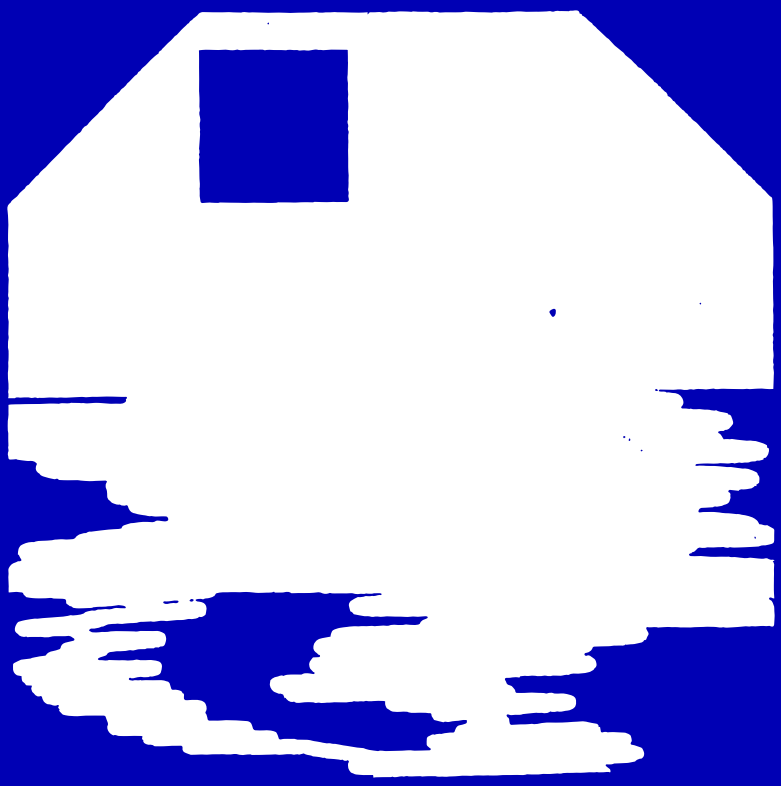
20 VOICE DUAL LAYER POLYPHONIC BINAURAL
ANALOG-HYBRID SYNTHESIZER

# UDO SUPER GEMINI — OWNER'S MANUAL


VERSION 1.0 · NOVEMBER 2023



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U·D·O | 20 VOICE DUAL LAYER POLYPHONIC BINAURAL ANALOG-HYBRID SYNTHESIZER WITH SUPER-WAVE TECHNOLOGY

# SUPER GEMINI

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VERSION 1.0 · NOVEMBER 2023

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# ⚠ IMPORTANT SAFETY INSTRUCTIONS ⚠

## THE FOLLOWING SAFETY REQUIREMENTS MUST BE ADHERED TO FOR PREVENTION OF FIRE, ELECTRIC SHOCK OR INJURY:

1. Read all the instructions before using the musical instrument.

2. Do not disassemble or modify the musical instrument.

3. Never attempt to repair this device or replace parts. If repair or part replacement should become necessary, you must contact your dealer. There are no user-serviceable parts inside the musical instrument.

4. Never place the musical instrument in an unstable location. A musical instrument set may fall, causing serious personal injury. Many injuries, particularly to children, can be avoided by taking simple precautions such as:
   - Only using cabinets or stands that can safely support the musical instrument and have an adequate load rating
   - Ensuring that the musical instrument is level and stable before use
   - Ensuring the musical instrument is not overhanging the edge of supporting furniture, which could cause the musical instrument to topple
   - Not placing the musical instrument on tall furniture (for example, cupboards or bookcases) without anchoring both the furniture and the musical instrument to a suitable support
   - Not placing the musical instrument on cloth or other materials that may be located between the musical instrument and supporting furniture or stand
   - Educating children about the dangers of climbing on furniture to reach the musical instrument

5. Do not use or store the musical instrument in the following types of locations:
   - Locations exposed to rain
   - Locations of excessive dust
   - Locations subject to heavy vibration
   - Locations of extremely high temperature (such as in direct sunlight, near heating equipment, or on a device that generates heat, or near naked flames or candles)
   - Near moisture (such as in a bathroom, near a sink, or on a wet floor) or in locations of high humidity

6. Do not stand on the musical instrument, or place heavy objects on it.

7. Do not drop the musical instrument.

8. The musical instrument should only be powered from an electrical outlet which provides a voltage within the ratings of the instrument and provides an earth connection. Connection to any supply voltage outside the rated range, or a supply without an earth connection, can cause permanent damage and serious personal injury.

9. Only use the power cord included with the device. Do not attempt to modify or disassemble the power cord. If replacing the fuse in the power cord, always replace it with a fuse of the same type.

10. Do not place heavy or sharp objects on the power cord, as this could damage the power cord and render it unsafe. If damage to the power cord is suspected, disconnect it from the electrical outlet if safe to do so, do not use the power cord and contact your dealer.

11. Do not place any containers which contain liquids on or near the musical instrument.

12. Do not allow foreign objects or liquids to enter the musical instrument, as this can cause permanent damage and may result in serious personal injury and possible ignition of the liquid if flammable. If damage from foreign objects or liquids entering the musical instrument is suspected, do not use the musical instrument, disconnect from the electrical outlet and contact your dealer.

13. Do not use the musical instrument, disconnect from the electrical supply and contact your dealer if any other serious malfunction is suspected, for example by:
    - The musical instrument becoming wet (by rain, etc.)
    - The musical instrument becoming hot
    - Generation of smoke or an unusual smell
    - Repeated abnormal behaviour
    - Visible damage to the enclosure, for example large dents or holes in the enclosure
14. If the musical instrument is to be used by children, the children must always be supervised by an adult.
15. Ensure that the connected cables are organised and managed in a safe manner, and do not cause an electrical or trip hazard.
16. When you need to transport the musical instrument, package it in the box (including padding) that it came in, otherwise damage during transport could occur.
17. Unplug the power supply from the outlet when left unused for long periods of time or during lightning storms.

## Electrical Specifications

| | |
|---|---|
| Rated input voltage: | 90~240 VAC |
| Rated input frequency: | 47-63 Hz |
| Power consumption: | 50 W |
| Fuse type: | 2A T-type |

## Note

This device has been tested and complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

## Caution

This product is not user serviceable. All servicing should be carried out by qualified personnel only. Please note that any changes or modifications made to this product not expressly approved by UDO Audio Ltd. could void the user's authority granted by the FCC to operate the equipment.

# ACKNOWLEDGEMENTS

Ben Crosland, Anthony Gillan, Axel Hartmann, Ann Hsu, Alexandros Liarokapis, Hazel Mills, Frank Rüffel, Klaus Weber and Angell Yu.

## The UDO Team

Ben Charlton, George Hearn, Magnus Hearn, Mike Hiegemann, Ben Miles, Callum Mulholland and Jamie Tucker.

Manual and illustrations by Mike Hiegemann.

# INTRODUCTION

Hello and welcome to your new UDO synthesizer. What sits beneath your fingers is an instrument crafted in recent times yet having benefitted from a long history of players and pioneers, of engineers and artists, technicians and tinkerers over several generations.

There is a magic in synthesizers, a detail between the lines, in the space between the traces of copper, and the complex interactions of code and fabrications of metal. If we are lucky, we can find ourselves in a state of flow as we play, comfortably putting aside the challenges of our inner world and the wider world beyond, and fully focus on the unique joy of what we find ourselves engaged with. If we are luckier still, we can share this moment with others. Yet, if you are one of those who have come to own this synthesizer, you have probably already learned the healing and restorative qualities of creativity as its own reward.

The creators of what you have before you understand the power of play, and what you play now while not a simple instrument, works hard to conceal its complexities and its secrets and presents you only with straightforward expressive controls of a superior mechanical quality to encourage you to seek and explore.

A journey into sound now awaits you and it is a journey with no wrong turns, and no dead-ends. It is an adventure of spectral dynamics, of glittering frequency and shattering subharmonics, of comfort and discord, expectations and surprises, and accompanying you always will be your loyal workmate and trusted companion, the UDO Super Gemini.

I hope you learn to love playing this instrument as much as I do, and when you find that moment, that sound, that glimpse of feeling or emotion that transcends your moment in time, then we have truly achieved something good together.

George Hearn,
Director UDO Audio Ltd

# OVERVIEW

The UDO Super Gemini is a 20-voice polyphonic, bi-timbral synthesizer based on a hybrid of analog and digital technologies. By combining the aesthetics and sonic character of vintage-era classics with state-of-the-art synthesis technology, it was designed to be flexible, powerful and, above all, *immediate* – providing you with gorgeous sound times two!

## DDS Oscillators

Direct Digital Synthesis is the signal generation method employed by both oscillator cores of the Super Gemini. At its centre is a clock signal running three orders of magnitude higher than typical audio sample rates. This clock increments a counter through thousands of indices in your chosen waveform, generating samples once every 20-billionths of a second and interpolating between them.

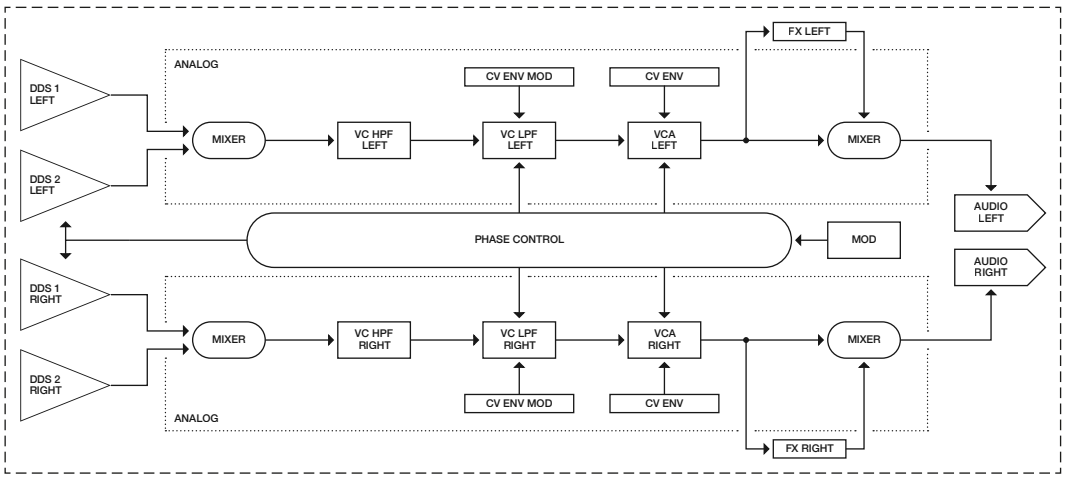
Each numerically controlled oscillator then uses its own DAC, also running at the same high sample rate, to convert the samples to analog voltages before being filtered by a preliminary analog low-pass filtering stage.

The extremely high sample-rate to output-frequency ratio provides DDS oscillators with the advantage of superior phase precision and natural-sounding frequency modulation. Importantly, it also allows us to avoid using the severe band-limiting, or “anti-aliasing”, of typical lower-frequency digital methods. This means our oscillators are easily capable of generating frequency content far above the limits of the human auditory system, as is the norm with analog oscillator synthesis.

# What is Binaural Synthesis?

In binaural mode, the Super Gemini features a true stereo signal path in which its 20 voices are twinned to form either ten stereo ‘super voices’ in single mode or five stereo ‘super voices’ in dual or split mode. Consequently, the left and right channels (and your ears) are each assigned a complete synthesizer voice per layer.

Starting with the stereo oscillators, parameters of both channels of each ‘super voice’ may also be independently controlled, enabling you to create gorgeous stereo images. The effect on the sound ranges from subtle to extreme stereo movement, resulting in an enhanced sense of spatial positioning compared to conventional monaural signal chains.



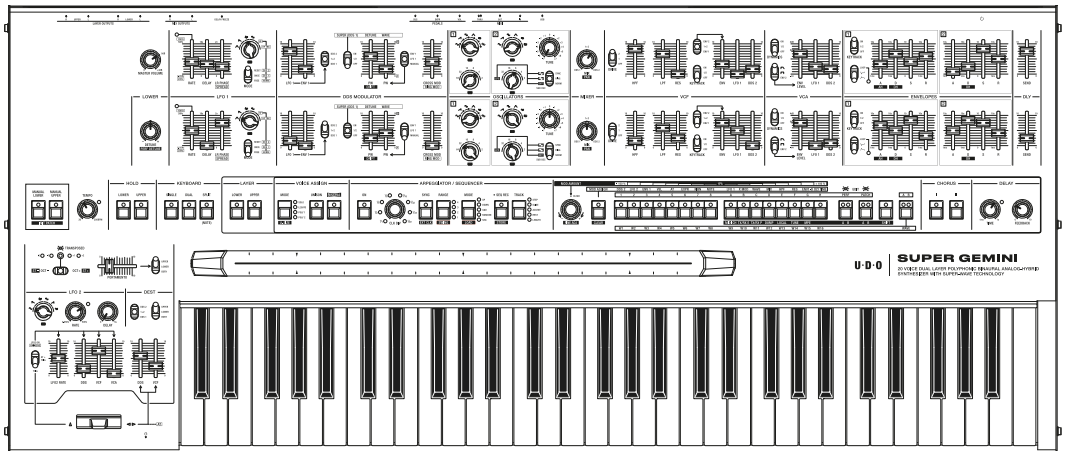

The Super Gemini’s signal path per layer.

# QUICK START

The Super Gemini was designed for hands-on performance and experimentation. Not only do we think it is a great sounding instrument, but it also provides you with a pleasing immediacy when interacting with the sound. All of the Super Gemini's primary controls are accessible directly from the front panel, making it an incredibly intuitive instrument that will spark your creativity in the studio and on stage.

