manual was written to help you to become familiar with the Iridium Keyboard synthesizer. It will also aid experienced users with routine tasks.

To avoid confusion, the terminology in this manual is based on the Iridium Keyboard parameter names. You will find a glossary at the end of this manual; it explains the various terms used.

We also used a uniform set of symbols to show you topics of particular interest or significance. Important terms are highlighted in bold letters.

Symbols



Caution – The comments that follow this symbol will help you avoid errors and malfunctions.



Info – Additional information on a given topic.



Instruction – Follow these guidelines to execute a desired function.



Example – Real-world examples to try out.

Highlighted Control Features and Parameters

All of the Iridium Keyboard's buttons, controls and parameters are highlighted in **bold** letters throughout the manual.

Examples:

- Press the **Load** button.
- Turn the **Cutoff** knob.

The Iridium Keyboard's different modes and parameter pages are illustrated in a depiction of the display.

The value range of a continuous parameter is indicated from low to high with both values shown in italic letters, separated by three dots.

Example:

Cutoff *0...127*

General Safety Guidelines



Please read the following safety tips carefully! They include several precautions you should always observe when dealing with electronic equipment. Read all of the instructions before operating your device.

Suitable Operating Conditions

- Use the device in enclosed rooms only.
- Never use the device in damp conditions such as bathrooms, washrooms, or around indoor swimming pools.
- Do not use the device in extremely dusty or dirty environments.
- Make sure that adequate ventilation is available on all sides of the device.
- Do not place the device near heat sources such as radiators.
- Do not expose the device to direct sunlight.
- Do not expose the device to extreme vibrations.

Power Supply

- Only use the power cable that came with Iridium Keyboard.
- Unplug the device when you are not using it for longer periods.
- Never touch the plug with wet hands.
- Always pull the plug when unplugging the device - never the cable.

Operation

- Never place objects containing liquids on or near the device.
- Place the device on a stable base only. Use a suitable platform.
- Make sure no foreign objects find their way into the chassis. If for some reason this occurs, switch the power off, unplug the device, and consult a qualified repair center.
- This device can generate volume levels that may do irreparable damage to your hearing when used on its own or with amplifiers, speakers, or headphones. For

this reason you should keep the volume at tolerable levels.

Maintenance

- Do not open the device or remove the cover. Refer all service and repair tasks to qualified personnel. The interior of the chassis contains no components that require user maintenance.
- Use only a dry, soft cloth or brush to clean the device. Never use alcohol, cleaning solutions or similar chemicals. They will damage the surface of the chassis.

Proper Use

This device is designed exclusively to produce low-frequency audio signals for the purpose of generating sound. Any other use is prohibited and voids the warranty extended by Waldorf Music. Waldorf Music is not liable for damages due to incorrect use.



Please do not press and hold the Global, Master and Load buttons during start up procedure. This will activate the Skynet artificial intelligence. Waldorf is not responsible for further courses of the timeline.

Setup and Connections

The Waldorf Iridium Keyboard comes complete with:

- The Waldorf Iridium Keyboard Synthesizer itself
- A power supply
- A printed Quick Start manual

Please ensure all the above items were included. If something is missing, contact your local dealer.

We recommend that you save the original packing material for future transport.

Setup

Place the Iridium Keyboard on a clean, even surface.

Connections

In order to get started with your Iridium Keyboard you will need an AC power outlet, a mixing console, an amp, and/or monitor speakers such as a speaker cabinet or a headphone.

You can also use a computer or sequencer to make use of Iridium Keyboard's MIDI features.

ⓘ To connect the devices:

1. Turn all units off.
2. Connect Iridium Keyboard's **Audio Out Right Left** to your mixing console or your computer audio interface. Optionally connect a headphone to the stereo **Headphones** outputs.
3. If you want to use a computer, connect Iridium Keyboard's **Computer USB** port with a USB cable to your computer (Windows or macOS). Thereafter, the Iridium Keyboard becomes automatically available as a MIDI device.
4. Optionally you can connect Iridium Keyboard's MIDI ports to a computer MIDI interface or any other MIDI device.
5. If desired, connect the **Controller USB** input to any suitable class-compliant USB hardware controller to send MIDI data to control functions of Iridium Keyboard.
6. Connect the power supply cable or the power cable that came with your Iridium Keyboard with the Power supply jack. Plug the other side of the power supply cable into a suitable AC power outlet.

7. Press the **Power** switch on the rear panel of your Iridium Keyboard.
8. Then switch on your computer (if connected), the mixing console and finally the amplifier or active monitor speakers.

- ⓘ The startup procedure is about 10-15 seconds. After this, the Iridium Keyboard is ready to play.
- ⓘ The overall volume of the Iridium Keyboard can be controlled with the **Master Volume** dial. This also affects the **Headphones** output.
- ⓘ If you do not choose to connect a mixing console, you can patch the Iridium Keyboard's output signals directly to an amplifier or an audio interface. Use an input usually called Line, Aux or Tape input.
- ⓘ The Iridium Keyboard's audio outputs deliver unbalanced line levels. When connecting to an amplifier, a mixing console or an audio interface with automatic balanced/unbalanced sensing inputs, please make sure to use TS mono jack cables and not TRS stereo jack cables.



Before connecting and disconnecting the Iridium Keyboard to a power supply source, turn your amp's volume control all the way down to avoid damage due to on/off switching noise. The Iridium Keyboard produces a line level output signal. Please take care that the connected playback device is suitable for the line level of an electronic instrument. Never use the microphone or phono input of the connected amp!

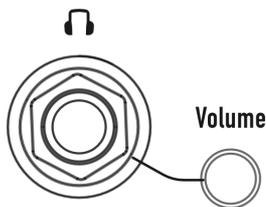
The Rear Panel Connections

The Iridium Keyboard provides analog stereo audio outputs and a headphones output. The audio and headphone outputs are affected by the setting of the **Master Volume** control dial. Use 2x TS mono jack cables to connect the audio output to a mixer. The Iridium Keyboard is a stereo instrument. There is no inherent mono output. Use your mixing console to appropriately distribute the stereo channels in this case.

Headphones Output and Headphone Volume

Here you can connect any headphone with a 1/4-inch stereo plug. The headphone output uses the same signal as the main output. The **Headphones Volume**

controls the Iridium Keyboard's headphone volume in addition to the **Main Volume** knob. Use this knob to amplify or attenuate headphones level to adjust for individual headphone loudness and impedance.



Audio Output

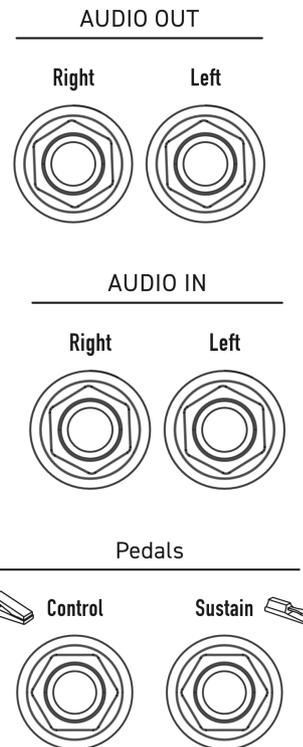
Connect the left and right jack with 1/4-inch mono plugs.

Audio Input

Iridium Keyboard offers a stereo audio input (2x mono jacks) that can be used to feed an external audio signal into the Iridium Keyboard. Therefore, the signal can either be routed through Iridium Keyboard's signal path for realtime live processing or directly recorded by using the Audio Recorder on the Global page.

Pedal Inputs

A sustain pedal switch connected to the **Sustain** input enables you to hold played notes as long as you press the pedal. As some pedals open contacts when pressed and others close, it is necessary that the connected pedal is not pressed when



switching on the Iridium Keyboard. This enables the synthesizer to match the pedal.

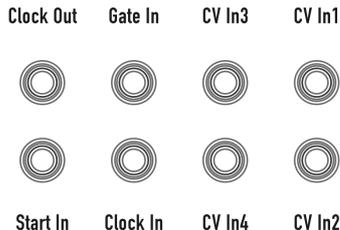
The **Control** Pedal input allows you to connect any suitable pedal. In the simplest case, you can plug in an expression pedal. For using its full-range signal as a modulation source the pedal needs to be calibrated using the 'Control Pedal' button in Global->System->Calibrate->Ctrl. Pedal.

Connect a suitable passive pedal or any active CV source (control voltage with 0-5V range) from modular systems, say, as a modulation source in the Iridium Keyboard.

CV Input Section

We included some control voltage connections, giving Iridium Keyboard the ability to interface with almost any kind of music-making modular technology, especially the well-known Eurorack standard.

By using **CV/Gate** inputs you are able to control Iridium Keyboard with your modular devices. You can also start



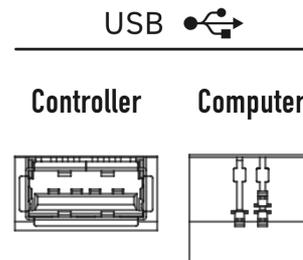
the Iridium Keyboard arpeggiator and sequencer with an external signal or sync devices with **Clock In/Out**. All settings regarding the CV Input section are made here: Global->Settings->CV.

! Read more about the CV and Clock configuration in 'The Global Page' chapter.

The USB Connections

Iridium Keyboard offers two USB ports. The **Controller USB** input lets you connect any suitable class-compliant USB hardware controller to send MIDI data to control functions of Iridium Keyboard. You can also use the MIDI Learn

function for most of Iridium Keyboard's parameters that can be controlled by an external MIDI hardware controller. Make sure that you use a USB 2 compatible port on your computer and an appropriate USB cable to avoid problems with data transmission.



The **Computer USB** port connects the Iridium Keyboard to your computer or iOS device with the following system requirements:

- Windows PC: Windows 7 or newer, a USB 2 port
- Apple: Intel or Apple Silicon with macOS 10.9 or newer, a USB 2 port (or a suited adapter)
- Apple iPad with iOS 9 or newer by using an optional Apple USB Adapter cable

The Computer USB connection of Iridium Keyboard allows transmitting and receiving of MIDI data.

! Read more about the configuration of USB MIDI in 'The Global Page' chapter

Support for USB Storage Devices

All USB storage devices from a simple USB stick to a terabyte UDB SSD disk are supported provided that they adhere to the USB Mass Storage Device Standard.

! It is important to use a FAT/FAT32 file system formatted USB device. Other file formats won't work.

The USB drives can be used in all scenarios where you currently use MicroSD cards, like importing/exporting samples, presets, patches, and wavetables etc, as well as for updating the system software. The only use case where

you would still need a MicroSD card is for a full system init, as well as a rescue boot from MicroSD card.

Connect a USB drive to to the **USB Controller** port.

The following is supported:

- Direct loading of samples from USB drive.
- Updating the Iridium Keyboard's operating system

MicroSD Card Slot

! It is important to use a FAT/FAT32 file system formatted MicroSD card. Other file formats won't work.

! Please insert the MicroSD Card **upside down**, i.e. with the contacts showing to the upper side. This is due to the mechanical construction of Iridium Keyboard. Please insert the card with normal force to avoid any damage.

A connected MicroSD card allows:

- Updating the Iridium Keyboard's operating system.
- Importing and saving audio files.
- Importing and saving Iridium Keyboard-specific data – e.g. sound patches, oscillator presets, wavetables, and MIDI Maps, etc.

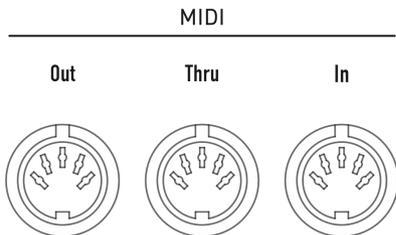
MicroSD Card



MIDI In/Thru/Out Jacks

Although we can hardly believe it, the Iridium Keyboard might not be enough for some people, so we added an elegant way to control external

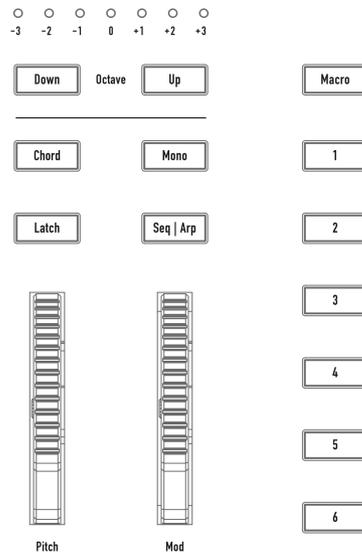
sound modules with Iridium Keyboard: just connect the DIN MIDI out (or USB Controller port) to your external gear and use the Iridium Keyboard and its knobs to control certain functions. For use with a computer we recommend the **Computer USB** port.



! Read more about the configuration of the MIDI ports in 'The Global Menu' chapter.

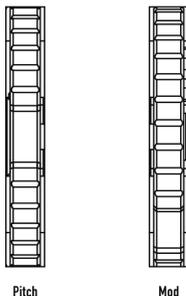
The Play Section

This section left beside the keyboard offers buttons and wheels for play controls and arpeggiator/sequencer functionality.



Pitch Bend Wheel

Use this wheel to alter the pitch of the played notes. It will jump to the center position when you release it.

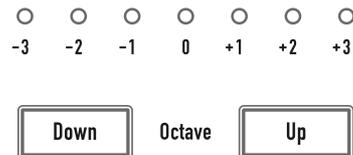


Modulation Wheel

Use this wheel to alter the sound of the played notes. In contrast to the pitch bend wheel it does not go back to its default position on release. Don't worry if sometimes the sound does not change. In this case it is likely that the sound designer simply forgot to assign it.

! Pitch Bend wheel and Modulation wheel can be calibrated by using the option Global -> System Calibrate -> Wheels. For more information, please refer to 'The Global Menu' chapter.

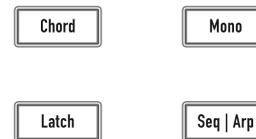
Octave Down/Up Buttons



Although the MIDI standard requires 128 keys, Iridium Keyboard offers only 49, so we added these buttons to enable you to reach more keys than are physically accessible. Press **Octave Down** to go one octave lower, and **Octave Up** to go one octave higher. Transposition is maximum two octaves up and two octaves down.

Chord Button

Chord is a variant of the **Latch** mode. Instead of latching based on a single key basis, an active Chord mode will latch all notes played within a short period of time like when you play a chord. If you then play another chord, the new chord will replace the previous chord. Press the **Chord** button again to end the Chords mode. In order to visualise that the



Chord mode is a variant of the **Latch** mode, each time the **Chord** mode button is activated, the **Latch** mode button is activated too.

Mono Button

Switches polyphonic to monophonic mode and vice versa. If the **Mono** button lights up (or blinks depending on the Button Backlight setting, see Global -> Colors page for more information), the monophonic mode is active. Mono means that only the last played note sounds. All other notes are stored in an internal list but aren't played. As soon as you release the note that is currently played, the second last note is played and so on. When you play legato, only the first note that was played triggers those envelopes which have the **SingleTrig** parameter activated. Those envelopes with **SingleTrig** deactivated will re-trigger at each note even when played legato. You can freely mix and match **SingleTrig** settings between all envelopes. The **SingleTrig** mode is for sustained sounds like typical 1970s solo sounds.

Latch Button

If active, all played notes are held. This also affects the arpeggiator. The **Latch** button acts similar to a pressed sustain pedal, but in addition you could release individual

latched notes by pressing them again. Press **Latch** again to disable it.

Seq | Arp Button

This button starts/stops the sequencer or arpeggiator and opens the **Autoplay** display page. When you hit a note or a chord on the keyboard or via MIDI, it is split up and repeated rhythmically (when in Arp mode) or it is repeated rhythmically based on the entered steps (when in Sequencer mode).

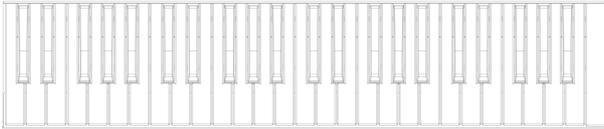
- ❗ In **Latch** mode, all played notes are held until their key is pushed again.
- ❗ Read more about the Arpeggiator and the Sequencer in 'The Perform Mode' chapter.

Macro Buttons

This section offers six freely-programmable buttons for different purposes - e.g. glide control, tuning. Press the uppermost button label with **Macro** to open the Macro display page for basic settings.

- ❗ Read more about Macros in the chapter 'The Macro Buttons'.

The Keyboard



Iridium Keyboard offers a brandnew Fatar TP8 keyboard with 49 light-weighted sensitive keys with polyphonic aftertouch – possibly one of the best synthesizer keyboards money can buy.

What is polyphonic aftertouch?

In the case of electronic keyboard instruments such as synthesizers, aftertouch (or also known as key pressure) is the term used to describe the control by pressure exerted on the keyboard. Pressing a key more or less after the actual key press continuously generates an additional modulation signal that is used to modulate tone or timbre – such as the pitch, the intensity of a vibrato, the volume, but also the waveform or filter used.

Especially when using MIDI devices, it is important to differentiate between two types of aftertouch:

- Monophonic aftertouch ("Channel Aftertouch"), where the pressure value has the same effect on all notes played and transmitted in the respective MIDI channel.
- Polyphonic aftertouch, that is transmitted individually for each note. For example, you can play and hold 10 keys at a time and move your fingers to create polyphonic aftertouch data. Each finger creates its own data stream for modulation purposes.

As you can probably imagine, the Iridium Keyboard offers polyphonic aftertouch. In this way, massive tonal changes are possible when playing live – from subtle sound formations to extreme sound alienations.

! Read more on page 190, how to adapt the polyphonic aftertouch keyboard to your needs.

Basic Operation

Switching On / Off

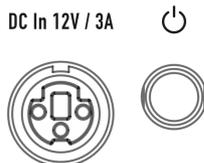
Iridium Keyboard is equipped with a power switch.

➤ To switch Iridium Keyboard on:

- Press the **Power** switch to switch on Iridium Keyboard. The boot procedure may take a few seconds. After this, the display is lit and Iridium Keyboard is ready to play.

➤ To switch Iridium Keyboard off:

- Press the **Power** switch to switch off Iridium Keyboard.



Master Volume

Use the **Master Volume** to control Iridium Keyboard's overall volume. The volume setting is global and affects the level of the Main audio outputs including the Headphones output.



Panic Function

Push the **Semitone / Octave** dials for Oscillator 1 and 2 simultaneously to send an All Notes Off message. This ends all played voices.

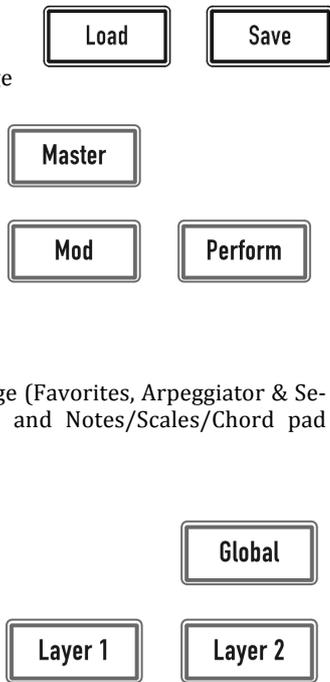
The Iridium Keyboard Mode Pages

These mode pages offers additions to the panel parameters or global settings. To enter a desired mode page, just press the corresponding mode button above or below the touchscreen display. The following mode pages are available:



- **LFOs** (6x Low Frequency Oscillators) mode page
- **OSC 1, 2 and 3** (Oscillators) mode page
- **FILTERS** (Dual Filters, Digital Former and Routing) mode page
- **ENVELOPES** (Amp-, Filter 1 & 2-, Free 1, 2, 3 envelopes) mode page
- **MOD** (Modulation Matrix & Komplex Modulator) mode page
- **EFFECTS** (Effects 1 to 5) mode page

- **Load** mode page
- **Save** mode page
- **Master** mode page (Master controls, – e.g. Levels, Compressor, and Voice controls)
- **Mod** mode page for setting up modulations
- **Perform** mode page (Favorites, Arpeggiator & Sequencer, XY pads, and Notes/Scales/Chord pad controls)
- **Layer 1/2** buttons to switch between both layers
- **Global** mode page (Scope, Pitch, Audio, MIDI, Settings, System)



- ❗ Press a mode button several times to switch through the corresponding function tabs.
- ❗ All modes will be described in detail in the corresponding chapters of this manual.

The Touchscreen Display

The touchscreen display gives you an overview of the actual Mode page, parameter changes, and delivers additional information. To select a desired function, open a pop-up menu, or to edit a graphic (e.g. envelopes) just tap on it and move your finger up and down or from left to right (and vice versa). The six endless dials on the left and the right side of the display control the corresponding parameter that is shown in the display next to the dials. The display presentation depends on the selected mode, but the lower part always shows the same overview:



1) The **Monitor** section in the lower left corner displays a VU meter unit to show the sound level of the left/right channels of the main output signal and the 16 played voices. Here you can also see the polyphonic workload as well as the used voices for each Layer with its own color

code (*VUs: Voices & Main*). Tap on the monitor section to open a pop-up menu for selecting further representations. *VUs: In & Main* shows VU meters for the incoming audio signal when using Iridium Keyboard's recording option (read more on that in the 'Global chapter' -> Audio tab. *Scope* delivers a realtime waveform display of the current stereo signal. The scope can be further configured in the Global Scope screen. *Analyzer (lin)* offers a realtime analyzer to display the linear frequency content of the signal, while *Analyzer (log)* shows a logarithmic representation like most analyzers. *MIDI Monitor* displays all MIDI messages that Iridium Keyboard creates (Internal) as well as incoming MIDI messages (from MIDI In and the USB ports). *CV Inputs* displays incoming control voltages for CV 1 to 4 inputs.

2) The **Sound Name** section shows the current loaded sound program. Active sound filters (can be set in the **Load** browser) are also displayed. Read more about the Layer modes in 'The Layer Mode'. Tap on the sound name to enter the **Load** mode. Read more about that later. Left to the sound name the program number is shown. Tap on this number to select a program by entering its number.

3) Below the sound name, Iridium Keyboard's tempo is displayed in bpm, as well as if it is generated internally or synced to an external tempo.

3) The **Layer** buttons show which Layer is active. Tap on the button **Layer 1** or **Layer 2** to switch between the layers. Below each layer button it is noted, if its program uses specific modes like Arp, Sequencer, Unisono, Mono and such. In case of an active split-mode, an appropriate icon of the split is displayed above the layer buttons. For a layered sound played by both layers simultaneously, an icon is displayed above the layer buttons. Read more about the layers in 'The Sound Layer in Iridium Keyboard' chapter.

Loading Programs

The Iridium Keyboard offers different ways of loading sound programs:

- When in Load mode (press **Load** button, it lights blue), use the **Selection** dial to select the desired sound program in the sound list. Turning the dial clockwise increases the Program number, while turning the dial counterclockwise decreases it. To load the desired sound program, press the **Selection** dial once. You can also tap on the **1234** button to enter a desired sound number. After that, tap on **Return** to load this sound program. Tapping a sound in the list will select the sound and the details section on the right shows more information about the sound. Selection is high-



lighted with a turquoise frame. Tapping the sound a second time – i.e. tapping an already selected sound – will load it. The loaded sound in the list is highlighted with a white background.

- ❗ You can also enter the **Load** mode page by tapping on the sound program name.
- ❗ You can also enter the sound number by tapping on the sound program number.
- ❗ You can filter sounds by attributes, banks, and authors. Use the three silver endless knobs to the left of the display. When set to *All* you have access to all existing sounds.

- Press the **Next** or **Prev** buttons to load the next or previous sound program immediately. This function is available in nearly every mode and on every display page.



The Load mode display page

If the current sound is a **Split** or **Layered** sound, then an option will be shown to load the patch only into the current layer and keep the other layer as it is. This option will be only shown when using the **Load** button so as not to slow down performance-oriented patch loading – like from **Favorites** page or via **Next** / **Prev** buttons.

The right section of the Load Patch page gives you more information about the selected sound. Next to the sound name is the **Bank**, the **Author**, and also the **Attributes**. These settings can be made while saving a sound program (see chapter ‘Saving Sounds’).

By tapping on the **Init** button, you can initialize the current loaded sound. No sound program is overwritten during this action. If in Layered mode, a popup window will open where you can choose, if the current selected layer (**Current**) or the complete sound program (**Reset**) will be initialized. If **Reset** is chosen, the initialized sound program will be a single layer program. By tapping on the **Delete** button, you can delete the current selected sound. This procedure must be confirmed before, because it is irreversible.

Tap on the **Favorites** button to open a new page for managing your favorite sounds. You can select any sound from the left list and add it to the Favorites list on the right side. You can add sounds to empty slots, replace or remove sound programs or change their positions (Up & Down). Tap on **Back** to leave the Favorites page. Read more about the Favorites Tab within the chapter 'The Perform Mode Page'.

Tap on the **Actions** pop-up menu to perform the following actions:

- **Import** lets you import sound programs from a connected MicroSD card or a USB storage device.
- **Export** lets you export the current sound program to a connected MicroSD card or a USB storage device. All related samples will be stored in a sub direction called

'samples' preserving further sub-folder structures. If you keep this structure, then importing these patches like on a different machine will also automatically import all referenced samples. If a sample is already existing internally, it won't be imported.

- **Delete** opens a pop-up window for deleting sound program(s). Here, you can define a slot range of the programs to delete. After confirmation, the programs will be deleted irrecoverable.
- **Rebuild Cache** lets you rebuild the internal data cache in case of any problems.

The Sound Layers in Iridium Keyboard

Iridium Keyboard offers a dual sound mode which means that two different sounds can be played simultaneously either as layered or as split sounds.

To switch between Layer 1 and Layer 2 just press the corresponding **Layer 1 / 2** button or tap on the **Layer 1 / 2** buttons in the lower right corner of the touchscreen display. The current selected **Layer** button lights up. Below the Layer buttons the current layer mode is displayed as well as the running state of the arpeggiator or the sequencer.

In **Master** mode, you can you can make further settings regarding the two sound layers. Please refer to the chapter ‘The Master Mode’.

⚠ Keep in mind that both sound layers will share the maximum polyphony of 16 voices.

Editing Parameters

In order to change or edit a sound program, you must access the appropriate parameters. Depending on the type of parameters, there are different ways to achieve this:

- The controls on the Iridium Keyboard’s front panel offer direct access to the most important sound parameters. The panel is divided into several sections, each containing knobs and dials associated with that section. By adjusting the controls on the panel you have instant access to the sound. These parameters are called **Panel Parameters**. When editing a Panel parameter, this is displayed in the lower part of the touchscreen display (parameter name and corresponding value).

⚠ All Panel parameter dials and pots are capable of sending MIDI Controller data via USB and MIDI Out. Read more in ‘The Global Menu’ chapter.

- Most sections offer additional sound parameters that are available through the touchscreen display. To edit an additional parameter, press the corresponding mode button above or beside the touchscreen (e.g. **LFOs**) and use the six silver display knobs to the left and the right of the touchscreen display. The touchscreen display page includes additional parameters that are not

accessible directly via the control elements on the panel. These parameters are called **Display Menu Parameters**. For each parameter the original value from a loaded patch is indicated by a vertical bar in the main bottom area and in the encoder displays.

- Some functions can be edited via the touchscreen display directly. Use your finger to tap on the corresponding parameter/option/button on the touchscreen to open pop-up menus or sliders which can be moved to change values or to edit graphics (e.g. envelopes).
- On most display pages the **Selection** dial can be used to control the most important parameter – e.g. **Cutoff 1** on the Dual Filter page.
- If a parameter from the bottom row is edited and in focus (with popup control and marked with colored frame), this parameter can be then also changed with **Selection** dial while in focus.

! Some parameters can be found on the panel and also as touchscreen display parameters – e.g. the Envelope phases.

Some rotary controls consist of endless dials or potentiometers. Turning a dial clockwise increases the corresponding value; turning it counterclockwise decreases it. Bipolar parameters (parameters with positive and negative

values) use special gradation when changing their values. As soon as the value 0 is reached, the sweep is stopped for a short period to make it easier to edit Iridium Keyboard.

! For each parameter the original value from the loaded patch is indicated by a vertical bar in the main bottom area and in the encoder displays.

! A useful hint: Press a mode button above the display several times to switch through the corresponding function tabs.

! The **Monitor** section in the lower left corner displays a VU meter unit to show the sound level of the left/right channels of the audio output signal and the 16 played voices. Here you can also see the polyphonic workload as well as the used voices for each Layer with its own color code. Tap on the monitor section to open a pop-up menu. Here you can choose other representations of this section.

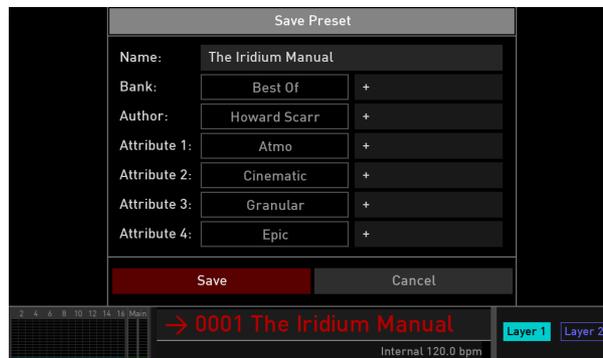
! Read more about basic settings for the knobs in 'The Global Page' chapter.



Want to start with a clean initialized sound? By tapping on the Init button, you can initialize the current loaded sound. No sound program is overwritten during this action. If in Layer mode, a popup window will open where you can choose if the current selected layer (Current) or the complete sound program (Reset) will be initialized. If Reset is chosen, the initialized sound programm will be a single layer program.

Saving Programs

After you have finished editing a sound program you must save it if you intend to use it again. All of Iridium Keyboard's memory locations are available for this purpose.



ⓘ To save a sound program:

1. Press the **Save** button to activate the Save Preset page. The **Save** button is lit red.
2. Edit the **Name** (if desired). Tap on **the sound name** on the touchscreen to open a virtual key-



- board. The program name can use up to 32 characters. Tap on **Return** to confirm. Tap on **Cancel** to cancel the naming procedure.
3. Tap on the **Bank** name to open a pop-up menu for selecting a desired sound bank. You can also add a new bank by tapping on + next to the bank name.
 4. Tap on the **Author** name to select a desired author in the pop-up menu. You can also add a new author name by tapping on + next to the author name.
 5. You can also choose up to four attributes for your sound. Tap on the corresponding **Attribute 1 to 4** on the touchscreen to open a pop-up menu selection list. Select the desired attribute. You can also add a new attribute by tapping on + next to the corresponding attribute name. It is strongly recommended to select an appropriate attribute for your sound. This helps you to locate your sound later.
 6. Use the **Prev/Next** button or the **Selection** dial to select the desired sound program number, where the sound is saved to. Alternatively, tap on the number field at the bottom of the screen to enter the sound program number manually.
 7. Finally, tap on **Save** on the touchscreen to store the sound program at the selected location.
 8. By tapping on **Cancel** in the touchscreen or pressing any button on the front panel, you can discard the storing process at any time.



Whenever you save a program, the selected memory location is overwritten. Therefore, any previously stored program at this location will be erased and there is no way to get it back. So, you should do backups of your sounds regularly by using **Export** in the Load screen's **Action** pop-up menu.



Use the **Save** function for copying sound programs. There is no need to edit a program before storing it.

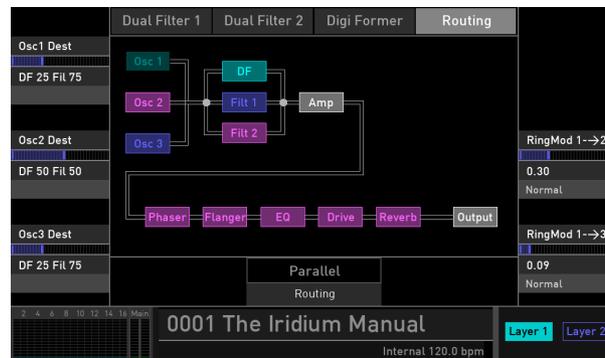
Sound Parameters

Overview of Functions

Waldorf Iridium Keyboard consists of numerous sound-shaping components. The following manual pages describe all parameters in detail.

Note that Iridium Keyboard consists of two different types of components for sound generation and sound shaping:

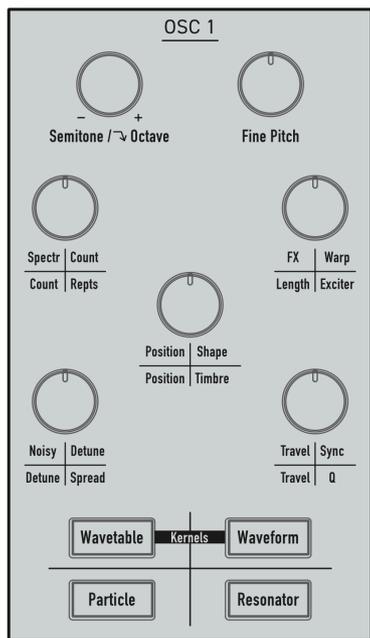
- Sound synthesis: Oscillator models, Filters, Digital Former, Amplifier, Effects. These modules represent the audio signal flow. Sound generation actually occurs within the oscillators. They can produce different shapes based on the selected model – e.g. classic waveforms such as square, sawtooth, triangle, and sine, or wavetables and samples. The dual filters shape the sound by amplifying (boosting) or attenuating (dampening) certain frequencies. Digital Former delivers additional filter models and effects for sound processing. The Amplifier and the Effects are located at the end of the signal chain. They determine the overall volume of the signal and add up to five effects like chorus, flanger, delay, and reverb, etc.



Potential signal routing for an audio signal

- Modulators: LFOs, Envelopes, Komplex Modulator, Modulation Matrix. These modules are called Modulators. The Modulators are designed to manipulate or modulate the sound generating components to add dynamics to sounds. The Low-frequency Oscillators (LFOs) are designed for periodic or recurring modulations while Envelopes are normally used for modulations that only occur once on each note. These generators are assigned to parameters through the Modulation Matrix and influence these parameters to alter a sound.

Oscillator Section



The Oscillator Section for Oscillator 1

Iridium Keyboard offers three oscillators with different capacities: **Wavetable Oscillator**, **Waveform Oscillator**, **Particle Generator**, **Resonator**, and **Kernel** synthesis.

The most important oscillator controls can be found in the **Oscillator section** on the Iridium Keyboard's user panel.

Choose the desired oscillator model by pressing the corresponding button. To enter the Kernel mode, press **Wavetable** and **Waveform** buttons simultaneously. The button of the chosen model lights up. Every model uses its own color – as is the case for the oscillator parameter knobs. For example, if the **Particle Generator** for Oscillator 1 is selected, the whole section lights up in blue.

- ❗ If you press an active oscillator model button, the current oscillator is switched off completely. This gives you a better overview when editing sounds because you can use it as a mute function.
- ❗ For each synthesis type, we have included **Presets** with which you can quickly create your own sounds and explore the possibilities of synthesis.

Based on the selected model the oscillator parameter knobs have different functions. This will be explained in detail in the next chapters.

The Wavetable Oscillator

A wavetable is a table consisting of single cycle waveforms. Each waveform is classified by its own special sound character. The main difference of wavetable synthesis in comparison with other sound-generation principles is the ability to not only to play one waveform per oscillator but also to step through the wavetable via different modulations, thereby-creating wavetable sweeps. The results can be dramatic – much more so than anything any sample playback-based system could ever produce.

This principle offers powerful capabilities. To give some examples:

- Each note on a keyboard can access a different wave of a wavetable.
- The **Travel** parameter allows a cyclic run through all waves of a wavetable.
- An LFO or envelope can modulate the position within the wavetable. You can create subtle to drastic sound changes.
- User-selected controllers, such as the Mod wheel, can change the position within the wavetable. When you turn the wheel while playing a chord, each note's wave will be modified instantly.

- ③ Press the **Wavetable** button to activate the Wavetable oscillator for the corresponding oscillator 1, 2 or 3. The whole oscillator section lights up in turquoise.



- ! An explanation of Wavetable synthesis can be found in the 'Sound Synthesis Basics' chapter.
- ! Further parameters can be found on the corresponding oscillator page. Read more on page 33.

Wavetable Oscillator Panel Parameters

Semitone / Octave

Sets the pitch of the wavetable oscillator in semitone steps. The standard setting for this parameter is 0, but there are cases where different values are interesting as well. Press and hold the **Semitone** dial while turning it enables you to select the pitch in octave steps.

Fine Pitch

Fine-tunes the oscillator within the range of a semitone up or down. The audible result of detuned oscillators is a chorus-like effect. Use a positive setting for one oscillator and an equivalent negative setting for another.