The upper two rows of the front panel feature individual sound shaping controls for each of the two layers, allowing you to program and edit two patches simultaneously in dual and split modes. The bottom row of the front panel mainly covers shared controls for both layers, which enable you to load a layer's patch and to modify the arpeggiator, sequencer and effects settings per layer amongst other things.

To the left of the keyboard is the performance control section that contains performance-related elements such as the bender, transpose and portamento controls as well as a second LFO. To further increase the expressiveness of your performance, the Super Gemini is also equipped with a custom-designed ribbon controller and a 61-note keyboard capable of polyphonic aftertouch.




The front panel of the Super Gemini.

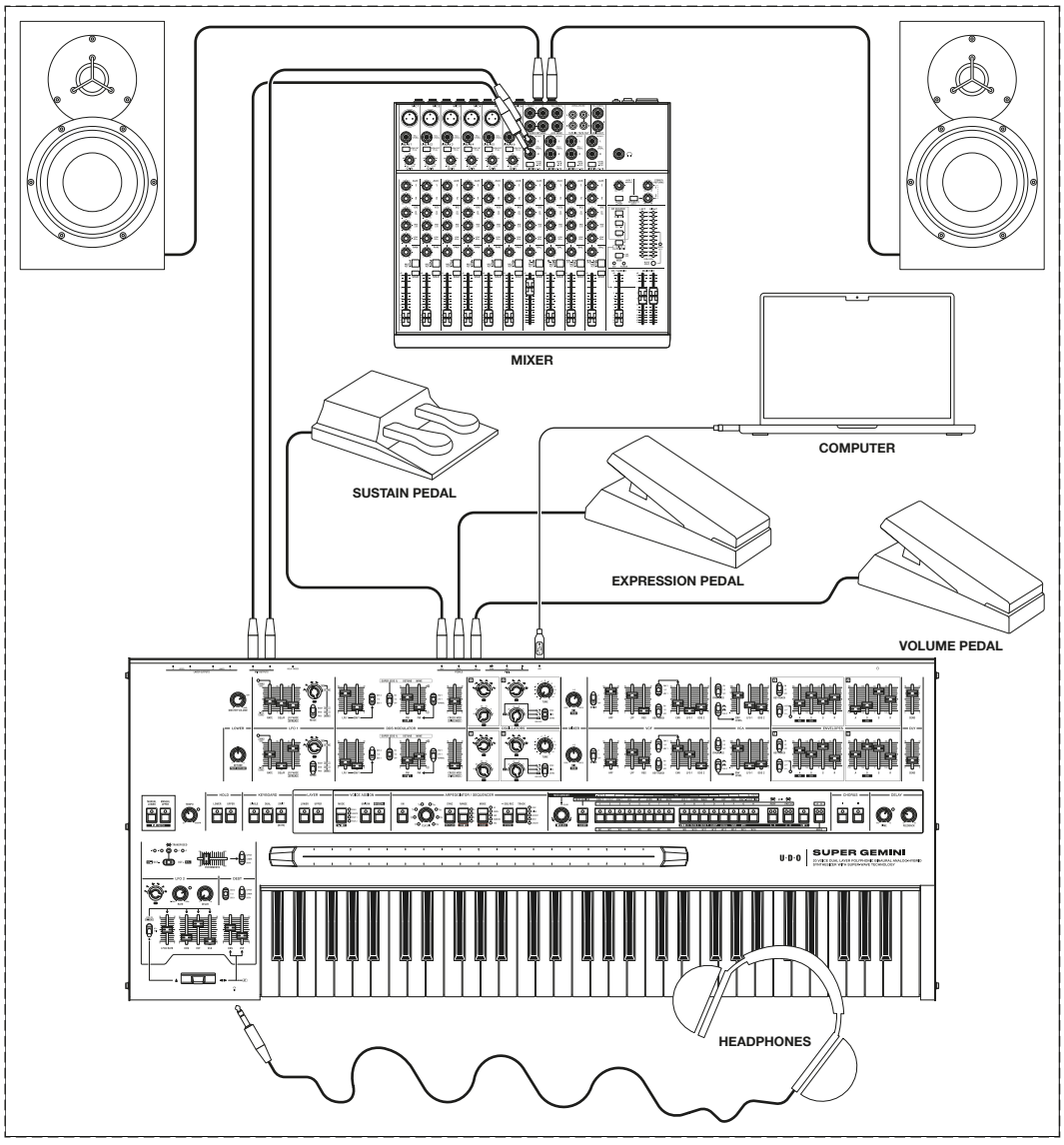
Exploration and experimentation are downright encouraged, so feel free to dive straight in and start creating your sounds. The best way to learn about how the Super Gemini works is to get involved! You can always come back later and read more about each of the Super Gemini's sound shaping tools in the subsequent paragraphs of this manual. We hope you enjoy playing and tweaking the Super Gemini as much as we do!

# Setting up Your Super Gemini

Follow the steps below to setup your brand-new synthesizer:

1. Plug the power cable into the power connector on the rear panel of the Super Gemini.
2. Use unbalanced 1/4-inch audio cables to connect the outputs labelled **MIX OUTPUT** to your mixer or audio interface, or connect headphones to the headphone output on the front left.
3. Turn on the Super Gemini.
4. Set the **MASTER VOLUME** control to about 0 dB.
5. Play some notes or chords and adjust the levels on your mixer or audio interface.

See pages 27-28 for a full overview of the Super Gemini's connections.




One of many ways to set up the Super Gemini.

# Performances

A performance comprises a complete instrument setup, consisting of two layers – an upper and a lower layer – each with its own patch (see pages 19-24) and overarching parameter settings (see pages 78-82).

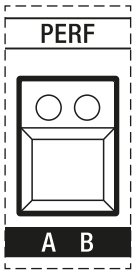
A performance is always loaded because it provides the framework for individual sounds or patches. It can consist of one patch in single mode, two stacked patches in dual mode, or two patches assigned to the left and right halves of the keyboard in split mode. See pages 81-82 for more details on each of these modes.

*The **MASTER VOLUME** setting is not part of a performance and must always be adjusted manually.*

A total of 128 performances are accessible from the front panel. They are organised in two groups (**A** and **B**) of 8 banks (**A**-**H**) featuring 8 performances each. You can edit these or use the dedicated memory slots to store your own performances.

# Loading a Performance

First of all, make sure you are in performance mode. The Super Gemini defaults to this mode when you turn it on, but otherwise it is activated by pressing the button labelled **PERF**.

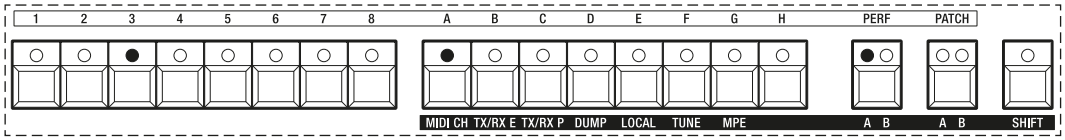



The performance mode button.

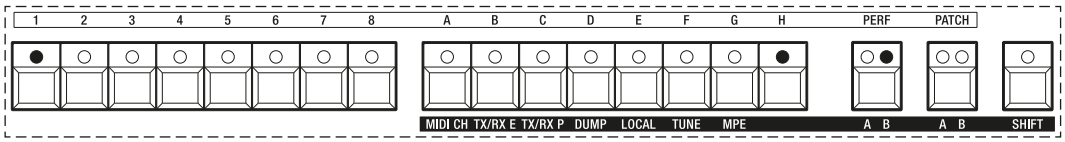
Pressing **PERF** gives you access to group **A**, indicated by the lit LED above the letter **A**. To access the performances of group **B**, hold **SHIFT** and then press **PERF**. The LED above the letter **B** will now light up.

Each lettered button (**A**–**H**) allows you to select a bank. Pressing a numbered button (**1**-**8**) loads one of eight performances within a selected bank.

The LEDs of buttons **1**-**8**, **A**-**H** and **PERF** indicate which performance is loaded. In the first example, performance **3** from bank **A** of group **A** is loaded:




In the second example, performance **1** from bank **H** of group **B** is loaded:




To load a different performance from the same bank:

- Press one of the seven numbered buttons (**1**-**8**) that are currently unlit. Its LED will then light up.

*If the LED of one of the select buttons does not light up, this indicates that the corresponding memory location is empty.*

To load a performance from a different bank:

1. Press one of the seven lettered buttons (**A**-**H**) that are currently unlit. Its LED will then light up, indicating that a different bank has been selected.

2. Press one of the numbered buttons (**1**-**8**). Its LED will then light up.

*Changing the bank does not load a new performance. A new performance is loaded only by pressing one of the numbered buttons after a bank has been selected.*

To load a performance from a different group:

1. Press the **PERF** button to select group **A**, or hold the **SHIFT** button and then press **PERF** to select group **B**.
2. Press one of the lettered buttons (**A**-**H**) to select a bank. Its LED will then light up.
3. Press one of the numbered buttons (**1**-**8**). Its LED will then light up.

## Editing a Performance

A performance is edited as soon as you alter any parameter except **MASTER VOLUME**. When a setting is changed, the LED of the currently lit numbered button (**1**-**8**) will start flashing, indicating you are in edit mode.

## Storing a Performance

To store a performance:

1. Press the **PERF** button to select group **A**, or hold the **SHIFT** button and then press **PERF** to select group **B**.
2. Press one of the lettered buttons (**A**-**H**) to select a bank. Its LED will then light up.
3. Press and hold one of the numbered buttons (**1**-**8**) for 3 seconds. The LEDs of buttons **1**-**8** and **A**-**H** will flash once to indicate that the performance has been stored.

*Storing a performance will overwrite the performance previously stored to that location.*

*When you store a performance, you are essentially saving a snapshot that contains copies of the patches in each layer. As a result, any changes applied to any of the layers are also saved without changing the original patches.*

*If you want to use a specific layer of a performance as part of other performances, you need to save it as a patch. This makes the patch banks the place to store your favourite or most important sounds. See page 23 on how to store patches.*

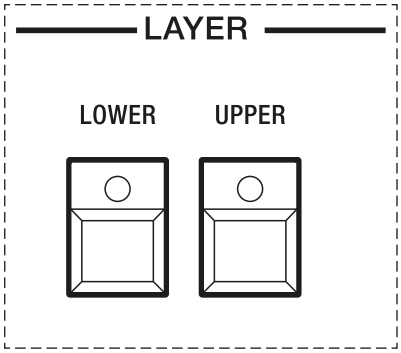
# Patches

A patch is a stored set of parameters that determine the characteristics of a sound. Patches are each loaded into one of the layers of a performance.

A total of 256 patches are accessible from the front panel. They are organised in two groups (**A** and **B**) of 16 banks (**A1**-**H2**) featuring 8 patches each. You can edit these or use the dedicated memory slots to store your own patches.

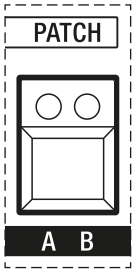
# Loading a Patch

First of all, select the layer you want to load a patch into by using the buttons in the layer section. Pressing the **UPPER** button selects the upper layer, pressing the **LOWER** button selects the lower layer.




The layer section.

After selecting a layer, make sure you are in patch mode. Patch mode is accessed by pressing the button labelled **PATCH**.



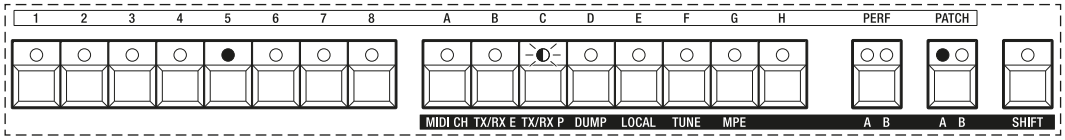

The patch mode button.

Loading a patch is similar to loading a performance: Pressing **PATCH** gives you access to group **A**, indicated by the lit LED above the letter **A**. To access the performances of group **B**, hold **SHIFT** and then press **PATCH**. The LED above the letter **B** will now light up.

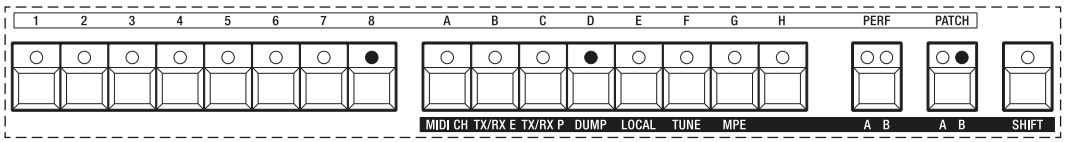
Each lettered button (**A**–**H**) allows you to select two banks: **A1** and **A2**, **B1** and **B2**, etc. A lit LED indicates one of the first banks (**A1**-**H1**) is selected, while a flashing LED indicates one of the second banks (**A2**-**H2**) is selected. To toggle between banks with the same letter, simply press the corresponding button repeatedly.

Finally, pressing a numbered button (**1**-**8**) loads one of eight patches within a selected bank.

The LEDs of buttons **1**-**8**, **A**-**H** and **PATCH** indicate which patch is loaded. In the first example, patch **5** from bank **C2** of group **A** is loaded:




In the second example, patch **8** from bank **D1** of group **B** is loaded:




To load a different patch from the same bank:

- Press one of the seven numbered buttons (**1**-**8**) that are currently unlit. Its LED will then light up.