Spectrum (Spectr)

The spectral envelope of a sound can be controlled independently from the pitch. Furthermore, the Wavetable oscillator can perfectly produce a periodic sound up to noisy components. The Spectrum parameter transposes the spectrum of a sound – specifically the spectral envelope. Negative values move the spectrum down; higher values move it up. The default setting is 0, where no transposition happens. This is the behaviour of classic wavetable synthesis.

Noisy

This parameter adds a noisy sound character to the wavetable oscillator. The spectrum is unaffected by the setting of this parameter.

Position

This parameter defines the start-point of the selected wavetable. A setting of 0 selects the first wave; the maximum setting selects the last wave of the wavetable.

FX

Determines the amount of saturation/gain that is added to the wavetable signal. If set to 0, no saturation/gain will be

added – the signal will remain clean, in other words. Lower values will add some harmonics, resulting in a warm character. Increasing the value will add more and more distortion/gain. The result depends on the selected **FX Type** (*Off, Drive, Gain*) which can be found on the Timbre tab page. Please refer to the corresponding section below.

Travel

Allows cyclic moving through a wavetable. Positive values allow a forward movement; negative values a backward movement. Lower values slow down the movement speed; higher values speed it up. Cyclic means, that a wavetable starts automatically again from the beginning when the end is reached. If you don't want a cyclic modulation, use the **Position** parameter modulated with an envelope, an LFO, or any other modulation source. You can also set up different **Travel Modes**. Please refer to the corresponding section below.



Use **Travel** with a setting of 3 seconds to get an impression of the diversity of the factory wavetables.

Wavetable Oscillator Display Page

To access the Wavetable Oscillator display page, press the corresponding OSC 1, 2 or 3 button.

Here you can switch between two modes: **Control** and **Timbre**. Tap on the corresponding tab to select it. The display switches to this mode. A third tab displays the current oscillator model. Tap on it to select another model or to switch it off.

Control Mode Tab

Here you find parameters for tuning and basic settings.



The Tools Button

Tap on this button to open a pop-up menu where you can choose, if you want to copy the parameter settings from one of the other two oscillators to the current oscillator.

Semitones

Same functionality as for the corresponding panel parameter.

Tap on **Semitones** to open a pop-up menu for further settings:

- **Set Default:** sets Semitones to its default value 0 .
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in ‘The Modulation Mode’ chapter. In contrast to the stepped nature of the semitone control, the pitch modulation is changing the pitch continuously according to the modulation source shape.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Fine Pitch

Same functionality as for the corresponding panel parameter.

Tap on **Fine Pitch** to open a pop-up menu for further settings:

- **Normal:** Fine Pitch parameter change is about 2 cents.
- **Fine:** Fine Pitch parameter change is about 0.2 cents.
- **Super Fine:** Fine Pitch parameter change is about 0.02 cents.
- **Set Default:** sets Fine Pitch to its default value *0*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Pitch Keytrack

Determines how much the pitch of the selected oscillator depends on the MIDI note number. The reference note for Keytrack is C3, note number 60. For positive settings, the oscillator pitch rises on notes above the reference note; for negative settings the oscillator pitch falls by the same amount, and vice versa. A setting of *+100%* corresponds to

a 1:1 scale – e.g. when an octave is played on the keyboard the pitch changes for the same amount. Settings other than *+100%* make sense, especially when using ring modulation.

Tap on **Keytrack** to open a pop-up menu for further settings:

- **Normal:** Keytrack change is about 4%.
- **Fine:** Keytrack change is about 0.4%.
- **Super Fine:** Keytrack change is about 0.04 %.
- **Set Default:** sets Keytrack to its default value *100%*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Osc 1/2/3 Vol

Same functionality as for the corresponding panel parameter.

Tap on **Osc 1/2/3 Vol** to open a pop-up menu for further settings:

- **Normal:** changes Oscillator volume on a normal scale.

- **Fine:** changes Oscillator volume more fine grained.
- **Super Fine:** Offers the most precise oscillator volume change.
- **Set Default:** sets Osc 1 volume to its default value *0 dB*, and Osc 2 & 3 to their defaults *-inf*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.
- **Set Default:** Sets Osc 1/2/3 panning to its default setting *Center*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Osc 1/2/3 Pan

Determines the stereo panning position of the corresponding oscillator.

Tap on **Osc 1/2/3 Pan** to open a pop-up menu for further settings:

- **Normal:** Oscillator panning change is about 2 %.
- **Fine:** Oscillator panning change is about 0.2 %.
- **Super Fine:** Oscillator panning change is about 0.02 %.
- **Main:** routes the signal to the full signal path (Dual Filter, Digital Former, VCA) as determined with the **Routing** parameter on the Filter page.
- **VCA:** routes the signal directly to the VCA without passing through the filter section.
- **DF - Fil** settings: offers a different setting for the signal relationship between the Digital Former section (**DF**) and the Dual Filter section (**Fil**). If you want to send the signal, for example, through the Digital Former section

by 30% and through the dual filter by 70%, select *DF 30 Fil 70* here. The routing also depends on the **Routing** parameter setting on the Filter page.

Tap on **Osc 1/2/3 Dest** to open a pop-up menu for further settings:

- **Set Default:** sets Osc 1/2/3 Dest to its default setting *Main*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

RingMod (only available for Osc 2 and 3)

Controls the volume of the ring modulation between Osc 1 and 2 (for Osc 2) or 1 and 3 (for Osc 3).



What is ring modulation? From a technical point of view, ring modulation is the multiplication of two oscillators' signals. The result of this operation is a waveform that contains the sums and the differences of the source frequency components. Since the ring modulation generates inharmonic components, it can be used to add metallic distorted sound characteristics. Please note that in a complex waveform all harmonic components behave like interacting sine waves, resulting in a wide spectral range of the ring modulated sound.

Tap on **RingMod** to open a pop-up menu for further settings:

- **Set Default:** sets RingMod volume to its default value *0 dB*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

PB Range Osc 1, 2 or 3

Determines the intensity of the pitch wheel in semitones for the selected oscillator from *-24* to *+24*. Negative values inverse the direction of the pitch bend.

Tap on **PB Range** to open a pop-up menu for further settings:

- **Set Default:** sets PB Range to its default value $+12$.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

PitchVar

To simulate the pitch variations that analog circuits have due to component tolerances, missing calibration and temperature effects, the Iridium Keyboard assigns each oscillator of each voice a random out-of-tune coefficient at startup. The amount by which these out-of-tune coefficients affects each oscillators pitch is controlled by the **PitchVar** parameter. The higher the value, the stronger the variation. Setting this parameter to 0 will disable this variation. While each oscillator of each voice has an individual out-of-tune coefficient, the **PitchVar** parameter is global to all oscillators of all voices.

Tap on **PitchVar** to open a pop-up menu for further settings:

- **Set Default:** sets Pitchvar to its default value 0.17 .

- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Timbre Mode Tab

Here you find specific parameters for the wavetable generators.



ⓘ The wavetable position can be dragged vertically in the graphical wavetable representation.

ⓘ Below the graphical wavetable representation, **Travel** and **Wavetable info** is shown.

Wavetable

Here you can select all available factory wavetables and your own custom wavetables.

Tap on **Wavetable** to open a pop-up menu for further settings:

- **Set Default:** sets the wavetable to its default *Resonant*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

⚙️ Switching between wavetables while notes are hold are super smooth without interruptions. This opens the door to use the table selection itself as a modulation target. This opens up an extra new dimension of wavetable synthesis: You modulate not only the position within a table to change a timbre, but you can simultaneously modulate between all preset tables. This modulation can be polyphonic, which means if your modulation source is like *Rand Trig* or *Voice Index*, each voice will use a different wavetable. Of course this is also true for LFO or Envelope based modulation.

Position

Same functionality as for the corresponding panel parameter.

Tap on **Position** to open a pop-up menu for further settings:

- **Normal:** Wavetable position change is about 0.64.
- **Fine:** Wavetable position change is about 0.06.
- **Super Fine:** Wavetable position change is about 0.06.
- **Set Default:** sets Wavetable position to its default value *0.00*.

- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Phase

Sets the initial phase of the wavetable in degree. By this you could e.g. generate clicks at note onsets if these are wanted. Turning **Phase** to maximum value will result in a "Free Running" phase much you would expect from an hardware oscillator.

Tap on **Phase** to open a pop-up menu for further settings:

- **Normal:** Phase change is about 5 degree.
- **Fine:** Phase change is about 0.5 degree.
- **Super Fine:** Phase change is about 0.1 degree.
- **Set Default:** sets Phase I to its default value *0.0 degree*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.

- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Spectrum

Same functionality as for the corresponding panel parameter.

Tap on **Spectrum** to open a pop-up menu for further settings:

- **Normal:** Spectrum change is about 2 %.
- **Fine:** Spectrum change is about 0.2 %.
- **Super Fine:** Spectrum change is about 0.02 %.
- **Set Default:** sets Spectrum to its default value + *0.0 %*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Brilliance

A setting of this parameter is only audible, when **Spectrum** is transposed relative to the original pitch of a sound. Higher settings result in narrow peaks. This can lead to an effect, whereby the perceived pitch comes from the sound spectrum instead of the oscillators' pitch. Value changes of this parameter are sometimes subtle.

Tap on **Brilliance** to open a pop-up menu for further settings:

- **Normal:** Brilliance change is about 1 %.
- **Fine:** Brilliance change is about 0.1 %.
- **Super Fine:** Brilliance change is about 0.01 %.
- **Set Default:** sets Brilliance to its default value *0.0* %.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Keytrack

The default setting is *100%*, so that the spectrum is in conjunction with the pitch of a sound. The pitch doesn't affect the spectrum when **Keytrack** is set to 0%. This setting is recommended for speech or vocals; that way the formants are not influenced by the pitch. Based on this, we have included a speech synthesizer for wavetables (see the 'Tools Button' chapter). **Keytrack** can also be set to other values so that the spectrum is transposed to the pitch.

Tap on **Keytrack** to open a pop-up menu for further settings:

- **Normal:** Keytrack change is about 1 %.
- **Fine:** Keytrack change is about 0.1 %.
- **Super Fine:** Keytrack change is about 0.01 %.
- **Set Default:** sets Keytrack to its default value *100.0* %.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Travel Mode

There are several modes available for the wavetable cycling.

Tap on **Travel Mode** to open a pop-up menu with the following options:

- **Cycle:** a wavetable starts automatically again from beginning when the end is reached. Every played note starts its own travel cycle.
- **Global Cyc.:** a wavetable starts automatically again from beginning when the end is reached. Every played note uses the same travel cycle.
- **Sync:** the Travel speed is controlled by the internal tempo of Iridium Keyboard (adjustable with the Arpeggiator or Sequencer **Bpm** parameter) or an incoming synchronisation signal via MIDI. If **Sync** is selected, you can set up **Travel** in musical values. The highest amount is *1024*, where one turn needs 1024 beats.
- **One Shot:** a wavetable stops when the last wave is reached. The last wavetable position is played and held. Every played note starts its own travel cycle.
- **Ping Pong:** a wavetable automatically starts a reverse playback when the end is reached and vice versa. Every played note starts its on travel ping pong cycle.

- **Global P. P.:** a wavetable automatically starts a reverse playback when the end is reached and vice versa. Every played note uses the same travel cycle.

Tap on **Travel Mode** to open a pop-up menu for further settings:

- **Set Default:** sets the Travel Mode to its default *Ping Pong*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Mode

Selects the synthesis quality. The first setting *Normal* keeps the current algorithm which synthesises in highest quality avoiding digital artefacts like aliasing and such. However, as we learned to love the digital artefacts of legacy wavetable synthesis implementation, other modes are available: *Legacy* emulates the wavetable scanning and wave interpolation of older Waldorf synthesizers as the Microwave I. *Harsh* produces additional non-harmonic components in the lower pitch ranges which result in more rich to aggressive timbres. *Dirty* adds digital aliasing in higher pitch ranges you will remember from time where

processing power was restricted and cheaper implementations were used.

Tap on **Mode** to open a pop-up menu for further settings:

- **Set Default:** sets Mode to its default *Normal*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Limit

Determines the wavetable interpolation quality when using the **Travel** parameter.

- **Wrap:** uses a smooth interpolation when **Travel** reaches the end of the wavetable and blends back to the start wave position. This setting is useful when the **Travel Mode** is set to *Cycle*.
- **Limit:** uses no interpolation as in older Waldorf wavetable synthesizers (e.g. Microwave) when **Travel** reaches the end of the wavetable and blends back to the start wave position.

Tap on **Limit** to open a pop-up menu for further settings:

- **Set Default:** sets the Limit to its default setting *Limit*.

- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Stepped

Determines the wave interpolation for traveling and modulation.

- **Smooth:** a very smooth interpolation is used to create a clean wavetable sound.
- **Stepped:** no interpolation is used to create a more pristine sound
- **2/4/8 Steps:** only every second, fourth, or eighth wave is interpolated. This creates a harsher sound for some wavetables.

Tap on **Stepped** to open a pop-up menu for further settings:

- **Set Default:** sets Stepped to its default setting *Smooth*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

FX Type

Determines the saturation/gain type that is added to the wavetable signal. The amount can be set with the **FX** parameter in the oscillator section.

- **Drive:** selects a drive type for signal saturation.
- **Gain:** selects an additional gain stage after the wavetable oscillator for adjusting the oscillator level.
- **Off:** no FX type is used. The FX parameter dial has no function.

Tap on **FX Type** to open a pop-up menu for further settings:

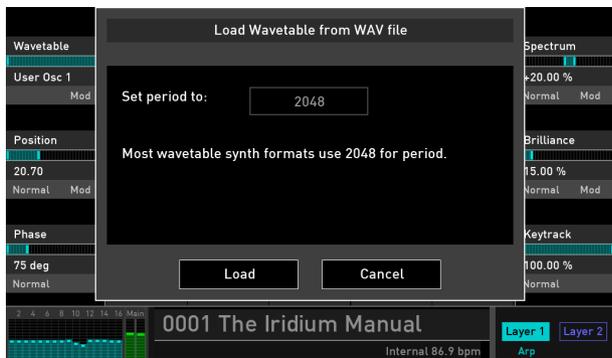
- **Set Default:** sets FX Type to its default setting *Drive*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Tools Button

Tap on the **Tools** button to open a pop-up menu for creating and exporting your own wavetables. The following options are available:

- **Talk:** allows you to enter word(s) with a virtual keyboard that automatically opens. These words will be synthesized as a wavetable when tapping on *Return*.
- **Analyze Audio:** enables you to select an audio file from the file browser of Iridium Keyboard's Flash memory or a connected MicroSD card/USB storage device. This audio file will be automatically synthesized as a new wavetable. Select the desired file and tap on **Analyze**.
- **Load Single Cycle:** Load a single-cycle waveform from the internal Flash memory (Internal) or a connected MicroSD Card/USB storage device into the Iridium Keyboard's Flash memory. A single-cycle waveform is in fact a very short wav/aif file which samples are interpreted as a single cycle of a wave. Good sizes are from 200 to 1024 samples. The size can be odd. You could use longer files but waveform will be averaged to a maximum of 1024 samples in case. An 8 position wavetable will be created morphing the single-cycle wave into a sine.

! Free single-cycle waveforms can be found here www.adventurekid.se/akrt/waveforms but there are many more available as free and commercial waveforms.



Wavetable import dialog window

- **Import from .wav:** Creates a wavetable from .wav/.aiff files which use a constant sample period. The period can be configured in import dialog window from 64 to 4096, many popular synths use 2048.
- **Load Wavetable:** imports a wavetable from the internal Flash memory or a connected MicroSD Card/USB storage device. This enables you to exchange user wavetables with other Iridium Keyboard users.
- **Save Wavetable:** exports the current wavetable to the internal Flash memory or a connected MicroSD Card or USB storage device. This enables you to exchange your

own created wavetables with other Iridium Keyboard users.

⚠ After a user wavetable loaded/analyzed from external file, the display shows **Prev/Next** buttons to quickly browse through all files in same folder.

Wavetable Representation

Tap on **3D**, **Wave** or **Spec** to change the graphic representation of the wavetable. These views adhere to the parameter settings of **Spectrum**, **Phase**, **Brilliance**, **Steps** and **Limit**.

⚠ **Wave** and **Spec** view modes are for information only. No further edits can be made.

Presets Button

Tap on the **Presets** button to open a pop-up window for loading, saving, and managing Wavetable oscillator settings. Here, the following options are available:

- On the left you find a list of all Wavetable oscillator presets. Tap on the desired name to load it immediately. Current oscillator settings will be overwritten.

- With the **Save** option you can save the current Wavetable oscillator settings. You can also enter a desired name for the preset.
- **Import:** imports a Wavetable oscillator presets from a connected MicroSD card/USB storage drive into the Iridium Keyboard's Flash memory. The imported preset is shown within the Wavetable oscillator preset list.
- **Export:** exports the current selected Wavetable oscillator presets to a connected MicroSD card/USB drive.
- **Delete:** deletes the current selected Wavetable oscillator preset after a security confirmation.
- **Init:** initializes the current selected Wavetable oscillator to its default settings.
- **Close:** closes the pop-up window. No further action is taking place.

The Waveform Oscillator

Iridium Keyboard offers a standard oscillator model to create typical analog synthesizer waveforms (sawtooth, triangle etc.), plus other classic waveforms like square (which is the father of the pulse waveform) and the sine wave (also part of every other waveform). Also, different noise signals can be chosen.

The Waveform oscillator can generate up to eight oscillator signals (called Kernel) simultaneously. Here, you can produce supersaw-like waves, for example.

- ⊙ Press the **Waveform** button to activate the Waveform oscillator for the corresponding oscillator 1, 2, or 3.



The whole oscillator section lights up in green.

- ⚠ An explanation of waveform synthesis can be found in the 'Sound Synthesis Basics' chapter.
- ⚠ Further parameters can be found on the corresponding OSC page. Read more on page 47.

Waveform Oscillator Panel Parameters

Semitone / Octave

Sets the pitch of the oscillator in semitone steps. The standard setting for this parameter is 0, but there are cases where different values are interesting as well. Press and hold the **Semitone** dial while turning it enables you to select the pitch in octave steps.

Fine Pitch

Fine-tunes the oscillator in steps of 1/128th of a semitone. The audible result of detuned oscillators is a Chorus effect. Use a positive setting for one oscillator and an equivalent negative setting for another.

Count

The waveform oscillator can generate up to eight oscillator signals simultaneously. This is determined by the **Count** knob. Up to eight kernels (equivalent to oscillators) are possible. Values in between two integer values mean that an additional oscillator is mixed in at a reduced level.

! Use **Count** to generate supersaw-like waves, for example.

Detune

Detunes the multi oscillator when **Count** is set to any kernel value greater than 1.0.

Shape

Use this knob to select the desired waveform. The following waveforms are available:

- *Sawtooth* selects the sawtooth waveform. A sawtooth wave has all the harmonics of the fundamental frequency in descending magnitude.
- *Sine* consists of the fundamental frequency only. It has no harmonics at all.
- *Triangle* selects the triangle waveform. The triangle wave mainly consists of the odd harmonics with very low magnitudes.
- *Square* selects the pulse waveform. A pulse waveform with a pulse width of 50% has only the odd harmonics of the fundamental frequency present. This waveform produces a hollow/metallic sound.
- *Pink Noise* – this special kind of noise produces higher levels in the deeper frequency range. It is a better match with the human hearing than the unfiltered white noise.

- *White Noise* is a fundamental source for any kind of analog-type percussion. It offers the same level over the complete frequency range. Wind and other sound effects can also be created by using noise.

Warp

Depending on the selected **Shape**, the **Warp** function alters the basic shape of a waveform.

- If *Sawtooth* is selected, the Warp parameter blends from a double saw wave (lowest setting) into a regular saw wave (middle setting) to a square wave (highest setting).
- If *Sine* is selected, the Warp parameter blends from a soft rising saw wave (lowest setting) into a regular sine wave (middle setting) to a soft falling saw wave (highest setting).
- If *Triangle* is selected, the Warp parameter blends from a rising saw wave (lowest setting) into a regular triangle wave (middle setting) to a falling saw wave (highest setting).
- If *Square* is selected, the Warp parameter changes the pulse width of the square wave

- If *Pink Noise* or *White Noise* is selected, the Warp parameter blends from a filtered noise (lowest setting) into the corresponding selected noise (middle setting) to a pitched noise (highest setting).

Sync

Adds a typical oscillator synchronisation to the selected oscillator shape (except Noise types). As a result, interesting sound effects may be generated – especially when higher **Sync** settings are used.

Waveform Oscillator Display Page

To access the Waveform Oscillator display mode, press the corresponding OSC 1, 2 or 3 button above the touchscreen display.

Here you can switch between two modes: **Control** and **Timbre**. Tap on the corresponding tab to select it. The display switches to this mode. A third tab displays the current oscillator model. Tap on it to select another model or to switch it off.

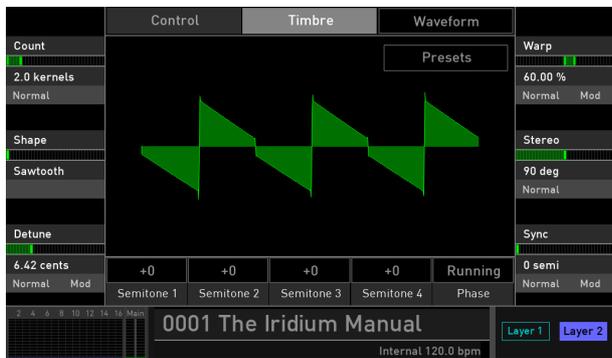
Control Mode Tab

Here you find parameters relating to tuning and some basic settings. The functions and options are the same as

for the Wavetable oscillator. Please refer to the corresponding chapter.

Timbre Mode Tab

Here you find specific parameters for the Waveform oscillators.



Count

Same functionality as for the corresponding panel parameter.

Tap on **Count** to open a pop-up menu for further settings:

- **Normal:** Count change is about 0.3 semi.

- **Fine:** Count change is about 0.03 semi
- **Super Fine:** Count change is about 0.003 semi.
- **Set Default:** sets Count to its default value *1.0 kernels*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Shape

Same functionality as for the corresponding panel parameter.

Tap on **Shape** to open a pop-up menu for further settings:

- **Set Default:** sets Shape to its default *Sawtooth*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Detune

Same functionality as for the corresponding panel parameter.

Tap on **Detune** to open a pop-up menu for further settings:

- **Normal:** Detune change is about 0.3 cents.
- **Fine:** Detune change is about 0.03 cents
- **Super Fine:** Detune change is about 0.003 cents.
- **Set Default:** sets Detune to its default value *0.0 % cents*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Warp

Same functionality as for the corresponding panel parameter.

Tap on **Warp** to open a pop-up menu for further settings:

- **Normal:** Warp position change is about 1 %.
- **Fine:** Warp position change is about 0.1 %.

- **Super Fine:** Warp position change is about 0.01 %.
- **Set Default:** Warp position is set to its default value of *50.0 %*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Stereo

When Count is set to any kernel value higher than 1.0, this parameter determines the stereo panning for every played oscillator kernel signal. In *Center* setting, all oscillators are played on both stereo channels. Higher settings move the signals within the stereo field.

Tap on **Stereo** to open a pop-up menu for further settings:

- **Normal:** Stereo change is about 2 degree.
- **Fine:** Stereo change is about 1 degree.
- **Super Fine:** Stereo change is about 0.1 degree.

- **Set Default:** sets Stereo to its default value of *0.0 %*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Sync

Same functionality as the corresponding panel parameter.

Tap on **Sync** to open a pop-up menu for further settings:

- **Normal:** Sync change is about 0.3 semi.
- **Fine:** Sync change is about 0.03 semi
- **Super Fine:** Sync change is about 0.003 semi.
- **Set Default:** sets Sync to its default value *0.0 %*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in ‘The Modulation Mode’ chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Semitone 1 - 4

Here you can individually transpose the first four oscillator kernels in semitones. If more than four kernels are selected then kernels 5 to 8 use the same pitch settings as kernels 1 to 4. Tap on the corresponding Semitone button to open a pop-up menu with semitone settings from -12 up to +12.

Tap on **Semitone 1 - 4** to open a pop-up menu for further settings:

- **Set Default:** sets Semitone to its default value of *+0*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Phase

Determines the start phase of the selected oscillator shape.

- **Running** results in free-running oscillators as in analog synthesizers. A played note „jumps in“ the current phase cycle.
- **Reset** forces the oscillator waveform to start with phase 0 for every played new note. Use this setting if

you want to create drum-like sounds where every played note sounds similar during its attack phase.

Tap on **Phase** to open a pop-up menu for further settings:

- **Set Default:** sets Phase to its default setting *Running*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Presets

Tap on the **Presets** button to open a pop-up window for loading, saving and managing Waveform oscillator settings. For more information on the available options please refer to the Presets chapter in the Wavetable section.

The Particle Generator

This generator creates its sound by playing back audio samples. There are two different ways of sample playback: normal playback and granular playback. Read more about the sample playback in the following chapters.

- ④ Press the **Particle** button to activate the Particle Generator for the corresponding oscillator 1, 2, or 3. The whole oscillator section lights up in blue.



The Particle Generator needs to be fed with one or more samples. The Particle Generator can use one single sample as well as multi samples that are mapped over the keyboard.

- ⚠ For more information about loading and editing samples, please refer to the 'Loading & Editing Samples' chapter.

Granular synthesis is based on a simple idea: instead of playing back an entire sample, only short portions of the sample – the so-called grains – are played. These grains can be played back in any order. Each time a grain ends, a new one starts. To avoid discontinuities in the playback, and to minimize artefacts, envelopes are applied to the grains. Granular synthesis can be used to extract interes-

ting spectra from all kinds of samples creating sound effects by completely scrambling a sample, or for low-fidelity time stretching, for example.

Very short grains produce sounds with an individual pitch. For that reason you can also use samples without a distinct pitch – such as drum loops and sound effects – to extract pitched spectra from them. Sounds with longer grains usually play back with the pitch of the original sample.

If you play back the same portion of a sample over and over again, the sound may become too static. You can use the Particle Generator parameters to compensate for this and bring more liveliness into the sound. By adding more grain streams (kernels) the grain and sound density can be increased to produce a richer sound.

This is where the samples can come from:

- From Iridium Keyboard's internal Flash memory. Here are located lot of factory samples, that can be loaded into the Particle generator.
- From MicroSD card or a connected USB storage device: you can import own samples from a connected MicroSD card/USB storage device into Iridium Keyboard's internal Flash memory and load it from there into the Particle generator.

- From audio recordings done with Iridium Keyboard. The **Global** page features an audio recorder. All recorded files are stored into the internal Flash memory and can be loaded into the Particle generator.
- From the audio input of Iridium Keyboard by using the Live Granular mode. Read more on this in the corresponding section.

ⓘ The Iridium Keyboard can playback WAV or AIFF/AIFC files (stereo or mono) with any sample rate and bit rate. We recommend to use samples with a rate of 44.1 kHz to keep the original pitch.

Particle Generator Panel Parameters

Semitone / Octave

Sets the pitch of the particle generator in semitone steps. The standard setting for this parameter is 0, but there are cases where different values are interesting as well. Press and hold the **Semitone** dial while turning it enables you to select the pitch in octave steps.

Fine Pitch

Fine-tunes the particle generator in steps of 1/128th of a semitone. The audible result of detuned oscillators is a Chorus effect. Use a positive setting for one oscillator and an equivalent negative setting for another

Count/Grain Poly (only in Granular Mode)

The Particle generator can generate up to eight grain streams for simultaneous playback. This is determined by the **Count/Grain Poly** knob. Up to eight kernels (equivalent to grain oscillators) are possible. Values in between two integer values mean that an additional grain oscillator is mixed in at a reduced level.

Detune/Pitch Spread (only in Granular Mode)

Determines the amount the grains that are displaced from center pitch, when **Count/Grain Poly** is set to any kernel value higher than 1.0.

Position (only in Granular Mode)

Determines the sample start position for grain playback. The higher the value, the later the sample starts.

Length (only in Granular Mode)

Determines the length of the grains that are used for playback. The higher the value (up to 250 ms), the more precise the playback.

Travel (only in Granular Mode)

Determines the speed by which the position is wandering in the sample. This allows for cyclic moving through a granular sample. Positive values allow a forward movement, negative values a backward movement. Lower values slow down the movement speed, higher values speed it up. Cyclic means that a sample starts automatically again from beginning when the end is reached. If you don't want a cyclic modulation, use the **Position** parameter modulated with an envelope, an LFO, or any other modulation source. You can also set up different **Travel Modes**. Please refer to the corresponding section below.

Particle Generator Display Page

To access the Particle Generator display page, press the corresponding **OSC 1, 2** or **3** button above the touchscreen display.

Here you can switch between two modes: **Control** and **Timbre**. Tap on the corresponding tab to select it. The

display switches to this mode. A third tab displays the current oscillator model. Tap on it to select another model or to switch it off.

Control Mode Tab

Here you find parameters for tuning and some basic settings. The functions are the same as for the Wavetable oscillator. Please refer to the corresponding chapter.

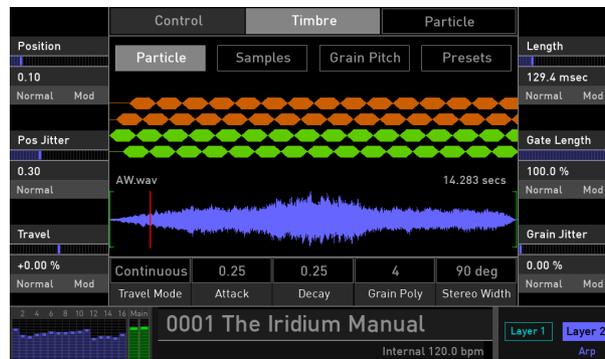
Timbre Mode Tab

Here you find specific parameters for the Particle Generator as well as the option to load samples into this generator.

Here, the display visualizes the envelopes and grain distribution.

Particle / Samples Buttons

Tap on the corresponding button to switch between **Particle** and **Sample** mode. Depending on the selected mode, the display parameter can differ.



- ❗ The Particle parameter page can only be reached, if the Mode is set to 'Granular'. This can be done by tapping on the **Particle** button (and confirming the granular mode switch) or selecting *Granular* with the **Mode** parameter.
- ❗ For more information about loading and editing samples, please refer to the 'Loading & Editing Samples' chapter.

Position (only in Granular Mode)

Same functionality as for the corresponding panel parameter.

Tap on **Position** to open a pop-up menu for further settings:

- **Normal:** Sample position change is about 0.01.
- **Fine:** Sample position change is about 0.001.
- **Super Fine:** Sample position change is about 0.0001.
- **Set Default:** sets Sample position to its default value *0.00*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to set up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Position Jitter (Pos Jitter, only in Granular Mode)

Determines the amount of how much the grain position will be randomized. The higher this value, the more random the sample start based on the initial **Position** setting.

Tap on **Pos Jitter** to open a pop-up menu for further settings:

- **Normal:** Sample position variation change is about 0.01.
- **Fine:** Sample position variation change is about 0.001.
- **Super Fine:** Sample position variation change is about 0.0001.
- **Set Default:** sets Sample position variation to its default value of *0.30*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Travel (only in Granular Mode)

Same functionality as for the corresponding panel parameter.

Tap on **Travel** to open a pop-up menu for further settings:

- **Normal:** Travel change is about 2%.
- **Fine:** Travel change is about 0.2%.
- **Super Fine:** Travel change is about 0.02%.
- **Set Default:** sets Travel to its default value of *+0.0%*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Length (only in Granular Mode)

Same functionality as for the corresponding panel parameter.

Tap on **Length** to open a pop-up menu for further settings:

- **Normal:** Length change is about 2.5 msec.
- **Fine:** Length change is about 0.25 msec.
- **Super Fine:** Length change is about 0.025 msec

- **Set Default:** sets Length to its default value of *0.00*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Gate Length (only in Granular Mode)

Determines the amount of the length that is used for its envelope – much like a Gate parameter. Smaller values produce gaps between the grains. **Gate Length** could also be called density.

Tap on **Gate Length** to open a pop-up menu for further settings:

- **Normal:** Gate Length change is about 0.9%.
- **Fine:** Gate Length change is about 0.09 %.
- **Super Fine:** Gate Length change is about 0.009 %.
- **Set Default:** sets Gate Length to its default value of *100.0%*.

- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Grain Jitter (only in Granular Mode)

Determines the amount by which the grain length and gate is randomized.

Tap on **Grain Jitter** to open a pop-up menu for further settings:

- **Normal:** Grain Jitter change is about 1 %.
- **Fine:** Grain Jitter change is about 0.1 %.
- **Super Fine:** Grain Jitter change is about 0.01 %.
- **Set Default:** sets Grain Jitter to its default value *0.0%*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.

- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Travel Mode (only in Granular Mode)

There are several modes available for the granular cycling process.

- **Continuous:** a granular sample automatically starts again from beginning when the end is reached. Every note played starts its own travel cycle.
- **One Shot:** a granular sample stops when the end is reached. Every note played starts its own travel cycle.
- **Ping Pong:** a granular sample automatically starts a reverse playback when the end is reached and vice versa. Every note played starts its own travel cycle.
- **Global:** a granular sample automatically starts again from beginning when the end is reached. Every note played uses the same travel cycle.

Tap on **Travel Mode** to open a pop-up menu for editing.

- **Set Default:** sets Travel Mode to its default setting *Continuous*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Attack (only in Granular Mode)

Determines the attack phase of a grain. The higher the value, the smoother the grain playback. **Attack** can strongly influence the spectrum of the sound.

Tap on **Attack** to open a pop-up menu for editing.

- **Set Default:** sets Attack to its default value of *0.25*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to set up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Decay (only in Granular Mode)

Determines the decay phase of a grain. The higher the value, the smoother the grain playback. **Decay** can strongly influence the spectrum of the sound.

Tap on **Decay** to open a pop-up menu for editing.

- **Set Default:** sets Count to its default value of *0.25*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to set up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Grain Poly (only in Granular Mode)

Same functionality as for the corresponding panel parameter.

Tap on **Grain Poly** to open a pop-up menu for editing.

- **Set Default:** sets Count to its default value *8*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.

- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Stereo Width

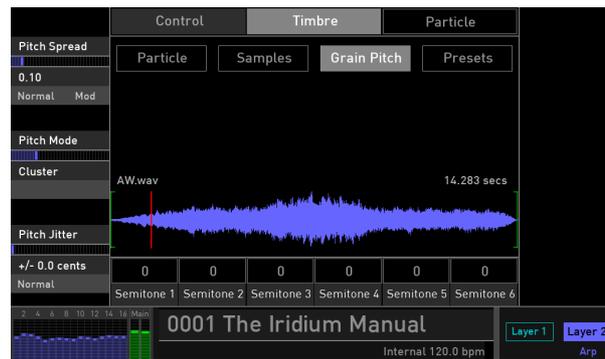
The grain streams are panned to left/right based on the setting of this parameter. It determines the position of the granular streams in the stereo field. The lower the value, the less the stereo width (0% is mono).

Tap on **Stereo Width** to open a pop-up menu for further settings:

- **Normal:** Stereo Width change is about 1.0 %.
- **Fine:** Stereo Width change is about 0.1%.
- **Super Fine:** Stereo Width change is about 0.01%.
- **Set Default:** sets Stereo Width to its default value of 50.0%.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Grain Pitch Button

On this display page, you can make settings relating to the tuning of the granular pitch response.



Pitch Spread

Determines the amount that grains are displaced from center pitch.

Tap on **Pitch Spread** to open a pop-up menu for further settings:

- **Normal:** Pitch Spread change is about 0.1
- **Fine:** Pitch Spread change is about 0.01.

- **Super Fine:** Pitch Spread change is about 0.001.
- **Set Default:** sets Pitch Spread to its default value of *0.10*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Pitch Mode

Determines by which method pitches will be altered. Here you can select between five options:

- **Random:** randomizes the pitch for each grain at grain-start.
- **Cluster:** constantly displaces each lane equidistant from its neighbouring lane.
- **Spread:** works similar to "Cluster" but with much more spread while keeping the overall pitch amplitude (from highest to lowest lane) constant, regardless of grain poly.

- **Mapped:** will constantly displace the grains based on a semitone map of up to six intervals specified at the bottom of the display page.
- **Mapped Random:** works like "Mapped" but the grain pitch is chosen randomly from the semitone map at each grain start.

For the "Mapped" modes the **Pitch Spread** parameter will determine how many parts of the semitone map will be used. For example, at lower values, only the first one or two semitones will be used; turned up to maximum, all semitone items will be used. The **Pitch Spread** can be modulated, so you can animate the chord or scales to be used. The semitone entries do not need to be in any order, such as rising or falling, and could be anything.

Tap on **Pitch Mode** to open a pop-up menu for further settings:

- **Set Default:** sets Pitch Mode to its default setting *Cluster*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Pitch Jitter

Adds an extra random pitch regardless of the current pitch.

Tap on **Pitch Jitter** to open a pop-up menu for editing.

- **Normal:** Pitch Jitter change is about 2 cents.
- **Fine:** Pitch Jitter change is about 0.2 cents
- **Super Fine:** Pitch Jitter change is about 0.02 cents.
- **Set Default:** sets Pitch Jitter to its default value of *+/- 0.0 cents*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Semitone 1 - 6

Here you can set up a map with up to six intervals – see also **Pitch Mode**. Tap on the corresponding **Semitone** button to open a pop-up menu with semitone settings from -0 up to 24.

Tap on **Semitone 1 - 6** to open a pop-up menu for further settings:

- **Set Default:** sets Semitone to its default value of *0*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Presets

Tap on the **Presets** button to open a pop-up window for loading, saving and managing Particle Generator settings. For more information on the available options please refer to the **Presets** chapter in the Wavetable section.

The Resonator

The basic concept of the Resonator is sound creation by using an initial exciter signal (mostly a short noise impulse) which goes through a bandpass filter bank, where its resonating filters finally produce a ringing sine-like sound. Based on different Timbre modes, the partials of this signal can be adjusted in many ways.

- ③ Press the **Resonator** button to activate the Resonator for the corresponding oscillator 1, 2 or 3. The whole oscillator section lights up in red.



- ⚠ Further parameters can be found on the corresponding display page. Read more on the next page.

The Resonator can also feed with one or more samples (instead of using a noise impulse). You can load one single sample as well as multi samples that were mapped over the keyboard range.



For a better understanding on how the Resonator works, we recommend initializing a sound program (on the **Load** page) and starting with a default Resonator. Try out all parameters to become familiar with the functionality of this powerful sound creation tool.

Resonator Panel Parameters

Semitone / Octave

Sets the pitch of the Resonator in semitone steps. The standard setting for this parameter is 0, but there are cases where different values are interesting as well. Press and hold the **Semitone** dial while turning it enables you to select the pitch in octave steps.

Fine Pitch

Fine-tunes the Resonator in steps of 1/128th of a semitone. The audible result of detuned oscillators is a Chorus effect. Use a positive setting for one oscillator and an equivalent negative setting for another.

Repeats (Repts)

Determines how often the exciter signal is repeated. The higher the value (up to 16), the more repeats include the sound. The speed of the repeats depends on the **Decay** settings at the Resonator display page.

Spread

Extends or compresses the partials of the resonator, which leads to massive timbre changes. There are two **Spread** modes that can be set at the Resonator display page.

Timbre

Based on the **Timbre Mode** at the Resonator display page, this parameter changes the structure of the partials. In some cases this works similar to a filter, which cuts off partials. In other cases the partials are emphasized.

Exciter

Determines the sound of the exciter signal. Fully counter-clockwise, a short impulse is generated while higher settings fade this impulse into a short noise. Use higher settings when you want to simulate the blowing sound of a wind instrument. If a loaded sample is used as exciter, this parameter influences how the sample sounds.

❗ For more information about loading and editing samples, please refer to 'The Loading & Editing Samples' chapter.

Q

Determines the resonance of the created partials. The higher the setting, the longer the duration of the created sounds.

Resonator Display Page

To access the Resonator display page, press the corresponding OSC 1, 2, or 3 button above the touchscreen display.

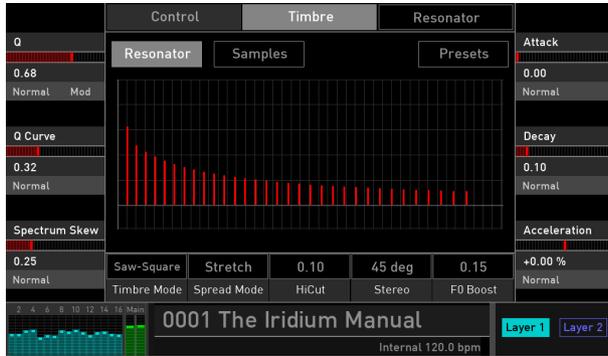
Here you can change between two modes: **Control** and **Timbre**. Tap on the corresponding tab to select it. The display changes to this mode. A third tab displays the current oscillator model. Tap on it to select another model or switch it off.

Control Mode Tab

Here you find parameters relating to the tuning and some basic settings. The functions are the same as for the Wave-table generator. Please refer to the corresponding chapter.

Timbre Mode Tab

Here you find specific parameters for the Resonator.



Q

Same functionality as for the corresponding panel parameter.

Tap on **Q** to open a pop-up menu for further settings:

- **Normal:** Q change is about 0.01.
- **Fine:** Q change is about 0.001.
- **Super Fine:** Q change is about 0.0001.
- **Set Default:** sets Q to its default value of *0.68*.

- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Q Curve

Determines the resonance performance of the partials. The higher the setting, the more partials are emphasized.

Tap on **Q Curve** to open a pop-up menu for further settings:

- **Normal:** Q Curve change is about 0.01.
- **Fine:** Q Curve change is about 0.001.
- **Super Fine:** Q Curve change is about 0.0001.
- **Set Default:** sets Q Curve to its default value of *0.32*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Spectrum Skew

Determines the level of the partials in relation to themselves. The higher the setting, the smoother the sound. Very low values result in partials with a similar level.

Tap on **Spectrum Skew** to open a pop-up menu for further settings:

- **Normal:** Spectrum Skew change is about 0.01.
- **Fine:** Spectrum Skew change is about 0.001.
- **Super Fine:** Spectrum Skew change is about 0.0001.
- **Set Default:** sets Spectrum Skew to its default value of *0.25*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Attack

Works similar to the attack parameter of an envelope. It controls the attack phase of the exciter. The more partials the exciter has (e.g. **Exciter** parameter set to maximum), the more the **Attack** parameter has an influence.

Tap on **Attack** to open a pop-up menu for further settings:

- **Normal:** Attack change is about 0.01.
- **Fine:** Attack change is about 0.001.
- **Super Fine:** Attack change is about 0.0001.
- **Set Default:** sets Attack to its default value of *0.00*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Decay

Determines the decay phase of the exciter signal. When **Repeat** is set to 1, this parameter has no effect. For higher **Repeat** settings, **Decay** also controls the speed of the repeats.

Tap on **Decay** to open a pop-up menu for further settings:

- **Normal:** Decay change is about 0.01.
- **Fine:** Decay change is about 0.001.
- **Super Fine:** Decay change is about 0.0001.
- **Set Default:** sets Decay to its default value of *0.10*.

- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Acceleration

Controls the repeat speed behaviour. Positive settings accelerate the speed of the repeats by time while negative settings will slow it down accordingly.

Tap on **Acceleration** to open a pop-up menu for further settings:

- **Normal:** Acceleration change is about 0.01.
- **Fine:** Acceleration change is about 0.001.
- **Super Fine:** Acceleration change is about 0.0001.
- **Set Default:** sets Acceleration to its default value of *+0.0%*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Timbre Mode

Here you can select different modes that affect the partial editing when using the **Timbre** parameter.

- **Peak Mode:** in the lowest **Timbre** setting the partials fade out exponentially. This sounds as a sawtooth wave. Higher settings create a partial shift with random peaks. The maximum setting emphasizes every 2nd partial so that the result sounds like a square wave.
- **Sin Mod:** this mode exhibits almost the same behaviour as the **Peak** mode, except that the maximum setting results in a triangle wave sound.
- **Saw-Square:** this mode starts from a regular partial fade out and removes most of the 2nd partials as **Timbre** is turned up. The result sounds like a square wave.
- **Sin-Saw:** this mode starts with a sine-like sound (only the fundamental note is heard). It adds more and more partials as **Timbre** is turned up. The result sounds like a sawtooth wave.
- **Modulo:** in the lowest **Timbre** setting the partials fade out exponentially. This sounds like a sawtooth wave. The more **Timbre** is turned up, the more partials will suddenly disappear. This leads to a less complex sound.

Tap on **Timbre Mode** to open a pop-up menu for further settings:

- **Set Default:** sets Timbre Mode to its default *Peak Mod* setting.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Spread Mode

Here you can determine the distance of the partials when using the **Stretch** parameter.

- **Stretch:** uses a wide range of stretching. The **Stretch** parameter can produce drastic changes to the timbre of a sound.
- **Stiffness:** uses a smaller range of stretching. The results of the **Stretch** parameter are less drastic.

Tap on **Spread Mode** to open a pop-up menu for further settings:

- **Set Default:** sets Timbre Mode to its default *Stretch* setting.

- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

HiCut

Determines the hi-cut frequency for cutting high frequencies. This filter is located between the exciter and the filter bank. Use it if the exciter signal is producing too many overtones.

Tap on **HiCut** to open a pop-up menu for further settings:

- **Set Default:** sets HiCut to its default value of *0.10*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Stereo

Spreads the signal in the stereo field.

Tap on **Stereo** to open a pop-up menu for further settings:

- **Set Default:** sets Stereo to its default value of *0.50*.

- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

F0 Boost

F0 is the denomination for the fundamental note. This parameter boosts F0 independently from the partials.

Tap on **F0 Boost** to open a pop-up menu for further settings:

- **Set Default:** sets F0 Boost to its default value of *0.15*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Samples Button

One ore more samples can be used as an exciter for the Resonator. To use a sample, simply tap on the **Samples** button. The **Sample** display page opens.



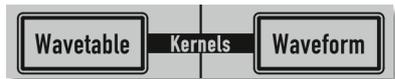
For more information about loading and editing samples, please refer to 'The Loading & Editing Samples' chapter.

Presets

Tap on the **Presets** button to open a pop-up window for loading, saving, and managing Resonator settings. For more information on the available options please refer to the **Presets** chapter in the Wavetable section.

The Kernel Synthesis Mode

➤ Press **Wave-table** and **Waveform** buttons simultaneously to activate the Kernel mode for the corresponding oscillator 1, 2, or 3. The whole oscillator section lights up in pink.



So what, exactly is Kernel synthesis? Simply speaking, it is a modular approach in which up to six audio kernels can be freely combined into a single oscillator. Effectively, each kernel is an oscillator in its own right, realising a whole range of timbres – from using sine and classic waveforms via wavetables and noise. For example, users could combine wavetables, a sine wave, and noise within a single oscillator.

On top of that, the kernels could modulate each other in audio rate using a variety of modulation methods, such as amplitude, frequency, phase, and ring modulation. Phase Distortion is also possible alongside unusual processes like audio rate wavetable-position modulation. Moreover, each kernel, of course, could also add self-modulation like classic FM feedback.

Furthermore, each kernel has its own multi-stage envelope, stereo output panning, plus multiple modulation opti-

ons for velocity, key-tracking, plus presenting feedback, level, pitch, and wavetable position as modulation targets. It is like having a modulation matrix within a kernel.

Meanwhile, kernel pitch can be set in relation to note pitch, as well as being set to fixed frequency in audio or LFO range. Pitch envelopes could be also applied to each kernel individually using the Modulation Matrix.

It is perfectly possible, then, to view Kernel synthesis as an oscillator construction kit, allowing for traditional approaches like a six-operator FM synth, as well as providing an experimental space for future-facing synthesis techniques



Here is a short example how to explore kernel mode:

- 1) Choose "Init" from the Load page.
- 2) From Osc1 Control page choose VCA or DF100 Fil 0 as "Osc1 Dest" for stereo fun.
- 3) Press Wavetable & Waveform buttons simultaneously to put Osc1 in kernel mode.
- 4) Choose from top left "Templates" menu any item you like.
- 5) Each template assigns the 5 OSC 1 pots to individual sound shaping parameters.
- 6) Turn knobs and make sound.
- 7) Choose another template.
- 8) Get lost!

Kernel Mode Panel Parameters

Semitone / Octave

Sets the pitch of the kernel in semitone steps. The standard setting for this parameter is 0, but there are cases where different values are interesting as well. Press and hold the **Semitone** dial while turning it enables you to select the pitch in octave steps.

Fine Pitch

Fine-tunes the kernel in steps of 1/128th of a semitone. The audible result of detuned oscillators is a Chorus effect. Use a positive setting for one oscillator and an equivalent negative setting for another

Additional Panel Parameters

Due to the fact that there are nearly endless possibilities for kernel mode parameters, the 5 panel parameters (except **Semitone** and **Fine Pitch**) of the Oscillator section and corresponds to the 5 template parameters shown in the touchscreen display. For example, if the template "FM Simple" is loaded, the **Position** dial controls **Timbre**, the **Spectrum** dial controls **Ratio** and so on. This allows you a fast editing of all important parameters of a template.

Kernel Mode Display Page

To access the Kernel Mode display page, press the corresponding **OSC 1, 2** or **3** button above the touchscreen display.

Here you can switch between two modes: **Control** and **Timbre**. Tap on the corresponding tab to select it. The display switches to this mode. A third tab displays the current oscillator model. Tap on it to select another model or to switch it off.



Kernel mode with template "FM Simple"

Control Mode Tab

Here you find parameters for tuning and some basic settings. The functions are the same as for the Wavetable oscillator. Please refer to the corresponding chapter.

Timbre Mode Tab

Here you find specific parameters for the Kernel mode as well as the option to load templates into this synthesis engine.

Templates

Tap on the **Templates** button to open a pop-up window for loading Kernel templates with predefined settings.

There are two levels of working with the Kernel mode: The Template mode as described below and the real deep editing mode.

The idea of the template mode was to provide a mezzanine level in which you can focus on your sound design and music by just using a few macro parameters. In fact these are the 5 main pots each oscillator has on the panel. Since each template uses them differently, their names and settings are put on the main screen.

You can use the pre-installed templates, but you can also build your own ones. Technically templates are nothing

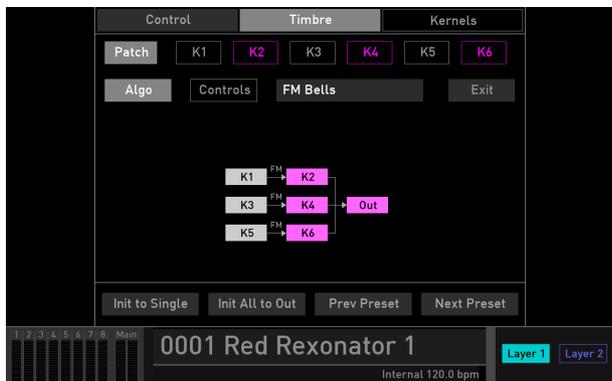
else than read-only presets. So, you could create a new template by doing some deep edits on the Kernel level and then going back to the template screen and save it as an Oscillator preset. Then you can use this preset in another oscillator or in another sound design session as your own starting point. You can also save a preset without deep editing just to save the 5 pot settings for a particular template for later re-use.

This template system is the reason why we call the kernel mode an “Oscillator Construction Kit.” Some might use the template level only and will never feel the need to go deeper, and that’s perfectly fine. We believe that traditional FM editing always had the difficulty that it was too complex in a normal sound and creative situation to do it. On the other hand this fact reduced FM-based synthesis into groups of two peoples: Most are just browsing fixed presets, some few others will do deep sound programming work. We wanted to create a creative middle ground, to provide an inspiring sound design without becoming a FM-wizzard.

But some fearless might want to press “Edit”:

Edit

Tap on the **Edit** button to open the deeper editing level of the Kernel mode.



The Kernel mode edit page for the "FM bells" template

What you see now is a series of sub-screens giving you the ability control all aspects of the kernel synthesis – be it just to modify an existing template in a deeper way than the 5 template macro parameters allow, or be it to create eventually a new template for later re-use. Both is perfectly possible. You can start from scratch using the oscillator in INIT state without any template macro defined and build up from there step by step, or using an existing template and start from there.

❗ In Kernel mode, each oscillator consists of 6 kernels. You can view these kernels as oscillators in itself which can be freely connected by various modes.

You select between editing each kernel by the row of **K 1...6** buttons. Each Kernel has then 4 sub-pages: **Wave, Mod, Env** and **Level**.

To the left there is also an overview section (**Patch** button) which is then initial screen when getting first into **Edit** Mode and you can also switch by tapping on the **Patch** button. There are two sub-screens: **Algo** which shows how kernels are connected to each other, and **Controls** which lets you define what each of the 5 Template Macros i.e. the display dials means.

The Algorithm Display Page

Tap on the **Algo** button to switch to the Algorithm display page.

The Algorithm page graphically shows how the kernels are connected with each other. Not used kernels will not be shown automatically. The kernel connections can made be freely and individually on the Kernel **Mod** page, but in addition the Algorithm screen provides some presets for an easy start from scratch.

This page is an overall control page with no additional functionality for the kernels. Tap on the kernel button on the top of the page or within the algorithm graphic (**K1** to **K6**) to open the corresponding kernel. Kernels are abbreviated by K1, K2 etc. and “Out” means the output of the oscillator.

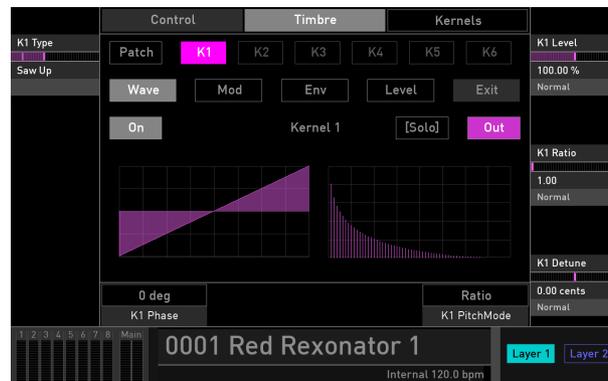
Below the algorithm graphic you find further options:

- Before getting into modulation scenarios, just press **Init to Single** to have a single kernel running to check out it’s capabilities on its **Wave**, **Env** and **Level** Pages. Once you are familiar with these, you can go to its **Mod** page and add Kernel 2 as its modulation source.
- You can also **Init All to Out**, to have all kernels running parallel to the Out.
- **Prev Preset** and **Next Preset** will browse between some classic FM algorithms (which is their word for how kernels/operators are connected to each other).

- ⓘ When tapped on one of the four option buttons, the template name automatically changes to *Custom*.
- ⓘ Keep in mind, the Kernel synthesis is much more than FM. Further, in contrast to classic FM, there is no restriction of FM feedback to a single kernel. Each of them could have it, even multiple in parallel.

The Kernel Display Pages

Tap on one of the **K1...K6** buttons in the first row to switch to the corresponding Kernel display page. This page is identical for all of the six kernels.



Kernel 1 Wave display page

In the second row the buttons will switch between **Wave**, **Mod**, **Env** and **Level** pages. Tap on **Exit** to leave edit mode.

Below the **Wave** button of the left side there is an **On/Off** button to enable and disable the particular kernel. This is e.g. useful for temporarily disabling a modulation by disabling the modulating kernel.

On the right you will find the **Out** button which determines if the kernel's output is sent and mixed into the oscillator's output. If output is activated, there is a **Solo** button shown, which is handy for layered algorithms with multiple kernels sending to the output. With **Solo** you can quickly experience each kernel's sonic component to the overall sound.

ⓘ Keep in mind that the On/Off state is saved with the sound patch and the template, but not the Solo state.

The Wave Page

Tap on one the **Wave** button to switch to the corresponding Kernel display page. This page is identical for all of the six kernels. The following parameters are available:

K1...6 Type: Each kernel can generate Sine waves for classic FM, the whole range of Iridium Keyboard factory wavetables, classic waveforms like Saw up/down, Triangle, Square, as resonant waveform as well as White & Pink noise. The screen shows the wave and its spectrum.

If Wavetable is selected, further parameters are available:

K1...6 Wavetable & K1...6 WTB Pos: These do what you would expect, switching between factory wavetable and setting the wavetable position. Both can be of course modulated, but there are no particular facilities like Travel

and such. For these and take use of user wavetables, talk, spectrum etc. you have to use the main Wavetable mode. So, the kernel wavetable mode is compared to it fairly simple, but well, you have now potentially 6 wavetable oscillators within a single oscillator each potentially using a different wavetable on a different position. And you can use an outside LFO to modulate them.

Tap on **K1...6 Type**, **K1...6 Wavetable** & **K1...6 WTB Pos** to open a pop-up menu for further settings:

- **Set Default:** sets the parameter to its default value.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

K1...6 Level determines the level of the corresponding kernel. For a kernel sending to the oscillator out, this is simply its volume. For kernels modulating other kernels, the effect of its level changes can be sonically dramatic. This is what kernel and FM synthesis is all about. Controlling the level of the modulating kernel is one of the most central aspect of this synthesis. This is, why each kernel has its own envelope and keybased level scaling.

K1...6 Ratio is based on the settings for PitchMode. When set to Ratio, it determines the ratios for getting easily par-

tial or overtone relationships (in whole numbers) For fractions use *Fine* or *Super Fine* modes.

K1...6 Detune adds an additional detuning interval up to +/-50 cents (100 cents is one semitone).

Tap on **K1...6 Level/Ratio/Detune** to open a pop-up menu for further settings:

- **Normal:** parameter change is normal.
- **Fine:** kernel level change is fine.
- **Super Fine:** kernel level change is super fine.
- **Set Default:** sets the parameter to its default value.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.

K1...6 Phase: You can set a fixed start phase (in degree) for each kernel waveform, or set it to *Free* for getting a random phase at each note onset.

K1...6 PitchMode: You can switch between 6 modes that determine how pitch is handled for kernels. Each mode has then one (*Fixed* and *LFO*) or two additional parameters for pitch control.

- **Ratio:** The kernel pitch is derived from the oscillator base pitch by putting a multiplier into the game.

- **Sub-Ratio Mode:** Like Ratio mode, just using dividers instead of multipliers for getting undertones.
- **Ratio + Offset:** Like Ratio mode but having a parameter **K1...6 Offset** which detunes by a fixed value in Hertz instead of an interval. With this, you get a constant beating frequency over the whole pitch range.
- **Semitones:** Like Ratio + Offset mode, but using a semitone scale instead of a ratio. This is useful for more scale- or chord/interval-based detuning or similar. Plus additional **K1...6 Offset** for fixed beating.
- **Fixed:** Sets the kernel to a fixed frequency from 0-10 kHz ignoring the oscillator base frequency. Still, this fixed frequency can be modulated.
- **LFO:** Like Fixed mode, but with a low frequency range.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

The Mod Page

Tap on one the **Mod** button to switch to the corresponding Kernel display page. This page is identical for all of the six kernels.



The Mod display page for Kernel 1

The following parameters are available:

K1...6 ModSrc 1/2/3: Each kernel can have up to 3 other kernels as direct kernel modulation sources (not to confuse with conventional modulation from modulation matrix

and such). In case of multiple modulation sources their signals will be simply summed.

⚠ Please keep in mind that the amount of modulation is determined by the level of the modulating kernels. This is a central and important fact for these kind of synthesis.

K1...6 ModType: There are 5 modulation types available:

- **Phase FM** is what historical called simply FM (Frequency Modulation). The modulating kernel modulates the phase of the target (or carrier) kernel. This can have huge sonic effects which are mainly determined by the level of the modulation and their pitch ratio. That means that once you have selected the modulating kernel here, you should change to the modulating kernel and edit its level and pitch ratio to control the sound.
- **True FM** modulates in fact the frequency (and not the phase like in traditional phase-based FM). Compared to Phase FM the sonic effect is even more drastic and can quickly get very nasty. If this is what you want, that is your mode.
- **Ring** does classic ring modulation between modulating kernel and target kernel. The sonic effect is mostly determined by the pitch difference of both kernels. Turn

up both levels to get a strong sound. Ring modulation is also a typical scenario where you could set the modulating kernel to a fixed frequency.

- **AM** is similar to **Ring** with the main sonic difference that lowering the level of the modulating kernel would keep more and more of the sound of the target kernel. So, in contrast to Ring, AM blends more in.
- **WT Pos**: Here, the modulating kernel modulated the wavetable position of the target kernel (which obviously should have set a wavetable on the **Wave** page). Unless the modulating kernel is in LFO mode, this WT Pos modulation is in audio rate and opens a whole range of new, strange and unknown sonic territory. This is also a good place to use the Sub-Ratio mode for the modulating kernel.

K1...6 Feedback: When in Phase FM or AM mode, then a kernel can modulate itself. In FM this is a classic way to add quickly partials to the sound mostly in sawtooth like direction but depending on the amount and level it can go quickly into harsh noise up to white-noise like sonic territory. Use it with care, but it is mega-fun since potentially every kernel could have its own feedback. When a kernel is FM-modulated already by another kernel, self-feedback still can be applied and added.

The Envelope Page

Tap on one the **Env** button to switch to the corresponding Kernel display page. This page is identical for all of the six kernels.

Since the level especially of the modulating kernels is of extreme sonic importance, each kernel has its own dual-decay-stage envelope. The attack is curved while the other stages are linear.



Envelope page for Kernel 1

K1...6 VeloDepth determines if extend lower velocities should lower the overall signal. This parameter is identical to the corresponding parameter on the Level page.

K1...6 Level controls the overall level of the kernel signal. This parameter is identical to the corresponding parameter on the Level page.

K1...6 LevelScale is an overall level scaling with three different modes. This parameter is identical to the corresponding parameter on the Level page.

- **Linear** controls the amplitude in a direct way, such that a linear envelope segment also controls the amplitude linearly.
- **Quad** controls the level in a more curved way by rising the envelope level to the forth power.
- **dB** lets the envelope control the level on a dB scale.

K1...6 OutPan determines how the kernel signal (which itself is mono) is panned to the oscillator stereo output. This is of course only valid for kernels that have been activated to send to the output by the **Out** button. This parameter is identical to the corresponding parameter on the Level page.

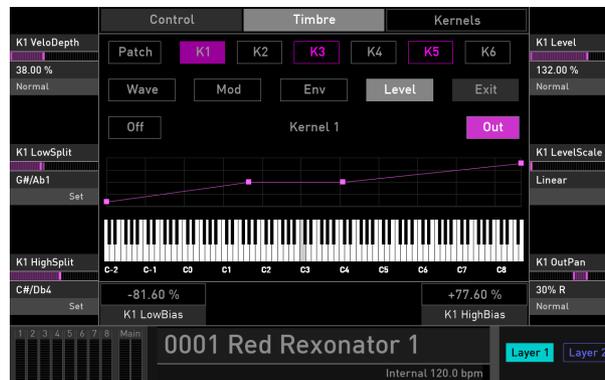
The envelope parameters below the envelope graphic set the envelope stages in milliseconds (ms). Except for the

K1...6 Level and **K1...6 Sustain** stage, that are non-timebased parameters. Both can be set in percent (%).

The Level Page

Tap on one the **Level** button to switch to the corresponding Kernel display page. This page is identical for all of the six kernels.

K1...6 VeloDepth determines if extend lower velocities should lower the overall signal. This parameter is identical to the corresponding parameter on the Env page.



Level page for Kernel 1

K1...6 LowSplit defines a low key split point for level scaling.

K1...6 HighSplit defines a high key split point for level scaling.

K1...6 Level controls the overall level of the kernel signal. This parameter is identical to the corresponding parameter on the Env page.

K1...6 LevelScale is an overall level scaling with three different modes. This parameter is identical to the corresponding parameter on the Env page.

- **Linear** controls the amplitude in a direct way, such that a linear envelope segment also controls the amplitude linearly.
- **Quad** controls the level in a more curved way by rising the envelope level to the forth power.
- **dB** lets the envelope control the level on a dB scale.

K1...6 OutPan determines how the kernel signal (which itself is mono) is panned to the oscillator stereo output. This is of course only valid for kernels that have been activated to send to the output by the **Out** button. This parameter is identical to the corresponding parameter on the Env page.

In addition the level can be adjusted in accordance to the played key. If you have set a low and a high key split point, you can rise or lower the curve depending on the **K1...6 Low and HighBias** parameter. Split points and bias can also be graphically edited by tapping and moving your finger up or down.



The sometimes extreme sonic effect of FM and similar modulation types makes it necessary to adjust the level in higher or lower ranges to get an overall satisfying sonic result.

The Controls Display Page

Tap on one the **Controls** button to switch to the Controls display page. If one of the kernels is edited, please tap an the **Patch** button before.

This page lets you determine which effect each of the 5 dials aka template macro parameter has. In fact, each kernel oscillator has a little internal modulation matrix that controls which kernel parameters are affected by the knob macro value.



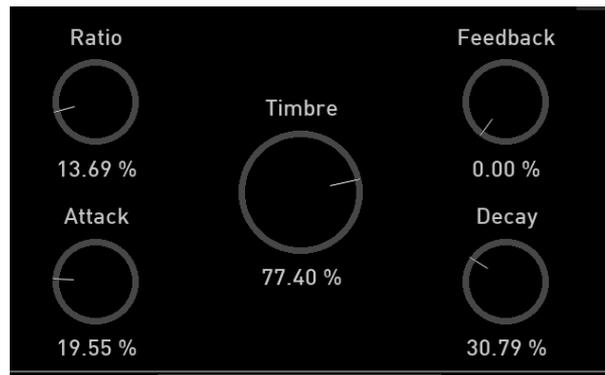
Controls display page

Each knob macro can affect up to 6 kernel parameters (“Slots”) regardless if in the same kernel or different kernels simultaneously are used. You can set the target parameter and amount for each slot. The sonic results can be hugely satisfying when a single knob movement controls a whole range of kernel parameters. Please check out the various templates for ideas what can be achieved here and then create your own ones.

Each knob macro can be a descriptive name given as well as the overall template can be named. All these settings will be of course saved in a Iridium Keyboard sound patch.

But if you made something interesting, just save it as a oscillator preset and re-use your template in other sounds. That is what Kernel synthesis makes a true oscillator construction kit.

Macro selects one of the five knobs for further editing. The following display graphic shows the assignment. For example, the Top-L (top left) knob is Ratio, the Bottom-R (bottom right) is Decay.



Example: Macro assignment for Simple FM template

Slot selects one of the six available knobs for assignment.

With the top right parameter you can set the value for the selected knob. This can also be done in the center of the display, where you can edit the name of the knob that is shown in the display.

Macro Dest determines the parameter that should be assigned to the selected knob.

Macro Amnt determines the amount of the modulation. This can be either positive or negative.

About Kernel Modulations

In kernel synthesis, there are 3 levels of modulations: First of course, the modulation of each kernel to another one. That is what kernel synthesis defines. Second, the knobs or template macro parameters which modulate up to 6 individual kernel parameters simultaneously.

So, these first two modulation level are happening all inside the kernel oscillator. The third level is simply the fact that the 5 knob macros are available in the Iridium Keyboard modulation matrix as modulation targets. By these, you can use Iridium Keyboard's LFOs, Envelopes, Komplex Modulator etc. to modulate the inner sonic aspects of the kernel oscillators. The only thing you have to do is to define what a certain knob macro parameter means to use it in the mod matrix. But doing, this is anyhow the best way to use the kernel oscillator, either by using prepared templates, or by creating your own ones.

Step-by-Step Tutorial for setting up a simple 2 Operator FM without using a template:

- Tap on **Load** and INIT the sound.
- Press **Wavetable** and **Waveform** buttons of OSC1 simultaneously to enter the Kernel mode.
- Tap on **Edit**.
- Tap on **Patch** and then on **Algo** if not already on the Algorithm page.
- There is already a 2 OP FM algo from INIT created. So, either done here, or for the sake of the learning experience, tap on **Init to Single** to start from scratch.
- Select **K1** and then **Mod** for setting the modulation source.
- Select **K2** in **K1 ModSrc 1** (top left encoder).
- Select **K2** from above to edit kernel 2.
- Activate **K2** by tapping the **Off** button below **Wave** which then changes to **On**.
- Select **Wave** and set the pitch ratio of **K2** to 2.0.
- Rise the **K2 Level** to nearly 60%.

- Tap on **Env** and change the **K2** envelope to some interesting curve.

You can stop here and play around, or you like to set up a custom template with these steps from here:

- Select **K1** again to edit kernel 1.
- Goto **Wave**, set **K1 Type** to **Wavetable**, choose a wavetable as you like but leave position at 0.
- Goto **Patch -> Controls**.
- Select **Macro** to Center from top left encoder.
- Keep Slot at 1.
- Set **Macro3 Dest1** from middle right encoder to **K1 WTB Pos**.
- Set **Amount** to like 80%.
- Play around with the middle dial.
- Tap on **Edit Name** in the middle below the dial graphic and rename it to Timbre or whatever you like.
- Tap on the name field to the right of the **Controls** button and rename **Custom** to whatever name you like, for example First FM.
- Tap on **Exit**.

- Tap on **Presets** and save the template for later re-use.

Congrats: You've constructed your first kernel oscillator template!

Oscillator Mixer (OSC MIX) Section

In the Oscillator Mixer section you control the volumes of the three oscillators. If an oscillator volume dial is turned fully counter-clockwise, no signal is passed.

Level Osc 1 / Osc 2 / Osc 3

Determines the volume of the corresponding oscillator.

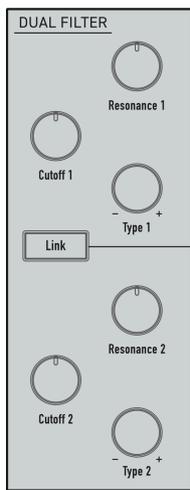
Routing Button

Press the **Routing** button to enter the Routing display page. Read more about signal routing in the corresponding section of the Filter chapter.



Dual Filter Section

Iridium Keyboard offers two filters with different types and additional settings (e.g. 12 dB/24 dB Lowpass with resonance - clean, saturated or dirty). With the **Link** parameter, different filter routings can be realized (e.g. Boost, Twin Peaks, Escaping, Opposition, and many more).



The Dual Filter Section

❗ The Dual Filter section can be bypassed by setting the **State** parameter on the corresponding Dual Filter page to *Bypass*.

❗ Further filter parameters can be found on the Filter display page.

Filter Panel Parameters

Cutoff 1 & 2

Controls the cutoff frequency for the selected filter types. You can bring more movement into the sound by modulating the cutoff frequency via LFOs, filter envelope or the **Keytrack** parameter of the filter. The functionality of these knobs depends on the **Type** setting.

Resonance 1 & 2

Controls the emphasis of the frequencies around the cutoff point. Use lower values to give more brilliance to the sound. At higher values the sound exhibits typical filter characteristics with a strong boost around the cutoff frequency. When the setting is raised to maximum, the filter starts to self-oscillate, generating a pure sine wave. This feature can be used to create analog-style effects and per-

cussion-like electronic toms, kicks, zaps, etc. The functionality of these knobs depends on the **Type** setting.

Type 1 / 2

Selects the filter slope for the corresponding filter:

- **12dB LP / 24dB LP** removes frequencies above the cutoff point with a 12dB/24dB slope.
- **12dB sat. LP / 24dB sat. LP** removes frequencies above the cutoff point with a 12dB/24 dB slope. The necessary signal adaption is done by a saturation stage. This leads to a light driven audio signal.
- **12dB dirty LP / 24dB dirty LP** removes frequencies above the cutoff point with a 12dB/24dB slope. The necessary signal adaption is done by a saturation stage. This leads to a harsh driven audio signal.
- **12dB HP / 24dB HP** removes frequencies below the cutoff point with a 12dB/24dB slope.
- **12dB sat. HP / 24dB sat. HP** removes frequencies below the cutoff point with a 12dB/24 dB slope. The necessary signal adaption is done by a saturation stage. This leads to a light driven audio signal.
- **12dB dirty HP / 24dB dirty HP** removes frequencies below the cutoff point with a 12dB/24dB slope. The

necessary signal adaption is done by a saturation stage. This leads to a harsh driven audio signal.

- **12dB BP / 24dB BP** removes frequencies above the cutoff point with a 12dB/24dB slope.
- **12dB sat. BP / 24dB sat. BP** removes frequencies above the cutoff point with a 12dB/24 dB slope. The necessary signal adaption is done by a saturation stage. This leads to a light driven audio signal.
- **12dB dirty BP / 24dB dirty BP** removes frequencies above the cutoff point with a 12dB/24dB slope. The necessary signal adaption is done by a saturation stage. This leads to a harsh driven audio signal.