*If the LED of one of the select buttons does not light up, this indicates that the corresponding memory location is empty.*

To load a patch from a different first bank:

1. Press one of the seven lettered buttons (**A**-**H**) that are currently unlit. Its LED will light up, indicating that one of the first banks (**A1**-**H1**) has been selected.

2. Press one of the numbered buttons (**1**-**8**). Its LED will then light up.

*Changing the bank does not load a new patch. A new patch is loaded only by pressing one of the numbered buttons after a bank has been selected.*

To load a patch from a second bank:

1. Press either the currently lit lettered button again or one of the other lettered buttons (**A**-**H**) twice. Its LED will start flashing, indicating that one of the second banks (**A2**-**H2**) has been selected.

2. Press one of the numbered buttons (**1**-**8**). Its LED will then light up.

*After loading a patch from one of the second banks (**A2**-**H2**), you remain in select mode for those banks until you load a patch from one of the first banks (**A1**-**H1**) and vice versa.*

To load a patch from a different group:

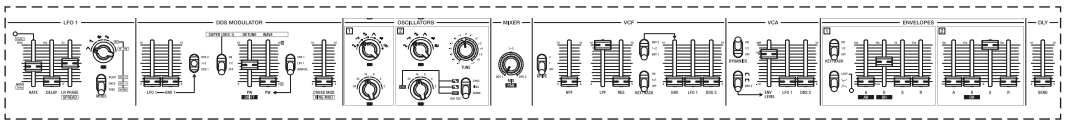
1. Press the **PATCH** button to select group **A**, or hold the **SHIFT** button and then press **PATCH** to select group **B**.

2. Press one of the lettered buttons (**A**-**H**) once or twice to select either one of the first banks (**A1**-**H1**) or one of the second banks (**A2**-**H2**). Its LED then lights up or starts flashing.

3. Press one of the numbered buttons (**1**-**8**). Its LED will then light up.

## Starting from the Init Patch

While stored patches can serve as great starting points, sometimes it may be useful to start from scratch when trying to create a new sound. For this purpose you can load the so-called ‘init patch’, which contains a single oscillator set to a sawtooth wave, among other basic settings.




The init patch settings of a single layer.

To load the init patch:

- Hold **SHIFT** and press either the **MANUAL UPPER** button to load the init patch into the upper layer, or the **MANUAL LOWER** button to load the init patch into the lower layer.

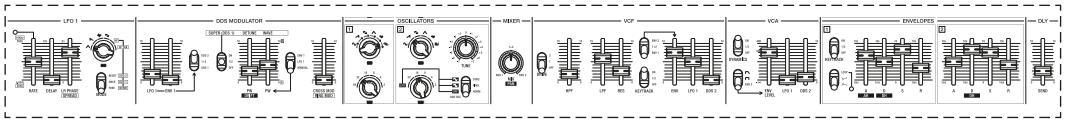
*The init patch is loaded by default when the Super Gemini is powered on.*

*If you load the init patch into one of the layers, the performance will switch to single mode.*

# Editing a Patch

Patch editing is quick and easy on the Super Gemini and can even be done simultaneously thanks to individual controls per layer.

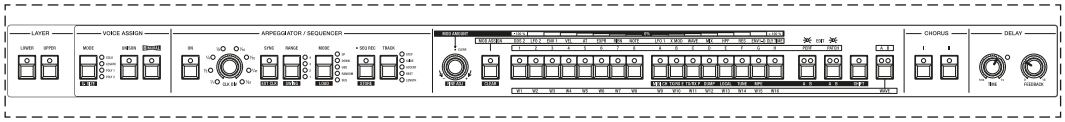
The sound shaping controls for each of the two layers are located in the upper two rows of the front panel: The top row contains controls for the upper layer, the second row contains controls for the lower layer.




The sound shaping controls for a single layer.

The boxed sections in the bottom row, starting with the layer section, contain patch-related controls shared by both layers. The respective front panel area includes the voice assign, arpeggiator and sequencer sections, the multifunctional select buttons, as well as the chorus and delay effects.

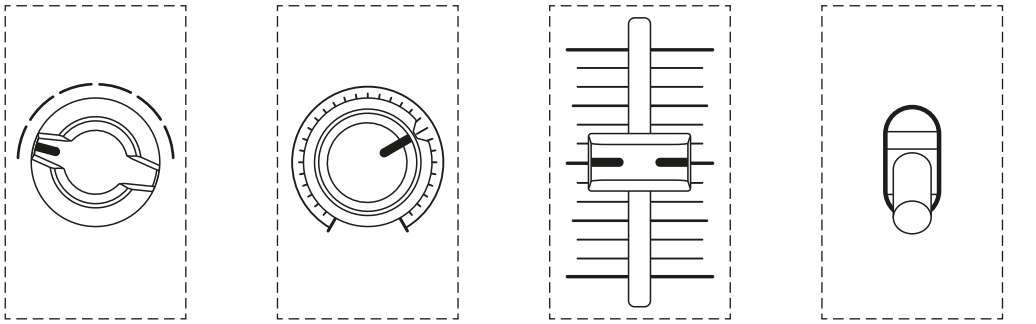
You can toggle between the layer-specific settings controlled in these sections by pressing the **UPPER** and **LOWER** buttons in the layer section.




The boxed front panel area that contains shared controls for both layers.

In addition to these sections, the performance control section to the left of the keyboard allows you to further shape your sounds by using a second LFO, adding portamento and determining what patch parameters of each layer should be affected by pitch bend and polyphonic aftertouch. See pages 67-73 for more details.

There are four main types of control elements that can impact a sound:



Rotary switch. Rotary control. Fader. Toggle switch.

Editing a patch is as simple as turning rotary controls, moving faders and toggling switches. Any gesture applied to a control element will have an immediate effect on the sound.

As soon as a patch-related parameter is changed, the LED of the currently lit numbered button (**1**-**8**) will start flashing, indicating that you are in edit mode. Keep experimenting, and once you have created a sound you like, it's time to save it.

## Storing a Patch

To store a patch:

1. After editing a patch in the upper or lower layer, press the **PATCH** button to select group **A**, or hold the **SHIFT** button and then press **PATCH** to select group **B**.

2. Press one of the lettered buttons (**A**-**H**) once or twice to select either one of the first banks (**A1**-**H1**) or one of the second banks (**A2**-**H2**). Its LED then lights up or starts flashing.

3. Press and hold one of the numbered buttons (**1**-**8**) for 3 seconds. The LEDs of buttons **1**-**8** and **A**-**H** will flash once to indicate that the patch has been stored.

*Storing a patch will overwrite the patch previously stored to that location.*

## Comparing an Edited With a Stored Patch

Before saving a patch, it can be helpful to first ensure that you are not overwriting a patch that you still have good use for.

To compare an edited with a stored patch:

1. In edit mode, press the numbered button (**1**-**8**) where you want to store the edited patch.

   If you want to select a patch from another bank, first select the bank by pressing the respective button (**A**-**H**) once or twice. If you want to select a patch from another group, select the desired group by pressing the **PATCH** button either alone or in combination with the **SHIFT** button before selecting a bank.

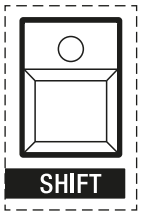
2. Press the same numbered button again to return to the patch you just edited.

## There's More to It Than That: Shift Mode

The **SHIFT** button provides access to either shift mode parameters such as the global settings (see pages 98-100) or secondary parameter functions, labelled in inverse colours below the primary parameter names.

- To switch to shift mode, press and release the **SHIFT** button. Its LED will then start flashing to indicate you are in shift mode.

- To temporarily access the secondary function of a patch-related parameter (such as **DRIFT**, **PAN**, or **DECAY HOLD**), press and hold the **SHIFT** button while moving the corresponding control. In this case, shift mode is exited when the **SHIFT** button is released.




The shift mode button.

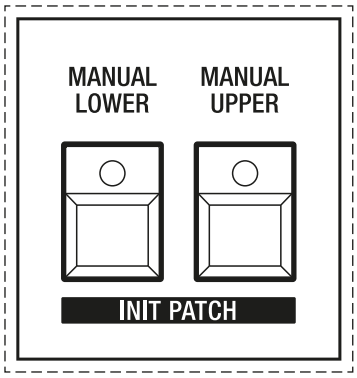
# What You See Is What You Get: Manual Mode

Entering manual mode ignores the current patch settings and prompts the currently selected layer to respond to the actual front panel control settings. This is a great way to better understand how each control affects the sound. In addition, it can also be a source of unexpected results!

To enter manual mode:

1. Press either the **MANUAL UPPER** button for the upper layer or the **MANUAL LOWER** button for the lower layer.

2. To return to patch mode, simply press the **MANUAL UPPER** or **MANUAL LOWER** button again, or press the **PATCH** button.




The manual mode buttons for both layers.

# Level Up!

The Super Gemini was designed to be played and tweaked in real-time, and we encourage you to do just that on your journey of finding and creating new sounds. After all, this is by far the best way to learn and fully understand the potential of your new instrument.

The following chapters of this manual provide a more detailed explanation of the Super Gemini's features and capabilities.

For information on how to adapt the instrument to your specific environment, such as using it alongside other MIDI instruments or to controlling it from a digital audio workstation (DAW) or an external sequencer, we recommend reading the paragraphs on global settings, connections and MPE control.

Throughout the manual you will also find some useful hints and tips to help you become familiar with the Super Gemini and its sound shaping parameters.

Enjoy!

# UPDATING THE FIRMWARE

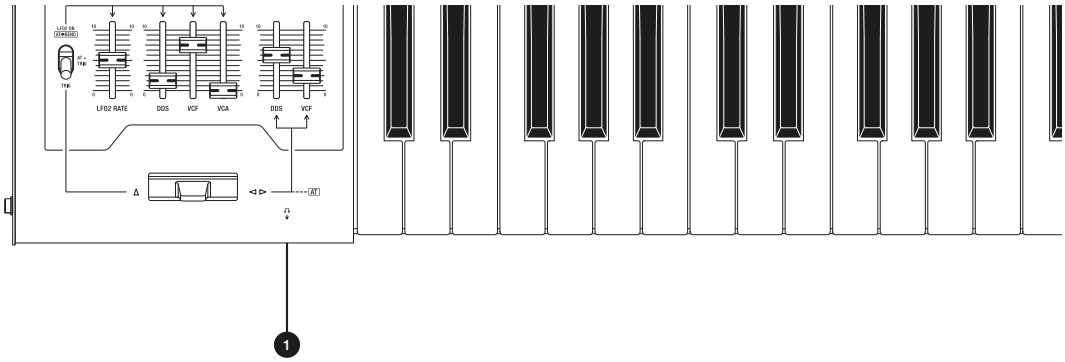
Follow the steps below to update the firmware of your Super Gemini:

1. Unlock the Super Gemini's patch drive:
   - Turn off the Super Gemini.
   - Connect the Super Gemini to your computer using the included USB cable.
   - Hold the **PATCH** button and turn on the Super Gemini to unlock its patch drive. The LEDs of buttons **1**-**8** and **A**-**H** light up one by one to indicate the loading progress.
   - Once the LEDs indicate that the Super Gemini is in patch mode, release the **PATCH** button.
2. Connect the Super Gemini to your computer using the included USB cable.
3. The Super Gemini's patch drive appears as a disk drive named **GEMINI** on your computer.
4. If present, delete any previous firmware file, for example 'gxos_v0.20.bin', from the **GEMINI** drive.
5. Copy the new firmware file, for example 'gxos_v1.00.bin' from your computer to the **GEMINI** drive. If asked if you want to copy files without properties, choose 'yes'. Please note that this process may take a few minutes.
6. Make sure the file transfers are complete.
7. Turn off the Super Gemini, wait a few seconds and turn it on again. The instrument reboots after several LED sequences on the LFO LEDs, followed by a combination of briefly lit lettered select buttons. Each time you turn on the Super Gemini, this combination of lit buttons will indicate the currently installed firmware version.

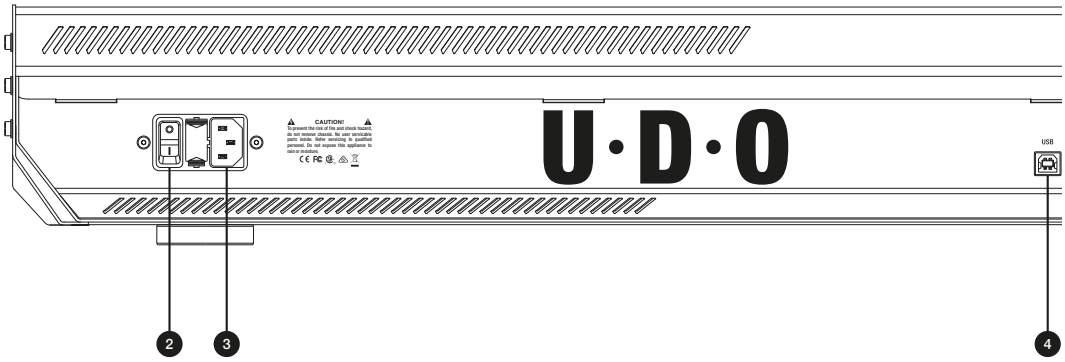
*If the patch drive is unlocked, you will not be able to play the Super Gemini, only manage or modify the files stored on it.*

*The latest firmware release can be downloaded from udo-audio.com/support.*

# CONNECTIONS




**1. Headphone Outputs:** Connect a 6.35 mm or a 3.5 mm stereo headphone jack to the respective outputs on the left front of the instrument. The overall volume of the headphone output is controlled by the **MASTER VOLUME** control.