Link Button

Switches between the available filter modes. Depending on the selected mode the effect of the Cutoff and Resonance parameters as well as the behaviour of Filter 1 and 2 differs. The following modes are available:

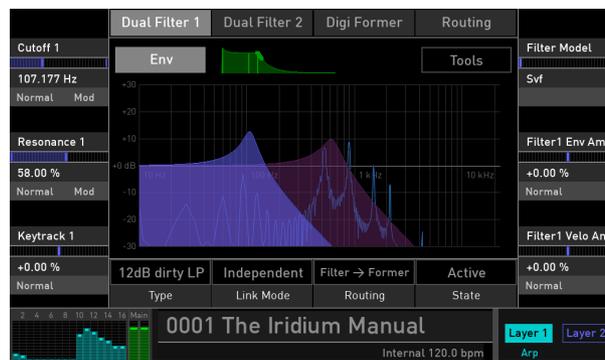
- **Single:** only **Cutoff 1** and **Resonance 1** (Filter 1) have an affect on the sound signal. **Cutoff 2** and **Resonance 2** have no influence here.
- **Boost:** only **Cutoff 1** and **Resonance 1** (Filter 1) have an affect on the sound signal. **Cutoff 2** is set to an au-

automatic cutoff value depending on the settings of **Cutoff 1**. This leads to a boosted signal. **Resonance 2** has no influence here.

- **Twin Peaks:** both filter cutoff values are set to a constant frequency distance where Cutoff 1 is higher than Cutoff 2. **Cutoff 2** and **Resonance 2** have no influence here.
- **Escaping:** both filter cutoff values are set to a constant frequency distance where Cutoff 2 is higher than Cutoff 1. **Cutoff 2** and **Resonance 2** have no influence here.
- **Opposition:** Cutoff 1 controls the frequency of Filter 1 and 2. Higher values increase Cutoff 1 and decrease Cutoff 2. Lower values increase Cutoff 2 and decrease Cutoff 1. **Cutoff 2** and **Resonance 2** have no influence here.
- **Endless:** similar to **Opposition**, but cutoff frequency from Filter 2 has a different behaviour relationship. **Cutoff 2** and **Resonance 2** have no influence here.
- **Independent:** both filters allow independent settings for **Cutoff 1** and 2 and **Resonance 1** and 2.
- **Linked:** both filters allow independent settings for **Cutoff 1** and 2 and **Resonance 1** and 2, but **Cutoff 1** controls the overall frequency cutoff.

Filter Display Page

To access the Filter display page for further Filter parameters press the FILTERS button. With the tabs in the upper part of the display you can call up the **Dual Filter 1** and 2 parameters and also **Digital Former** and **Routing**. Tap on the desired tab to select the corresponding page.



! **Digital Former** and **Routing** will be explained in the corresponding chapters.

Cutoff (for Dual Filter 1 & 2)

See corresponding description in the 'Filter Panel Parameters' chapter.

Tap on **Cutoff 1** or **Cutoff 2** to open a pop-up menu for further settings:

- **Normal:** Cutoff change is about 1 %.
- **Fine:** Cutoff change is about 0.1 %.
- **Super Fine:** Cutoff change is about 0.01 %.
- **Set Default:** sets Cutoff to its default value of *100.0 %*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Resonance (for Dual Filter 1 & 2)

See corresponding description in the 'Filter Panel Parameters' chapter.

Tap on **Resonance 1** or **Resonance 2** to open a pop-up menu for further settings:

- **Normal:** Resonance change is about 1 %.
- **Fine:** Resonance change is about 0.1 %.
- **Super Fine:** Resonance change is about 0.01 %.
- **Set Default:** sets Resonance to its default value of *0.0 %*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Keytrack (for Dual Filter 1 & 2)

Determines how much the cutoff frequency depends on the MIDI note number. The reference note for Keytrack is E3, note number 64. For positive settings the cutoff frequency rises on notes above the reference note; for negative settings the cutoff frequency falls by the same amount, and vice versa. A setting of *+100%* corresponds to a 1:1

scale, so, for example, when an octave is played on a keyboard, the cutoff frequency changes by the same amount.



On most bass sounds lower settings in the range of around +30% are optimal to keep the sound smooth at higher notes.

Tap on **Keytrack 1** or **Keytrack 2** to open a pop-up menu for further settings:

- **Normal:** Keytrack change is about 2 %.
- **Fine:** Keytrack change is about 0.2 %.
- **Super Fine:** Keytrack change is about 0.02 %.
- **Set Default:** sets Keytrack to its default value of +0.0 %.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Filter Model (for Dual Filter 1 & 2)

Determines the filter model for the corresponding Dual Filter. The following types are available:

- **SVF:** offers a filter type with a state variable filter characteristic.
- **Raiser:** offers a filter type that raises the slope when resonance is added.
- **Largo:** offers a filter type with Waldorf *Largo* synthesizer characteristic.
- **Nave:** offers a filter type with Waldorf *Nave* synthesizer characteristic.
- **PPG:** offers a filter type with Waldorf *PPG Wave 3.V* synthesizer characteristic.
- **Quantum:** offers a filter type with Waldorf *Quantum* synthesizer characteristic.

Tap on **Level** to open a pop-up menu for further settings:

- **Set Default:** sets Level to its default value of 0 dB.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Filter 2 Level (for Dual Filter 1 & 2)

ⓘ This parameter is only displayed when the ENV button is deactivated.

Sets the output level for the corresponding filter.

Tap on **Level** to open a pop-up menu for further settings:

- **Normal:** Level change is about 0.6 dB.
- **Fine:** Level change is about 0.1 dB.
- **Super Fine:** Level change is about 0.01 dB.
- **Set Default:** sets Level to its default value of *0 dB*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Filter 1 & 2 Pan (for Dual Filter 1 & 2)

ⓘ This parameter is only displayed when the ENV button is deactivated.

Sets the panning for the audio signal that comes from the corresponding filter.

Tap on **Filter Pan** to open a pop-up menu for further settings:

- **Normal:** Filter Pan change is about 2% L/R.
- **Fine:** Filter Pan change is about 1% L/R.
- **Super Fine:** Filter Pan change is about 0.1% L/R.
- **Set Default:** sets Filter Pan to its default *Center*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Filter 1 & 2 Env Amount (for Dual Filter 1 & 2)

ⓘ This parameter is only displayed when the ENV button is activated. It is similar to the **Amount** parameter in the Envelopes section.

Determines the amount of influence the filter 1 or filter 2 envelope has on the cutoff frequency parameter of filter 1 or 2. For positive settings, the modulation is increased by of the envelope; for negative settings, it is decreased.

Tap on **Filter Env Amt** to open a pop-up menu for further settings:

- **Normal:** Filter Env Amount change is about 2%.
- **Fine:** Filter Env Amount change is about 1%.
- **Super Fine:** Filter Env Amount change is about 0.1%.
- **Set Default:** sets Filter Env Amount to its default + 0.00%.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Filter 1 & 2 Velocity Amount (for Dual Filter 1 & 2)

ⓘ This parameter is only displayed when the ENV button is activated. It is similar to the **Velocity** parameter in the Envelopes section.

Determines the amount of influence the filter 1 or filter 2 envelope has on the cutoff frequency parameter of filter 1 or 2 for the filter envelope, based on keyboard velocity. This parameter works similarly to the **Filter Amount** parameter with the difference that its intensity is velocity based. Use this feature to give a more expressive character to the sound. When you hit the keys smoothly only minimal modulation is applied. Hit them harder, the modulation amount increases likewise.

- **Normal:** Velocity Amt. change is about 2%.
- **Fine:** Velocity Amt. change is about 1%.
- **Super Fine:** Velocity Amt. change is about 0.1%.
- **Set Default:** sets Velocity Amt. to its default + 0.00%.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Type for Dual Filter 1 & 2

See corresponding description in the 'Filter Panel Parameters' chapter.

Tap on **Type** to open a pop-up menu for selection.

- **Set Default:** sets Type to its default setting *12 dB LP*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Link Mode

See corresponding description in the 'Filter Panel Parameters' chapter.

Tap on **Link Mode** to open a pop-up menu for selection.

- **Set Default:** sets Link Mode to its default *Single* setting.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Routing

Determines the routing of the audio signal that comes from the oscillators.

- **Former -> Filter:** the audio signal first leads into the Digital Former section and from there into the Dual Filter section.
- **Filter -> Former:** the audio signal first leads into the Dual Filter section and from there into the Digital Former section.
- **Parallel:** the audio signal is routed in equal parts to the Digital Former section as well as into the Dual Filter section. This enables simultaneous parallel processing.

Tap on **Routing** to open a pop-up menu for selection:

- **Set Default:** sets Routing to its default setting *Filter -> Former*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

State

Determines the state of the corresponding filter. When set to *Active*, the filter works in normal condition. If set to *Bypass*, the filter is bypassed but **Level** and **Pan** can still be controlled. If set to *Off*, the filter is completely deactivated.

❗ A Dual Filter can be bypassed by setting the **State** parameter for the corresponding Dual Filter to *Bypass*.

Tap on **State** to open a pop-up menu for selection.

- **Set Default:** sets State to its default setting *Active*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Env Button

Tap on this button to switch the Envelope mode on or off. If inactive (button is greyed out), Filter Level and Filter Pan can be controlled by the right display parameter dials. If active (button lights and a small filter envelope graphic is shown), Filter Envelope Amount and Filter Velocity Amount can be controlled by the right display parameter dials.

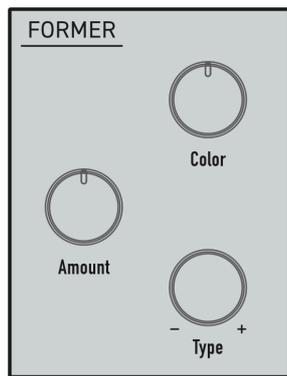
Tools Button

Tap on the **Tools** button to open a pop-up menu for selecting the following filter screen options:

- **Show/Hide Analyzer:** Activates/deactivates a real-time graphic spectrum analyzer that is shown as an overlay. Keep in mind, that the analyzer curve displays the filtered audio signal.
- **Animate/Hide Mods:** Animates the filter curve when a modulation (e.g. via LFO) is set up.

Former Section

This section offers additional digital filters and signal enhancer effects, such as Drive and Bit Crusher.



The Former section

⚠ Keep in mind that the **Routing** parameter determines if the audio signal is routed into the Dual Filter section before or after passing the Former section. Therefore, the **Routing** parameter is available on both Dual Filter display pages.

Former Panel Parameters

Type

The following Former types are available. Depending on the selected type, **Amount** and **Color** control different settings. This will be explained in the following list:

- **Bypass**: no effect is used. **Amount** and **Color** have no effect on the signal.
- **Drive**: adds a drive effect. **Amount** determines the amount of saturation that is added to the signal. If set to *0.00*, no saturation will be added – in other words, the signal will remain clean. Lower values will add some harmonics to the signal, resulting in a warm character. Increasing the value will bring in more and more distortion, suitable for harder lead sounds and effects. **Model** determines the character of the drive. You can also deactivate the drive curves completely. The following drive curves are available:
 - **PNP** generates a distortion based on a bipolar transistor.
 - **Tube** simulates the asymmetric distortion of a tube circuit.

- **PickUp** simulates an electrostatic pickup. This drive type sounds very interesting, when the audio signal level is modulated.
- **Diode** generates a typical diode distortion.
- **Crunch** is a sinusoidal waveshaper. It generates FM-like sounds that can be extremely distorted.
- **Gain**: offers an adjustable gain level. **Gain** increases the level of the audio signal. With **Gain Phase** you can switch the phase of the signal between *Normal* and *Reverse*.
- **Comb + / Comb -** : a comb filter is basically a very short delay that can be controlled in length and feedback. The delay time is so short that you can't hear its individual taps but rather a colorization of the original signal created by peaks or holes in the frequency spectrum. The frequency of the colorization is set by the delay length, which is controlled through **Freq**, while the amount of colorization is set by the Comb filter feedback, which is controlled through **Feedback**. Iridium Keyboard offers two comb filter types (+ and -) which differ in the shape of the peaks.
- **Bit Crusher**: produces lo-fi sound effects by decimating and truncating the audio signal. **Bits** determines the bit resolution of the audio signal. **Rate** determines the amount by which the audio samples are decimated. At the lowest setting no processing takes place. Higher settings eliminate more and more of the information describing the original audio signal, turning it into unrecognizable noise.
- **Ring Mod**: offers a ring modulator. **Freq** sets the frequency for the ring mod oscillator while **Depth** determines the intensity of the ring modulation effect.
- **Nave LP 12 / LP 24**: offers a lowpass filter with resonance as in the Waldorf *Nave* synthesizer. This filter type was implemented due to compatibility reasons because Iridium Keyboard can load sound programs from *Nave*. **Freq** controls the cutoff frequency while **Reso** controls the emphasis.
- **PPG LP 12 / LP 24**: offers a lowpass filter with resonance as in the Waldorf *PPG Wave 3.V* synthesizer. **Freq** controls the cutoff frequency while **Reso** controls the emphasis.
- **Largo LP 12 / LP 24**: offers a lowpass filter with resonance as in the Waldorf *Largo* synthesizer. **Freq** controls the cutoff frequency while **Reso** controls the emphasis.

- **SVF LP 12 / LP 24:** offers a state variable lowpass filter with resonance. **Freq** controls the cutoff frequency while **Reso** controls the emphasis.
- **Nave HP 12 / HP 24:** offers a highpass filter with resonance as in the Waldorf *Nave* synthesizer. This filter type was implemented due to compatibility reasons because Iridium Keyboard can load sound programs from *Nave*. **Freq** controls the cutoff frequency while **Reso** controls the emphasis.
- **Largo HP 12 / HP 24:** offers a highpass filter with resonance as in the Waldorf *Largo* synthesizer. **Freq** controls the cutoff frequency while **Reso** controls the emphasis.
- **SVF HP 12 / HP 24:** offers a state variable highpass filter with resonance. **Freq** controls the cutoff frequency while **Reso** controls the emphasis.
- **Nave BP 12 / BP 24:** offers a bandpass filter with resonance as in the Waldorf *Nave* synthesizer. This filter type was implemented due to compatibility reasons because Iridium Keyboard can load sound programs from *Nave*. **Freq** controls the cutoff frequency while **Reso** controls the emphasis.
- **Largo BP 12 / BP 24:** offers a bandpass filter with resonance as in the Waldorf *Largo* synthesizer. **Freq** controls the cutoff frequency while **Reso** controls the emphasis.
- **SVF BP 12 / BP 24:** offers a state variable bandpass filter with resonance. **Freq** controls the cutoff frequency while **Reso** controls the emphasis.
- **Nave Notch 12 / Notch 24:** offers a notch filter with resonance as in the Waldorf *Nave* synthesizer. This filter type was implemented due to compatibility reasons because Iridium Keyboard can load sound programs from *Nave*. **Freq** controls the cutoff frequency while **Reso** controls the emphasis.
- **Largo Notch 12 / Notch 24:** offers a notch filter with resonance as in the Waldorf *Largo* synthesizer. **Freq** controls the cutoff frequency while **Reso** controls the emphasis.

Amount

Depending on the selected **Type**, this parameter controls filter frequency or gain amount. Please refer to the corresponding **Types**.

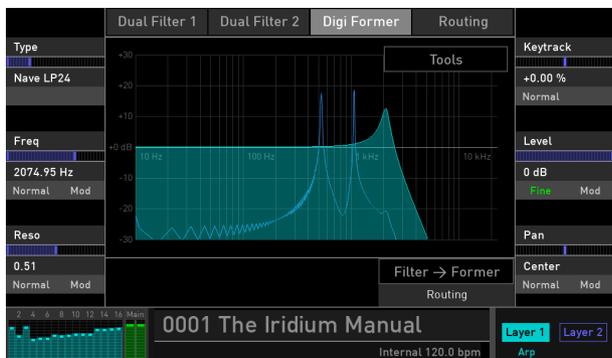
! The Main Encoder also controls the amount parameter, depending on the selected **Type**.

Color

Depending on the selected **Type**, this parameter controls e.g. the filter resonance or selects the Drive type. Please refer to the corresponding **Types**.

Digital Former Display Page

To access the Digital Former display page for further parameters, press the FILTERS button. Tap on the **Digi Former** tab on the touchscreen to select the corresponding display page.



Digital Former display page with Nave LP24 Type

⚠ Based on the selected **Type**, the display may look different.

Type

See corresponding description in the 'Former Panel Parameters' chapter.

Tap on **Type** to open a pop-up menu for further settings:

- **Set Default:** sets Type to its default *Bypass* setting.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Amount

See corresponding description in the 'Former Panel Parameters' chapter. Depending on the selected **Type**, this parameter can be named different. Please refer to the corresponding Types.

Tap on **Amount** to open a pop-up menu for further settings:

- **Normal:** Amount change will be normal.

- **Fine:** Amount change will be fine.
- **Super Fine:** Amount change will be very fine.
- **Set Default:** sets Amount to its default setting.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in ‘The Modulation Mode’ chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Color

See corresponding description in the ‘Former Panel Parameters’ chapter. Depending on the selected **Type**, this parameter can be named different. Please refer to the corresponding Types.

Tap on **Color** to open a pop-up menu for further settings:

- **Normal:** Color change will be normal.
- **Fine:** Color change will be fine.
- **Super Fine:** Color change will be very fine.

- **Set Default:** sets Color to its default setting.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in ‘The Modulation Mode’ chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Keytrack

Determines how much the Former **Amount** depends on the MIDI note number. The reference note for Keytrack is E3, note number 64. For positive settings **Amount** rises on notes above the reference note; for negative settings it falls by the same amount, and vice versa. A setting of *+100%* corresponds to a 1:1 scale, so, for example, when an octave is played on a keyboard, the **Amount** changes by the same amount.

Tap on **Keytrack** to open a pop-up menu for further settings:

- **Normal:** Keytrack change will be normal.
- **Fine:** Keytrack change will be fine.

- **Super Fine:** Keytrack change will be very fine.
- **Set Default:** sets Keytrack to its default setting.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Level

Sets the output level for the Digital Former section.

Tap on **Level** to open a pop-up menu for further settings:

- **Normal:** Level change will be normal.
- **Fine:** Level change will be fine.
- **Super Fine:** Level change will be very fine.
- **Set Default:** sets Level r to its default setting.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.

- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Pan

Sets the panning for the audio signal that comes from the Digital Former section.

Tap on **Pan** to open a pop-up menu for further settings:

- **Normal:** Pan change will be normal.
- **Fine:** Pan change will be fine.
- **Super Fine:** Pan change will be very fine.
- **Set Default:** sets Pan to its default setting.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Routing

Determines the routing of the audio signal that comes from the oscillators.

- **Former -> Filter:** the audio signal first leads into the DFormer section and from there into the Dual Filter section.
- **Filter -> Former:** the audio signal first leads into the Dual Filter section and from there into the Former section.
- **Parallel:** the audio signal is routed in equal parts to the Former section as well as into the Dual Filter section. This enables simultaneous parallel processing.

Tap on **Routing** to open a pop-up menu for further settings:

- **Set Default:** sets Routing to its default *Filter -> Former* setting.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Tools Button

⚠ This button is only available when a filter type is selected.

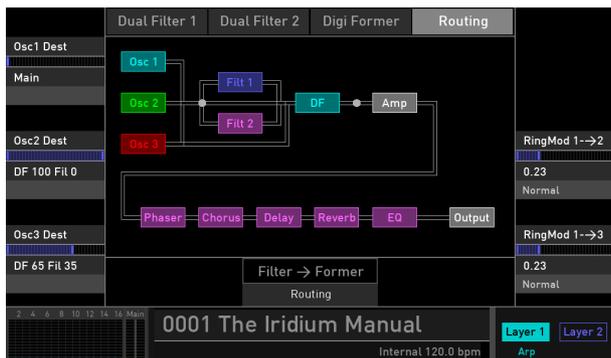
Tap on the **Tools** button to open a pop-up menu for selecting the following screen options:

- **Show/Hide Analyzer:** Activates/deactivates a real-time graphic spectrum analyzer that is shown as an overlay. Keep in mind, that the analyzer curve displays the filtered audio signal.
- **Animate/Hide Mods:** Animates the filter curve when a modulation (e.g. via LFO) is set up.

Routing Display Page

To access the Routing display page press the **FILTERS** button. Tap **Routing** on the touchscreen to select the Routing display page.

! You can also access the Routing display page by pressing the **Routing** button in the OSC MIX section.



Here you will get a graphic overview of the Iridium Keyboard's signal routing. You can also control the routing of the three oscillators and set up the ring modulation for the current sound.

The Graphic Routing Overview

The central area of the display shows the current audio signal path from the sound generation (Osc 1, 2, 3) through the Dual Filters (Filt 1 and 2), the Digital Former section (DF), and the Amplifier (AMP), followed by the 5 FX slots. The audio signal finally leaves the Iridium Keyboard via the Master output.

The signal path changes when one of the following parameters are edited:

- **Osc 1, 2, 3:** the Osc block lights up in the color of the selected oscillator model when the corresponding **Osc Mix** parameter is turned up. An Osc block is moved to another signal position when the **Osc Dest** parameter is set to *VCA*. An Osc block shows another routing when the **Osc Dest** parameter is set to one of the *DF Filter* settings.
- Based on the setting of the **Routing** parameter, the Filter and DF blocks change their position within the graphic. If Digital Former **Type** is set to *Bypass*, the DF block is greyed out.
- A FX slots lits in pink when an effect is set up. Also, the effect name is shown within the slot.

Osc 1/2/3 Dest

Here you can determine the routing of the corresponding oscillator signal. The following routing options are available:

- **Main:** routes the signal to the full signal path (Dual Filter, Digital Former, VCA) as determined with the **Routing** parameter on the Filter page.
- **VCA:** routes the signal directly to the VCA without passing both filter sections.
- **DF - Fil** settings: offers different signal relationship settings between the Digital Former section (**DF**) and the Dual Filter section (**Fil**). If you want to send the signal, for example, through the Digital Former section by 30% and by 70% through the dual filter, select *DF 30 Fil 70* here. The routing also depends on the **Routing** parameter setting on the Filter page.

Tap on **Osc 1/2/3 Dest** to open a pop-up menu for further settings:

- **Set Default:** sets Osc 1/2/3 Dest to its default *Main* setting.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.

- **MIDI Learn CC:** Activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

RingMod 1 → 2, 1 → 3

Controls the volume of the ring modulation between Osc 1 and 2 and Osc 1 and 3.

Tap on the corresponding **RingMod** to open a pop-up menu for further settings:

- **Normal:** RingMod volume change is about 0.4 dB.
- **Fine:** RingMod volume change is about 0.04 dB.
- **Super Fine:** RingMod volume change is about 0.004 dB.
- **Set Default:** sets RingMod volume to its default value of *0 dB*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Routing

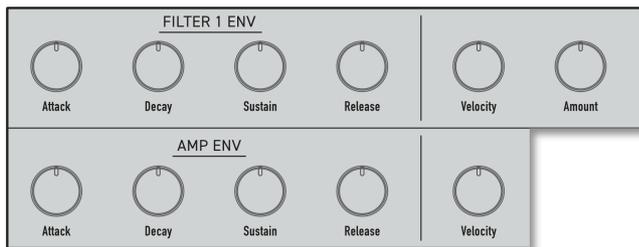
Determines the routing of the audio signal that comes from the oscillators.

- **Former -> Filter:** the audio signal first leads into the Digital Former section and from there into the Dual Filter section.
- **Filter -> Former:** the audio signal first leads into the Dual Filter section and from there into the Digital Former section.
- **Parallel:** the audio signal is routed in equal parts to the Digital Former section as well as into the Dual Filter section. This enables simultaneous parallel processing.

Tap on **Routing** to open a pop-up menu for further settings:

- **Set Default:** sets Routing to its default *Filter -> Former* setting.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Envelopes Section



The Envelopes Section

Iridium Keyboard’s envelopes allow you to manipulate sound parameters via rate or timed modulations. Iridium Keyboard offers six independent programmable envelopes for every sound program:

- Two Filter Envelopes. These envelopes are designed to control the Dual Filter 1 and 2 but can also be used for other modulations.
- An Amplifier Envelope (Amp). This envelope is designed to control the sound volume, but can also be used for other modulations.

- Three additional Free Envelopes. These envelopes can be used freely to perform additional modulations on any module.

Most traditional synthesizers feature ADSR envelopes. These envelopes are made up of four parameters that determine their response: **Attack**, **Decay**, **Sustain**, and **Release**.

An envelope is started by pressing a key. It ascends to its maximum value at the rate determined by the **Attack** parameter. It then descends at the rate determined by the **Decay** value until it reaches the predetermined **Sustain** value. It remains at this value until the key is released. The envelope then descends to zero at the rate determined by the **Release** parameter

Envelope Panel Parameters

⚠ The Panel parameter knobs control the Filter 1 and the Amplifier envelopes. All other envelopes can be edited via the touchscreen display.

Attack

Determines the attack rate or amount of time it takes for a signal to go from zero to maximum level.

Decay

Determines the decay rate or amount of time it takes for a signal to reach the **Sustain** level.

Sustain

Determines the sustain level that is held until a note ends.

Release

Once the note has ended, the release phase begins. During this phase, the envelope fades to zero at the rate determined by the release value.

Velocity

Determines the amount of influence the corresponding envelope has on the routed parameter – for example, cutoff frequency for the filter envelope, based on keyboard velocity. This parameter works similarly to the **Amount** parameter with the difference that its intensity is velocity based. Use this feature to give a more expressive character to the sound. When you hit the keys smoothly only minimal modulation is applied. Hit them harder, the modulation amount increases likewise.

Amount (not for Amp Envelope)

Determines the amount of influence the corresponding envelope has on the modulated parameter – for example, cutoff frequency. For positive settings, the modulation is increased by of the envelope; for negative settings, it is decreased.

ⓘ The overall modulation applied to the corresponding parameter is calculated as the sum of both the **Amount** and **Velocity** parameters. Therefore, you should always bear this total in mind – especially when a filter does not behave as you expect. You can also create interesting effects by setting one parameter to a positive and the other to a negative amount.

Envelopes Display Page

To access the Envelope display page, press the ENV button. Tap on the corresponding tab (**Amp**, **Filter 1**, **Filter 2**, **Free 1 to 3**) to select the desired envelope you want to edit.



! The display page parameters for every one of the six envelopes are similar.

Attack, Decay, Sustain, Release

See corresponding parameter in the 'Envelope Panel Parameters' chapter.

Tap on the corresponding parameter to open a pop-up menu for further settings:

- **Normal:** amount change will be normal.
- **Fine:** amount change will be fine.

- **Super Fine:** amount change will be very fine.
- **Set Default:** sets amount to its default setting.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Delay

Delays the start of the envelope by the selected time after a note trigger happens.

Tap on **Delay** to open a pop-up menu for further settings:

- **Normal:** Delay change will be normal.
- **Fine:** Delay change will be fine.
- **Super Fine:** Delay change will be very fine.
- **Set Default:** sets Delay to its default setting of *0 secs*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.

- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

EnvelopeVar

Creates an analog-like behaviour when a note is triggered. The higher the setting, the more the attack and decay envelope phases differ from their original values.

Tap on **EnvelopeVar** to open a pop-up menu for further settings:

- **Normal:** EnvelopeVar change is about 0.01.
- **Fine:** EnvelopeVar change is about 0.001.
- **Super Fine:** EnvelopeVar change is about 0.0001.
- **Set Default:** sets EnvelopeVar to its *0.35* default value.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Attack Curve

Sets the characteristic of the attack phase.

- **Exponential (Exp)** switches the attack phase to exponential.
- **RC** simulates an analogue circuit and delivers a convex attack envelope phase.
- **Linear (Lin)** switches the attack phase to linear.

Tap on **Attack Curve** to open a pop-up menu for further settings:

- **Set Default:** sets Attack Curve to its default *RC* setting.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Decay Curve

Sets the characteristic of the decay phase.

- **Exponential (Exp)** switches the decay phase to exponential.
- **Alternate Exponential (Exp alt)** switches the decay phase to an alternative exponential curve.
- **Linear (Lin)** switches the decay phase to linear.

Tap on **Decay Curve** to open a pop-up menu for further settings:

- **Set Default:** sets Decay Curve to its *Exp* default setting.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Release Curve

Sets the characteristic of the release phase.

- **Exponential (Exp)** switches the release phase to exponential.
- **Alternate Exponential (Exp alt)** switches the release phase to an alternative exponential curve.
- **Linear (Lin)** switches the release phase to linear.

Tap on **Release Curve** to open a pop-up menu for further settings:

- **Set Default:** sets Release Curve to its *Exp* default setting.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.

- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Loop Mode

Sets one of the two available loop functions for the corresponding envelope:

- **AD Loop** repeats the **Attack** and **Sustain** phases while a note is held until it gets released and normal fade out starts. After releasing the note, **Release** phase of the envelope starts.
- **ADSR Loop** is identical to **AD**. As soon as the **Release** phase starts, the loop will go on.

Tap on **Loop Mode** to open a pop-up menu for further settings:

- **Set Default:** sets Loop Mode to its default *Off* setting.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Single Trigger

All envelopes offer a single trigger function. It works in Mono mode only, which can be activated with the **Mono** button:

- When set to **Off**, every note starts the envelope of its own voice; also works when playing legato.
- When set to **On**, the envelopes of all voices of a selected patch behave like a single envelope. This is the perfect setting for playing legato. The common envelope starts as soon as the first note is played. The sustain level remains until the last note is released. Afterwards the release phase is active.

Tap on **Single Trig** to open a pop-up menu for further settings:

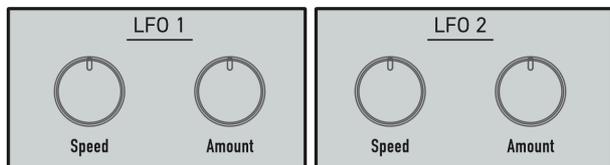
- **Set Default**: sets Single Trigger to its *Off* default setting.
- **Set Last Loaded**: resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC**: activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Mod Targets Button

Read more in the 'Modulation' chapter.

LFO Section

In addition to the main oscillators, Iridium Keyboard is equipped with six low frequency oscillators (LFOs) that can be used for modulation purposes. Each LFO generates a periodic waveform with adjustable frequency and shape.



The LFO section for LFO 1 and LFO 2

⚠ The basic parameters of **LFO 1** and **2** can be directly controlled via the front panel, while LFO 4 to 6 are accessible via the touchscreen display.

LFO Panel Parameters

Speed

Determines the frequency of the corresponding LFO. At low values it might take four minutes for the LFO to perform a complete cycle while higher values are in the audible range.

When the LFO **Sync** parameter is set to *On*, you can adjust **Speed Ratio** in musical values. The lowest possible value is *1024* bars, meaning that a complete LFO cycle would need 1024 bars.

Amount

Determines the amount of the corresponding LFO modulation applied to all destinations. Since the modulation is in fact, a multiplication of the source signal and this parameter, the resulting amplitude depends on the type of modulation source you select.

LFO Display Page

To access the LFO display page, press the LFO button. Tap on the corresponding tab (**LFO1** to **6**) to select the desired LFO you want to edit.

⚠ You can also switch through the LFOs by pressing the LFO button again and again.



! The display page parameters for every one of the six LFOs are similar.

Shape

Sets the type of waveform generated by the corresponding LFO.

- The **Sine** shape is best suited for oscillator FM or pan modulations.
- The **Triangle** shape is perfect for smooth pitch, filter or volume modulations.

- The **Square** shape can be interesting for hard pan modulations or special effects.
- The **Saw (down)** shape can generate interesting filter or volume changes. It creates a falling sawtooth wave.
- The **Saw (up)** shape can generate interesting filter or volume changes. It creates a rising sawtooth wave.
- **S&H** (Sample & Hold) samples a random value and holds it until the next value is generated. If **Speed** is set to 0 , a random value is generated on each new note.

Tap on **Shape** to open a pop-up menu for further settings:

- **Set Default:** sets Shape to its default *Sine* setting.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Speed /Speed Ratio

See corresponding description in the 'LFO Panel Parameters' chapter.

Tap on **Speed** to open a pop-up menu for further settings:

- **Normal:** Speed change is about 2.8 Hz.

- **Fine:** Speed change is about 0.28 Hz.
- **Super Fine:** Speed change is about 0.028 Hz.
- **Set Default:** sets Speed to its default value of 6.25 Hz.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Warp

Depending on the selected LFO **Shape**, the **Warp** parameter folds the corresponding waveform. Here are the results for the different LFO waveforms:

- If **Sine** is selected, positive or negative values compress the upper or lower phase of the waveform.
- If **Triangle** is selected, higher values turn the wave into a rising sawtooth wave while lower values create a falling sawtooth wave.
- If **Square** is selected, Warp changes the pulsewidth of the waveform.

- If **Saw (down or up)** is selected, the waveform is folded. Settings below 0.00% also reduce the LFO phase from bipolar to unipolar.
- If **S&H** (Sample & Hold) is selected, Warp shapes the edges of the held waveform and smooths it.

Tap on **Warp** to open a pop-up menu for further settings:

- **Normal:** Warp change is about 2.0 %.
- **Fine:** Warp change is about 0.2 %.
- **Super Fine:** Warp change is about 0.02 %.
- **Set Default:** sets Warp to its default value of +0.0%.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

All Amounts

See corresponding description in the 'LFO Panel Parameters' chapter.

Tap on **All Amounts** to open a pop-up menu for further settings:

- **Normal:** All Amounts change is about 2.0 %.
- **Fine:** All Amounts change is about 0.2 %.
- **Super Fine:** All Amounts change is about 0.02 %.

Attack

Controls the speed with which the LFO is faded in. With this parameter you can create slowly rising modulations that might create interest when routed to pitch or volume.

Tap on **Attack** to open a pop-up menu for further settings:

- **Normal:** Attack change is normal.
- **Fine:** Attack change is fine.
- **Super Fine:** Attack change is super fine.
- **Set Default:** sets Attack to its default value of *0 secs*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Decay

Controls the speed with which the LFO is faded out. With this parameter you can create slowly falling modulations that might create interest when routed to pitch or volume.

Tap on **Decay** to open a pop-up menu for further settings:

- **Normal:** Decay change is normal.
- **Fine:** Decay change is fine.
- **Super Fine:** Decay change is super fine.
- **Set Default:** sets Decay to its default *Off* setting.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Sync

When **Sync** is activated, the corresponding LFO is synced to the global **Tempo** of the Iridium Keyboard (can be set with the **Bpm** parameter). The **Speed** setting (called **Speed Ratio** here) can be changed to offer musically meaningful values.

Tap on **Sync** to open a pop-up menu for further settings:

- **Set Default:** sets Sync to its default *Off* setting.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Mode

When set to *Global*, the LFO phases of all voices are synced so that they sound as one LFO. This can be interesting when the LFO is applied to modulate **Cutoff**. If set to *Poly*, every note triggers its own LFO.

Tap on **Mode** to open a pop-up menu for further settings:

- **Set Default:** sets Mode to its default *Poly* setting.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Slew

Determines the slew rate of the selected LFO waveform. The higher the setting, the smoother the slew rate. Higher

settings also change the phase from a bipolar LFO waveform to nearly unipolar.

Tap on **Slew** to open a pop-up menu for further settings:

- **Set Default:** sets Slew to its default value of *40.0%*
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Phase

Controls the initial phase of the corresponding LFO when a new note is started. *Free* means that the LFO isn't restarted on a new note but runs freely while other values set the LFO phase to the respective offset in degrees.

Tap on **Phase** to open a pop-up menu for further settings:

- **Set Default:** sets Phase to its default setting of *0.0 deg*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Delay

Controls the delay in seconds, with which the corresponding LFO is faded in. With this parameter you can create slowly rising modulations that might create interest when routed to wave, pitch, or volume.

Tap on **Delay** to open a pop-up menu for further settings:

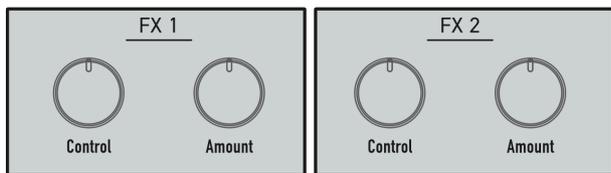
- **Set Default:** sets Delay to its default value of *0 secs.*
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Mod Targets Button

Read more in the 'Modulation' chapter.

The Effects

The Iridium Keyboard offers five effect units with a bunch of different effect types. Two basic parameters for the first and second effect unit can be controlled via the panel parameters while deeper editing is done on the Effect display page.



The FX 1 and FX 2 panel parameters

⚠ Keep in mind that the five effect units provide insert effects with a serial routing. That means that the signal will first go through Effect 1, then through Effect 2 after that, and so on.

Effects Display Page

To access the Effects display page press the EFFECTS button. Tap on the corresponding **Effect** tab to select the desired effect unit you want to edit.

⚠ The overall editing of the five effect units is similar. Depending on the selected effect type, different effect parameters are provided.

⚠ Hint: Most of the effect parameters can be modulated by any modulation source.

How to select an effect?

- 1) Tap on the desired Effect tab (Effect 1 to 5) you wish to use.
- 2) Tap on the Effect pop-up menu below the Effect tab button. Hint: You can skip step 1, because opening an Effect pop-up menu jumps automatically to the corresponding Effect unit.
- 3) Select the desired effect from the effect list.
- 4) All effect types can only be used once. This means, for example, that if you have set up the Delay for Effect 2 and you also select the Delay for Effect 4, Effect 2 is set to *Off*. All parameter edits made will be adopted. This enables you to perform an insert swapping of effects.
- 5) After an effect is loaded it can be edited by using the display page parameters.

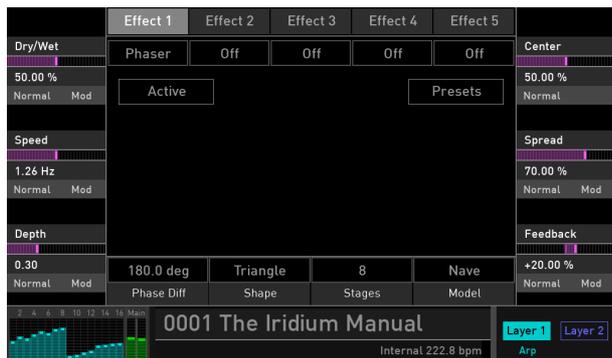
Common Effect Parameters

Every effect type offers an **Active** and a **Presets** button. Tap on it to activate its function:

- By tapping on **Active** the corresponding effect unit is set to bypass. No effect signal is generated. Tap on **Bypass** to unmute the effect again.
- Tap on **Presets** to open a pop-up window. Here you can load, save, and manage effect presets for the corresponding effect type. Here the following options are available:
 - On the left side you find a list of all presets for the current effect type. Tap on the desired name to select it and load it immediately. Already made effect settings will be overwritten.
 - With the **Save** option you can save the selected effect settings. You can also enter a desired name.
 - **Import** imports an effect preset from a connected MicroSD card or an USB storage device into the Iridium Keyboard's Flash memory. The imported preset is shown within the effect preset list.
 - **Export** exports the current selected effect preset to a connected MicroSD card or a USB storage device.
- **Delete** deletes the current selected effect preset after a security confirmation.
- **Init** initializes the current selected effect preset to its default settings.
- **Close** closes the pop-up window. No further action takes place.

The Effect Types

Phaser



Phase shifting is a sweeping effect that was first popularized in the 1960s. It adds motion and a swirling character to the sound. It works by splitting the incoming signal, changing the phase of one side, and recombining it with the unaffected signal. This creates a notch-comb filter that can be swept through the frequency spectrum, causing the signature ‘whooshing’ sound of the phase shifter. The sweep is caused when the phase of the affected half is modulated by a LFO, with the frequency determined by the

Speed control. Depth sets the amplitude for the action of the filtering, while Feedback amplifies certain harmonics.

⚠ For the typical Phaser effect sound the **Dry/Wet** parameter should be set to 50%.

Dry/Wet

Controls the volume ratio between the original signal and the effect output. If set to *0%*, the dry signal is sent to the output only so that no effect can be heard. Higher values will increase the effect signal. At maximum setting of *100%* the pure effect signal will be heard.

Speed

Sets the LFO speed of the Phaser effect.

Depth

Sets the modulation depth of the Phaser effect.

Center

Sets the phase offset of the modulation oscillator between the left and right audio channels. Higher values lead to a wider stereo range.

Spread

Controls the phase position of the Phaser signal. Lower settings produce a more resonant Phaser effect.

Feedback

Controls the feedback amount of the signal.

Phase Diff

Determines the start phase of the modulation waveform in degrees.

Shape

Determines the shape of the LFO waveform, which is used for the phaser modulation. You can select between a sine and a triangle waveform.

Stages

Determines the numbers of stages that are used for the Phaser effect. The Phaser offers five phaser types with either two, four, eight, 12, or 16 independent delay lines, where half of them are routed to the left input and output and the others to the right input and output.

Model

Determines the Phaser model that is used. You can select between the Phaser from Waldorf's *Nave* and *PPG Wave 3.V*.

Tap on the corresponding effect parameter to open a pop-up menu for further settings (not all settings are available for all effect parameters):

- **Normal:** parameter change is about 1%.
- **Fine:** parameter change is about 0.1%.
- **Super Fine:** parameter change is about 0.01%.
- **Set Default:** sets the parameter to its default value.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Chorus

A Chorus effect is generated by using comb filters that generate slightly detuned copies of the input signal and mix it into the output signal. The result sounds like an ensemble of several simultaneous sounds, like a choir as opposed to a single voice – hence being called Chorus. The detuning is generated by an internal LFO that can be controlled in speed and depth.



⚠ For the typical Chorus effect sound the **Dry/Wet** parameter should be set to 50%.

Dry/Wet

This parameter controls the volume ratio between the original signal and the effect output. If set to 0%, the dry signal is sent to the output only so that no effect can be heard. Higher values will increase the effect signal. At maximum of 100%, the pure effect signal will be heard.

Depth

Sets the modulation depth of the Chorus effect.

Speed

Sets the LFO speed of the Chorus effect.

Delay

Determines a delay for the chorus signal in milliseconds.

Feedback

Controls the feedback amount of the signal.

Spread

Controls the phase position of the chorus signal. Lower settings produce a more resonant chorus effect.

Shape

Determines the shape of the LFO waveform, which is used for the chorus modulation. You can select between a sine and a triangle waveform.

Stages

Determines the numbers of stages that are used for the Chorus effect. The Chorus offers four chorus types with either two, four, six, or eight independent delay lines, where half of them are routed to the left input and output and the others to the right input and output.

HighCut

Reduces the high frequencies of the chorus signal.

LowCut

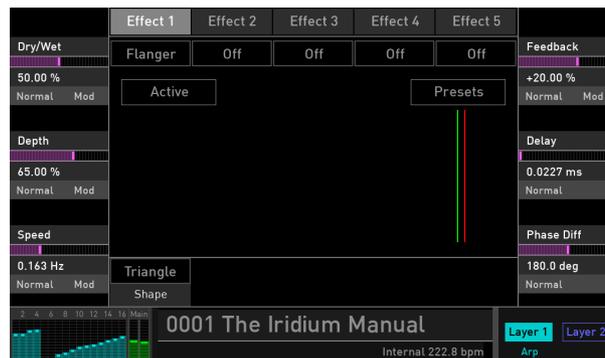
Reduces the low frequencies of the chorus signal.

Tap on the corresponding effect parameter to open a pop-up menu for further settings (not all settings are available for all effect parameters):

- **Normal:** parameter change is about 1%.
- **Fine:** parameter change is about 0.1%.
- **Super Fine:** parameter change is about 0.01%.
- **Set Default:** sets the parameter to its default value.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Flanger

The flanger effect is very similar to the chorus effect, but features feedback circuitry to feed the generated signal back into the comb filter. This generates a deeper detuning and colorizes the signal. With extreme settings you can hear a whistling sound which is very characteristic of a flanger effect.



⚠ For the typical Flanger effect sound the **Dry/Wet** parameter should be set to 50%.

Dry/Wet

This parameter controls the volume ratio between the original signal and the effect output. If set to *0%*, the dry signal is sent to the output only so that no effect can be heard. Higher values will increase the effect signal. At maximum setting of *100%* the pure effect signal will be heard.

Depth

Sets the modulation depth of the Flanger effect.

Speed

Sets the LFO speed of the Flanger effect.

Feedback

Controls the feedback amount of the flanger-signal.

Delay

Determines a delay for the flanger signal in milliseconds.

Phase Diff

Determines the start phase of the modulation waveform in degrees.

Shape

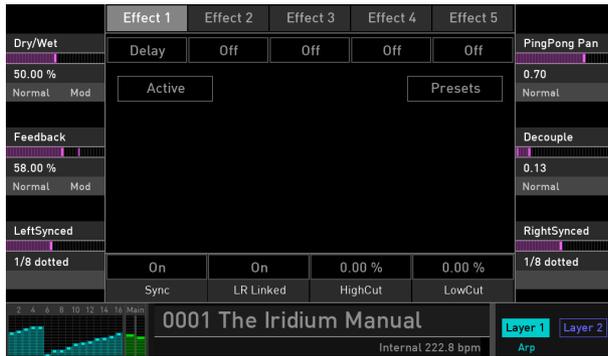
Determines the shape of the LFO waveform, which is used for the flanger modulation. You can select between a sine and a triangle waveform.

Tap on the corresponding effect parameter to open a pop-up menu for further settings (not all settings are available for all effect parameters):

- **Normal:** parameter change is about 1%.
- **Fine:** parameter change is about 0.1%.
- **Super Fine:** parameter change is about 0.01%.
- **Set Default:** sets the parameter to its default value.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Delay

A Delay is an effect that produces echoes of the input signal.



Dry/Wet

This parameter controls the volume ratio between the original signal and the effect output. If set to 0%, the dry signal is sent to the output only so that no effect can be heard. Higher values will increase the effect signal. At maximum setting of 100% the pure effect signal will be heard.

Feedback

Controls the amount of signal that is routed back into the Delay line. Lower values, therefore, produce fewer echoes than higher values.

Delay-L

Sets the length of the Delay tap for the left channel in milliseconds or rather seconds. If **Sync** is activated, the delay length can be entered in musical values.

PingPongPan

Controls the feedback send from the left channel to the right one and vice versa.

Decouple

This parameter delays the synced delay differently for the right and the left channel. This leads to a less static delay sound.

Delay-R

Sets the length of the Delay tap for the right channel in milliseconds or rather seconds. If **Sync** is activated, the delay length can be entered in musical values.

Sync

Synchronizes the delay to the internal tempo of the Iridium Keyboard. If activated, you can set up **Delay-L** and **Delay-R** in musical values.

LR Linked

If this parameter is set to on, both delay signals (Delay-L and Delay-R) work as one signal. **Delay-L** is used to set the delay length; **Delay-R** has no function.

HighCut

Dampens the high frequencies produced by the Delay effect. This filter is routed before the feedback circuitry meaning that adjacent taps of the Delay will be dampened further. This creates the typical 'high frequency loss' that often happens in natural echoes. A minimal setting means that the signal isn't filtered, while higher settings filter the high frequencies of the feedback signal.

LowCut

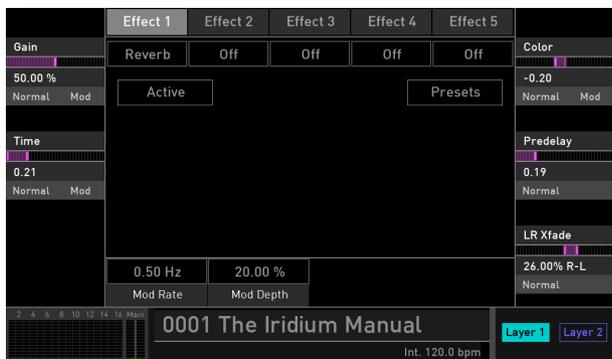
Dampens the low frequencies produced by the Delay effect.

Tap on the corresponding effect parameter to open a pop-up menu for further settings (not all settings are available for all effect parameters):

- **Normal:** parameter change is about 1%.
- **Fine:** parameter change is about 0.1%.
- **Super Fine:** parameter change is about 0.01%.
- **Set Default:** sets the parameter to its default value.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Reverb

The Reverb effect is probably the most widely used effect in music production. Iridium Keyboard's reverb effect is an addition to the sound to make it more expressive with a three-dimensional feel.



Gain

This parameter controls the volume of the reverb effect. If set to 0%, the dry signal is sent to the output only so that no effect can be heard. Higher values will increase the reverb level. At maximum setting of 100% the pure reverb effect signal will be heard.

Time

Determines the reverb time. Lower settings simulate a normal room while higher settings simulate a big hall or church.

Color

Determines the spectral colorization of the reverb sound. Negative values dampen the higher frequencies while positive settings dampen the lower frequencies.

Predelay

Determines the delay between the direct sound and the reverb effect output. Lower settings connect the reverb more to the original signal while higher settings separate the effect signal to produce a more spacious sound.

LR Xfade

Crossfades the left and right channel of the reverb effect. It is possible to crossfade from left to right and vice versa.

Mod Rate

Modulation allows you to enrich the reverb flag over subtle pitch modulations. **Mod Rate** determines the frequency of this pitch modulation.

Mod Depth

Determines the intensity of the pitch modulation. If no pitch modulation is desired, set this parameter to *0.00%*.

Tap on the corresponding effect parameter to open a pop-up menu for further settings (not all settings are available for all effect parameters):

- **Normal:** parameter change is about 1%.
- **Fine:** parameter change is about 0.1%.
- **Super Fine:** parameter change is about 0.01%.
- **Set Default:** sets the parameter to its default value.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in ‘The Modulation Mode’ chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

EQ (Equalizer)

Iridium Keyboard offers a parametric equalizer to adjust the sound frequencies to your needs.



ⓘ Tap on the corresponding EQ curve in the touch-screen display to edit the **Frequency** and **Gain** parameters.

The equalizer features four bands with the following parameters:

EQ Dry/Wet

This parameter controls the volume ratio between the original signal and the effect output. If set to 0%, the dry signal is sent to the output only so that no effect can be heard. Higher values will increase the effect signal. At maximum setting of 100% the pure effect signal will be heard.

Low Freq

Controls the cutoff frequency of the low band. This shelf filter type looks like a normal or an inverted 'S' and it sounds and works similar to a low filter with adjustable stop band attenuation or boost.

Low Gain

Controls the gain boost or cut of the low band.

Freq Shift

Frequency shifting moves each frequency in a signal by the set amount. This is different to pitch shifting. For example, set an EQ Mid band to 2000 Hz with a Gain of 10 dB; every frequency within the signal is shifted by the same amount so that the harmonic relationships within the signal are broken, resulting in a very different sound.

High Freq

Controls the cutoff frequency of the high band. This shelf filter type looks like a normal or an inverted 'S' and it works and sounds similar to a hi-pass filter with adjustable stop band attenuation or boost.

High Gain

Controls the gain boost or cut of the high band.

Mid Freq / Mid 2 Freq

Controls the center frequency of the corresponding band. This bell filter looks like a normal or inverted bell and works and sounds similar to a band pass or notch filter – again with variable boost or attenuation and also with variable width.

Mid Gain /Mid 2 Gain

Controls the gain boost or cut of the corresponding band.

Mid Q / Mid2 Q

Controls the quality or width of the corresponding band. Higher values result in a narrower band, lower values widen it.

Master Gain

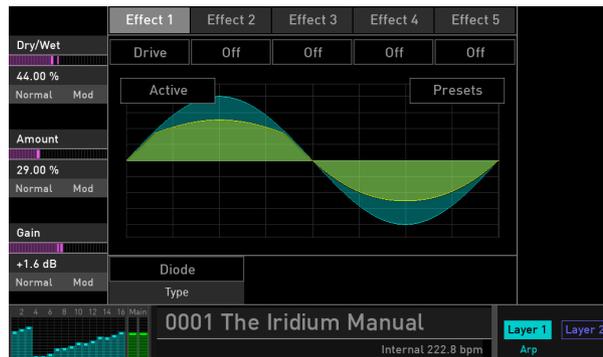
Working with an equalizer mostly affects the level of the output signal. Use **Master Gain** to adjust the overall gain to suit your needs.

Tap on the corresponding effect parameter to open a pop-up menu for further settings (not all settings are available for all effect parameters):

- **Normal:** parameter change is about 1%.
- **Fine:** parameter change is about 0.1%.
- **Super Fine:** parameter change is about 0.01%.
- **Set Default:** sets the parameter to its default value.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in ‘The Modulation Mode’ chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Drive

Adds gain to a signal causing it to clip and distort. It introduces new harmonics that add a harsh edge to sounds.



⚠ Tap on the drive curve in the touchscreen display to edit the **Amount** parameter.

Dry/Wet

This parameter controls the volume ratio between the original signal and the effect output. If set to 0%, the dry signal is sent to the output only so that no effect can be heard. Higher values will increase the effect signal. At

maximum setting of *100%* the pure effect signal will be heard.

Amount

Determines the amount of saturation that is added to the signal. If set to *0.00%*, no saturation will be added or, in other words, the signal will remain clean. Lower values will add some harmonics to the signal, resulting in a warm character. Increasing the value will bring in more and more distortion, suitable for harder lead sounds and effects.

Gain

Working with the drive effect mostly affects the level of the output signal. Use **Gain** to adjust the overall gain to your needs.

Type

Determines the character of the drive. The following drive curves are available:

- **PNP** generates a distortion based on a bipolar transistor.
- **Tube** simulates the asymmetric distortion of a tube circuit.

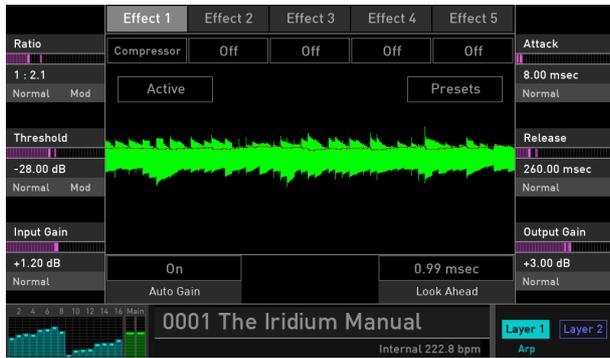
- **PickUp** simulates an electrostatic pickup. This drive type sounds very interesting, when the audio signal level is modulated.
- **Diode** generates a typical diode distortion.
- **Crunch** is a sinusoidal waveshaper. It generates FM-like sounds that can be extremely distorted.

Tap on the corresponding effect parameter to open a pop-up menu for further settings (not all settings are available for all effect parameters):

- **Normal:** parameter change is about 1%.
- **Fine:** parameter change is about 0.1%.
- **Super Fine:** parameter change is about 0.01%.
- **Set Default:** sets the parameter to its default value.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Compressor

An Compressor reduces signals which exceed a certain **Threshold** level in volume by an adjustable **Ratio**. The speed of this level reduction is controlled by **Attack**, when the signal starts to exceed the threshold, and **Release**, when it drops below the threshold again.



Ratio

Sets the amount of gain reduction (compression) applied to signals above the set **Threshold**. A ratio of 4:1 means that for every 4 dB the input level increases, the output level increases by 1 dB.

Threshold

Determines to which signal level the compressor will be working. Only signal levels above threshold are processed.

Input Gain

Determines the input gain of the incoming audio signal.

Attack

Determines how fast the compressor responds to audio signals above the set **Threshold**. If the attack time is high, more of the transient parts of the signal passes through unprocessed.

Release

Sets the time after which the gain returns to its original level when the signal drops below the threshold.

Output Gain

Compensates for output gain loss caused by compression.

Auto Gain

Switch on the **Auto Gain** function for an automatic control of **Output Gain** when adjusting the **Threshold**.

Look Ahead

Higher **Look Ahead** values produce more accurate processing, but adds a certain amount of latency.

⚠ Keep in mind, that the Compressor effect settings are stored with the current sound program. This is not valid for the **Compressor** knob in the **Output** section.

Tap on the corresponding effect parameter to open a pop-up menu for further settings (not all settings are available for all effect parameters):

- **Normal**: parameter change is about 1%.
- **Fine**: parameter change is about 0.1%.
- **Super Fine**: parameter change is about 0.01%.
- **Set Default**: sets the parameter to its default value.
- **Set Last Loaded**: resets the parameter to the last loaded value from the current sound patch.
- **Modulations**: opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC**: activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Modulation in the Iridium Keyboard

A modulation can be described as a signal-generating unit's influence upon a sound parameter. The terms used in this context are 'Source' and 'Destination'. The Iridium Keyboard offers 40 independent modulation assignments (slots) each with individual settings of source, destination, and amount. The Modulation Matrix (Mod Matrix) is key to the power of every Waldorf synthesizer, so start experimenting with it *right now*.

! A complete table of all available sources and destinations can be found in the Appendix.

How to set up a modulation

Iridium Keyboard offers an easy way to determine modulation by using the dials on the panel. This modulation assignment can be called up in different ways:

- Press the **MOD** button
or
- Tap on one of the display parameter names (the three parameters on the left and right side) to open a pop-up menu. Select the **Modulation** option. Keep in mind that not all parameters include this option.

The display shows the **Modulation Assignment** window. The basic concept is to select a modulation destination first (a parameter or function to be modulated), then select a modulation source (a function, such as an LFO or a wheel, that will modulate the destination) and finally determine the amount of modulation. This is also called modulation depth or intensity.

! If you have opened the Modulation Assignment window by clicking on a display parameter, the modulation destination is already defined by this parameter.

This is how the Modulation Assignment works:

- 1) If you have pressed the **Mod** button, first select a modulation destination by turning one of the parameter dials that are lit in blue. This step is not necessary if the **Modulation** option is selected in the pop-up menu of a display parameter.
- 2) Select the corresponding modulation source by either turning one of the available panel dial sources (the LED below any dials/sources is lit in yellow). By turning the dial you can directly set the desired modulation amount. This will be also shown in the display.

- 3) You can also select one of the six modulation sources in the display. Turn the corresponding dial (e.g. wheel) to select the desired modulation amount.
- 4) You can add other modulation assignments by repeating step 2. Any assignment will be shown in the display by its **Source**, its **Amount** and the **Destination**.
- 5) Amounts can be changed at any time by turning the corresponding modulation source dial.

⚠ Keep in mind that you can set up positive or negative modulation amounts. Positive amounts will be shown as a green bar while negatives will be shown as a red bar. The same goes for the LEDs below the corresponding modulation source.

The Modulation Assignment window includes some more options:

- **Clear Selected** button: tap on the desired modulation entry to select it. Tap on the **Clear Selected** button to delete the selected modulation assignment.
- **Clear All** button: tap on this button to delete all modulation assignments that are shown in this list.

- **Go to Matrix** button: tap on this button to open the Modulation Matrix. Read more on this in the next chapter.
- **Close** button: closes the Modulation Assignment window. Already made modulation assignments will not be deleted.

Modulation Matrix Display Page

To access the Modulation Matrix display page press the MOD button. Tap on the **Modulation Matrix** tab on the touchscreen to select the display page.



This page shows all modulation assignments in a list. You can set up to 40 assignments.

How to setup a modulation:

- 1) Select the desired slot by using the **Slot** dial or tap on the slot in the list. You can scroll the list up and down by tapping and holding on it, then moving your finger up or down.
- 2) Select the desired modulation source by using the **Source** dial. Within the Source list there are 53 sources.
- 3) Select the desired modulation destination by using the **Destination** dial. Within the Destination list there are 191 destinations.
- 4) Set the desired modulation amount by turning the **Amount** dial. You can set a positive or negative amount.
- 5) You can also add a **Controller** with a **Control Amount** to a modulation assignment. More on this below.

Slot

Selects the respective Modulation Slots 1 to 40.

Source

Defines the modulation source.

Tap on **Source** to open a pop-up menu for further settings:

- **Set Default:** sets the parameter to its default *Off* setting.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Controller

All modulation sources can also be used as controllers for the selected **Source**. A controller is used to scale the output of the modulation source. A typical example is the Modulation wheel as source and a LFO as the controller. This allows you to control the intensity of the LFO modulation using the wheel.

Tap on **Controller** to open a pop-up menu for further settings:

- **Set Default:** sets the parameter to its default *Off* setting.

- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Amount

Determines the amount of modulation applied to the destination. Since the modulation is, in fact, a multiplication of the source signal and this parameter, the resulting amplitude depends on the type of modulation source you select:

- For the so-called unipolar modulation sources the resulting amplitude lies within the range of 0...+1 – if **Amount** is positive or 0...-1 – if **Amount** is negative. These sources are: all envelopes; all MIDI controllers including Mod Wheel, Pedal, etc; Velocity; Release Velocity; Aftertouch (Pressure; and Polyphonic Pressure).
- For the so-called bipolar modulation sources the resulting amplitude lies within the range of -1...0...+1. These sources are: all LFOs, Keytrack, and Pitchbend.

Tap on **Amount** to open a pop-up menu for further settings:

- **Normal:** parameter change is about 2%.

- **Fine:** parameter change is about 0.2%.
- **Super Fine:** parameter change is about 0.02%.
- **Set Default:** sets the parameter to its default value of +0.0%.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Destination

Defines the modulation destination.

Tap on **Destination** to open a pop-up menu for further settings:

- **Set Default:** sets the parameter to its default *Off* setting.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Control Amount

Determines an additional amount for the selected **Controller. Amount** and **Control Amount** is summed up to the total amount.

Tap on **Control Amount** to open a pop-up menu for further settings:

- **Normal:** parameter change is about 2%.
- **Fine:** parameter change is about 0.2%.
- **Super Fine:** parameter change is about 0.02%.
- **Set Default:** sets the parameter to its default value of *+0.0%*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Active Button

Select a desired modulation entry. Tap on the **Active** button to disable the corresponding modulation assignment. The button is labeled 'Disabled' and the modulation slot is greyed out. Use this to temporarily bypass a modulation. Tap on Disabled to activate the modulation again.

Copy Slot Button

Tap on the **Copy Slot** button to copy the current selected modulation slot into the internal clipboard.

Paste Slot Button

Only available, when a slot was copied before. Tap on the **Paste Slot** button to copy the slot clipboard to the current modulation slot. Keep in mind that this operation cannot be undone.

Clear Slot Button

Select a desired modulation entry. Tap on the **Clear Slot** button to delete this modulation assignment.

Clear All Button

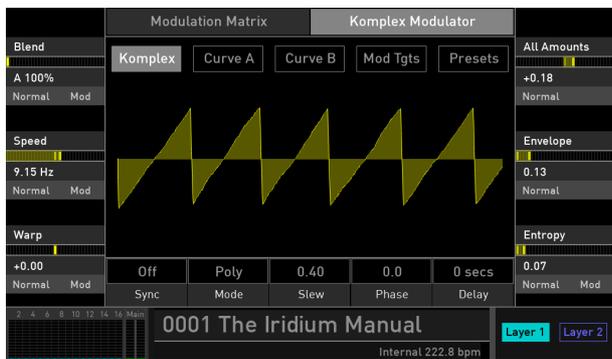
Tap on this button to delete all modulation assignments that are shown in the modulation matrix. A confirmation to finish this process is necessary.

Modulation Matrix List

The matrix list shows all currently made modulations. If a **Controller** is selected, it will also be shown in the **Source** column. If a **Control Amount** is set, it will also be shown as a separate bar in the **Amount** column.

Komplex Modulator

The Komplex Modulator could be described as a complex LFO with two different curves that can be mixed together, if desired. The output signal of this section can be used as modulation source to create morphing atmospheres, drones, and blurring sounds.



⚠ To hear result of the Komplex Modulator you should define it as a modulation source for a desired parameter like pitch, filter cutoff frequency, or any other parameter you like.

To access the Komplex Modulator display page, press the MOD button. Tap on the **Komplex Modulator** tab to select the corresponding display page.

The Komplex Tab

Here you find parameters that are used for the overall Komplex Modulator signal.

Blend

Mixes the result of **Curve A** and **Curve B**. The leftmost setting (*A 100%*) only uses the signal from **Curve A** as modulation source while the rightmost setting (*B 100%*) only uses **Curve B**. Other settings morph **Curve A** into **Curve B**, and vice versa.

Tap on **Blend** to open a pop-up menu for further settings:

- **Normal:** Blend change is about 1%.
- **Fine:** Blend change is about 0.1%.
- **Super Fine:** Blend change is about 0.01%.
- **Set Default:** sets Blend to its default value of *A 100%*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.

- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in ‘The Modulation Mode’ chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Speed

Determines the frequency of the Komplex Modulator waveform. At low values it might take four minutes to perform a complete cycle while higher values go up to the audible range.

When the Komplex Modulator **Sync** parameter is set to *On*, you can adjust the **Speed** in musical values. The lowest possible value is *1024* bars, meaning that a complete cycle would need 1024 bars.

Tap on **Speed** to open a pop-up menu for further settings:

- **Normal:** Speed change is about 0.01.
- **Fine:** Speed change is about 0.001.
- **Super Fine:** Speed change is about 0.0001.
- **Set Default:** sets Speed to its default *0.50* value.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.

- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in ‘The Modulation Mode’ chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Warp

Depending on the created Komplex Modulator shape the **Warp** parameter folds the waveform. The result may look different, based on the initial waveform.

Tap on **Warp** to open a pop-up menu for further settings:

- **Normal:** Warp change is about 0.02.
- **Fine:** Warp change is about 0.002.
- **Super Fine:** Warp change is about 0.0002.
- **Set Default:** sets Warp to its default value of *+0.0%*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in ‘The Modulation Mode’ chapter.

- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

All Amount

Determines the amount of the Komplex Modulator modulation applied to all destinations. Since the modulation is in fact, a multiplication of the source signal and this parameter, the resulting amplitude depends on the type of modulation source you select.

Tap on **All Amounts** to open a pop-up menu for further settings:

- **Normal:** All Amounts change is about 2.0 %.
- **Fine:** All Amounts change is about 0.2 %.
- **Super Fine:** All Amounts change is about 0.02 %.

Envelope

Controls the speed with which the Komplex Modulator is faded in and out. With this parameter you can create slowly rising and falling modulations that might create interest when routed to pitch or volume.

Tap on **Envelope** to open a pop-up menu for further settings:

- **Normal:** Envelope change is about 0.01.
- **Fine:** Envelope change is about 0.001.
- **Super Fine:** Envelope change is about 0.0001.
- **Set Default:** sets Envelope to its default value of *0.00*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Entropy

Determines how intensive a random noise signal has influence on the time axis. The higher the Entropy value, the more randomly the complete waveform seems to be in all cycles. The graphic display of the waveform may give an idea of what exactly is happening. Otherwise the result is far from accurate.

Tap on **Entropy** to open a pop-up menu for further settings:

- **Normal:** Entropy change is about 0.1.
- **Fine:** Entropy change is about 0.01.
- **Super Fine:** Entropy change is about 0.001.

- **Set Default:** sets Entropy to its default value of *0.00*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in ‘The Modulation Mode’ chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Sync

When **Sync** is activated, the Komplex Modulator is synced to the global **Tempo** of the Iridium Keyboard, which can be determined via the **Arpeggiator** or **Sequencer** pages. The **Speed** setting (called **Speed Ratio** here) changes to offer musically meaningful values.

Tap on **Sync** to open a pop-up menu for further settings:

- **Set Default:** sets Sync to its default *Off* setting.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Mode

When set to *Global*, the Komplex Modulator phases of all voices are synced so that they sound as one Komplex Modulator. This can be interesting when the Komplex Modulator is applied to modulate **Cutoff**. If set to *Poly*, every note triggers its own Komplex Modulator. If set to *Envelope*, the Komplex Modulator acts as a free-form envelope. In this mode the graphic representation changes to a single envelope based on the settings made for **Curve A** and **B**.

Tap on **Mode** to open a pop-up menu for further settings:

- **Set Default:** sets Mode to its default *Poly* setting.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates the MIDI Learn function, which maps an incoming MIDI control change to this parameter.

Slew

Determines the slew rate of the created Komplex Modulator waveform. The higher the setting, the smoother the slew rate. Higher settings also change the phase from the bipolar Komplex Modulator waveform to nearly unipolar.

Tap on **Slew** to open a pop-up menu for further settings:

- **Set Default:** sets Slew to its default *0.40* value.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Phase

Controls the initial phase of the Komplex Modulator shape when a new note is started. *Free* means that the Komplex Modulator isn't restarted on a new note but runs freely while other values set the Komplex Modulator phase to the respective offset in degrees.

Tap on **Phase** to open a pop-up menu for further settings:

- **Set Default:** sets Phase to its default value of *0.0*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Delay

Controls the speed in seconds, at which the Komplex Modulator is faded in. With this parameter you can create

slowly rising modulations that might create interest when routed to wave, pitch or volume.

Tap on **Delay** to open a pop-up menu for further settings:

- **Set Default:** sets Delay to its default value of *0 secs*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

The Mod Tgts (Modulation Targets) Button

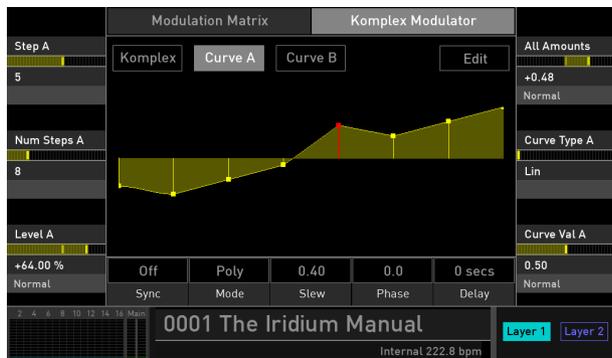
Read more in the 'Modulation' chapter.

The Presets Button

Tap on the **Presets** button to open a pop-up window for loading, saving, and managing Komplex Modulator settings. For more information on the available options please refer to the **Presets** chapter in the Wavetable section.

The Curve A & B Tabs

Here you can edit the two curves A and B. Tap on the button **Curve A** or **Curve B** to open the corresponding edit page.



! Curve A and B use the same parameters for editing.

Editing Curves within the Curve Graphic

To edit a curve in the graphic display you can do the following:

- Tap on the corresponding step and move your finger up or down to change its level. The selected step is lit in red.
- You can also tap and hold a step and move your finger to the left or to the right to draw the level of the steps in one go.

- If you double tap above or below a step, the level jumps immediately to this position.

! For more precise editing of steps we recommend using the corresponding display page parameters.

Step A/B

Selects a desired step for further editing. The current selected step is lit in red.

Num Steps A/B

Determines the number of available steps. Here you can set up step numbers from a minimum of two through to a maximum of 32.

Tap on **Num Steps A** or **B** to open a pop-up menu for further settings:

- **Set Default:** sets Num Steps to its default value of 8.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Level A/B

Determines the level of the selected step.

Tap on **Level** to open a pop-up menu for further settings:

- **Normal:** Level change is about 2%.
- **Fine:** Level change is about 0.2%.
- **Super Fine:** Level change is about 0.02%.
- **Set Default:** sets Level to its default setting.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

All Amounts

See corresponding description in the 'Komplex Modulator Panel Parameters' chapter.

Tap on **All Amounts** to open a pop-up menu for further settings:

- **Normal:** All Amounts change is about 2.0 %.
- **Fine:** All Amounts change is about 0.2 %.

- **Super Fine:** All Amounts change is about 0.02 %.

Curve Type A/B

Selects the curve type that is used for the selected step. The following curve types are available:

- **Lin:** uses a linear curve.
- **Step:** uses a step that switches directly to the level of the next step.
- **Cos:** uses a cosine curve.
- **Saw:** uses a sawtooth-like curve that rises or falls to the next step. This depends on the step level.
- **Curve:** uses a curve characteristic that can be defined with the **Curve Type** parameter.

Tap on **Curve Type** to open a pop-up menu for further settings:

- **Set Default:** sets Curve Type to its default *Lin* setting.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Curve Val A/B

If the **Curve Type** is set to *Curve*, you can shade the curve from exponential to linear to inverse exponential.

Tap on **Curve Val** to open a pop-up menu for further settings:

- **Normal:** Curve Val change is about 0.01.
- **Fine:** Curve Val change is about 0.001.
- **Super Fine:** Curve Val change is about 0.0001.
- **Set Default:** sets Curve Val to its default setting of *0.50*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

The Edit Button

Tap on the **Edit** button to open a pop-up window with additional tools for editing Curve A or B. This parameter does not affect the number of the steps.

- **Clear:** clears all steps and sets their levels to *0*.
- **All Steps:** sets all steps to the Step curve type.

- **All Lin:** sets all steps to the linear curve type.
- **All Saw:** sets all steps to the sawtooth curve type.
- **All Cos:** sets all steps to the cosine curve type.
- **All Curve:** sets all steps to the Curve type.

Additional Modes

Master Mode Pages

To access the Master display pages press the **Master** button. Tap on the corresponding tab to open the desired master option page (Levels, Pitch, Voices, or Master).



The Levels Tab

Here you can make settings regarding the audio input signal as well as for the current selected layer.



Input Volume

Here you determine the input volume of an external audio signal for the selected layer. Use this parameter if you want to feed an external audio signal through the Iridium Keyboard's signal path in **Live Granular** mode. Be careful with this setting because higher values could disturb the sound.