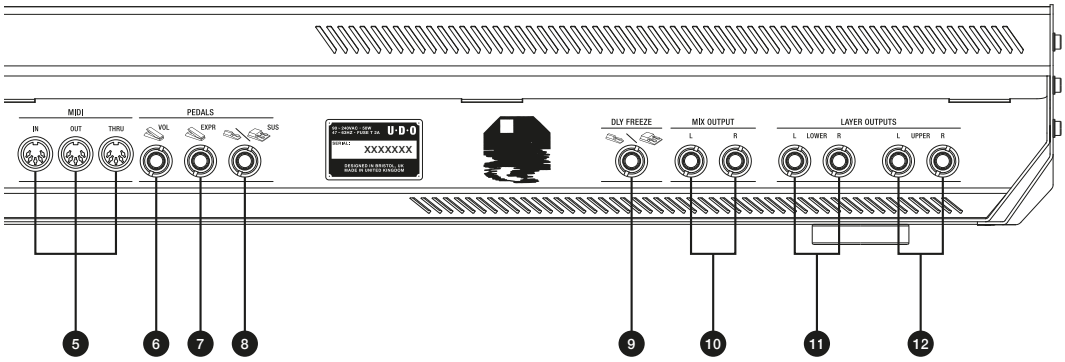



**2. Power Switch:** Use this switch to power cycle the Super Gemini.

**3. Power Connector:** The AC power connector accepts a standard, grounded IEC power cord.

**4. USB Port:** Connect the Super Gemini to your computer using the included USB cable for bidirectional MIDI communication, performance, patch, waveform and sequence file management, and firmware updates. The Super Gemini does not require any drivers to interface with a computer.

*Do not connect a USB cable when using the MIDI DIN ports. The Super Gemini does not support simultaneous DIN and USB MIDI.*




**5. MIDI In, Out and Thru Ports:** Standard 5-pin MIDI DIN connectors.

**6. Volume Pedal Input:** Connect an expression pedal to this input to use it as a volume pedal. This input accepts any standard expression pedal that features a TRS (Tip-Ring-Sleeve) connector and operates with a linear potentiometer over a range of 0 to +5 volts.

**7. Expression Pedal Input:** Connect an expression pedal to this input to add dynamics to your live performance. There are a variety of options for using an expression pedal, since it is an assignable modulation source in the Super Gemini's modulation matrix. This input accepts any standard expression pedal that features a TRS (Tip-Ring-Sleeve) connector and operates with a linear potentiometer over a range of 0 to +5 volts.

**8. Sustain Pedal Input:** Connect a single or a dual footswitch to this input to sustain notes during your performance. A single footswitch sustains upper layer notes. When a dual footswitch is connected, the left pedal sustains the upper layer notes while the right pedal sustains the lower layer notes. Upon power cycling, the Super Gemini will automatically detect the polarity of the connected pedal. Note that the state of the sustain pedal at power-up is taken as its 'off' state.

**9. Delay Freeze:** Connect a single or dual footswitch to this input to create sound-on-sound loops, the length and depth of which you can control in the delay section. When using a single footswitch, it controls the upper layer delay freeze function. When a dual footswitch is connected, the left pedal controls the upper layer delay freeze function, while the right pedal controls the lower layer delay freeze function. For more information on delay freeze, see page 66.

**10. Mix Output (Left and Right):** This pair of connectors outputs the upper and lower layer audio signals. Connect both outputs to your mixer or audio interface using unbalanced 6.35 mm audio jack cables.

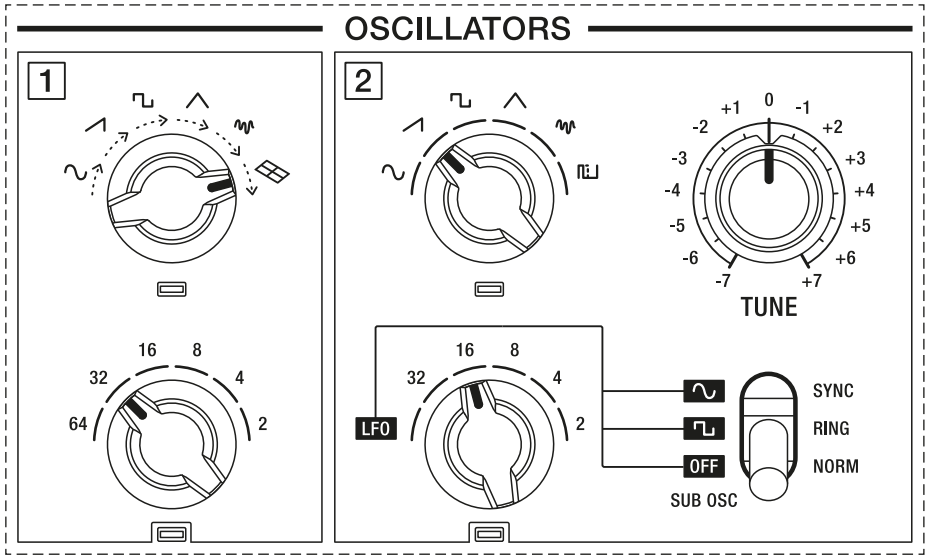
**11. Lower Layer Output (Left and Right):** This pair of connectors outputs the lower layer audio signal, allowing you to mix and process it individually. Connect both outputs to your mixer or audio interface using unbalanced 6.35 mm audio jack cables.

**12. Upper Layer Output (Left and Right):** This pair of connectors outputs the upper layer audio signal, allowing you to mix and process it individually. Connect both outputs to your mixer or audio interface using unbalanced 6.35 mm audio jack cables.

In this chapter we will explore the Super Gemini's sound design capabilities by explaining the functionality of all patch-specific front panel controls related to the manipulation of sound. The respective parameters are identical for both layers.

## Oscillators

Oscillators belong to the most basic and essential building blocks of a synthesizer. Without them, you could neither hear a sound nor shape or modulate what is generating an audio signal.




The oscillator section.

The Super Gemini's primary sound sources are its two FPGA-based oscillators (DDS 1 and DDS 2), which are capable of generating classic analog waveforms.

A **sine wave** contains only the first harmonic, the fundamental, which is why it is considered the purest waveform. It is ideal for 'glassy' sounds, an added fundamental and non-dissonant cross or ring modulation effects.

A **sawtooth wave** contains both odd and even harmonics and is bright sounding. It can be used for creating brass, bass and string sounds.

**Square and pulse waves** contain a wide range of odd harmonics. They sound hollow and can be used for reed-like sounds or basses. Apply pulse width modulation to use a pulse wave for swirling string sounds.

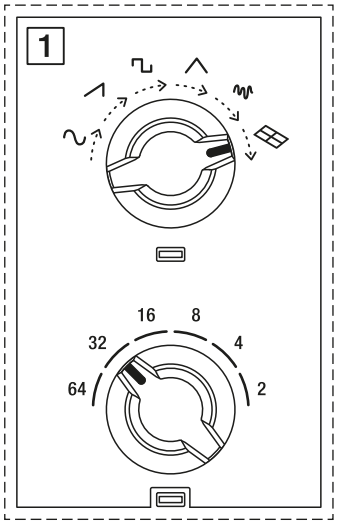
A **triangle wave** contains only odd harmonics and sounds very soft. It is particularly suitable for generating flute, organ or vocal sounds.

**White noise** contains all frequencies and is the most common noise waveform. It is useful for creating wind or percussive sounds.

In addition, DDS 1 offers up to 64 digital-sounding alternative waveforms organised in two groups. They are user definable (see page 108) and allow for a sheer unlimited range of sounds.

# DDS 1 Parameters

DDS 1 features an FPGA-based super waveform oscillator core. It consists of a centroid oscillator and six 'sister' oscillators that can be dynamically de-phased in the stereo field by enabling one of the two super modes in the DDS Modulator section. Essentially, this means that DDS1 contains seven free-running oscillators, which give the Super Gemini its characteristically rich and wide sound. See pages 59-61 for more details.

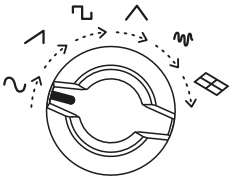
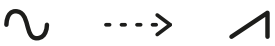
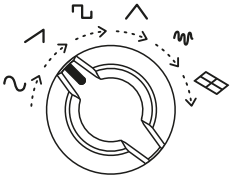
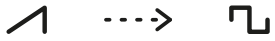
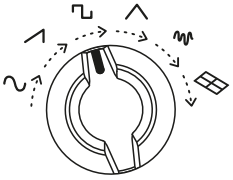
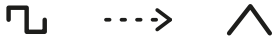
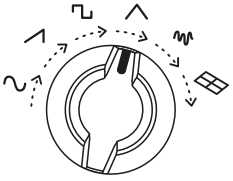
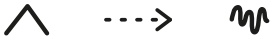
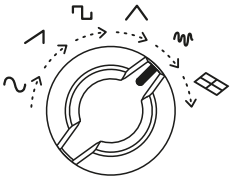
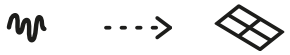
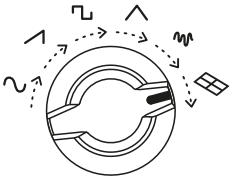
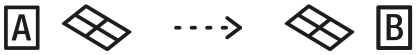



DDS1 waveform and range controls.

**WAVEFORM:** Use this rotary switch to select a waveform for DDS 1. You can either select one of the classic waveforms such as sine, sawtooth, square, triangle and white noise or, when this control is set to the rightmost position, a digital-sounding alternative waveform.

As indicated by the dashed arrows below the waveform icons, you can also morph between two adjacent waveforms using the **PW**/**WAVE** fader in the DDS Modulator section (see page 61). When the **WAVEFORM** control is set to the rightmost position, use the **PW**/**WAVE** fader to morph between the currently loaded alternative waveforms assigned to channels **A** and **B**.

The following table lists the available wave modulation options, which you can use to create seamless transitions between waveforms:

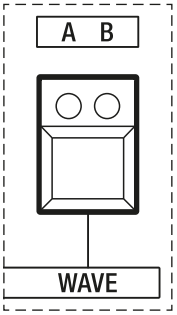
| DDS 1 Waveform Setting | Wave Modulation |
|---|---|
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

*When moving the **WAVEFORM** control to the rightmost position, you will hear the alternative waveform assigned to channel **A**. The waveform assigned to channel **B** is made audible by setting the **PW**/**WAVE** fader to the highest position.*

**RANGE:** Use this rotary switch to adjust the coarse frequency of DDS 1 over a range of 64 to 2 feet.

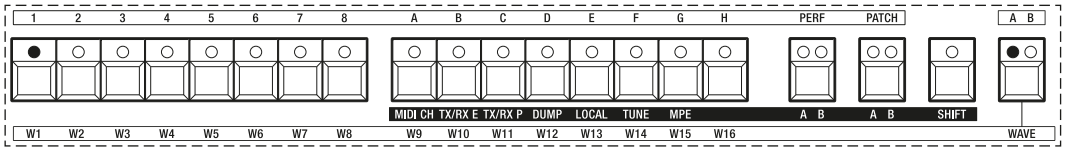
# Loading Alternative Waveforms for DDS 1

To load alternative waveforms for DDS 1, make sure you are in wave mode, which is accessed by pressing the button labelled **WAVE** or by moving the DDS 1 waveform rotary switch to the rightmost position.




The wave mode button.

Notice how the **WAVE** button label is surrounded by a box, which also contains the names of the functions the select buttons **1**-**8** and **A**-**H** take over in wave mode: **W1** to **W16**, which stands for waveform 1 to 16.




The waveform select buttons.

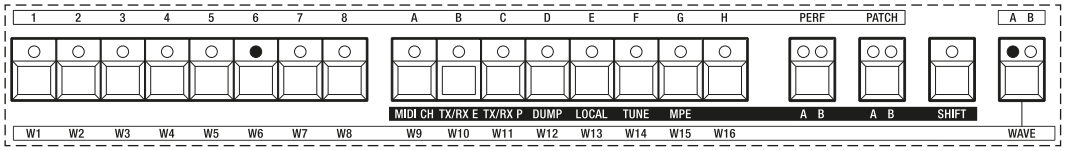
The alternative waveforms are organised in two groups of 16 waveforms each, giving you access to a total of 32 alternative waveforms. You can choose which channel (**A** or **B**) to assign one of these waveforms to by pressing the **WAVE** button.

After selecting a channel, you can use each of the select buttons (**W1**-**W16**) to load two alternative waveforms: **W1** and **W17**, **W2** and **W18**, etc. For example, toggling between alternative waveforms 8 and 24 is achieved by repeatedly pressing button **W8**.

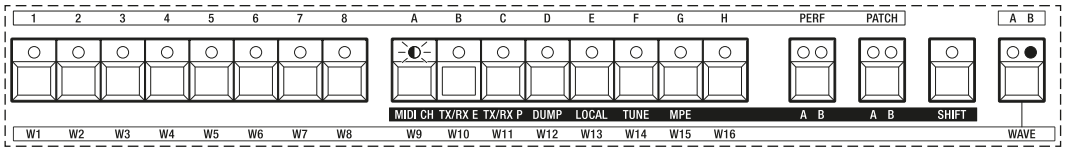
When you load a waveform from the first group of 16 waveforms (1-16), the corresponding LED lights up. If you load a waveform from the second group of 16 waveforms (17-32), the LED will start flashing.

*After loading an alternative waveform from the second group, you remain in selection mode for that group until you load an alternative waveform from the first group again, and vice versa.*

The LEDs of buttons **W1**-**W16** indicate which waveform is loaded, while the two LEDs of the **WAVE** button indicate which channel it is assigned to. In the first example, waveform **6** is loaded and assigned to channel **A**:




In the second example, waveform **25** is loaded and assigned to channel **B**:




To load alternative waveforms:

1. Press **WAVE** or move the DDS 1 waveform rotary switch to the rightmost position. LED **A** will light up, indicating that you are now in wave selection mode for channel **A**.

2. Play some notes and press one of the select buttons (**W1**-**W16**) once or twice to load the waveform you would like to assign to channel **A**.

3. Press **WAVE** again. LED **B** will light up, indicating that you are now in wave selection mode for channel **B**.

4. Play some notes and press one of the select buttons (**W1**-**W16**) once or twice to load the waveform you would like to assign to channel **B**.

5. Press the **PATCH** button to exit wave mode.

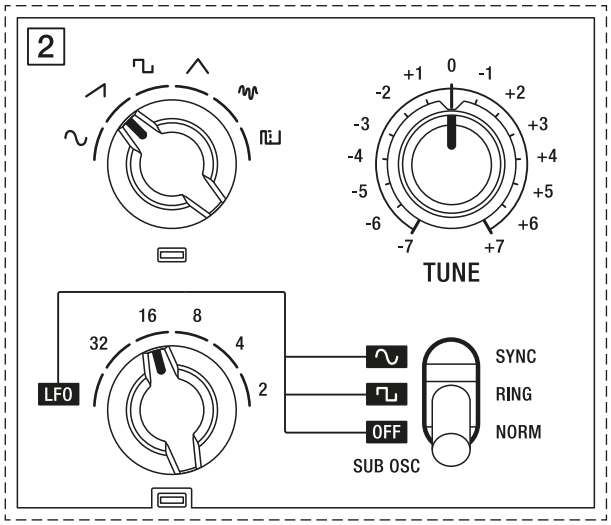
*Each patch remembers the alternative waveforms it was saved with. Even if you replaced all alternative waveforms the Super Gemini is shipped with, the factory patches wouldn't change.*

*When you switch from patch to manual mode, the alternative waveforms from the previously loaded patch will be retained for DDS 1.*

# DDS 2 Parameters

DDS 2 features an FPGA-based oscillator core running at a very high sample rate and provides you with six classic waveforms. Unlike DDS 1, which uses sampled waveforms, DDS 2 has an algorithmic core and thus behaves in a subtly different way.

*The phase of the DDS 2 waveform is reset to zero with each note played to allow for binaural pitch and pulse width modulation via LFO 1. The latter wouldn't be possible if DDS 2 was operating as a free-running oscillator.*




DDS 2 controls.

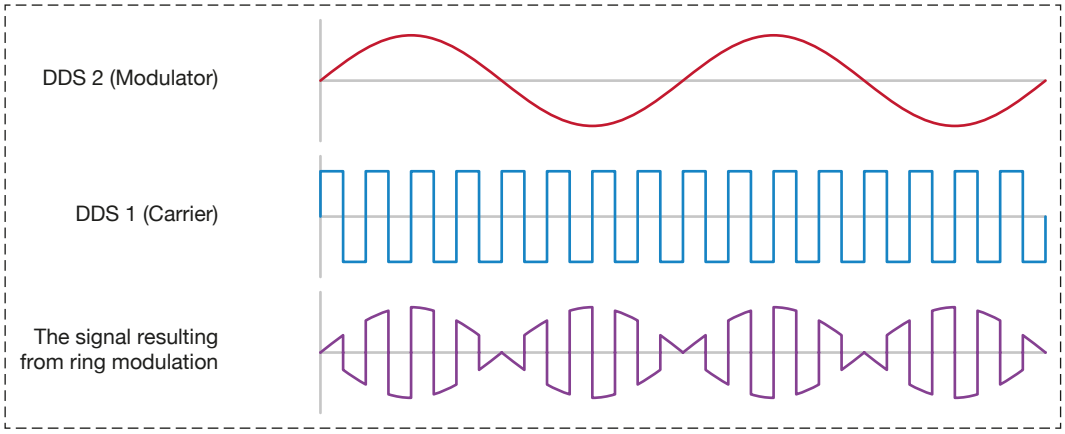
**WAVEFORM:** Use this rotary switch to select a waveform for DDS 2. You can choose from the following classic waveforms: sine, sawtooth, square, triangle, white noise or pulse.

**RANGE:** Use this rotary switch to adjust the coarse frequency of DDS 1 over a range of 32 to 2 feet. If you turn this control to the leftmost position, DDS 2 will act as an additional LFO. In this mode, you can also enable a sub-oscillator. For more details see page 37.

**TUNE:** This control allows you to fine-tune the frequency of DDS 2 over a range of +/-7 semitones. You can use this control to either slightly detune DDS 2 relative to DDS 1 or to create intervals such as fourths or fifths.

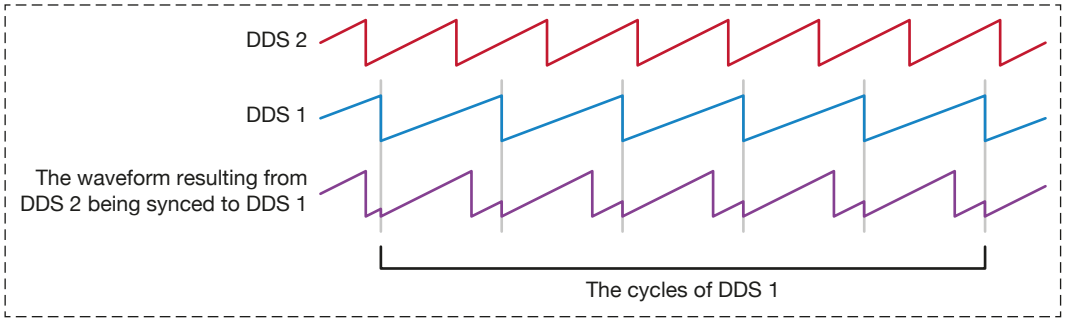
The toggle switch in the DDS 2 section allows you to choose from three different modes:

- **NORM:** This is the default mode for DDS 2, in which it behaves like a normal oscillator.
- **RING:** Selecting this option activates the ring modulator. Ring modulation combines two signals, a carrier (DDS 1) and a modulator (DDS 2), and outputs their sum and difference while subtracting the frequencies of the original signals. This can result in clangorous tones, especially when applied to harmonically rich waveforms such as sawtooth or square. The output signal of the ring modulator is passed through the channel of DDS 2. To fade in the ring modulated signal, turn the **MIX** control clockwise.




Ring modulation between DDS 1 and DDS 2. In this example, DDS 1 is set to a square wave at 8 times the frequency of DDS 1, which is set to a sine wave.

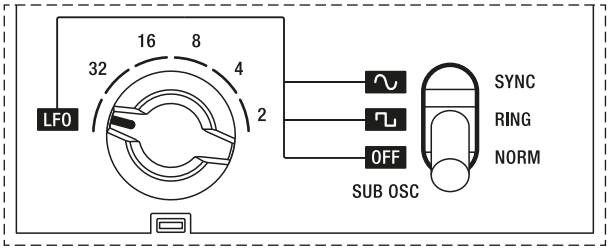
- **SYNC:** Selecting this option, also known as ‘hard sync’, forces DDS 2 to restart its duty cycle each time DDS 1’s duty cycle begins. By setting the frequency of DDS 2 to a higher pitch than DDS 1, you can create complex and harmonically rich timbres, especially if you modulate the pitch of DDS 2 with an envelope. A famous example of a typical hard-sync patch is the lead sound in Daft Punk’s “Robot Rock”.




The duty cycle of DDS 2 synchronised to DDS 1 with both oscillators set to a sawtooth wave.

# Using DDS 2 as an LFO

As mentioned above, you can also use DDS 2 as an LFO. To do so, turn the **RANGE** control to the leftmost position marked **LFO**.




DDS 2 set to LFO mode.

When DDS 2 is used as an LFO, its signal is no longer routed to the audio path. In this mode, the **TUNE** control determines the frequency over a range of approximately 0.1 to 100 Hz. As in default mode, the LFO waveform can be selected with the **WAVEFORM** rotary switch.

*In LFO mode, DDS 2 offers two more waveforms than LFO 1, namely sine and pulse. If you pulse width modulate DDS 2 in the DDS Modulator section or modulate its frequency via LFO 1, DDS 2 can become a very complex and dynamic LFO, which allows for interesting modulation results.*

You can route DDS 2 in LFO or default mode to all available modulation destinations via the modulation matrix. See pages 83-88 for more information on how to use the modulation matrix.

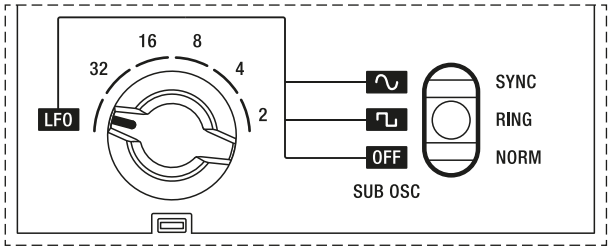
# Enabling the Sub-Oscillator

Enabling the sub-oscillator is useful for adding more bottom end to your sounds. In this mode, the audio signal from the sub-oscillator replaces the audio signal from DDS 2. The pitch of the sub-oscillator is locked one octave below the frequency of DDS 1. The **WAVEFORM** and **TUNE** controls have no effect on the sub-oscillator.

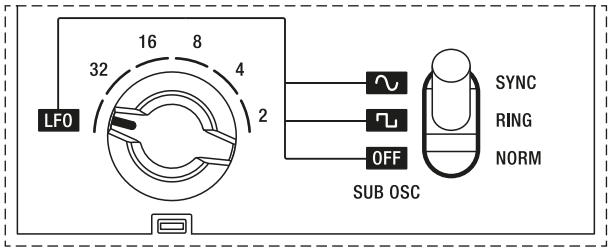
The waveform of the sub-oscillator can be either a square or a sine. Choose the square wave to add harmonically rich bass tones to your sound. Choose the sine wave if you want to subtly boost the lower harmonics.

To enable the sub-oscillator:

1. Turn the **RANGE** control to the leftmost position marked **LFO**.
2. Flip the mode toggle switch to either the middle position to select the square sub-oscillator or the upper position to select the sine sub-oscillator.




The sub-oscillator set to square wave.



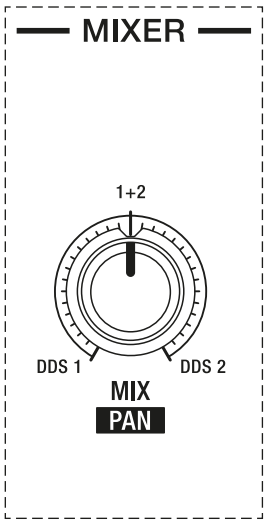

The sub-oscillator set to sine wave.

You can adjust the level of the sub-oscillator in the mixer section. When the sub-oscillator is enabled, the **MIX** control blends between the audio signals from DDS 1 and the sub-oscillator.

*With the sub-oscillator enabled, DDS 2 can still be used as an additional LFO.*

# Mixer

In the mixer section you can control the balance between the audio signals from DDS 1 and DDS 2 or DDS 1 and the sub-oscillator.




The mixer section.

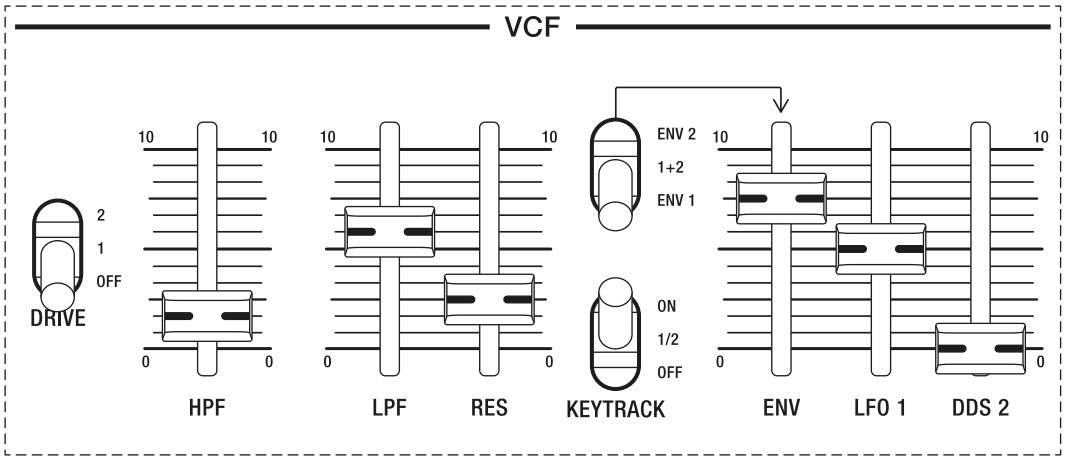
**MIX:** At 12 o'clock, the signals from both audio sources are equally balanced. If set to the leftmost position, only the audio signal from DDS 1 will be audible. Likewise, only the audio signal from DDS 2 or that of the sub-oscillator is audible if you turn the control to the rightmost position.

**PAN:** In shift mode, the **MIX** parameter becomes a pan control, allowing you to position a layer within the stereo field. At 12 o'clock, the layer is centred. If set to the leftmost position, the layer is hard-panned to the left. If set to the rightmost position, the layer is hard-panned to the right.

# VCF (Voltage Controlled Filter)

The filter section is integral to the instrument's unique sonic character and allows you to shape the sound of the oscillators by modifying the harmonic content of their signals.