Tap on **Input Volume** to open a pop-up menu for further settings:

- **Normal:** Input Volume change with normal values.
- **Fine:** Input Volume change with fine values.
- **Super Fine:** Input Volume change with super fine values.
- **Set Default:** sets Input Volume to its default value of *-inf dB*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Input Routing

Here you can determine the signal flow for an incoming audio signal. Tap on **Input Routing** to open a pop-up menu with the following options:

- **Off:** an incoming signal is ignored.
- **Main Output:** an incoming audio signal is directly routed to the Iridium Keyboard's Main Output.
- **FX Layer 1:** an incoming audio signal is directly routed into the Effect section of Layer 1.
- **Filter L1:** an incoming audio signal is directly routed into the Dual Filter section of Layer 1.
- **Former L1:** an incoming audio signal is directly routed into the Digital Former section of Layer 1.
- **FX Layer 2:** an incoming audio signal is directly routed into the Effect section of Layer 2.
- **Filter L2:** an incoming audio signal is directly routed into the Dual Filter section of Layer 2.
- **Former L2:** an incoming audio signal is directly routed into the Digital Former section of Layer 2.

Layer Volume

Here you determine the volume of the current selected layer.

Tap on **Vol** to open a pop-up menu for further settings:

- **Normal:** Volume change with normal values.
- **Fine:** Volume change with fine values.
- **Super Fine:** Volume change with super fine values.
- **Set Default:** sets Volume to its default value of *0 dB*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Pan

Here you determine the panning of the current selected layer.

Tap on **Pan** to open a pop-up menu for further settings:

- **Normal:** panning change is about 2%.
- **Fine:** panning change is about 0.2%.
- **Super Fine:** panning change is about 0.02%.
- **Set Default:** sets panning to its default *Center* value.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to set up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Gain

Here you determine the gain for an external signal. Make sure to adapt the overall level of an external audio signal by using **Input Volume** in conjunction with **Gain**.

Tap on **Gain** to open a pop-up menu for further settings:

- **Normal:** Gain changes with normal values.
- **Fine:** Gain changes with fine values.
- **Super Fine:** Gain changes with super fine values.
- **Set Default:** sets Gain to its default value of *+0.0 dB*.

- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Amp Velo Amt. (Amplifier Velocity Amount)

Specifies how much volume will be affected by keyboard velocity. Use this feature to give more expression to the sound. With a setting of *0.0%* velocity will have no effect on the volume. Classic organs work in this way because they do not have dynamic response. For positive settings the volume rises with higher velocities. This is the most commonly used setting, which gives a piano-like character. With negative settings, the volume decreases at higher velocities. This gives an atypical character is suited for effect sounds. As this parameter always works in conjunction with the Amplifier Envelope it actually determines the envelope velocity amount.

Tap on **Amp Velo Amt.** to open a pop-up menu for further settings:

- **Set Default:** sets Amp velocity amount to its default value of *+0.00 %*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.

- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

AT Attack

This option opens a slider to determine the behaviour of the polyphonic aftertouch, when a key is hold and pressed. In normal way, aftertouch takes place immediately when a key is pressed. Here, you can determine an attack value, so that aftertouch is blend in with that current time amount.

Tap on **AT Attack** to open a pop-up menu for further settings:

- **Set Default:** sets AT Attack to its default value of *0.10*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

AT Release

This option opens a slider to determine the behaviour of the polyphonic aftertouch. In normal way, aftertouch ends immediately when a pressed key is released. Here, you can determine a release value, so that aftertouch is blend out with that current time amount.

Tap on **AT Release** to open a pop-up menu for further settings:

- **Set Default:** sets AT Release to its default value of *0.01*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

The Pitch Tab

Here, you can set up the Glide function and control the overall Pitch variation.



Glide Active

If set to **On**, the Glide effect is activated. 'Glide' or 'Portamento' describes the continuous gliding from one note to another. This effect can be created on fretless stringed instruments or some brass instruments (e.g. trombone). It is very common on synthesizers and used throughout all music styles. Please note that Glide affects the pitch of all oscillators.

Tap on **Glide Active** to open a pop-up menu for further settings:

- **Set Default:** sets Glide to its default mode: *Off*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Glide Rate

Use **Rate** to determine the glide time. Low values will give a short glide time in a range of milliseconds that gives a special character to the sound. Higher values will result in a long glide time of up to several seconds which can be useful for solo and effect sounds.

Tap on **Glide Rate** to open a pop-up menu for further settings:

- **Normal:** Glide Rate change is about *0.08 secs*.
- **Fine:** Glide Rate change is about *0.01 secs*.
- **Super Fine:** Glide Rate change is about *0.001 secs*.
- **Set Default:** sets Glide Rate to its default *0.045 secs*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Glide Type

Here you can choose between two Glide modes:

- **Onset** means that a continuous glide is performed on all new notes.
- **Legato** means that a continuous glide is performed only when notes are played legato. Staccato played notes start on the exact pitch of their note.

Tap on **Glide Type** to open a pop-up menu for further settings:

- **Set Default:** sets Glide Type to its default mode: *Onset*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

PitchVar

The **PitchVar** parameter (on the left display section) is global to all oscillators of all voices. It represents the **PitchVar** parameter that also can be found on the bottom of the Oscillator Control display page.

Tap on **PitchVar** to open a pop-up menu for further settings:

- **Normal:** PitchVar change is about *0.01*.
- **Fine:** PitchVar change is about *0.005*.
- **Super Fine:** PitchVar change is about *0.001*.
- **Set Default:** sets PitchVar to its default *0.17*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.

- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

The Voices Tab

Here you determine the layer mode and how many voices are triggered when a note is played.



Voices tab page with active Unisono section

Timbre Mode

Iridium Keyboard offers three different modes for the Sound layers:

- **Single:** both Sound layers have individual settings and cannot be played together. You can switch between two layers by tapping on the **Layer 1** or **Layer 2** button in the touch screen display.
- **Split:** Layer 1 and Layer 2 use a dedicated keyboard range for playing. A typical situation is that a bass sound is played in the lower range of the keyboard while a lead sound is played in the upper range.
- **Layered:** both Sound layers are played simultaneously over the whole keyboard range. Use this option to combine two sounds, such as a pad and a poly lead.

ⓘ Depending on the selected Timbre mode, the display representation may differ.

Unisono

Here you determine the number of voices that are stacked when playing a note. This means that the selected number of voices are triggered when a note is played. Only the first voice has high priority, meaning that it can cut off other played notes. The other voices can only sound if any voices

are free or if there are other unison voices with lower priority that could be cut off. This ensures that older notes play at least one voice as long as the voice allocation isn't forced to even steal this voice for a new note. You can select a maximum of 8 voices.

Tap on **Unisono** to open a pop-up menu for further settings:

- **Set Default:** sets Unisono to its default value of *Off*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates the MIDI Learn function, which maps an incoming MIDI CC to this parameter.

ⓘ Please note that the number of Unisono voices will respectively lower the number of available voices.

ⓘ The following parameters (Unisono Detune, Pan and Delay) are only available if **Unisono** is set to a voice value other than *Off*.

Uni Detune

Controls the detuning of the Unisono voices. Each voice is detuned differently; with **Uni Detune** you control the overall amount.

Tap on **Uni Detune** to open a pop-up menu for further settings:

- **Set Default:** sets Uni Detune to its default value of *0.20*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Uni Pan

Controls the panning of the Unisono voices. Each voice is panned differently; with **Uni Pan** you control the overall degree amount.

Tap on **Uni Pan** to open a pop-up menu for further settings:

- **Set Default:** sets Uni Pan to its default value of *90 deg*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Uni Delay

Controls the delay of the Unisono voices relating to the first played note. Each voice is delayed differently; with **Uni Delay** you control the overall delay amount.

Tap on **Uni Delay** to open a pop-up menu for further settings:

- **Set Default:** sets Uni Delay to its default value of *0.25*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.



The following parameters are only available if **Timbre Mode** is set to *Split*.



Voices tab page in Split mode

Layer 1 / 2 Voices (only for Split Mode)

Here you determine, how many voices the corresponding sound layer is able to play. Keep in mind that Iridium Keyboard offers an overall polyphony of 16 voices. If you set Layer 1 to 9 voices, Layer 2 automatically switches to 7 voices, and vice versa.

L1 / 2 Min / Max Key (only for Split Mode)

Here you determine the keyboard range for the corresponding layer when in **Split** mode. The lowest setting is 0 (note C-2); the highest is 60 (note C8).

Tap on **L1/2 Min Key** or **L1/2 Max Key** to open a pop-up menu for further settings:

- **Set Default:** sets L1/2 Min Key/Max Key to its default value.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates the MIDI Learn function, which maps an incoming MIDI control change to this parameter.
- **Set From Keys:** play a key on your keyboard to set the corresponding note value manually.

Controller (only for Split and Layered Mode)

Determines which Layer will be affected by incoming Mod wheel, Pitch bend, Aftertouch, Pads and Modulation pad data.

- **Both:** wheels and play controls affect both layers.

- **Layer 1 / Layer 2:** wheels and play controls affect Layer 1 or Layer 2.
- **Selected:** wheels and play controls affect the current selected layer.

The Master Tab

On the Master page tab you can setup panning and level for each layer, as well as the master volume and compression.



The current volume of Layer 1, 2 and main volume is displayed in the gain meter representation.

Layer 1 / 2 Volume

Determines the volume for the corresponding layer.

Tap on **Layer Volume** to open a pop-up menu for further settings:

- **Normal:** Volume change with normal values.
- **Fine:** Volume change with fine values.
- **Super Fine:** Volume change with super fine values.
- **Set Default:** sets Volume to its default value of 0 dB .
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Layer 1 / 2 Pan

Determines the panning for the corresponding layer.

Tap on **Layer Pan** to open a pop-up menu for further settings:

- **Normal:** panning change is about 2%.
- **Fine:** panning change is about 0.2%.
- **Super Fine:** panning change is about 0.02%.
- **Set Default:** sets panning to its default *Center* value.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Compression

A 'one knob – one function' tool. Reduces the dynamic range of the overall audio signal. The signal seems to be louder and more assertive. The compressor effect is positioned after the effect units and before **Master Volume**.

Tap on **Compression** to open a pop-up menu for further settings:

- **Normal:** Compression change with normal values.
- **Fine:** Compression change with fine values.

- **Super Fine:** Compression change with super fine values.

Master Volume

Controls the overall output of the audio signal. **Master Volume** controls the **Main Outs** and the **Headphones Out**. Keep in mind that the headphones output contains an extra volume dial that works in addition to Main Volume.

Tap on **Master Volume** to open a pop-up menu for further settings:

- **Normal:** Master volume change with normal values.
- **Fine:** Master volume change with fine values.
- **Super Fine:** Master volume change with super fine values.

Bass Boost

Activates/deactivates the typical Waldorf bass emphasis for the overall audio signal.

Timbre Mode

Iridium Keyboard offers three different modes for the Sound layers:

- **Single:** both Sound layers have individual settings and cannot be played together. You can switch between two layers by tapping on the **Layer 1** or **Layer 2** button in the touchscreen display.
- **Split:** Layer 1 and Layer 2 use a dedicated keyboard range for playing. A typical situation is that a bass sound is played in the lower range of the keyboard while a lead sound is played in the upper range. You need to set up a lower/upper range in the settings of your MIDI master keyboard. The MIDI settings for both layers are available here: Global -> MIDI -> Inputs.

⚠ When playing the pads in Split mode, the current selected layer is used.

- **Layered:** both Sound layers are played simultaneously over the whole keyboard range. Use this option to combine two sounds, such as a pad sound and a poly lead.

The Perform Mode Pages

To access the Perform display page press the **Perform** button. To select the desired option tab, tap on the corresponding tab in the upper display area.



! The Default Perform Screen tab can be determined here: Global->Settings->Edit->Default Perf Screen.

The Favorites Tab

This is a special perform mode for live musicians. You can set up 20 sound programs per **Set** for faster selection. Up to 6 Sets can be defined, which means a faster access to 120 sound programs with just two taps.



! You can also access the **Favorites** tab by pressing the selection dial. This is valid from every location except when on the **Load** display page.

Here is how it works.

- 1) Select the desired sound program by using the **Prev/Next** buttons or tapping on the sound name in the lower display section.
- 2) Tap and hold on one of the 20 blocks. After a little while a pop-up window will be shown. Here you can **Assign** the current sound program to the selected block. You can also **Clear** the selected block or **Cancel** any action.
- 3) Repeat steps 1 & 2 until you have filled the matrix with your favorite sound programs. You can tap on Set 1 to 6 to select a new favorite matrix.
- 4) To call up a favorite sound program just tap on the desired matrix block or use the **Selection** dial to scroll through the sound programs of the current Set. If you want to load a sound program, press the **Selection** dial.
- 5) One Set can contain only one sound program at any given time. This means that if you want to add the same sound program as previously added, the older one disappears when saving the new one to a desired location.

The Autoplay Tab

Here you will find an exceptional arpeggiator as well as an outstanding step sequencer. Within the Autoplay display page, use the **Mode** button to switch between Arpeggiator and Sequencer. You can also choose Parameter Seq. Later more on that!

! You can also enter the Autoplay tab by pressing the **Arp | Seq** button in the **Play** button section.

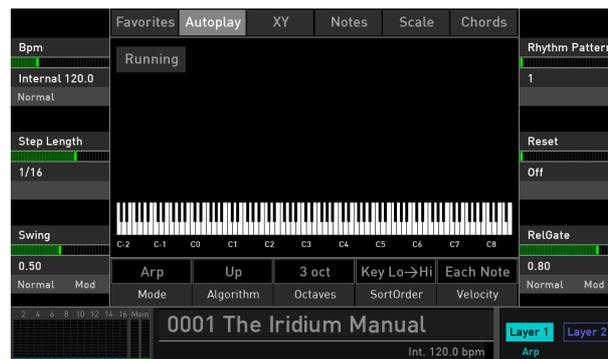
The Arpeggiator

An Arpeggiator is a device that splits an incoming chord into its individual notes and repeats them rhythmically. Different sequence modes can be defined for the Arpeggiator to cover a wide range of applications. In addition to the synthesis features Iridium Keyboard offers a programmable arpeggiator. It can play a wide range of different rhythm patterns.

To enter the Arpeggiator, tap on the **Mode** button and select *Arp*. You can also press the **Arp | Seq** button.

! In **Latch** mode, all played notes are held until their key is pushed again.

! The arpeggiator outputs MIDI notes in case the MIDI Out function on the **Global** menu page is enabled.



Bpm

Sets the overall tempo for the Arpeggiator and the Sequencer in Bpm (beats per minute). This tempo also affects the functions that may depend on tempo settings (e.g. LFOs, Komplex Modulator, Delay effect).

Step Length

Determines the rate at which notes are triggered – that is to say, the speed at which the arpeggio is running. In addi-

tion to the **Bpm** parameter this gives you further control over the playback speed. You can specify a value in fractions of beats. For example, if **Step Length** is set to $1/8$, the arpeggio plays eight notes per measure.

Swing

Determines how much the timing affects an arpeggio step. If **Swing** is set to 0.50 , the arpeggio is played back without any shuffled timing. Settings from 0.51 to 0.95 increase the shuffling of the notes and creates a typical swing. You can also use settings below 0.50 to influence the timing.

Rhythm Pattern

With the pop-up menu **Pattern** you can select one of the 31 internal rhythm and accent patterns.

Reset

Sets up a limit for the played notes. This is useful to create inclined measures. Set **Reset** to 8 or 16 to start an arpeggio at the beginning of a measure.

RelGate (Release Gate)

With the settings of the pop-up menu **RelGate** you can determine the note length depending on the original length. The lower the value, the shorter the played notes.

Mode

Here you can switch between the Arpeggiator mode, which uses the standard arp parameters, and Sequencer mode, where own patterns can be programmed. Also, a Parameter sequencer is available as well as the Pad trigger.

Algorithm

Sets the direction that is used to play back the arpeggio. This parameter works in conjunction with **Octaves** and **Sort Order**:

- If *Up* is selected, the note list is played forward and the octaves are transposed upward. The arpeggio starts in the original octave and goes up to the highest octave (determined with **Octaves**). Then the arpeggio is repeated.
- If *Down* is selected, the note list is played backward and the octaves are transposed downward. The arpeggio starts in the highest octave (determined with **Octa-**

- ves**) and goes down to the original octave. Then the arpeggio is repeated.
- If *Up ^ Down* is selected, the note list is first played forward and the octaves are transposed upward. After reaching the last note of the note list in the highest octave to play, the note list is played backward and the octaves are transposed downward down to the first note of the note list in the original octave. Then the arpeggio is repeated.
 - If *Up - Down* is selected, the note list is first played forward and the octaves are transposed upward. After reaching the last note of the note list in the highest octave to play, this note is repeated and the note list is played backward and the octaves are transposed downward down to the first note of the note list in the original octave. Then the arpeggio is repeated.
 - If *Down v Up* is selected, the note list is first played backward and the octaves are transposed downward. The arpeggio starts in the highest octave (determined with **Octaves**). After reaching the first note of the note list in the original octave, the note list is played forward and the octaves are transposed upward up to the last note of the note list in the highest octave to play. Then the arpeggio is repeated.

- If *Down - Up* is selected, the note list is first played backward and the octaves are transposed downward. The arpeggio starts in the highest octave (determined with **Octaves**). After reaching the first note of the note list in the original octave, this note is repeated and the note list is played forward and the octaves are transposed upward up to the last note of the note list in the highest octave to play. Then the arpeggio is repeated.
- If *Random* is selected, the list will be played randomly.

Octaves

Determines the range of the single notes in octaves. When it is set to *1 oct*, the note list will be played back in the same octave as originally entered. Higher octave values mean that the note list is repeated in higher or lower octaves. The octave in which the arpeggio starts is determined by the **Algorithm** parameter. If you play notes that span more than one octave, they are still kept in the note list and played back before the note list is transposed.

SortOrder

With the settings in the pop-up menu **SortOrder** you can determine how the notes you originally play are split up for the arpeggio:

- If *As Played* is selected, the notes are sorted in the exact order you played them.
- If *Reversed* is selected, the notes are sorted in reverse order to which you played them. If, for example, you press E1, G1 and C1, the note list is sorted to C1, G1, and E1.
- If *Key Lo->Hi* is selected, the notes are sorted from the lowest note to the highest note. If, for example, you press E1, G1 and C1, the note list is sorted to C1, E1, and G1.
- *Key Hi->Lo* is the opposite of *Key Lo->Hi*. The example would be sorted as G1, E1, and C1.
- If *Vel Lo->Hi* is selected, the notes are sorted from the softest to the loudest velocity.
- *Vel Hi->Lo* is the opposite of *Vel Lo->Hi*.
- If *Chord* is selected, the arpeggiator plays a chord based on all notes from the note list.

Velocity

With the settings in the pop-up menu **Velocity** you can determine how velocity is interpreted in the arpeggio:

- If *Each Note* is selected, each note of the arpeggio is played back with the velocity that you originally played.
- If *First Note* is selected, the first note you played sets the velocity for all arpeggio steps.
- If *Last Note* is selected, the last note you played sets the velocity for all arpeggio steps.

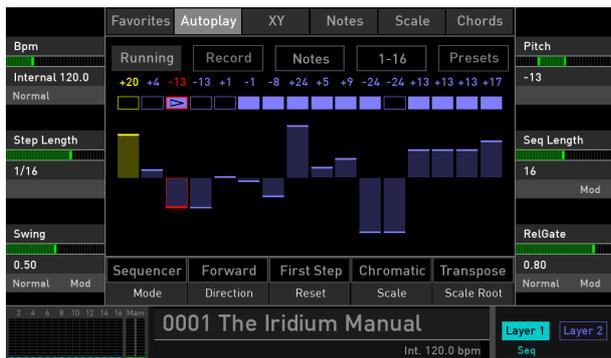
Tap on the corresponding arpeggiator parameter to open a pop-up menu for further settings (not all settings are available for some arpeggiator parameters):

- **Normal:** parameter change is about normal.
- **Fine:** parameter change is about fine.
- **Super Fine:** parameter change is about super fine.
- **Set Default:** sets the parameter to its default value.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the **Mod** menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

The Step Sequencer

The **Autoplay** tab also contains a programmable step sequencer, where you can use up to 32 steps per measure. For each step the note length, velocity, and pitch can be defined. You can also create four additional controller sequences that can be used as modulation sources.

To enter the Step Sequencer, tap on the **Mode** button and select *Sequencer*. You can also press the **Arp | Seq** button.



⚠ The sequencer outputs MIDI notes in case the MIDI Out function on the **Global** menu page is enabled.

- ⌚ To start the sequencer playback, tap on the **Off** button (it switches to Running) and play one or more notes on the keyboard.

The Sequencer Graphic

The display gives you an overview of all steps of a sequence. You can edit this graphic directly by using the following tools:

- Each block in the center of the graphic represents a step. The number of blocks depends on the settings of the **Step Length** parameter. Up to 32 blocks/steps are possible. Tap on a step to select it (it lights up in red). Move your finger up and down to change the pitch of the selected step. Move your finger from left to right or vice versa to 'draw' a sequence.
- Above the graphic you find the same number of blocks. Each block represents a step. Tap on a desired block to mute the corresponding step, the same applies for unmute. A selected block lights up in red and displays the current pitch (e.g. +3).
- For a more accurate editing of a selected step you can use the **Pitch** parameter.

- To get a better overview you can divide the graphic in steps overview from 1-16 and 17-32, if desired. Tap on the corresponding button above the graphic.
- Based on the selected step overview the blocks display pitch, velocity, gate (note length), or one of the four modulation parameters.

Bpm

Sets the overall tempo for the Arpeggiator and the Sequencer in Bpm (beats per minute). This tempo also affects the functions that may depend on tempo settings (e.g. LFOs, Komplex Modulator, Delay effect).

Step Length

Determines the rate at which notes are triggered – that is to say, the speed at which the sequence is running. In addition to the **Bpm** parameter this gives you further control over the playback speed. You can specify a value in fractions of beats. For example, if **Step Length** is set to 1/8, the sequence plays eight notes per measure.

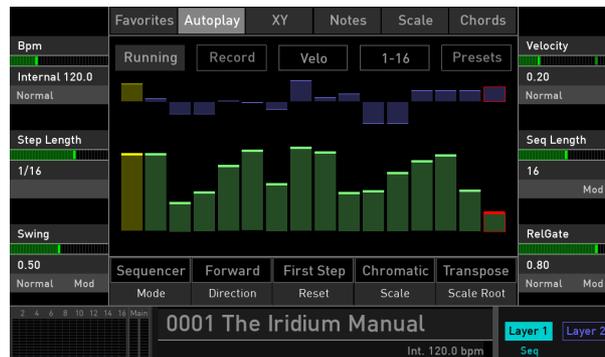
Swing

Determines how much the timing affects a sequence step. If **Swing** is set to 0.50, the sequence is played back without

any shuffled timing. Settings from 0.51 to 0.95 increase the shuffling of the notes and create a typical swing. You can also use settings below 0.50 to influence the timing.

Pitch/Velocity/Gate/Param 1 - 8

This parameter depends on the setting of the Notes button above the graphic. If **Notes** is selected, **Pitch** is shown and you can set the pitch for the selected step. If **Velo** is selected, you can edit the velocity for the selected step. If **Gate** is selected, you can edit the gate length for the selected step. If Param 1...8 is selected, you can edit the modulation signal for the selected step.



The Sequencer in Velocity mode

ⓘ **Param 1...8** controls the parameter modulation for the Parameter sequencer. Read more on this on page 165.

Seq Length

Determines the step sequence length. A sequence must contain a minimum of one step. You can set up to 32 steps.

RelGate (Release Gate)

With the settings of the pop-up menu **RelGate** you can determine the note length depending on the original length. The lower the value, the shorter the played notes.

Mode

Here you can switch between the Sequencer and the Arpeggiator mode. **Mode** is available on the Arpeggiator page and the Sequencer page. You can also select the Parameter Sequencer and the Trigger Pads. Read more on this later in this manual.

Direction

Sets the direction that is used to play back the sequence:

- If *Forward* is selected, the notes are running from the first step to the last. Then the sequence is repeated.
- If *Backwards* is selected, the notes are running from the last step to the first. Then the sequence is repeated.
- If *Ping-Pong* is selected, the notes are running from the first step to the last, then back to the first note and so on.
- If *Forw-Back* is selected, the notes are running from the first step to the last. The last step is repeated and the sequence is running back to the first note, which also is repeated and so on.
- If *One-Shot* is selected, the notes are running from the first step to the last. Then the sequence stops.

Reset

Determines the behaviour of the Step sequencer when a new note is triggered:

- If *First Step* is selected, the sequence always starts from the beginning when a new note is triggered.
- If *No Reset* is selected, the sequence always runs, regardless of any new notes, that are triggered.

- If *Random* is selected, the sequence always starts from a random position, when a new note is triggered.

Scale

Opens a pop-up menu with numerous musical scales, e.g. *Chromatic, Major, Minor* or *Lydian dominant*.

Scale Root

Determines the tonic keynote for used scale.

Tap on the corresponding sequencer parameter to open a pop-up menu for further settings (not all settings are available for some sequencer parameters):

- **Normal:** parameter change is about normal.
- **Fine:** parameter change is about fine.
- **Super Fine:** parameter change is about super fine.
- **Set Default:** sets the parameter to its default value.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **Modulations:** opens the Mod menu to sets up a modulation for this parameter. How to set up a modulation can be read in 'The Modulation Mode' chapter.

- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

The Sequencer Buttons

Above the graphic you find four buttons for further settings.

Running/Off

Here you start or stop the sequencer playback. You can also use the **Play** button below the **Tempo** dial.

Record/Stop Record

Here you can start and stop the realtime recording function. It records a played note (pitch) for each step, one at a time.

1-32/1-16/17-32

Tap on this button to open a pop-up menu where you can switch between the graphic overview of the steps. You can display all steps (1-32), only steps 1-16, or only steps 17-32.

Presets

Tap on the **Presets** button to open a pop-up window for loading, saving, and managing Step sequences. For more

information on the available options please refer to the **Presets** chapter in the Wavetable section.

The Parameter Sequencer

Beside arpeggiator and step sequencer, Iridium Keyboard offers a so-called parameter sequencer that is made for parameter modulation purposes.

Tap on the **Mode** button and select **Param Seq** to switch to the corresponding display page.

The functionality is very similar to the step sequencer. You can either make step edits by tapping on the steps representation or by using the **Param** display knob.



Param 1...8

Tap on this button to open a pop-up menu where you can switch between the 8 parameter sequences.

1-32/1-16/17-32

Tap on this button to open a pop-up menu where you can switch between the graphic overview of the steps for the selected parameter sequence. You can display all steps (1-32), only steps 1-16, or only steps 17-32.

Presets

Tap on the **Presets** button to open a pop-up window for loading, saving, and managing Step sequences. For more information on the available options please refer to the **Presets** chapter in the Wavetable section.

Mod Targets

Tap on this button to switch the display representation for assigning modulations for the parameter sequencer. Up to 40 modulation assignments can be made.



The Parameter Sequencer with Mod Targets

⚠ When **Mod Targets** mode is active, no step edits can be made. This page is for modulation set ups only.

You can set up a modulation routing very easily:

- Tap on **Add** to add a modulation routing. Up to 40 routings are possible.
- With **Destination**, you can select a desired modulation target.
- **Amount** determines the modulation intensity. This can be adjusted positive or negative.

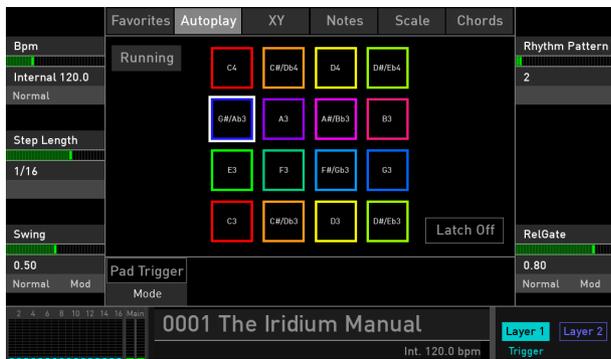
- You can also add a **Controller** with a **Control Amount** to a modulation assignment.
- Tap on the **Clear Selected** button to delete the selected modulation assignment. **Clear All**: tap on this button to delete all modulation assignments that are shown in this list.
- To end the Mod Targets mode, tap on the **Mod Targets** button.

⚠ Read more about modulation assignments in the chapter 'The Modulations in the Iridium Keyboard'.

The Pad Trigger Mode

Tap on the **Mode** button and select **Pad Trigger** to switch to the corresponding display page or press the **Trigger** button left of the pads.

In this mode the 4x4 pads will be sequentially run through based on the direction given by the **Algorithm** parameter. This pitches of each pad and therefore of the sequenced steps will be taken from either the **Notes**, **Scale** or **Chords** pitch configurations of the pads. Press the respective button for setting up these pitches.



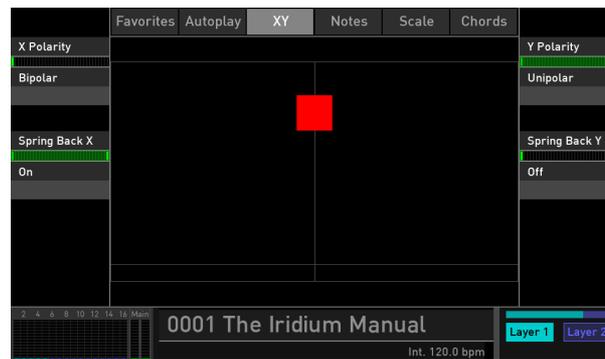
If no pad is latched all pads will be used to sequence the notes. For rhythmic variation you can use the parameters **Rhythm Pattern**, **Swing** and **Rel Gate**.

You could also press the **Latch** button and then select a set of steps by pressing the corresponding pads. These will then lit white and only these will be used for playback, i.e. when the algorithm is wandering through the pads only the latched ones will play. For the other ones a rest will be inserted. If you like to get back using all pads in playback, then simply press **Latch** to un-latch everything.

The XY Pad Tab

In this tab, you find a X-Y pad, a two-dimensional controller based on two selected modulation parameters.

First you need to define the X and Y controller within the **Modulation Matrix**. You can, for example, easily set up a modulation for Cutoff (Pad X) and Resonance (Pad Y).



X/Y Polarity

Both controllers can be switched from *Bipolar* to *Unipolar*. For the so-called unipolar modulation sources the resulting amplitude lies within the range of 0...+1. For the so-

called bipolar modulation sources the resulting amplitude lies within the range of -1...0...+1.

Spring Back X/Y

If set to *On*, the button jumps back in the middle of the pad, when you release your finger. If set to *Off*, the button stays in its last position.

Tap on the corresponding Modulation pad parameter to open a pop-up menu for further settings:

- **Set Default:** sets the parameter to its default value.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

The Pad Tabs

The display pads can be used to play live or to setup latch patterns to be auto-played in one of three modes:

1. **Arpeggiator:** The arpeggiator will take the pitches from the latched pads as basis for the arp algorithm. Chords will be broken into their constituent notes.
2. **Sequencer:** The last hold or latched pad will trigger the sequencer and determine its transposition much as you would do it from a normal keyboard.
3. **Trigger Mode:** The pads will be wandered according to the trigger algorithm. Chords will be kept as chords. If no note is latched, all pads will be used. If notes are latched, they will be played but for the others rested.

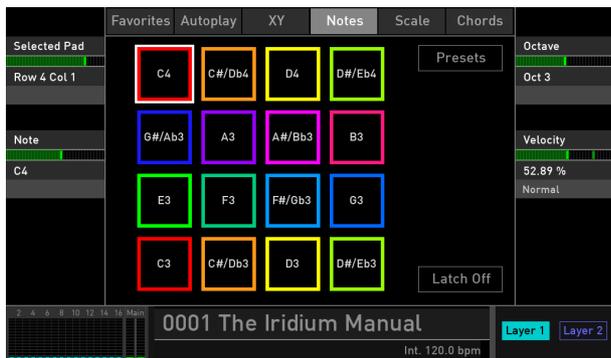
⚠ Keep in mind that there are two mode dimensions: The **Autoplay** modes for **Arp**, **Seq** and **Triggers**. And the **Pitch** modes for **Notes**, **Scales** and **Chords**.

Notes Tab

Tap on the **Notes** tab to enter the pad note mode. The touchscreen display switches to the Notes representation.

Here, all 16 pads can be assigned with individual notes.

⚠ Keep in mind that each layer has its own pad configuration. The pads will have the pad configuration of the active layer. Everything will be saved with a patch.



Selected Pad

Determines the pad for note assignment. You can also tap on the desired display pad to select it for editing.

Note

Determines note for the selected pad.

Octave

Determines the octave transposition for all 16 pads.

Tap on **Octave** to open a pop-up menu for further settings:

- **Set Default:** sets Octave to its default value of *Oct 3*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Velocity

Determines the velocity that is used for all 16 pads.

Tap on **Velocity** a pop-up menu for further settings:

- **Normal:** Velocity changes with normal values.
- **Fine:** Velocity changes with fine values.
- **Super Fine:** Velocity changes with super fine values.
- **Set Default:** sets Velocity to its default value of *80.00%*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Latch Button

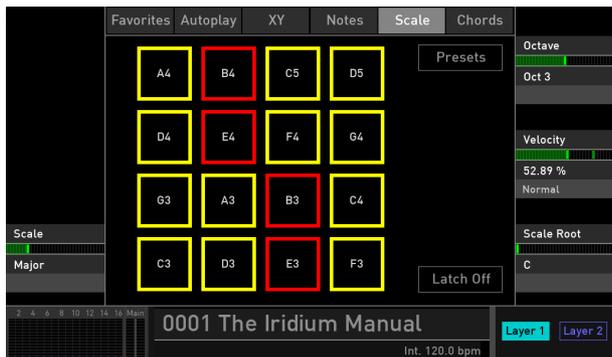
If active, a tapped pad will hold a note until it is tapped again.

Presets Button

Tap on the **Presets** button to open a pop-up window for loading, saving, and managing note assignments.

Scale Tab

Tap on the the **Scale** tab to enter the scale mode. The touchscreen display switches to the Scale representation.



Here, the notes are automatically assigned according to various scale types and root pitches.

Scale

Determines the musical scale, e.g. *Chromatic*, *Major*, *Minor* or *Lydian Dominant*.

Tap on **Scale** to open a pop-up menu for further settings:

- **Set Default:** sets Scale to its default: *Major*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Octave

Determines the octave transposition for all 16 pads.

Tap on **Octave** to open a pop-up menu for further settings:

- **Set Default:** sets Octave to its default value of *Oct 3*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Velocity

Determines the velocity that is used for all 16 pads.

Tap on **Velocity** a pop-up menu for further settings:

- **Normal:** Velocity changes with normal values.
- **Fine:** Velocity changes with fine values.
- **Super Fine:** Velocity changes with super fine values.
- **Set Default:** sets Velocity to its default value of *80.00%*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Scale Root

Determines the tonic keynote for the chord.

Tap on **Scale Root** to open a pop-up menu for further settings:

- **Set Default:** sets Scale to its default: *C*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.

- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Latch Button

If active, a tapped pad will hold a note until it is tapped again.

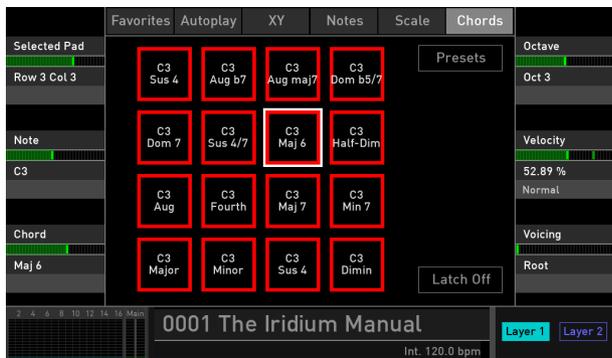
Presets Button

Tap on the **Presets** button to open a pop-up window for loading, saving, and managing scale assignments. For more information on the available options please refer to the **Presets** chapter in the Wavetable section.

Chords Tab

Tap on the **Chords** tab to enter the chord mode. The touchscreen display switches to the Chord representation.

Each pad can be assigned a specific chord type with various voicing and inversions.



Selected Pad

Determines the pad for chord assignment. You can also tap on the desired display pad to select it.

Note

Determines the fundamental note for the selected pad.

Chord

Determines the chord interval for the selected pad. Tensions are also possible.

Octave

Determines the octave transposition for all 16 pads.

Tap on **Octave** to open a pop-up menu for further settings:

- **Set Default:** sets Octave to its default value of *Oct 3*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Velocity

Determines the velocity that is used for all 16 pads.

Tap on **Velocity** a pop-up menu for further settings:

- **Normal:** Velocity changes with normal values.
- **Fine:** Velocity changes with fine values.
- **Super Fine:** Velocity changes with super fine values.
- **Set Default:** sets Velocity to its default value of *80.00%*.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Voicing

Determines the voicing for the selected chord. Besides Root, different inversions and splits are also available.