The Super Gemini's main filter is a 4-pole, 24 dB per octave, analog resonant low-pass filter that uses a classic polysynth filter design by Sound Semiconductor (SSI). It is preceded in the signal chain by a 1-pole, 6 dB per octave, analog high-pass filter.



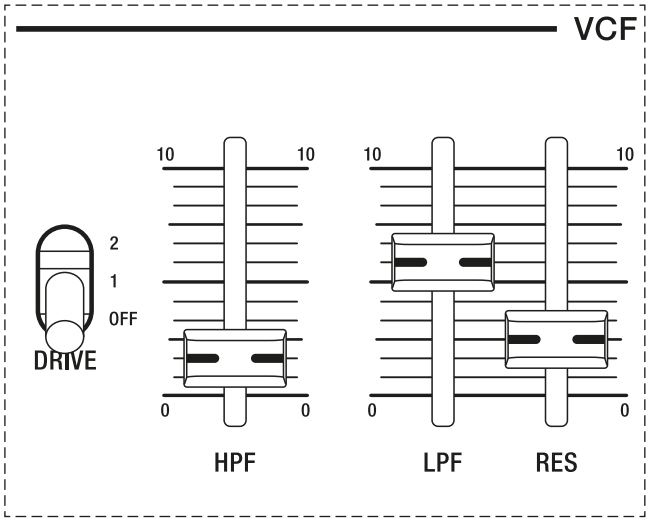

The filter section.

The **low-pass filter** (**LPF**) subtracts frequency content above its cutoff frequency. The frequency content below the cutoff frequency remains unaffected, meaning the lows will pass through.

The **high-pass filter** (**HPF**) subtracts frequency content below its cutoff frequency. The frequency content above the cutoff frequency remains unaffected, meaning the highs will pass through. Using the high-pass filter can be useful for removing 'muddy' low ends from pad sounds, particularly in recording or mixing situations.

The Super Gemini offers numerous options for modulating the low-pass filter's cutoff frequency, making the filter section extremely versatile and suitable for a wide variety of sounds.

Overall, the filter section of the Super Gemini is divided into two: In the left half you can adjust basic filter settings. The right half of the filter section contains controls that affect how the low-pass filter is modulated by different modulation sources and how it responds to key tracking.




The left half of the filter section.

The **DRIVE** toggle switch allows you to determine whether and to what extent the low-pass filter signal is overdriven:

- **OFF:** This setting results in a clean filter signal.
- **1:** This setting adds subtle saturation with resonance compensation.
- **2:** This setting adds a healthy dose of overdrive.

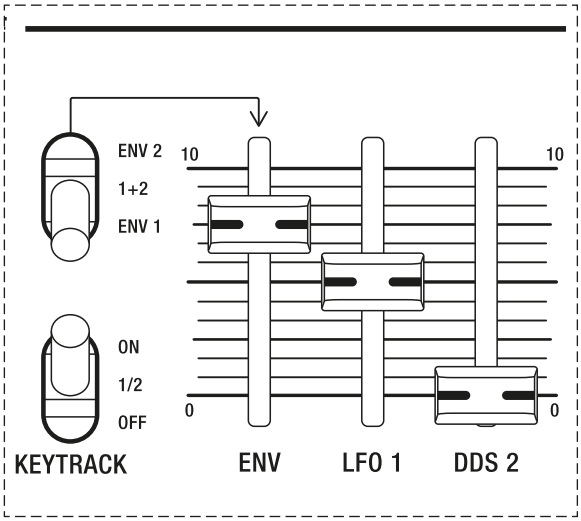
**HPF:** This fader controls the cutoff frequency of the high-pass filter.

**LPF:** This fader controls the cutoff frequency of the low-pass filter.

**RES:** This fader controls the amount of resonance the low-pass filter responds with. As you increase the amount of resonance, the frequencies around the cutoff frequency set by the **LPF** fader will be emphasised and more pronounced.

*The Super Gemini's low-pass filter is designed to respond to key tracking in a musical manner. This in turn determines how much you can open the filter with the **LPF** fader. You can use the remaining headroom if you modulate the low-pass filter's cutoff frequency with an envelope or an expression pedal via the modulation matrix.*

*The low-pass filter can be driven into self-oscillation if you set **RES** to its highest value. In this case, the filter generates a pitch determined by the cutoff frequency and a timbre that sounds like a sine wave. You can also use the keyboard to control or rather play the low-pass filter's pitch if you enable key tracking.*




The right half of the filter section.

**ENV:** This fader controls the amount by which either or both envelopes modulate the low-pass filter's cutoff frequency over time. See pages 45-51 to learn more about the envelope generators.

Use the upper toggle switch to select the envelope modulation source:

- **ENV 1:** With this setting, envelope 1 acts as the modulation source.
- **1 + 2:** With this setting, both envelopes act as modulation sources.
- **ENV 2:** With this setting, envelope 2 acts as the modulation source.

**LFO 1:** This fader controls the amount by which LFO 1 modulates the low-pass filter's cutoff frequency.

**DDS 2:** This fader controls the amount by which DDS 2 modulates the low-pass filter's cutoff frequency. The result can range from subtle textures to complex, experimental timbres.

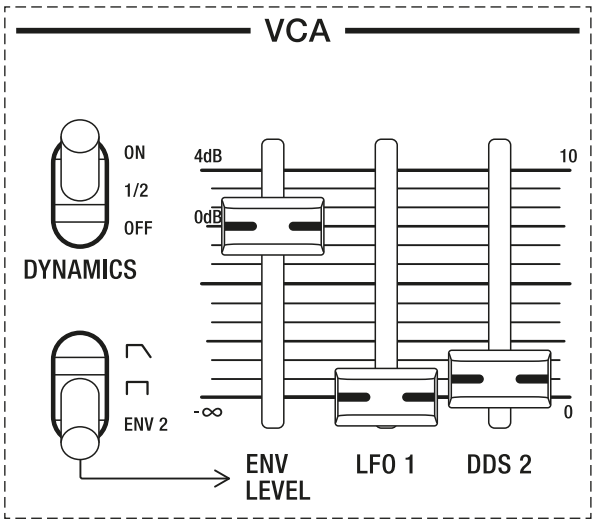
The **KEYTRACK** toggle switch allows you to determine whether and to what extent the low-pass filter's cutoff frequency responds relative to the pitch of the notes played on the keyboard:

- **OFF:** With this setting, the low-pass filter's cutoff frequency is unaffected by the pitch of the notes played on the keyboard.
- **1/2:** With this setting, the low-pass filter's cutoff frequency follows the keyboard pitch in quarter tone steps, resulting in brighter sounding higher notes. This is how acoustic instruments typically behave, so this setting can be useful for creating more natural-sounding timbres.
- **ON:** With this setting, the low-pass filter's cutoff frequency follows the keyboard pitch in semitones as you move up the keyboard. This is useful when using the low-pass filter in self-oscillating mode, as the pitch generated by the filter then precisely follows the intervals you play on the keyboard, allowing you to play the filter like an oscillator.

# VCA (Voltage Controlled Amplifier)

After being shaped by the filter, the audio signal passes on to the voltage-controlled amplifier (VCA). The Super Gemini's VCA section can be used to further shape the sound by modifying and modulating its volume.

By default, the level generated by the VCA is controlled by envelope 2 (ENV 2), which gives you control over the attack, decay, sustain, and release stages. On pages 50-51 you can read more about how the VCA level can be modulated by the dedicated envelope. Alternatively, the VCA level can be controlled by one of two fixed envelopes, allowing the second envelope to be freed up for other tasks if desired.




The VCA section.

**ENV LEVEL:** This fader controls the amount by which envelope 2 or one of the fixed envelopes modulates the VCA level over time.

**LFO 1:** This fader controls the amount by which LFO 1 modulates the VCA level. This parameter is useful for tremolos, as the volume increases and decreases according to the rate of LFO 1. Use a triangle wave for smooth tremolo effects and a square wave for abrupt tremolo effects.

**DDS 2:** This fader controls the amount by which DDS 2 modulates the VCA level. The resulting amplitude modulation can generate anything from subtle textures to clangourous timbres.

The envelope selector toggle switch allows you to choose between three types of VCA envelopes:

- **Lower position:** With this setting, envelope 2 acts as the modulation source. This is the default setting, which means that the second envelope is usually responsible for modulating the VCA level.
- **Middle position:** With this setting, the first of the fixed envelopes acts as the modulation source. Its attack, decay and release stages have no duration, meaning it acts as a simple on/off envelope or gate.

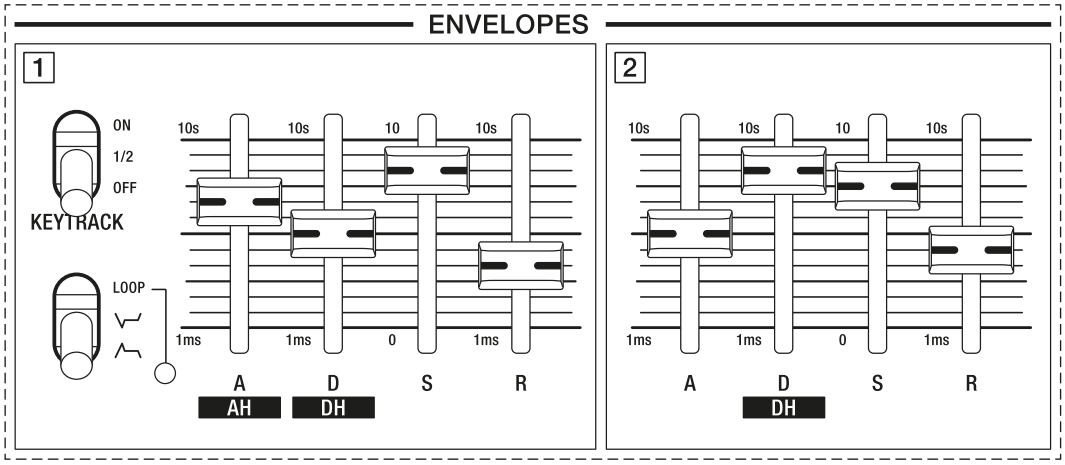
- **Upper position:** With this setting, the second of the fixed envelopes acts as the modulation source. Its attack and decay stages have no duration, but it does feature a release stage. Use this envelope when you want to free up envelope 2 for other modulation tasks, but prefer your sound to fade out after playing a note.

The **DYNAMICS** toggle switch allows you to determine whether and to what extent the VCA level and the low-pass filter will respond to keyboard velocity:

- **OFF:** With this setting, the VCA level and the low-pass filter remain unaffected by keyboard velocity.
- **1/2:** With this setting, the VCA level and the low-pass filter respond to keyboard velocity with half intensity. The harder you hit a key, the louder and brighter the sound becomes. Use this setting when you want the velocity effect to be subtle.
- **ON:** With this setting, the VCA level and the low-pass filter respond to keyboard velocity with full intensity. The harder you hit a key, the louder and brighter the sound becomes. Use this setting when you want velocity to have a significant impact, for example if you wish to emulate the behaviour of acoustic stringed instruments.

# Envelopes

By using envelope generators we can specify how a sound evolves over time. Typically, envelope generators are mapped to filters and amplifiers to change the harmonic content and the overall volume of a sound through multiple stages.

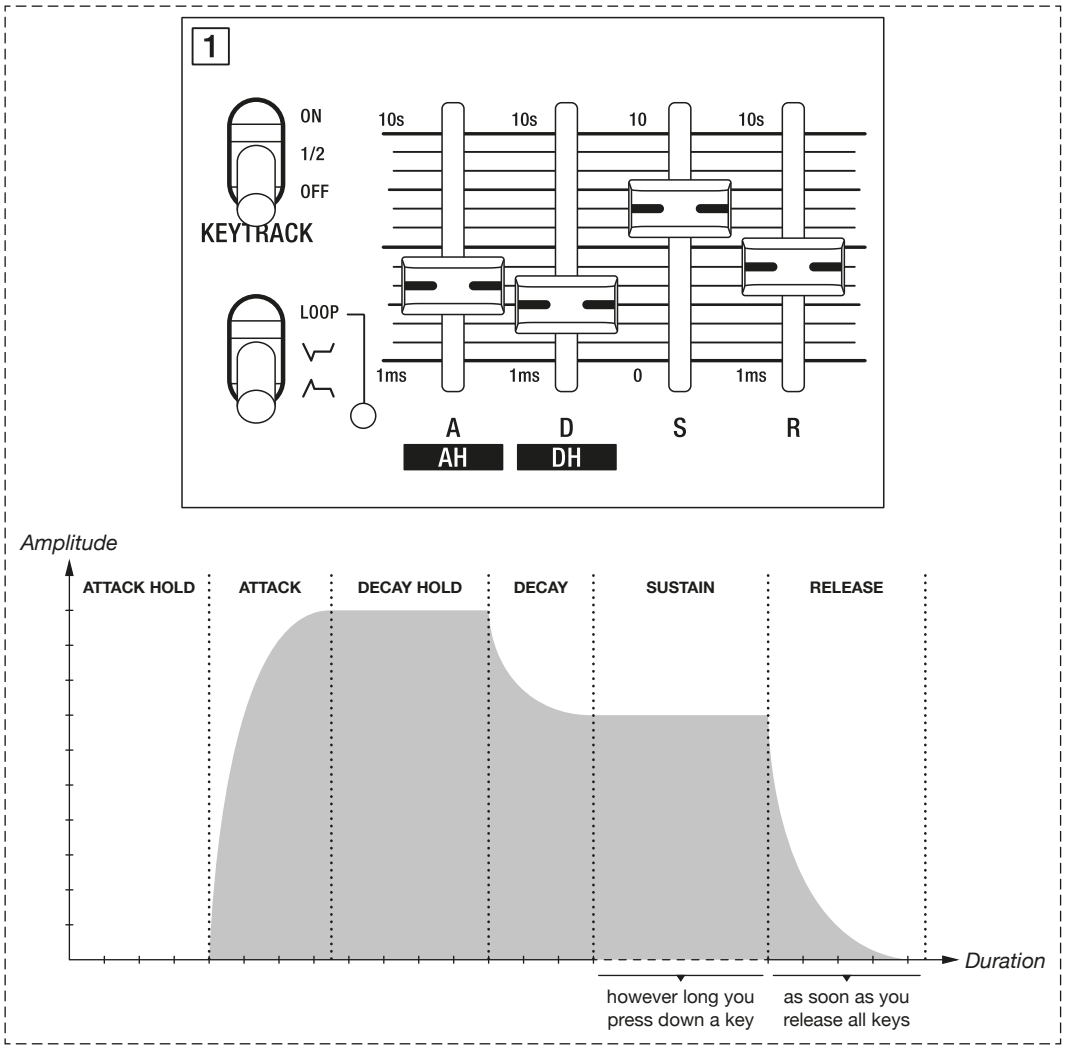



The envelope section.