Latch Button

If active, a tapped pad will hold a note until it is tapped again.

Presets Button

Tap on the **Presets** button to open a pop-up window for loading, saving, and managing chord assignments. For more information on the available options please refer to the **Presets** chapter in the Wavetable section.

The Macro Buttons

Iridium Keyboard offers 6 Macro buttons that can be found in the Play section. These buttons can be freely assigned with a large number of different options.

To access the Macro display page, press the **Macro** button above the 6 Macro buttons.



The Macro Display Page

Here, you can program the Macro buttons.



- Tap on the button besides the macro button you want to program.
- In the pop-up list, select the desired option you want to use for this macro button.
- Some options offer a second/third selection button, e.g. Unisono (here, you can specify the number of unisono voices that will activated, when the corresponding macro button is pressed).

Below you will find a list of all possible macro options.

Macro option	Description
Off	No function for the corresponding Macro button
Glide	Activates/deativates Glide
Transpose	Transposes the overall pitch by the set semitone
PitchBend Range	Sets the pitch bend range by the set semitone
Tuning	Sets the tuning scale with a definable root
Record	Starts the recording function for the audio recorder
Play	Starts playback for arpeggiator/sequencer

Timbre Mode	Switches the timbre mode to Single, Split or Layered
Controller Mode	Switches the controller mode to Both, Layer 1, Layer 2 or Select
Player Mode	Switches the player mode to Off, Arp, Sequencer, Param Seq or Pad Trigger
Unisono	Switches to unisono mode with the definable number of voices
Sned MIDI CC	Sends a definable MIDI controller (from 0 to 127) with a definable value (from 0 to 127)
Send MIDI Prog	Sends a definable MIDI program change from 0 to 127.
Show Screen	Switches to the corresponding selected display screen (Favorites, XY Pad Audio or Scope)

The Global Mode

To access the Global Mode page press the **Global** button. To select the desired function tap on the corresponding tab in the upper display area. On the next pages, we describe every Tab mode page in detail.



The Scope Tab

Here you can select a graphic representation of the current sound that is played. Tap on **Source**, **Type**, or **Mode** to open a pop-up menu with further settings.



- **Source:** here you can determine the signal that is shown in the graphic representation. You can select single signals (as for Osc 1, 2 or 3) or the signal that passes a component of Iridium Keyboard's signal flow (Filter, Digital Former, VCA, Pre-FX, Compressor), a layer signal, the Input signal of the external audio input as well as the Main output signal.
- **Type:** you can choose three types of graphic representation: *Scope* shows a realtime stereo wavemeter (see also **Mode**), *Analyzer (lin)*, and *Analyzer (log)* shows a graphic analyzer of the frequency spectrum of the signal, either with a linear (lin) or a logarithmic (log) representation.
- **Mode/FFT Size:** depends on the selected **Type**. If *Scope* is selected, you can choose between *One Shot* (a momentary shot of the corresponding sound), *Pitch* (a continuous representation) and *Continuous* (a realtime wavemeter). If any other **Type** is chosen, it determines the block size of the FFT (Fast Fourier transformation) spectrum analyzer. Higher block sizes provide more resolution in the lower frequency range, but decrease time coherence (time precision) in the higher frequency range - the higher frequency information becomes over-averaged.

The Pitch Tab

Here you can make settings relating to the overall tuning of the Iridium Keyboard.



Pitch Button

- **Transpose:** Allows a global pitch transposition for the tone generator. Played notes are shifted by the number of semitones.
- **Master Tuning:** Determines the Iridium Keyboard's overall pitch in Hertz. The value specified here is the

reference pitch for MIDI note A3. The default setting is 440 Hz, which is commonly used by most instruments.

- **Scale:** Opens a pop-up menu for a wide-ranging selection of musical scales – *chromatic, major, minor, or lydian dominant*, for example. You can also choose User 1 - 8 for selecting a user definable tuning. In this case, an additional **Edit Tuning** button is available.
- **Scale Root:** Determines the tonic keynote for the selected scale. This parameter is not available for the User scales.

Edit Tuning Button

If a User scale is selected with the Scale option, you can create an equal tuning from scratch by giving number of steps and repeating interval (like 1200 cents for an octave or anything else).

The following options are available in the User Tuning window:

- **New** adds a new tuning table with definable **Steps** and **Repeat Intervals**.
- **Insert** adds a new tuning step after the current one.
- **Delete** removes the current tuning step.

- Use the **Step** dial to select the desired Step for editing.
- Use the **Step Type** dial to edit individual steps by specifying **Interval** in cents **From Root**, from previous Step or by numeric **Ratio** like 5/4 (with Numerator/Denominator). **Skip** certain keys to distribute scale notes over keyboard to be more playable.
- Tune individual steps by holding a note and then turn interval encoder.
- The **Import/Export** option allows to load/save a User Tuning table from and to Iridium Keyboard's MicroSD card.
- Tab on **Pitch** to return to the regular Pitch page.
- If a User table is selected, it can be renamed, copied and pasted by using the corresponding buttons.

! You can also import Tuning tables that are made with the free software application Scala by Huygens-Fokker Foundation (<http://www.huygens-fokker.org/scala>). Tap on **Import Tuning** to import a Scala (*.scl) file from a connected MicroSD card or a USB storage device.

Tap on **Keymap** to display the current tuning settings for each note by MIDI pitch and its interval. Use the **MIDI Note**

dial to scroll through the Tuning list. By tapping **Pitch** you can close this window.

The Audio Tab

Here you find a simple and easy-to-use audio recorder and sample editor to record and edit any audio signal from the Audio Input or the Outputs into the Iridium Keyboard's Flash memory.



The Audio tab display with Input as Recording Source

Recording

Here is how to proceed a sample recording:

- 1) Turn the **Rec. Source** display dial to select the desired input signal. You can either record an external audio signal (**Input**) or the output signal of Iridium Keyboards **Main** output. In the latter case, no further signal connection or setting is necessary since the signal is recorded internally without any loss.
- 2) Set the recording **Trigger**: *Manual* means that you have to start the recording manually. With *Note*, the recording starts after hitting a key. With *Signal*, the recording starts after an audio signal occurs on the selected **Rec. Source** input. In all cases, you need to tap on the **Record** button before.
- 3) Tap on **Stop** to end the recording process.
- 4) Tap on **Play** to playback your recording. Use the **Playback Vol** parameter to control the playback volume.
- 5) If you want to save your recording in the Iridium Keyboard's Flash memory, tap in **Save** to open the Save Audio file window.

- 6) You can also search the internal Flash memory by tapping on **Load**. Here you can import an audio file from the Flash memory, a connected MicroSD card or USB storage device.

If you want to record an external audio signal, first make sure to connect a suited signal source to the Iridium Keyboard's audio inputs:

- 1) Turn the **Rec. Source** display dial and select **Input**.
- 2) With **Rec. Level** you set the recording level. Make sure that you do not drive the incoming signal into saturation.
- 3) With **Monitor Level** you can monitoring the incoming audio signal. In the lower left area of the touchscreen display, the recorded signal will be shown in the **Input** meters.
- 4) Set the recording **Trigger**: *Manual* means that you have to start the recording manually. With *Note*, the recording starts after hitting a key. With *Signal*, the recording starts after an audio signal occurs on the selected **Rec. Source** input. In all cases, you need to tap on the **Record** button before.
- 5) Tap on **Stop** to end the recording process.

Sample Editing

You can make some standard sample editings to adapt the sample to your needs.

- Tap on **Select** to select (*All*) or deselect (*None*) the recorded sample.
- You can either move your finger to make a sample selection.

Tap on the **Zoom** button to open a pop-up menu with different zoom options:

- **Zoom In/Zoom Out** lets you zoom in and zoom out the sample waveform representation.
- **Zoom All** zooms to an overall representation of the complete sample waveform.
- **Selection** displays the sample selection that is defined before. To define a sample area, draw a selection with your finger. The area is shown in yellow. You can move the area by holding and moving.
- **Sel. Start/Sel. End** displays the sample selection start/end for a detailed overview.

Tap on the **Edit** button to open a pop-up menu with different sample selection edit options:

- **Trim** deletes the parts before and after the sample waveform selection.
- **Cut** deletes sample waveform selection and glues the remain sample waveform.
- **Normalize** raises the level of the sample selection based on the maximum peak level.
- **Norm. -3dB/Norm. -6dB** raises or lower the level of the sample selection to -3dB or -6dB.
- **Fade In** allows you to apply a fade in to the selected samples area.
- **Fade Out** allows you to apply a fade out to the selected samples area.
- **Reverse** reverses the selection so that it sounds as if you play back a tape backwards.
- **Silence** allows you to replace the sample selection with silence.
- **Copy L -> R/Copy R -> L** copies the left channel sound to the right channel or vice versa.

Tap on the **Undo** button to undo the last edit command. If made, the Undo button will become a **Redo** button to redo the last undo command.

The MIDI Tab

Here you can make further settings relating to the MIDI inputs and outputs, the MPE functionality, as well as for the synchronisation. You can also manage the MIDI Controller Learn settings. Tap on the desired button to open the corresponding setting window.



The MIDI Inputs page

Inputs

Here you can make settings regarding the MIDI inputs (DIN In, USB Controller In, USB Computer In):

- **State:** Tap on the first state button to switch the corresponding MIDI In port on or off.
- **Layer 1/2 Input Channel:** Tap on the corresponding button to open a pop-up menu. Here you can select the desired MIDI channel on which Layer 1 and Layer 2 reacts.
- **Local Keyboard:** Determines whether incoming MIDI messages are received (*On*) or ignored (*Off*) by the sound engine of Iridium Keyboard.
- **MPE** option for MIDI DIN, USB Control and USB computer (see next section).

About MPE

MIDI Polyphonic Expression (or MPE) is a method of using MIDI to enable expressive electronic musical instruments to control multiple dimensions of sound polyphonically. In MIDI, channel-wide messages (such as pitch bend, CCs, and channel aftertouch) are applied to all notes being played on a single channel; therefore, in MPE each note is assigned its own channel so that those messages can be applied to each note individually.

An MPE instrument typically has three dimensions of expression/control: left-right (X-axis); front-back (Y-axis);

and pressure (Z-axis) – each axis can be mapped to various parameters of sound and be applied on a per-note basis.

Each MPE dimension is mapped to the Iridium Keyboard sound engine as follows:

- Left-right / X-axis (sent as MIDI Pitch Bend) – This controls the pitch of the note, with the range set using the PB Range for the corresponding oscillator.
- Front-back / Y-axis (sent as MIDI CC 74) – This controls the destination parameter set for the modulation source MPE Y Axis.
- Pressure / Z-axis (sent as MIDI Channel Aftertouch) – this controls the Aftertouch modulation assignments.

From now on, MPE support is available for MIDI DIN, USB Host (Controller) and USB Device (Computer). You can activate MPE support individually. Further, if a connected MPE Controller send MCM (MPE Configuration Messages), these will be detected and put Iridium Keyboard automatically into MPE mode.

The Iridium Keyboard MPE supports an optional second MPE zone; channel ranges can be configured with the **Channel** button (when MPE is set to active) or set automatically from MCM messages. For making use of dual MPE zones it is recommended to choose the “Split” layer mode.

Outputs

Here you can make settings relating to the MIDI outputs (DIN Out, USB Controller Out, USB Computer Out).



- **State:** Tap on this button to switch the corresponding MIDI Out on or off. Keep in mind that the arpeggiator and the step Sequencer will send MIDI notes for enabled MIDI outputs.
- **Channel:** Here you can determine the MIDI channel for Layer 1 and 2, on which MIDI data is sent out.

- **Send CC:** Here you can activate all mapped MIDI Control Change (MIDI CC) data being sent out for the panel pots, buttons, and encoders.

⚠ If you have a MIDI hardware controller routed in both directions, you could use your DAW automation function to easily control the Iridium Keyboard parameters.

Sync

Determines how the Iridium Keyboard reacts on incoming MIDI Clock messages.



Tap on **Source**, to determine the sync behaviour:

- *Internal* means that Iridium Keyboard doesn't react to incoming MIDI Clock, nor does it send MIDI Clock. Iridium Keyboard only syncs to its own tempo base that is set by the **Tempo** dial or the **BPM** parameter which can found on the Autoplay page.
- *MIDI Clock* means that Iridium Keyboard automatically syncs to incoming MIDI Clock if it is sent by an external device like a sequencer or drum machine.
- *CV Clock* means that Iridium Keyboard automatically syncs to incoming CV Clock if it is sent by an external device like an analog sequencer, Eurorack module or drum machine.

Tap on **Snapp to Beat**, to activate (*On*) or deactivate (*Off*) the external synchronisation to the downbeat.

ⓘ Pressing the **Global** and **Layer** buttons together toggles between the sync modes.

Bpm

Determines the overall tempo for the Iridium Keyboard in Bpm (beats per minute). This tempo is valid for all functions that can be affected by tempo (e.g. arpeggiator, step sequencer, LFOs, Komplex Modulator, Delay effect).

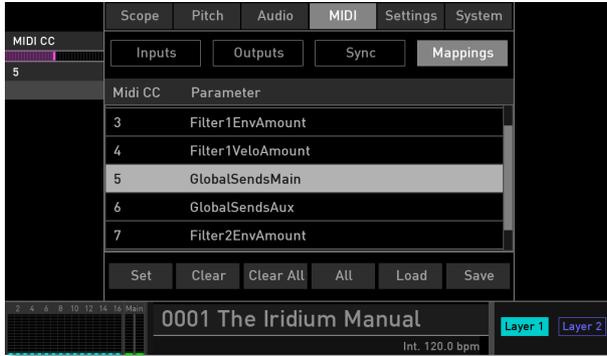
Tap on **Bpm** a pop-up menu for further settings:

- **Normal**: Bpm changes with normal values.
- **Fine**: Bpm changes with fine values.
- **Super Fine**: Bpm changes with super fine values.
- **Set Default**: sets Bpm to its default value of *120.0*
- **Set Last Loaded**: resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC**: activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Mappings

Opens a page with all mapped MIDI Control Change data. This page gives you an overview of all used MIDI mappings. You can also change or set up settings.

Use the MIDI CC parameter dial or your finger to scroll through the list and select a desired MIDI CC.



Below the list there are some more buttons regarding the MIDI CC editing:

- **Set:** Tap on set to open a page for set up a desired MIDI CC connection to any panel parameter dial, potentiometer, or button.
- **Clear:** Deletes the current selected MIDI Controller mapping.
- **Clear All:** Deletes all MIDI Controller mappings after a confirmation.
- **Used/All:** Switches between used MIDI Controller mappings and the complete list representation.

- **Load:** Loads a MIDI Controller mapping from the Flash memory. Current MIDI Controller mappings will be overwritten.
- **Save:** Saves the current MIDI Controller mapping to the Iridium Keyboard's Flash memory.

The Settings Tab

Here you can make general settings relating to the dials, the display, and further options.



Settings display with selected General page

General Page

- **Load at Startup:** determines, which sound program the Iridium Keyboard will load after starting up the synthesizer. You can choose between the *Last Loaded* preset, an *Init Sound* program, and *Patch 0* (sound program number 0000).
- **Display Brightness:** controls the brightness of the touchscreen display from 0 to 100%.
- **LED Brightness:** controls the brightness of all LEDs from 0 to 100%.
- **Screen Saver:** Sets the time in minutes until the screen saver starts. The screen saver automatically disappears when a note is played, a knob is turned, or a button is pressed. Iridium Keyboard is always ready to play, even when in screen saver mode.

⚠ Keep in mind that the screen saver doesn't activate a sleep mode. It is just to protect the screen from a burn-in effect when left running for hours.

Edit Page



- **Pot Mode:** Tap on this button to select the behaviour of the potentiometers (not the endless dials). *Immediate* means that a parameter value will jump immediately to the corresponding dial position. *Pick-Up* means that you have to turn the dial until it reaches the current parameter value. If reached, the value is changed. *Catch* works almost the same as Pick-Up, but the current value moves while turning – if the dial position matches the value.
- **Touch Mode:** Controls the behaviour of value changes with the touch display, especially when editing sliders

and faders. *Direct* means that the value jumps directly to the value that is tapped on, while *Relative* means that a value must be picked up before changing.

- **Switch Screens:** here you can determine whether the touchscreen display should automatically open the corresponding parameter page when editing any sound parameter in any panel section (*At Edit*) or not (*Off*).
- **Edit Popup Time:** here you can determine how long a popup window/menu will be shown in the touchscreen display. The default setting is *2.0 sec*.
- **Default Perf Screen:** determines the display screen that is shown when the **Perfom** button is pressed. You can choose between the *Last Screen*, the *Favorites* tab, Player screen (*Autoplay*) and the *XY* pad.

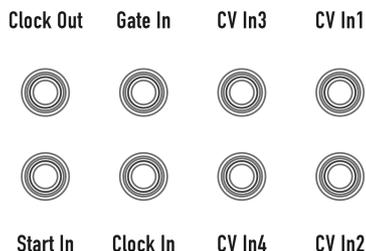
CV Page

Here, you can make all settings for the CV/Gate Inputs and the Clock In/Out.

⚠ With CV/Gate signals you can play notes on the Iridium Keyboard from external devices such as modular systems. CV (Control Voltage) defines the pitch of a note, Gate its length.

The display gives you a live overview of incoming CV signals (for CV inputs 1 to 4). You can also set up the live CV input for the meter display in the lower left corner of the touchscreen.





CV/Gate and Clock connections on the Iridium Keyboard rear panel

The CV Inputs

With the touchscreen encoders you can determine the voltage scale for each of the CV input ports. The voltage scale determines the voltage which will correspond to 100% modulation amount when using the CV input in the mod matrix as a modulation source.

For example, if you use an envelope generator as CV source (going from 0V to 5V), you can set the CV scale to 5V to get its full amount at 100% in the mod matrix.

Or if you have an analog LFO which only goes from -3V to +3V, then you can set the CV scale to 3V to experience its full modulation amount.

You can also set the CV scale by feeding the appropriate voltage to the CV input and then tap on „Scan 100%“

Iridium Keyboard is always capable to receive CV from -12V to +12V even when the CV scale is much less, voltages above the CV scale value will not be cut off.

For 1V/Oct pitch control (which is a standard for all Eurorack modules/systems) set CV Scale around 2V and the Mod Amount to 100%. A mod amount of 100% corresponds in the mod matrix when modulated to pitch to 24 semitones or 2 octaves. Thus, the recommended value of 2V for the CV scale.

Since our ear is very sensitive to pitch variations and most analogue sources are not precisely calibrated, you can for precise tuning push the corresponding encoder to make a fine or super fine control of the octave scaling.“

The Clock In/Out

Iridium Keyboard is endowed with the ability to transmit or receive clocking signals from a huge range of vintage devices.

The **Clock In** jack is intended to receive signals from an external device so that the Iridium Keyboard sequencer and arpeggiator can be synchronized to an external clock source.

The **Clock Out** jack sends signals to an external device so that it can be synchronized to the Iridium Keyboard tempo clock.

CV Start Input

CV Start In starts/stops the arpeggiator or sequencer depending on the incoming voltage level.

Gate Input

Analog gate signals can be fed into **Gate In**. A positive voltage will gate a new note in Iridium Keyboard, using a default pitch of MIDI 60. You can use one of the CV inputs as described about to control the note's pitch.



An Example:

- Route CV1 in the mod matrix to pitch with an amount 100%.
- Set the CV1 scaling to 2V and optionally fine tune this value to calibrate a precise octave.
- Now, 0V at CV1 would correspond to MIDI pitch 60 aka C3, 1V to C4, 2V to C5 and so forth.
- You can adjust the base pitch at 0V for each oscillator individually by using its semitone parameter.
- Alternatively you can transpose pitch +/- 2 octaves for all oscillators by using a constant modulation source and an appropriate amount value.
- Use **Gate In** to gate notes.

Colors Page

Here you can switch on/off the backlight LEDs for all buttons and determine a personal color scheme.

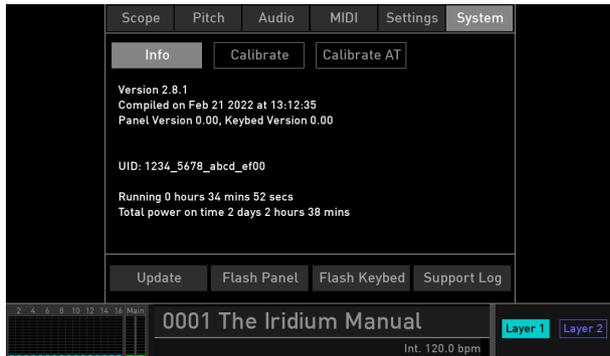


- **Button Backlight:** Here you can switch on/off the backlight LEDs for all buttons. We recommend to switch it on when the ambient light is dark.
- **Custom Section Color List:** Here you can define a custom LED color for every parameter section, for example, the LFOs or the Resonator. Select the corresponding section with the **Item** parameter or by tapping on the touchscreen and choose the desired LED color

with the **Color** parameter. You can **Save** and **Load** color setups or **Reset** the complete list to its default setting.

The System Tab

This page gives you information on the current operating system and your serial number (UID) as well as the unit's running time. Here you can also update the operating system software and perform some test routines.



Info Page

Tap on the **Info** button to open the Info display page.

- **Update:** Here you are able to update the operating system software. Read more at the end of this chapter.
- **Flash Panel** and **Flash Keybed** updates are needed in special cases. Normally, these updates are part of the operating system update.
- Tap on **Support Log** to save a log file onto a connected MicroSD card or a USB storage device in case you need support or service for your Iridium Keyboard.

❗ How to update the Iridium Keyboard operating system? Read more in the Appendix chapter.

Calibrate Page

Tap on the **Calibration** button to open the Calibration display page. The following options are available:

- **Velocity Curve.** This determines the sensitivity for the Iridium Keyboard from Soft to Hard. The default setting is Medium.
- **Wheels** calibrates the pitch bend and modulation wheel. Please tap on the Wheels button and follow the onscreen instructions.

- **Ctrl. Pedal** calibrates a connected controller pedal. Please tap on the Ctrl Pedal button and follow the onscreen instructions.



Calibrate AT Page

Tap on the **Calibration AT** button to open the display page regarding the polyphonic aftertouch settings. The following options are available:

- **Poly AT Curve** determines the sensitivity for the polyphonic aftertouch from Soft to Hard. The default setting is Medium.



- **Poly AT Delay** delays the polyphonic aftertouch for a hold and pressed key for the corresponding time amount.
- **AT Min Threshold Min/Max** sets the minimum/maximum pressure for all keys to trigger the polyphonic aftertouch.
- **AT Key Offset Min/Max** sets the offset pressure for the current played key to trigger the polyphonic aftertouch. Here, you can make settings for each individual of the 49 key. The procedure is very simple:

- Play the desired key on the keyboard. The corresponding key in the display keyboard representation lits in red.
- Make your settings for this key by using the AT Key Offset Min or Max slider in the touchscreen display. A set value is shown in the graphic grid below the display keyboard representation.
- Hit any other key and proceed the same setting.
- **Reset Offset** resets the current AT key offset to the default settings of 0%.
- **Reset All Offsets** resets all AT key offsets to the default settings of 0%.

Loading & Editing Samples

As you may know, Iridium Keyboard can play back samples via the Particle generator or as an exciter for the Resonator.

Out of the box Iridium Keyboard is delivered with a bunch of audio samples, but you can also record or use your own samples to create interesting sounds.

❗ Iridium Keyboard is capable of loading WAV and AIFF/AIFC samples with bit rates from 8 to 32 (including floating point format) and all sample rates. We recommend using 44.1 kHz as the sample rate, otherwise you have to use the Pitch parameter to set the sample pitch accordingly. Sample loops are also recognized by Iridium Keyboard.

❗ Stereo samples are supported, but you can also use mono samples and multichannel files. In the latter case, only channels 1 and 2 are used.

There are three ways to load/import samples for further usage:

- **Factory samples:** you can load and edit all of the factory samples. This is the easiest way to start exploring the sample capabilities of your Iridium Keyboard.

- **Import own audio samples:** you can import your own samples from a connected MicroSD card or any USB storage device and load them in the Iridium Keyboard's Flash memory. Here the samples are stored permanently and can be used for loading and further editing.
- **Record own audio samples:** you can use the Audio Recorder on the Global page to record samples via the external audio input or they can be resampled via the Main outputs. Recordings are stored in Iridium Keyboard's Flash memory. Here they can be used for loading and further editing.

You can use samples within Iridium Keyboard with the following oscillator modes:

- **Particle Generator:** one or more samples can be used for normal or for granular playback. Read more about the Particle Generator on page 48 To use a sample, simply tap on the **Particles** button within the Particle Generator display page. The **Sample** display page opens.
- **Resonator:** one ore more samples can be used as an exciter for the Resonator. Read more about the Resonator on page 58. To use a sample, simply tap on the **Samples** button within the Resonator display page. The **Sample** display page opens.

The Sample Display Page

Here you can load, manage, and edit your sample(s). To close the Sample display page, simply tap on the **Samples** button.



! To edit the following parameters we recommend loading a sample. For more information please refer to 'The Actions Tab' chapter.

The Display Representation

If one sample is loaded, the central display shows a graphic waveform representation of this sample. If more than one sample is loaded, the display also shows a sample file list. The currently selected sample is highlighted.

Selected Sample

If more than one sample is loaded, you can use this parameter to select the desired sample for further editing. You can also tap on the desired sample file in the display list to select it.

! Read more about adding samples later in this chapter.

From Velo / To Velo

Here you determine the velocity range of the currently selected sample. You can set up a minimum velocity for triggering (**From Velo**) and a maximum velocity value (**To Velo**) so the incoming velocity determines which sample is played. Use this function to create stacked samples that react on different velocities.

Pitch

Determines the pitch of the currently selected sample. Use this parameter to tune samples that don't match up with your desired tone pitch.

Tap on **Pitch** to open a pop-up menu for further settings:

- **Normal:** Pitch change is about 10.0 cents.
- **Fine:** Cutoff change is about 1.0 cents
- **Super Fine:** Cutoff change is about 0.1 cents.
- **Set From Keys:** play a key on your keyboard to set the corresponding pitch.

From Note / To Note

Here you determine the keyboard range of the currently selected sample. You can set up a minimum key (**From Note**) and a maximum key (**To Note**). Use this function to create multi-samples where every sample has its own playback range.

Tap on **From Note** or **To Note** to open a pop-up menu for further settings:

- **Set From Keys:** play a key on your keyboard to set the corresponding note.

Mode (only available for Particle Generator)

Determines the playback mode of all loaded samples.

- **Normal:** plays back the loaded sample(s) in a regular way. If only one sample is loaded, it will mapped automatically over the complete keyboard. This also affects the original pitch and length. When this mode is selected, some parameters of the Particle Generator are not available.
- **Granular:** uses the Iridium Keyboard Particle engine for granular playback.
- **Live Granular:** uses Iridium Keyboard's Audio Input for a live granular transformation. Make sure to set up the audio input on the **Layer Levels** page (Input Volume, Input Routing).

Tap on **Mode** open a pop-up menu for further settings:

- **Set Default:** sets the parameter to its default value.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Rule (only available for Particle Generator)

Determines the playback rule if more than one sample is loaded.

- **Round Robin:** the samples are played repeatedly one after the other from the top of the sample list to the end, and so on.
- **Reverse Robin:** the samples are played repeatedly one after the other from the end of the sample list to the top and so on.
- **Ping Pong:** the samples are played repeatedly one after the other from the top of the sample list to the end and backwards.
- **Random Robin:** the samples are played repeatedly one after the other in a random way. No sample is played twice.
- **Random:** the samples are played repeatedly one after the other, in a random way. Samples can be played twice or more.

Tap on **Rule** open a pop-up menu for further settings:

- **Set Default:** sets the parameter to its default value.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.

- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Stereo Width (only available for Particle Generator)

The Iridium Keyboard is able to playback mono and stereo sample files. Sometimes stereo samples have a stereo width that doesn't fit with your needs. Use **Stereo Width** to adapt the stereo width of all samples as desired.

Tap on **Stereo Width** open a pop-up menu for further settings:

- **Set Default:** sets the parameter to its default value.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

Overall Gain (only available for Particle Generator)

Determines the overall gain of all loaded samples. If you want to change the gain of a single sample, please use the **Sample Gain** option on the **Edit** page.

Tap on **Overall Gain** open a pop-up menu for further settings:

- **Set Default:** sets the parameter to its default value.
- **Set Last Loaded:** resets the parameter to the last loaded value from the current sound patch.
- **MIDI Learn CC:** activates MIDI Learn, which maps an incoming MIDI control change to this parameter.

The Actions Button

Here you load and manage your samples. Tap on this button to open a pop-up menu with further options:

- **Add:** opens the Add Samples window. Here you have full access to all the samples in Iridium Keyboard's Flash memory or a connected USB drive/SD card. Tap on the corresponding button (**Samples**, **USB Drive** or **SD Card**) to switch between the desired location. Here, you can select a sample by tapping through the directories.

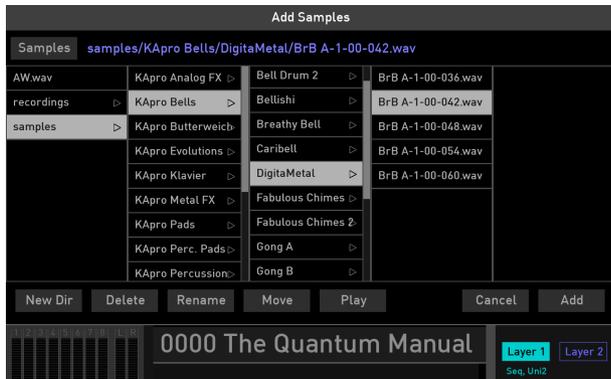
! When you have chosen a sample from USB or SD, you will be asked if you like to copy the samples to the internal Flash (recommended) or if you like to keep the samples on the external drive.

! It is possible to keep sample(s) on an external media. Please keep in mind, that you need the external drive available when reloading that sample.

! In case a sample is lost, the sample search dialog appears. Follow the onscreen instructions.

By tapping the corresponding button below the window you can perform further options:

- **New Dir:** creates a new directory folder. The directory path depends on the selected row. You need to name the new folder.
- **Delete:** deletes the selected folder/sample after a confirmation.
- **Rename:** renames the selected folder/sample.
- **Move:** moves the selected sample/folder. If performed, the folder/sample is copied into a clipboard. Use Insert to move it to the desired location.
- **Play:** plays back the selected sample.
- **Cancel:** closes the Add Sample windows. No further action is taken.
- **Add:** finally adds the selected sample to the Particle Generator or the Resonator.



The Add Samples window

- **Remove:** removes the selected sample from the list.
- **Auto-Map:** if more than one sample is loaded, **Auto-Map** maps the samples over the keyboard. This means that the keyboard range (**From Note** and **To Note**) is set automatically.
- **Load Map:** loads a Map from the Flash memory.
- **Save Map:** samples and their settings can be saved as a Map. Tap on **Save Map** to perform the storing process.
- **Clear Map:** deletes all samples and their settings.

- **Import:** imports a sample from a connected MicroSD card or a USB storage device into the Iridium Keyboard's Flash memory. If imported, the sample can be loaded by using the **Add** function.
- **Reload:** if one or more samples don't work properly, the **Reload** function can be helpful to load it again.

The Edit Button

Tap on the Edit button to enter the Sample Edit mode. The display representation changes in some partitions. In Sample Edit mode you can perform further editing at the sample start and end, as well as loop settings.



The Display Representation

The central display shows a graphic waveform representation of the currently selected sample with some rulers. If more than one sample is loaded, the display also shows a sample file list. The currently selected sample is highlighted.

Selected Sample

If more than one sample is loaded, you can use this parameter to select the desired sample for editing. You can also tap on the desired sample file in the display list to select it.

Sample Start / Sample End

Here you determine the start position (**Sample Start**) and end position (**Sample End**) of the currently selected sample. Use this function to adapt the sample length to your needs. Within the waveform representation two green rulers shows the loop start and end.

Tap on **Sample Start** or **Sample End** to open a pop-up menu for further settings:

- **Normal:** parameter change is normal.
- **Fine:** parameter change is fine.
- **Super Fine:** parameter change is super fine.

Pitch

Determines the pitch of the currently selected sample. Use this parameter to tune samples that don't match with your desired tone pitch.

Tap on **Pitch** to open a pop-up menu for further settings:

- **Normal:** Pitch change is about 10.0 cents.
- **Fine:** Pitch change is about 1.0 cents
- **Super Fine:** Pitch change is about 0.1 cents.
- **Set From Keys:** play a key on your keyboard to set the corresponding pitch.

Loop Start/ Loop End

If **Loop Mode** is set to *On*, you can define a **Loop Start** and **Loop End**. Within the waveform representation two yellow rulers shows the loop start and end.

Tap on **Loop Start** or **Loop End** to open a pop-up menu for further settings:

- **Normal:** parameter change is normal.
- **Fine:** parameter change is fine.
- **Super Fine:** parameter change is super fine.

Direction

Determines the playback direction of the sample. (*Forward* or *Backward*)

Loop Mode

Determines if the sample loop is active (*On*) or not (*Off*). A third option is *Ping Pong* which lets the loop moving forwards and backwards again and again.

X-Fade

Here you can introduce a crossfade when Loop Mode is set to *On* or *Ping Pong*. A crossfade creates a smoother transition for the sample loop points. The crossfade curve will be displayed in yellow within sample waveform representation.

Sample Gain

Determines the gain for the currently selected sample.

The Zoom Button

Tap on the Zoom button to open a pop-up menu with different zoom options:

- **Zoom In/Zoom Out** lets you zoom in and zoom out the sample waveform representation.
- **Zoom All** zooms to an overall representation of the complete sample waveform.
- **Selection** displays the sample selection that is defined before. To define a sample area, draw a selection with your finger. The area is shown in yellow. You can move the area by holding and moving.
- **Sel. Start/Sel. End** displays the sample selection start/end for a detailed overview.
- **Start/End** displays the sample start/end for a detailed overview. Keep in mind that the zoom depends on the defined sample start and end. This could be different from the real sample start/end.
- **Start -> End** displays the area between sample start and end points.
- **Loop Start/Loop End** displays the loop start/loop end for a detailed overview. Keep in mind that the zoom depends on the defined sample loop start and end.
- **Loop** displays the area between loop start and loop end points.

The Select Button

Tap on the Select button to open a pop-up menu with different selection options:

- **All** selects the complete sample.
- **None** deselects any selection of the sample.
- **Start->End** selects the sample area between sample start and end point.
- **Loop** selects the sample area between loop start and end point.
- **Trim** sets the start and end point around the selection which means that the sample start point is set to the beginning of the selection and the sample end point to the selection end.
- **Set Loop** sets a loop around the selection which means that the loop start point is set to the beginning of the selection and the loop end point to the selection end.
- **Play** start the sample playback of the selection. If no selection is made, the playback starts from the beginning of the sample.

The Close Button

Tap on the Close button to return to the Sample page.

Appendix

How to update the Iridium Keyboard operating system

The Iridium Keyboard has a service-friendly feature that makes it possible to update the system software without changing any parts.

All software updates come in the form of a .bin file that can be copied on every FAT file formatted USB storage device. The fastest way to get this file is by downloading it from our web site at:

www.waldorfmusic.com/iridium-keyboard

Please make sure to download the following files:
iridium_keyboard.update.bin

⊙ To update the Iridium Keyboard system software:

- Copy the .bin file onto the top-level of a suitable USB storage device.
- Connect the USB device to the Controller USB port.
- Press the **Global** button to enter the Global page.

- Tap on the **System** tab to open the System sub page.
- Tap on the **Update** button and select the connected USB drive. Locate the .bin file and press **Load**. Then follow the onscreen instructions.
- After the file is installed correctly, the Iridium Keyboard saves the update into the internal flash memory.
- Wait until the operation is completed. If updating was successful, the Iridium Keyboard will perform a system reset and start up.



Do not under any circumstances turn off the Iridium Keyboard while the update step is in progress. A complete loss of data may occur!

Wavetable Synthesis

A part of the sound generation in Iridium Keyboard is based on wavetable synthesis.

The following overview explains how wavetable synthesis works:

A wavetable is a table consisting of single waveforms. Each waveform is classified by its own special sound character. The main difference of wavetable synthesis in comparison with other sound-generation principles is the ability to not only to play one waveform per oscillator but also to step through the wavetable via different modulations, thereby creating wavetable sweeps. The results can be dramatic – much more so than anything any sample playback-based system could ever produce.

This principle offers powerful capabilities. To give some examples:

- Each note on a keyboard can access a different wave of a wavetable.
- The Travel parameter allows a cyclic run through all waves of a wavetable.
- An LFO can modulate the position within the wavetable. You can create subtle to drastic sound changes.