The Super Gemini's envelopes can be mapped to multiple destinations including the low-pass filter's cutoff frequency (see page 41), the VCA level (see page 42), DDS 1's waveforms and DDS 2's pulse width (see page 61).

Both envelopes contain five stages known as attack, decay hold, decay, sustain and release. In addition, envelope 1 features a hold stage that can be used to delay the moment when the attack stage begins after hitting a key.

# ENV 1 (Envelope 1)




Envelope 1 setting and a diagram of the resulting envelope shape.

**A(TTACK) H(OLD):** In shift mode, you can use the **ATTACK** fader to adjust the time it takes for the attack stage to begin after hitting a key. The attack hold stage can be as long as 10 seconds. At its minimum setting this parameter has no effect, i.e. the envelope then behaves as if it had only four or five stages (attack, decay, sustain and release or attack, decay hold, decay, sustain and release).

**A(TTACK):** This fader determines the duration of the envelope's attack stage. The higher the setting, the slower the attack time and the longer it takes for the envelope to reach its maximum level. The attack stage can be as short as 1 millisecond or as long as 10 seconds.

**D(ECAY) H(OLD):** In shift mode, you can use the **DECAY** fader to adjust the time it takes for the decay stage to begin after the attack stage reached its peak. The decay hold stage can be as long as 10 seconds. At its minimum setting this parameter has no effect, i.e. the envelope then behaves as if it had only four or five stages (attack, decay, sustain and release or attack hold, attack, decay, sustain and release).

**D(ECAY):** This fader determines the duration of the envelope's decay stage. The higher the setting, the longer it takes for the envelope to travel from its maximum level to the level determined by the sustain fader. The decay stage can be as short as 1 millisecond or as long as 10 seconds.

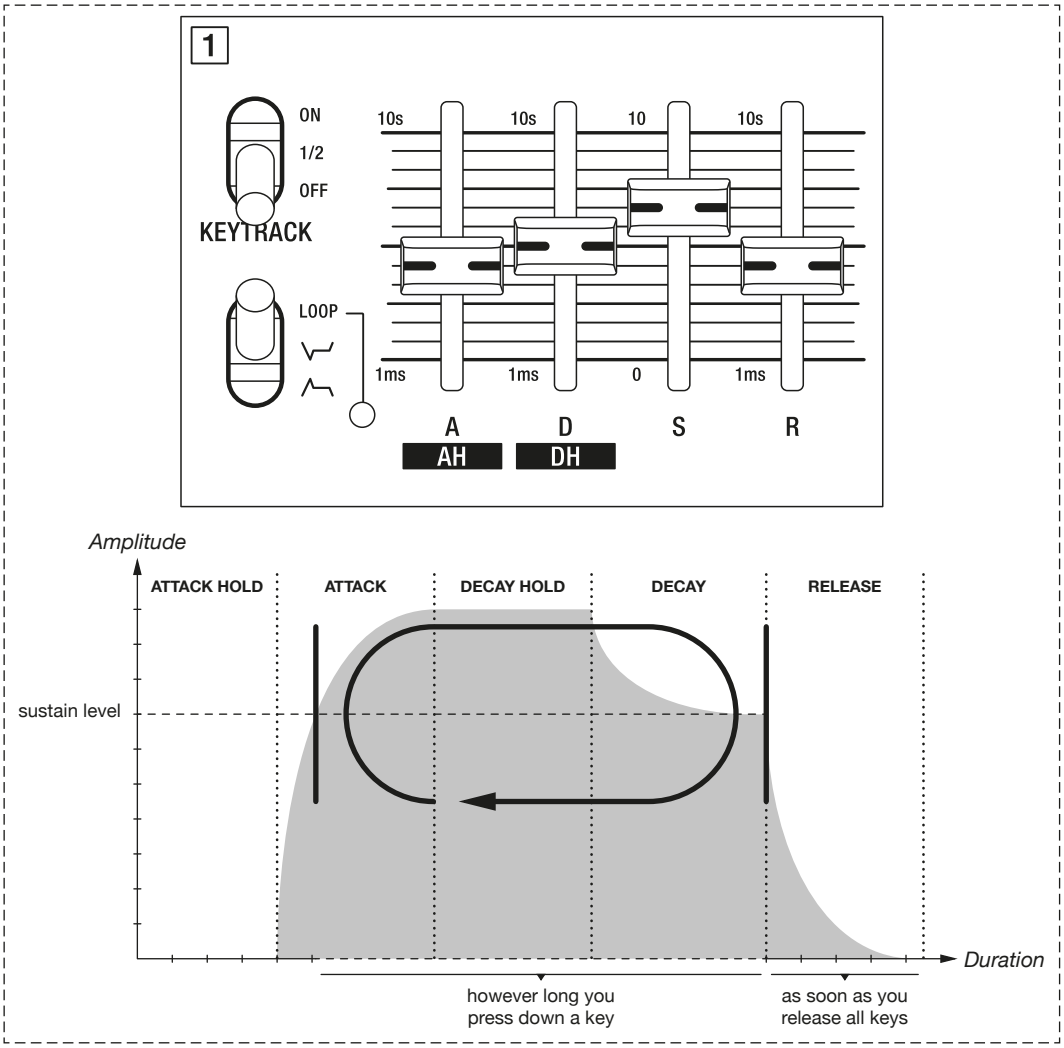
**S(USTAIN):** This fader determines what level the envelope will be held at when you hold a note past the decay stage. This is the only envelope parameter that is not tied to a duration but to a level. The duration of the sustain stage always depends on how long you hold a note.

**R(ELEASE):** This fader determines the duration of the envelope's release stage. The higher the setting, the slower the release time and the longer it takes for the envelope to fade out after you release a key. The release stage can be as short as 1 millisecond or as long as 10 seconds.

The bottom toggle switch allows you to choose between three types of envelope behaviours:

- **Lower position:** With this setting, envelope 1 is in default mode.
- **Middle position:** With this setting, the shape of envelope 1 is inverted. An envelope that is ramping up during its attack stage will now ramp down. The effect on the modulation destination is the opposite of envelope 1 modulating in default mode.
- **Upper position:** With this setting, envelope 1 operates in loop mode. Instead of being triggered just once, the attack, decay hold and decay stages are repeated indefinitely until you release a key. As soon as you release a key, the release stage is triggered. The rate at which the looped envelope is repeated is indicated by the LED graphically linked to the **LOOP** label.

*In loop mode, the sustain setting determines from what level the envelope rises at the beginning of the attack stage and to what level it falls at the end of the decay stage.*




Envelope 1 in loop mode.

*In loop mode you can use envelope 1 as an additional LFO, which can even be key tracked. Low attack, decay hold, and decay settings can generate sonic results that resemble frequency modulation.*

The **KEYTRACK** toggle switch allows you to determine whether and to what extent envelope 1's decay and release stages respond relative to the pitch of the notes played on the keyboard:

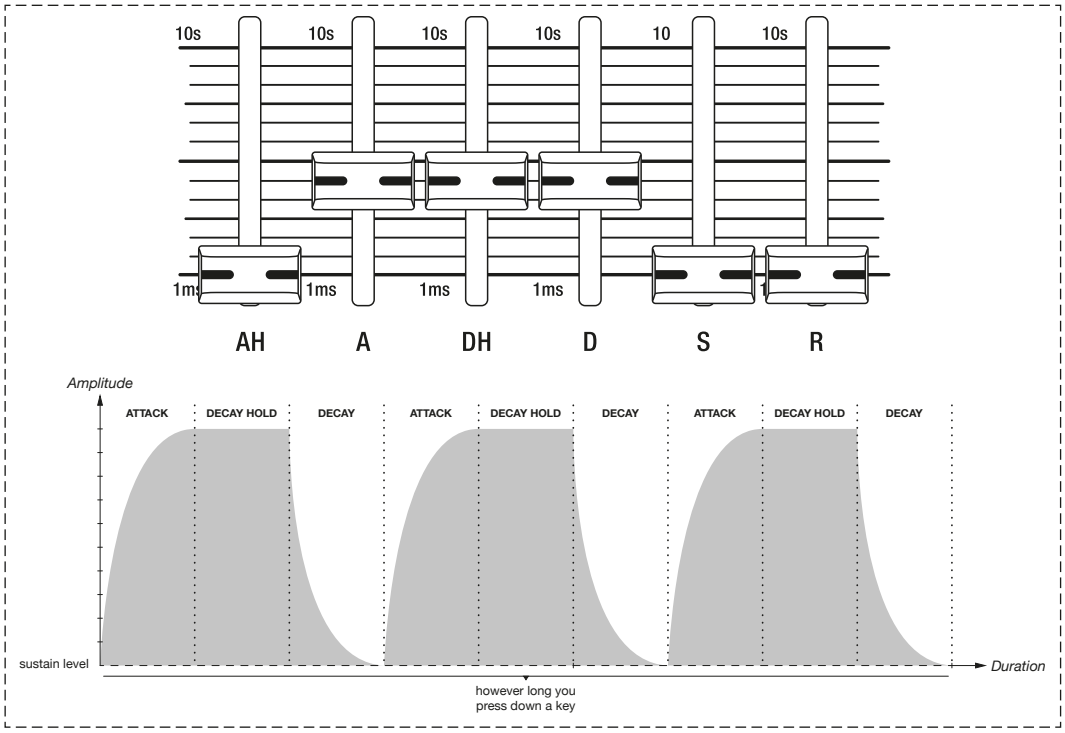
- **OFF:** With this setting, the duration of the envelope's decay and release stages is unaffected by the pitch of the notes played on the keyboard.
- **1/2:** With this setting, the time it takes for the envelope to cycle through its decay and release stages decreases in quarter tone steps as you move up the keyboard.
- **ON:** With this setting, the time it takes for the envelope to cycle through its decay and release stages decreases in semitones as you move up the keyboard.

*If you don't notice any noticeable key tracking effect when envelope 1 is set to inverted mode, consider that the effect the inverted envelope has on its modulation destination is the opposite of envelope 1 set to default mode.*

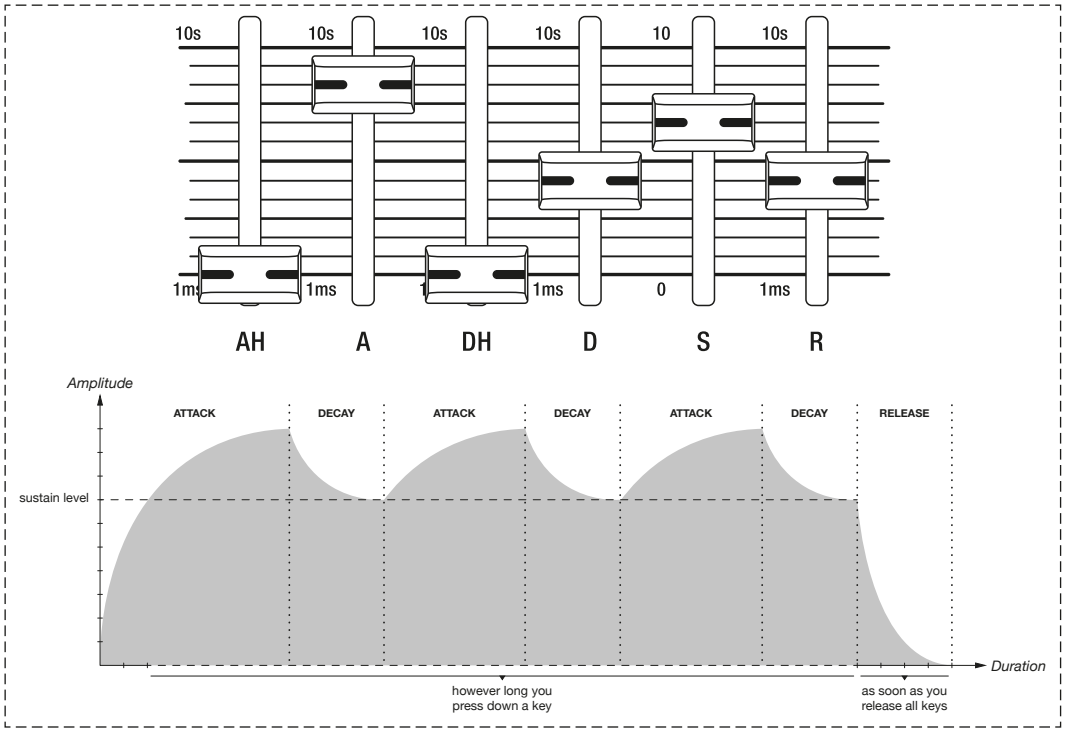
# Creating Periodic Modulation Shapes With Envelope 1 in Loop Mode

Below are some examples that illustrate what periodic modulation shapes you can create with envelope 1 in loop mode. The repeated shapes are based on the looped segment of envelope 1, namely the attack, decay hold and decay stages.