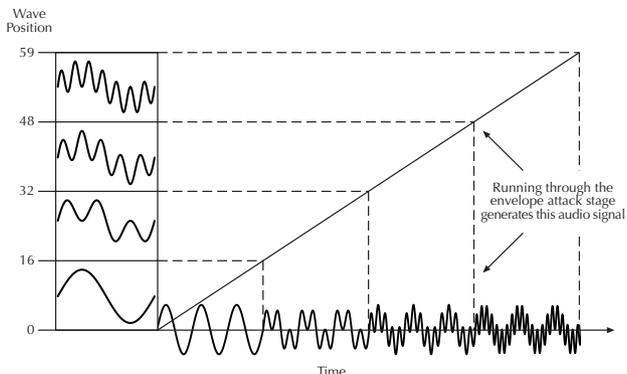
- User-selected controllers, such as the mod wheel, can change the position within the wavetable. When you turn the wheel while playing a chord, each note's wave will be modified instantly.

You should keep the following sentence in mind:

⚠ A wavetable is a list with two or more waves, among which you can move at will.

Modulating Waves over time

The graphic below shows a wavetable with 60 waves and some of its included waves from position 0 to 59 on the vertical axis. The horizontal axis represents the audio signal that is generated and the diagonal line in the graphic shows the attack stage over time.



As soon as you play a note the envelope moves through the wavetable positions generating different waveforms over time.

The decay stage would move through these waves in the opposite direction while ultimately holding a certain wave at its sustain stage. When you release the note, the envelope decays to zero.

Most wavetables are created so that they start with a hollow wave at position 0 and go through increasingly brighter waves up to maximum position. This results in a behaviour similar to a low pass filter so that they can be conveniently controlled by an envelope.

If Attack is 0 and Decay set to a medium value you get a percussive sound; if you turn up the attack, you get a soft-sounding start.

You can also use an LFO to modulate the wavetable position and, depending on the selected **LFO Shape**, you might get a wave scanning that goes back and forth (triangle) only into one direction followed by a hard reset to the origin (sawtooth) or between only two waves (square)

Exceeded Waves of a Wavetable

Of course you can combine envelope and keytrack modulations or add other modulation sources. All these modulations will be added so that maybe the end or the beginning of a wavetable could be exceeded. In such cases, the waves will be cyclically repeated.

Waveform Oscillators Introduction

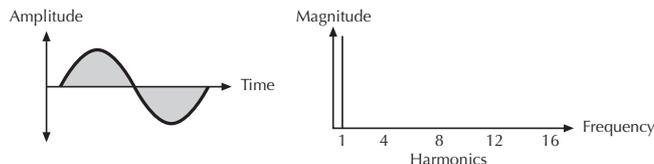
The oscillator is the first building block of a synthesizer. It delivers the signal that is transformed by all other components of the synthesizer. In the early days of electronic synthesis, Robert A. Moog found out that most real acoustic instrument waveforms could be reproduced by using abstracted electronic versions of these waveforms. He wasn't the first who came to that conclusion, but he was the first to recreate them electronically and build them into a machine that could be used commercially. What he implemented into his synthesizer were the still well-known waveforms sawtooth, square and triangle. For sure, this is only a minimal selection of the endless variety of waveforms, but the Waldorf Iridium Keyboard provides all those waveforms, plus other classic waveforms like square (which is the father of the pulse waveform) and the sine wave (also part of every other waveform).

You probably know how these waveforms look and sound, but the following chapter gives you a small introduction into the deeper structure of these waveforms. Let's start with the most basic one.

The Sine Wave

The Sine Wave is the purest tone that can be generated. It consists of only one harmonic, the fundamental, and has no

overtones. The following picture shows the sine wave and its frequency representation:



The Sine Wave

There is no acoustic musical instrument that generates a pure sine wave; the only instrument that comes close to it is the pitch fork. Therefore, the sine wave sounds a little artificial to the ear. However, the sine wave can be an interesting oscillator waveform to emphasize a certain harmonic while other oscillators are playing more complex waveforms, or as an FM source for frequency modulation.

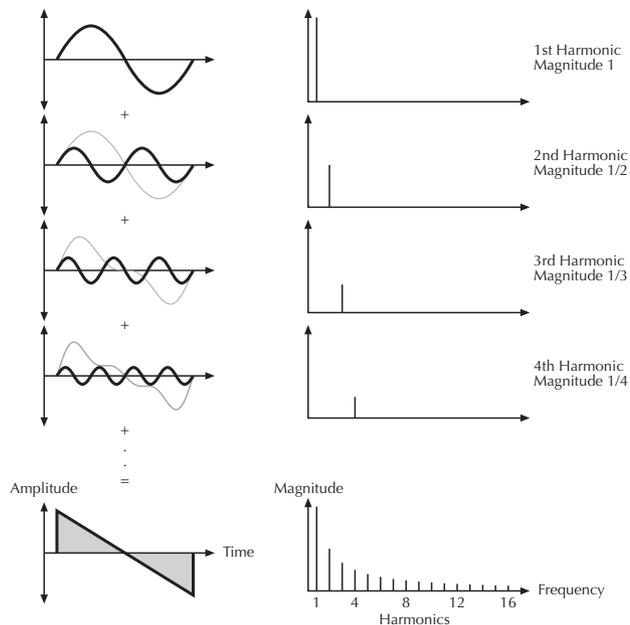
The sine wave is the most basic building block of each waveform. Any waveform can be broken down into several (or many) sine waves that are arranged with different frequencies and magnitudes. These sine waves are called *partials*. In most waveforms the partial with the lowest frequency is dominant, meaning that this partial is used by the ear to determine the pitch of the tone. This partial is called the *fundamental*. All other partials are called *overtones*. So the second partial is the first overtone.

Cyclic waveforms such as the waveforms in the Iridium Keyboard only feature sine waves in integer frequency ratios to the fundamental like double frequency, triple frequency and so on. Those partials are called *harmonics* because their frequency is a harmonic multiple of the fundamental.

Confusing? Let's generalize it to cyclic waveforms: a cyclic waveform – like sawtooth, square, etc. – only consists of harmonic partials. The harmonic with the lowest frequency is dominant and therefore called the fundamental. All other harmonics are called overtones.

The Sawtooth Wave

The Sawtooth Wave is the most popular synthesizer waveform. It consists of all harmonics in which the magnitude of each harmonic descends by the factor of its position. This means that the first harmonic (the fundamental) has full magnitude, the second harmonic has half magnitude, the third harmonic has a third magnitude, and so on. The following picture shows how the individual harmonics build up the sawtooth wave:



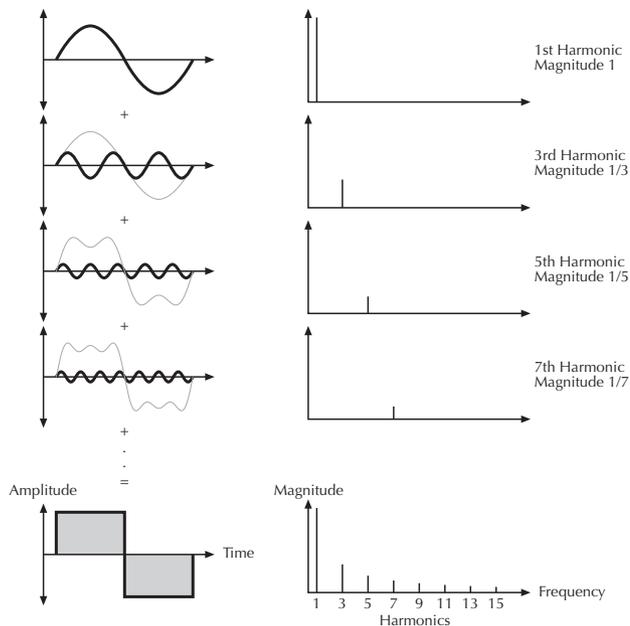
Additive components of the Sawtooth wave

The sawtooth wave was thought as an abstraction of the timbre of string and brass instruments. You can easily understand that when you think of a violin. Imagine a bow

pulling the string slightly into one direction. At one point, the string abruptly comes off the bow and swings back to its original position. The bow is still moved and so it catches the string again and the procedure is repeated. The result is a waveform that looks like a sawtooth. The same is true for a brass instrument. In this case the 'string' are the lips while the bow is the air. The lips are moved by the air to a certain extent and abruptly move back to their original position.

The Square Wave

The Square Wave is a special waveform generated by a pulse waveform with 50% pulse width. This means that the positive part of the waveform has equal length to the negative part. The pulse waveform can have other pulse widths as you will read later. For now, we'll talk about the square wave as a unique waveform. The square wave consists of all odd harmonics in which the magnitude of each harmonic descends by the factor of its position. This means that the first harmonic has full magnitude, the third harmonic has a third magnitude, the fifth harmonic has a fifth magnitude and so on. The following images illustrates how the individual harmonics build up the sawtooth wave:



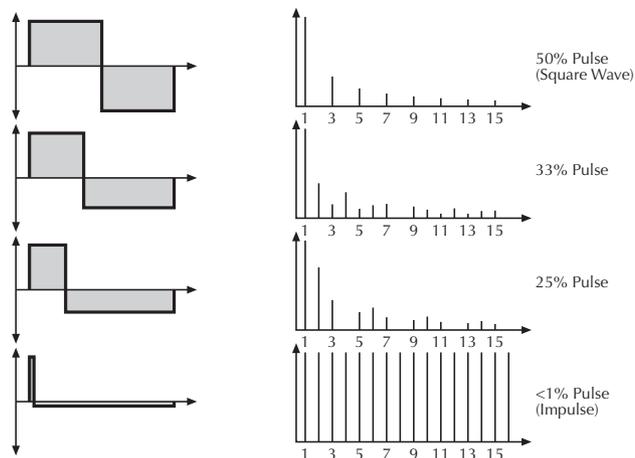
Additive components of a square wave with 50% pulse width

The square wave was thought as an abstraction of wind instruments like a pan flute or a recorder. They consist of a tube that can contain a certain amount of air. The player

blows air through the tube in such a way that the air starts to vibrate. This vibration is almost completely symmetrical, resulting in a hollow timbre.

The Square Wave

The Square wave is the most versatile wave in a classic synthesizer because its shape and therefore its harmonic content can be changed in realtime. This is done by changing the width of the upper and lower portion of the waveform cycle. These portions are called pulses – hence the pulse width name. The width of the first pulse is used to distinguish between different pulse waves and it is measured in percent. The following image illustrates several pulse waves with different pulse widths:



Additive components of Pulse wave with different pulse widths

The first thing you probably observe is that the lower part of the wave has a narrower excursion. This is because the energy of the wider pulse is higher than the one of the narrower pulse. If this were not compensated, the overall signal would have an unwanted DC offset.

As you have read in the previous chapter the harmonic content of a 50% pulse wave is a special case. It has a very

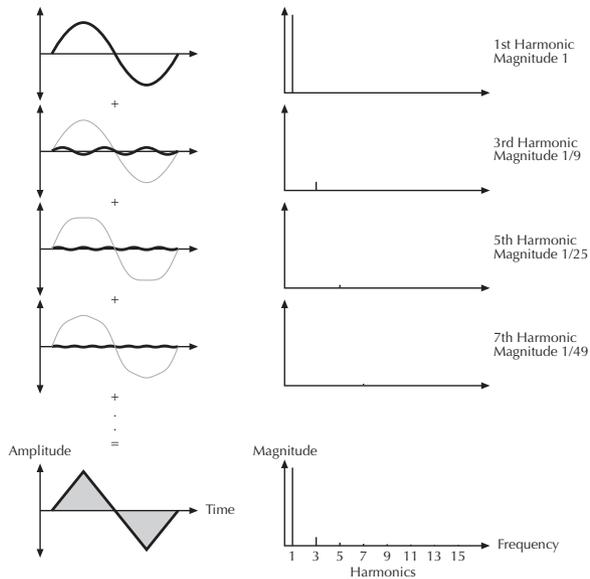
symmetrical harmonic content while all other pulse widths create peaks or troughs at certain frequencies. Another special case is a pulse wave with a very narrow pulse width – labelled as < 1% in the previous image. An infinitely thin pulse creates a spectrum that has all harmonics with equal magnitudes. In a digital synthesizer, ‘infinitely’ necessarily means one sample.

The pulse wave is an artificial wave, which means that it doesn’t occur in nature. It was built into synthesizers because it could create a lot of different timbres with a minimum of technical effort. However, certain pulse widths sound very close to the timbres of acoustic (or semi-acoustic) instruments – i.e. guitar or bass guitar, e-piano, or even a flute.

The most powerful feature of the pulse wave is the ability to change its width while sounding. This is called pulse width modulation. When the pulse width is changed the waveform starts to sound thicker. This happens because the effect is very similar to what you hear when you have two oscillators running with slightly different frequencies. They interfere and create irregular troughs in the resulting waveforms.

The Triangle Wave

The Triangle Wave is very similar to the square wave. It is composed of the same harmonics as the square wave but with different magnitude ratios. The magnitude of each harmonic is divided by the power of its number. This means that the third harmonic’s magnitude is a ninth, the fifth harmonic is a twenty-fifth and so on. The following image illustrates the harmonic content:



Additive components of the Triangle wave

The reason why the triangle wave is so popular in classic synthesizers is that it can act as a sub-oscillator wave, to emphasize certain frequencies or to frequency modulate other oscillators.

The triangle wave sounds like a woodwind instrument – i.e. a clarinet. It can also be used for mallet instruments like vibraphone and xylophone, etc.

A Short Introduction to Granular Synthesis

Granular synthesis is based on a simple idea: instead of playing back an entire sample, only short portions of the sample – the so-called grains – are played. These grains can be played back in any order. Each time a grain ends, a new one starts. To avoid discontinuities in the playback, and to minimize artefacts, envelopes are applied to the grains. Granular synthesis can be used to extract interesting spectra from all kinds of samples creating sound effects by completely scrambling a sample, or for low-fidelity time stretching, for example.

Very short grains produce sounds with an individual pitch. For that reason you can also use samples without a distinct pitch – such as drum loops and sound effects – to extract pitched spectra from them. Sounds with longer grains usually play back with the pitch of the original sample.

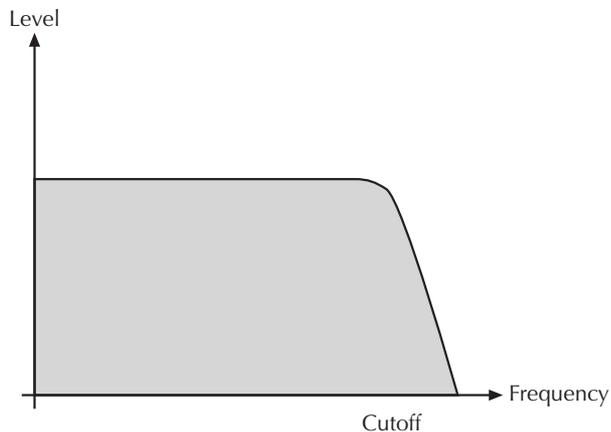
If you play back the same portion of a sample over and over again, the sound may become too static. You can use the Particle Generator parameters to compensate for this and bring more liveliness into the sound. By adding more grain streams (kernels) the grain and sound density can be increased to produce a richer sound.

Filter Introduction

Once the oscillator signal leaves the mixer it is sent to the filters (Dual Filters and Digital Former). The Iridium Keyboard offers two filter units, each with its own individual settings. The signal flow in the filters can be controlled via the Routing function on the Filter page. The filters are components that have significant influence on the Iridium Keyboard's sound characteristics.

Now, we'll explain the basic function of a filter discussing the type used most commonly in synthesizers: the lowpass filter.

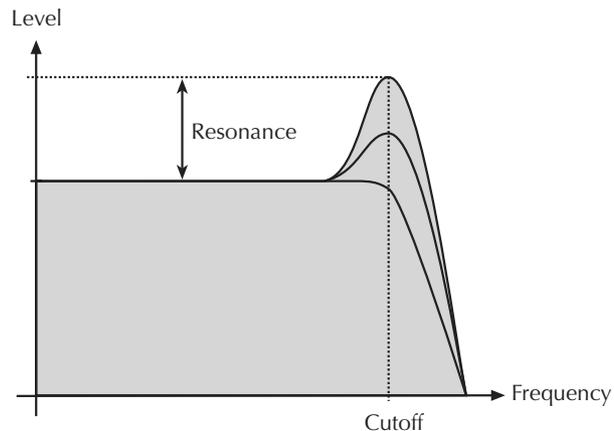
The lowpass filter type dampens frequencies that lie above a specified cutoff frequency. Frequencies below this threshold are hardly affected. The frequency below the cutoff point is called the pass band range; the frequencies above are called the stop band range. The Iridium Keyboard's filter dampens frequencies in the stop band with a certain slope. The slope can be 12dB or 24dB per octave. This means that the level of a frequency that lies an octave above the cutoff point will be 12dB or 24dB less than those frequencies of the signal that fall into the pass band. The following image illustrates the basic principle of a low pass filter:



To give you an idea of the extent of damping, consider this example of a lowpass filter: a reduction of 24dB reduces the original level one octave above the cutoff point by approx. 94%. The damping factor two octaves above the cutoff point reduces the original level by more than 99%, which in most cases means this portion of the signal is no longer audible.

The Iridium Keyboard's filter also features a resonance parameter. Resonance in the context of a low, band or high pass filter means that a narrow frequency band around the cutoff point is emphasized. The following image illustrates

the effect of the resonance parameter on the filter's frequency curve:



If the resonance is raised to a great extent then the filter will begin self-oscillation – i.e. the filter generates an audible sine wave even when it does not receive an incoming signal.

FAQ - Frequently Asked Questions

How do I make a backup of my patches?

Please go to Load > Actions > Export. There, you can select and export your patches. Please note that the samples attached to the patches will not be saved automatically.

My MicroSD card is not recognized by the Iridium Keyboard

Please make sure the MicroSD card is turned upside down and inserted properly. Also, it should be FAT or FAT32-formatted. There are no known incompatibilities with any MicroSD card.

Iridium Keyboard doesn't recognize the update file, although it definitely is located in the top directory of the MicroSD card.

Please allow a bit of time, sometimes Iridium Keyboard needs up to a minute after inserting the MicroSD before it recognizes the card and the update file. In rare cases, you may try two or three times. Opening the zip file isn't enough, the Iridium Keyboard.update.bin file has actually been unpacked. Maybe your file got corrupted during download, please try downloading it again.

My device isn't recognized via USB.

- Make sure that your device is connected to your computer directly and not through a hub.
- Use the rear USB, not front USB connection.
- Disconnect all other USB devices from your computer which aren't needed at the moment.
- Change the USB cable or try from a different computer.
- On macOS: Click on **About this Mac** in the Apple menu. Select **System Report**. Go to the **Hardware** dropdown menu on the left and unfold it. Select **USB**. Check if your device is listed there.
- On Windows: Press the Win key + R. Enter **devmgmt.msc** and press OK. Check if your device is listed there. If it shows up as an "Unknown Device" and if there's a black and yellow warning sign, deinstall the driver. Then unplug the instrument, reboot your machine and plug it back in.

I think of a certain feature about sound design, is this possible to do in Iridium Keyboard?

In many cases, specific wishes for sound design can be realized using the modulation matrix. Remember that you can use a Control Amount that will be added to the modu-

lation. E.g., an unipolar LFO can be achieved with Constant in the Control amount of the same modulation slot.

Iridium Keyboard has crashed!

First, please update Iridium Keyboard's OS. We often release a new firmware with new features and we definitely recommend going for it. The procedure takes less than a minute. Iridium Keyboard's OS is really stable so crashes rarely occur. If Iridium Keyboard crashes anyway, please generate a system logfile by pressing Global -> System -> Support Log. Include your name and crash date in the file name when saving. Send us your file and we will take a look into this.

Are the outputs from my device balanced or unbalanced?

This device has unbalanced outputs. We recommend using it with unbalanced cables.

Does my device send audio via its USB connection?

No. This device only sends and receives MIDI via USB. Transferring audio or files isn't possible.

Modulation Sources and Destinations

Modulation Sources

Source	Description
Off	No modulation source
Amp Env	Amplifier Envelope signal
Filter1 Env	Filter 1 Envelope signal
Filter2 Env	Filter 2 Envelope signal
Free Env1	Free Envelope 1 signal
Free Env2	Free Envelope 2 signal
Free Env3	Free Envelope 3 signal
LFO 1	LFO 1 signal
LFO 2	LFO 2 signal
LFO 3	LFO 3 signal
LFO 4	LFO 4 signal
LFO 5	LFO 5 signal
LFO 6	LFO 6 signal
Komplex	Komplex Modulator signal
Wheel	Modulation wheel (CC #1)
Pitchbend	MIDI Pitchbend signal
After Touch	Polyphonic Keyboard Pressure Data
MPE Y Axis	Second MPE parameter

Pedal	MIDI Sustain pedal (CC #64)
Expression	MIDI Expression pedal (CC #11)
Breath Control	MIDI Breath Controller (CC #2)
CC 22 - CC 31	MIDI CC #22 - #31
Keytrack	MIDI Note number
Velocity	MIDI Velocity
Voice Number	Number of played voice
Unisono Idx	Number of Unisono voices
Poly Idx	Number of active voices
Rand Trig	Random Trigger signal unipolar
Rand Trig Bipol	Random Trigger signal bipolar
Constant	Constant modulation value
Mod Pad X	Modulation Pad position X
Mod Pad Y	Modulation Pad position Y
SeqParam 1 - 8	Step Sequencer parameter values
CV 1 -4	CV 1 - 4 input signal
CV Start	CV start signal
CV Gate	CV gate signal

Modulation Destinations

Destination	Description
Off	No modulation destination
Pitch	Global pitch of all three Oscillators at once
Osc1/Osc2/Osc3 Pitch	Pitch of Oscillator 1...3
Osc1/Osc2/Osc3 Mix	Level of Oscillator 1...3
Osc1/Osc2/Osc3 Pan	Panning of Oscillator 1...3
WT1/WT2/WT3 Position	Wavetable Position of Oscillator 1...3
WT1/WT2/WT3 Travel	Wavetable Travel of Oscillator 1...3
WT1/WT2/WT3 Spectrum	Wavetable Spectrum of Oscillator 1...3
WT1/WT2/WT3 Noisy	Wavetable Noisy of Oscillator 1...3
WT1/WT2/WT3 Brilliance	Wavetable Brilliance of Oscillator 1...3
WT1/WT2/WT3 FX	Wavetable FX of Oscillator 1...3
WT1/WT2/WT3 Table	Wavetable selection of Oscillator 1...3
WF1/WF2/WF3 Warp	Waveform Warp of Oscillator 1...3

WF1/WF2/WF3 Sync	Waveform Sync of Oscillator 1...3
WF1/WF2/WF3 Detune	Waveform Detune of Oscillator 1...3
PT1/PT2/PT3 Length	Particle Length of Oscillator 1...3
PT1/PT2/PT3 Gate	Particle Gate of Oscillator 1...3
PT1/PT2/PT3 Jitter	Particle Jitter of Oscillator 1...3
PT1/PT2/PT3 Attack	Particle Attack of Oscillator 1...3
PT1/PT2/PT3 Decay	Particle Decay of Oscillator 1...3
PT1/PT2/PT3 Pos	Particle Position of Oscillator 1...3
PT1/PT2/PT3 Travel	Particle Travel of Oscillator 1...3
PT1/PT2/PT3 PSpread	Particle Pitch Spread of Oscillator 1...3
Osc1/2/3 Samp Start	Sample start point of Osc 1...3
RS1/RS2/RS3 Timbre	Resonator Timbre of Oscillator 1...3
RS1/RS2/RS3 Exciter	Resonator Exciter of Oscillator 1...3

RS1/RS2/RS3 Spread	Resonator Spread of Oscillator 1...3
RS1/RS2/RS3 Q	Resonator Q of Oscillator 1...3
KN1/KN2/KN3 Top-L	Kernel 1/2/3 top left parameter
KN1/KN2/KN3 Top-R	Kernel 1/2/3 top right parameter
KN1/KN2/KN3 Center	Kernel 1/2/3 center parameter
KN1/KN2/KN3 Bottom-L	Kernel 1/2/3 bottom left parameter
KN1/KN2/KN3 Bottom-R	Kernel 1/2/3 bottom right parameter
DF Amount	Digital Former Amount (based on the selected Type)
DF Color	Digital Former Color (based on the selected Type)
DF Pan	Digital Former Panning
DF Level	Digital Former Level
Filter 1/2 Cutoff	Cutoff of Filter 1/2
Filter 1/2 Reso	Resonance of Filter 1/2
Filter 1/2 Pan	Filter Panning
Filter 1/2 Level	Filter Level
VCA	VCA

AmpEnv Attack	Attack rate of Amp Envelope
AmpEnv Decay	Decay rate of Amp Envelope
AmpEnv Sustain	Sustain level of Amp Envelope
AmpEnv Release	Release rate of Amp Envelope
Filt1/2 Env Attack	Attack rate of Filter Env. 1/2
Filt1/2 Env Decay	Decay rate of Filter Envelope 1/2
Filt1/2 Env Sustain	Sustain level of Filter Envelope 1/2
Filt1/2 Env Release	Release rate of Filter Envelope 1/2
Free1/2/3 Env Attack	Attack rate of Free Envelope 1/2/3
Free1/2/3 Env Decay	Decay rate of Free Envelope 1/2/3
Free1/2/3 Env Sustain	Sustain level of Free Envelope 1/2/3
Free1/2/3 Env Release	Release rate of Free Envelope 1/2/3
FX1/2/3/4/5 DryWet	FX Dry Wet for Effect 1...5
FX1/2/3/4/5 Control	FX Control for Effect 1...5 (based on the selected FX Type)
Volume	Amplifier output volume

Pan	Output Panning
LFO1/2/3/4/5/6 Speed	Speed of LFO 1...6
LFO1/2/3/4/5/6 Gain	Gain of LFO 1...6
Komplex Speed	<- see destination name
Komplex Blend	<- see destination name
Komplex Entropy	<- see destination name
Komplex Warp	<- see destination name
Komplex Gain	<- see destination name
Glide Rate	<- see destination name
Chorus DryWet	<- see destination name
Chorus Depth	<- see destination name
Chorus Speed	<- see destination name
Chorus Feedback	<- see destination name
Phaser DryWet	<- see destination name
Phaser Depth	<- see destination name
Phaser Speed	<- see destination name
Phaser Feedback	<- see destination name
Phaser Spread	<- see destination name
Flanger DryWet	<- see destination name
Flanger Depth	<- see destination name
Flanger Speed	<- see destination name
Flanger Feedback	<- see destination name

Reverb Gain	<- see destination name
Reverb Time	<- see destination name
Reverb Color	<- see destination name
Delay DryWet	<- see destination name
Delay Feedback	<- see destination name
Delay Time L	<- see destination name
Delay Time R	<- see destination name
EQ DryWet	<- see destination name
EQ FreqShift	<- see destination name
Drive DryWet	<- see destination name
Drive Amount	<- see destination name
Drive Gain	<- see destination name
Compress Ratio	<- see destination name
Compress Thresh	<- see destination name
Arp/Seq RelGate	<- see destination name
Arp/Seq Swing	<- see destination name
Seq Length	<- see destination name

Technical Data

Power Supply

Supply Voltage Input	100 – 240 V AC / 50-60 Hz
Nominal Voltage Output	12 V DC
Maximum power consumption:	15 W

Dimensions and Weight

Width:	851 mm
Depth:	355 mm
Height (including knobs):	110 mm
Total weight:	12.0 kg

Glossary

Aftertouch

The majority of contemporary keyboards are capable of generating aftertouch messages. On this type of keyboard, when you press harder on a key you are already holding down, a MIDI Aftertouch message is generated. This feature makes sounds even more expressive (e.g. through vibrato).

Aliasing

Aliasing is an audible side effect arising in digital systems as soon as a signal contains harmonics higher than half the sampling frequency.

Amount

The extent to which modulation influences a given parameter.

Amplifier

An amplifier is a component that influences the volume level of a sound via a control signal. This control signal is often generated by an envelope or an LFO.

Arpeggiator

An arpeggiator is a device that splits an incoming chord into its individual notes and repeats them rhythmically. Most arpeggiators feature different sequence modes to cover a wide range of applications. Typical controls for an arpeggiator are the octave range, the direction, the speed and the clock, which means the repetition interval. Some arpeggiators also feature preset or programmable rhythm patterns.

Attack

An envelope parameter. 'Attack' is a term that describes the ascent rate of an envelope from its starting point to the point where it reaches its highest value. The Attack phase is initiated immediately after a trigger signal is received – i.e. after you play a note on the keyboard.

Clipping

Clipping is a sort of distortion that occurs when a signal exceeds its maximum value. The curve of a clipped signal is dependent of the system where the clipping takes place. In the analog domain, clipping effectively limits the signal to its maximum level. In the digital domain clipping is similar to a numerical overflow and so the polarity of the signal's part above the maximum level is negated.

Coffee Filter

A coffee filter is a coffee-brewing utensil, usually made of disposable paper. It is part of an essential toolkit for survival when working with the Waldorf Iridium Keyboard.

Control Change (Controllers)

MIDI messages enable you to manipulate the response of a sound generator to a significant degree.

This message essentially consists of two components:

- The Controller number, which defines the element to be influenced. It can be between 0 and 120.
- The Controller value, which determines the extent of the modification.

Controllers can be used for effects such as slowly swelling vibrato, changing the stereo panorama position and influencing filter frequency.

Decay

'Decay' describes the descent rate of an envelope once the Attack phase has reached its zenith and the envelope drops to the level defined for the Sustain value.

Envelope

An envelope is used to modulate a sound-shaping component within a given time frame so that the sound is changed in some manner. For instance, an envelope that modulates the cutoff frequency of a filter opens and closes this filter so that some of the signal's frequencies are filtered out. An envelope is started via a trigger – usually a fixed trigger. Normally the trigger is a MIDI Note. The classic envelope consists of four individually variable phases: Attack, Decay, Sustain, and Release. This sequence is called an ADSR envelope. Attack, Decay, and Release are time or slope values, and Sustain is a variable volume level. Once an incoming trigger is received, the envelope runs through the Attack and Decay phases until it reaches the programmed Sustain level. This level remains constant until the trigger is terminated. The envelope then initiates the Release phase until it reaches the minimum value.

Filter

A filter is a component that allows some of a signal's frequencies to pass through it and dampens other frequencies. The most important aspect of a filter is the filter cutoff frequency. The most common type is the lowpass filter. A lowpass filter dampens all frequencies above the cutoff frequency.

Filter Cutoff Frequency

The filter cutoff frequency is a significant factor for filters. A lowpass filter dampens the portion of the signal that lies above this frequency. Frequencies below this value are allowed to pass through without being processed.

LFO

LFO is an acronym for Low-Frequency Oscillator. The LFO generates a periodic oscillation at a low frequency and features variable waveshapes. Similar to an envelope, an LFO can be used to modulate a sound-shaping component.

Low Pass Filter

Synthesizers are often equipped with a lowpass filter. A lowpass filter dampens all frequencies above its cutoff frequency. Frequencies below the cutoff point are not affected.

MIDI

The acronym MIDI stands for Musical Instrument Digital Interface. It was developed in the early '80s so that diverse types of electronic musical instruments by different manufacturers could interact. At the time a communications standard for different devices did not exist, so MIDI was a

significant advance. It made it possible to link any MIDI-equipped device with another through simple, uniform connections.

Essentially, this is how MIDI works: One sender is connected to one or several receivers. For instance, if you want to use a computer to play the Iridium Keyboard, then the computer is the sender and the Iridium Keyboard acts as the receiver. With a few exceptions, the majority of MIDI devices are equipped with two or three ports for this purpose: MIDI In, MIDI Out and in some cases, MIDI Thru. The sender transfers data to the receiver via the MIDI Out jack. Data is sent via a cable to the receiver's MIDI In jack.

MIDI Thru has a special function. It allows the sender to transmit to several receivers. It routes the incoming signal to the next device without modifying it. Another device is simply connected to this jack, thus creating a chain through which the sender can address a number of receivers. Of course it is desirable for the sender to be able to address each device individually. Consequently, there is a rule that is applied to ensure each device responds accordingly.

MIDI Channel

This is a very important element of most messages. A receiver can only respond to incoming messages if its receive

channel is set to the same channel as the one the sender is using to transmit data. Consequently, the sender can address specific receivers individually. MIDI Channels 1 through 16 are available for this purpose.

MIDI Clock

The MIDI Clock message determines the tempo of a piece of music. It serves to synchronize processes based on time.

Modulation

Modulation influences or changes a sound-shaping component via a modulation source. Modulation sources include envelopes, LFOs, or MIDI messages. The modulation destination is a sound-shaping component such as a filter or an amplifier.

Note On / Note Off

This is the most important MIDI message. It determines the pitch and velocity of every generated note. The time of arrival is simultaneously the start time of the note. Its pitch is derived from the note number, which lies between 0 and 127. The velocity lies between 1 and 127. A value of 0 for velocity is similar to 'Note Off'.

Panning

The process of changing the signal's position within the stereo panorama.

Pitchbend

Pitchbend is a MIDI message. Although pitchbend messages are similar in function to control change messages, they are a distinct type of message. The reason for this distinction is that the resolution of a pitchbend message is substantially higher than that of a conventional Controller message. The human ear is exceptionally sensitive to deviations in pitch so the higher resolution is used because it relays pitchbend information more accurately.

Program Change

These are MIDI messages that switch sound programs. Program numbers 1 through 128 can be changed via program change messages.

Release

An envelope parameter. The term 'Release' describes the descent rate of an envelope to its minimum value after a trigger is terminated. The Release phase begins immediately after the trigger is terminated, regardless of the enve-

lope's current status. For instance, the Release phase may be initiated during the Attack phase.

Resonance

Resonance is an important filter parameter. It emphasizes a narrow bandwidth around the filter cutoff frequency by amplifying these frequencies. This is one of the most popular methods of manipulating sounds. If you substantially increase the resonance, to a level where the filter begins self-oscillation then it will generate a relatively clean sine waveform.

Spectrum

A basic component of sounds are periodic oscillations. The perceived pitch corresponds to the fundamental frequency of this oscillation. The frequency spectrum of periodic oscillations is a line spectrum, the lowest frequency corresponds to the fundamental frequency (fundamental) and other frequencies-integer multiples of the fundamental frequency (harmonics). A spectrum display like that which is in the Iridium Keyboard is a graphical overview of all the frequencies of a wavetable with their amplitudes over time.

Sustain

An envelope parameter. The term 'Sustain' describes the level of an envelope that remains constant after it has run through the Attack and Decay phases. Sustain lasts until the trigger is terminated.

System Exclusive Data

System exclusive data allow access to the heart of a MIDI device, enabling access to data and functions that no other MIDI messages are able to address. 'Exclusive' in this context means that this data pertains to only one device type or model. Every device has unique system exclusive data. The most common applications for SysEx data include transfer of entire memories and complete control of a device via a computer.

Trigger

A trigger is a signal that activates events. Trigger signals are very diverse. For instance, a MIDI note or an audio signal can be used as a trigger. The events a trigger can initiate are also very diverse. A common application for a trigger is use to start an envelope.

Volume

The term describes a sound's output level

USB

The Universal Serial Bus (USB) is a serial bus system to connect a computer with an external device. USB equipped devices can be plugged together while active. The recognition is made automatically.

Wave

In this context, a Wave is a digitally-memorized reproduction of one single wave pass insofar as it is identical to a sample that is looped after one single wave pass. In contrast to the samples in a sampler, all waves in Waldorf Wavetable synthesizers have the same lengths and are played back in the same pitch.

Wavetable

One oscillator shape in the Iridium Keyboard is based on waveform sets called wavetables. You should think of these as a sequence of up to up to 128 single waves. This can be played back in a static way or played through dynamically, which results in their typically interesting sound transformations. If the waves do not differ much,

then the wavetable will probably sound smooth and pleasant. If they have a completely different structure then this will result in wild spectral changes.

Product Support

Service & Repair

The Iridium Keyboard does not contain any user-serviceable parts. If your Iridium Keyboard develops a fault or needs servicing, please refer to a Waldorf authorised service center. For more information, please ask your musicians dealer or your local Waldorf distributor.

Any Questions?

If you have any questions about your Waldorf product, feel free to contact us. We're here to help.

① Use the support form at our website. This is the most efficient and fastest way to contact us. Your questions will be forwarded immediately to the resident expert and you will quickly receive an answer.

support.waldorfmusic.com

② Send us a letter. It will take a bit longer, but it is just as dependable as an email.

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③ Visit our support area at **waldorfmusic.com**

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