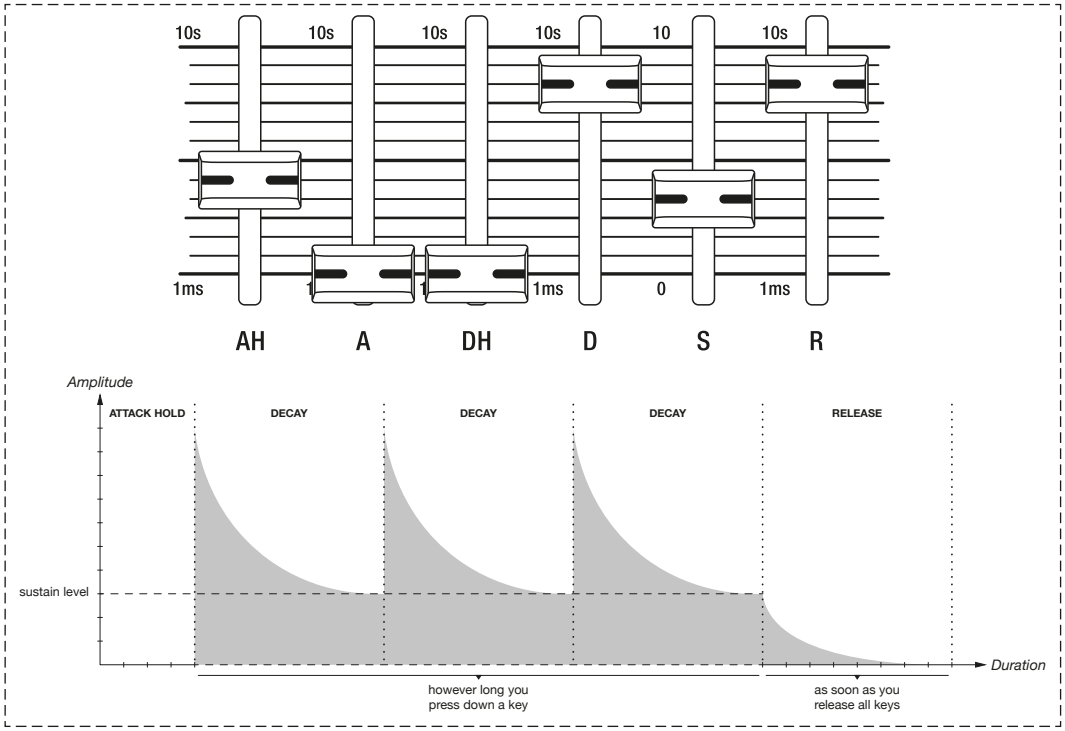
Note that the **ATTACK HOLD** and **DECAY HOLD** faders shown in the figures below have been added for illustrative purposes only. Your Super Gemini is not missing any parts!




Example 1.

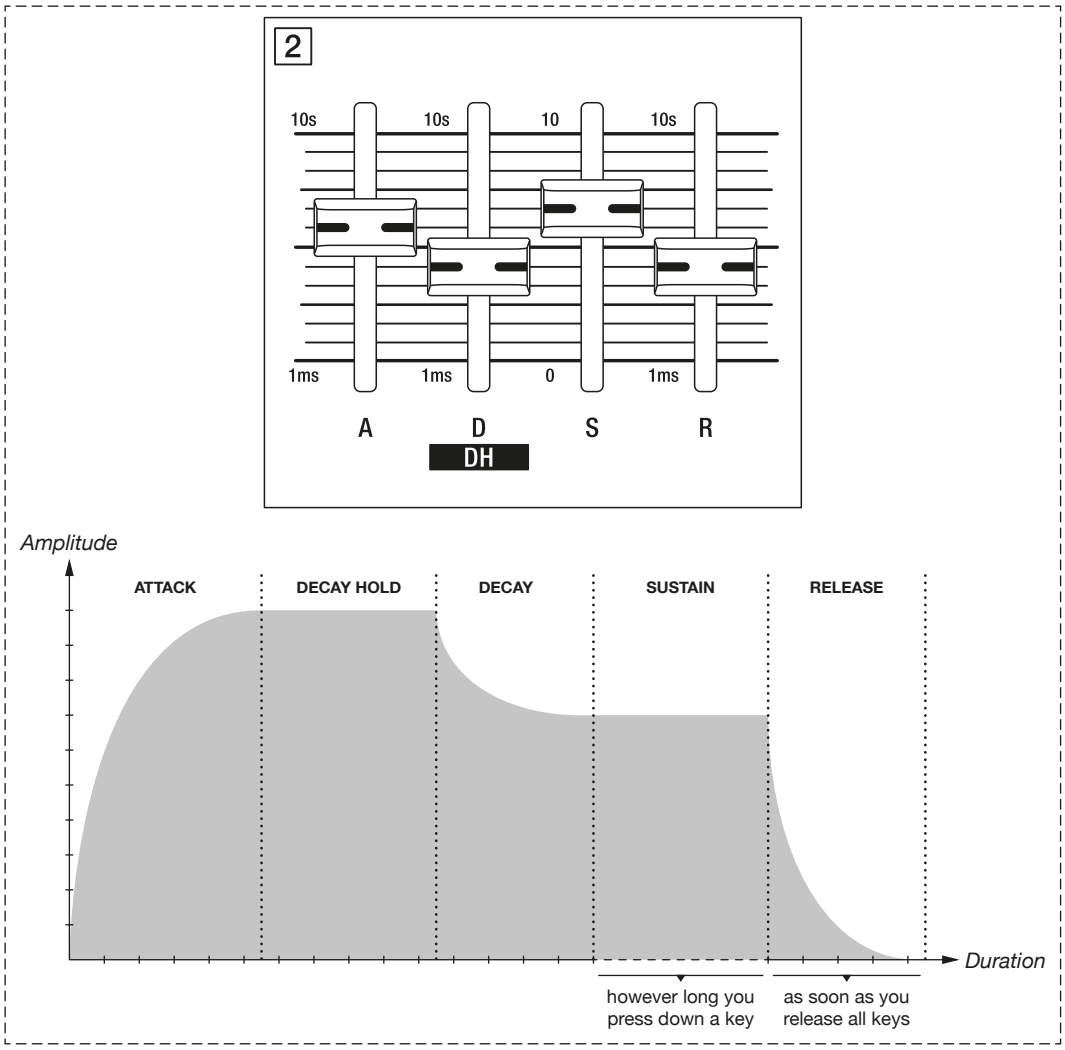



Example 2.




Example 3.

# ENV 2 (Envelope 2)




Envelope 2 setting and a diagram of the resulting envelope shape.

**A(TTACK):** This fader determines the duration of the envelope's attack stage. The higher the setting, the slower the attack time and the longer it takes for the envelope to reach its maximum level. The attack stage can be as short as 1 millisecond or as long as 10 seconds.

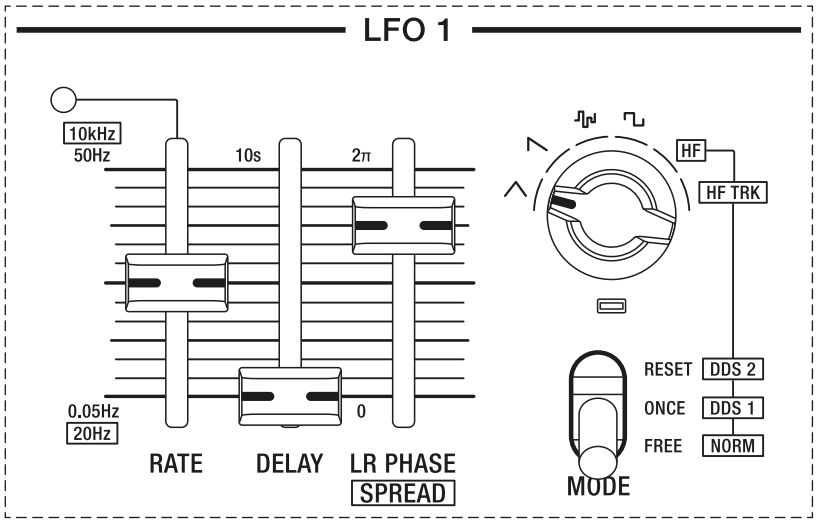
**D(ECAY) H(OLD):** In shift mode, you can use the **DECAY** fader to adjust the time it takes for the decay stage to begin after the attack stage reached its peak. The decay hold stage can be as long as 10 seconds. At its minimum setting this parameter has no effect, i.e. the envelope then behaves as if it had only four stages (attack, decay, sustain and release).

**D(ECAY):** This fader determines the duration of the envelope's decay stage. The higher the setting, the longer it takes for the envelope to travel from its maximum level to the level determined by the sustain fader. The decay stage can be as short as 1 millisecond or as long as 10 seconds.

**S(USTAIN):** This fader determines what level the envelope will be held at when you hold a note past the decay stage. This is the only envelope parameter that is not tied to a duration but to a level. The duration of the sustain stage always depends on how long you hold a note.

**R(ELEASE):** This fader determines the duration of the envelope's release stage. The higher the setting, the slower the release time and the longer it takes for the envelope to fade out after you release a key. The release stage can be as short as 1 millisecond or as long as 10 seconds.

# LFO 1 (Low Frequency Oscillator 1)




The LFO 1 section.

An LFO, or low frequency oscillator, is an oscillator that generates frequencies below the range of human hearing. In default mode, LFO 1 can be used to modulate the frequency of the oscillators to create vibrato effects or to modulate the VCA level to create tremolo effects.

LFO 1 can also be set to high frequencies, allowing you to use it either as a third oscillator, as a drone, or for audio rate modulation.

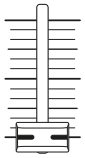
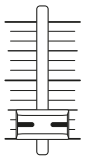
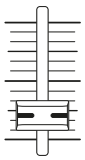
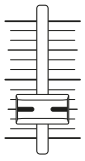
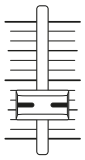
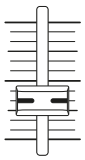
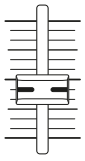
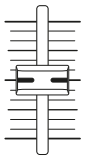
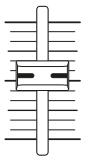
*LFO 1 essentially consists of ten individual LFOs: one for each of the ten 'super voices'. In 20-voice non-binaural mode, each of these ten LFOs is shared by two voices.*

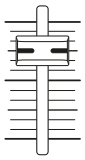
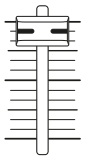
## Modulation Parameters

**RATE:** This fader controls the rate of LFO 1. The LED at the top left of the LFO 1 section provides a visual indication of the rate.

If you enable the **SYNC** option in the arpeggiator and sequencer section, the rate of LFO 1 will be synchronised to either the internal clock as set by the **TEMPO** control (see page 78) or to an external MIDI clock signal (see pages 91-92). When synchronised, you can use the **RATE** fader to adjust the duty cycle duration of LFO 1's waveform in clock divisions relative to the internal or external tempo.

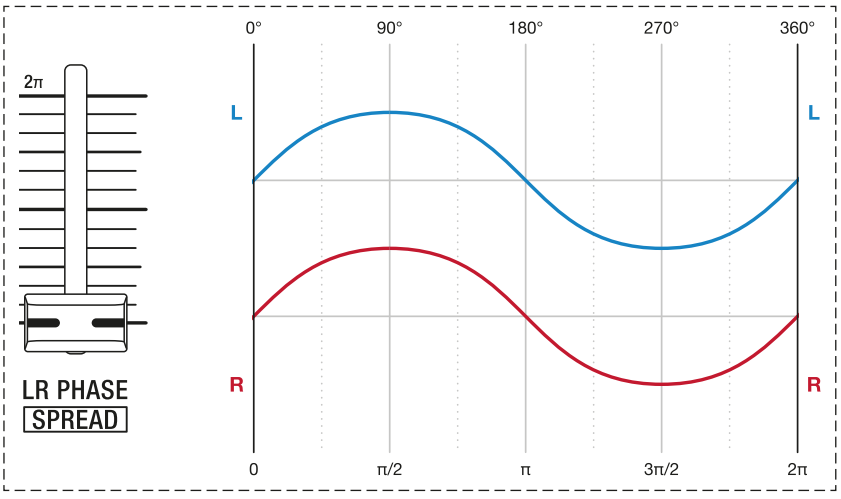
The following table lists the clock divider settings for the synchronised LFO 1 rate:

| Setting | Clock Division | LFO 1 Duty Cycle Duration |
|---|---|---|
|  | 8 whole notes | 32 beats |
|  | 4 whole notes | 16 beats |
|  | 2 whole notes | 8 beats |
|  | Whole note | 4 beats |
|  | 1/2 note | 2 beats |
|  | Dotted 1/4 note | 1 1/2 beats |
|  | 1/2 note triplet | 1/3 of 4 beats |
|  | 1/4 note | 1 beat |
|  | Dotted 1/8 note | 3/4 of 1 beat |
|  | 1/4 note triplet | 1/3 of 2 beats |
|  | 1/8 note | 1/2 of 1 beat |

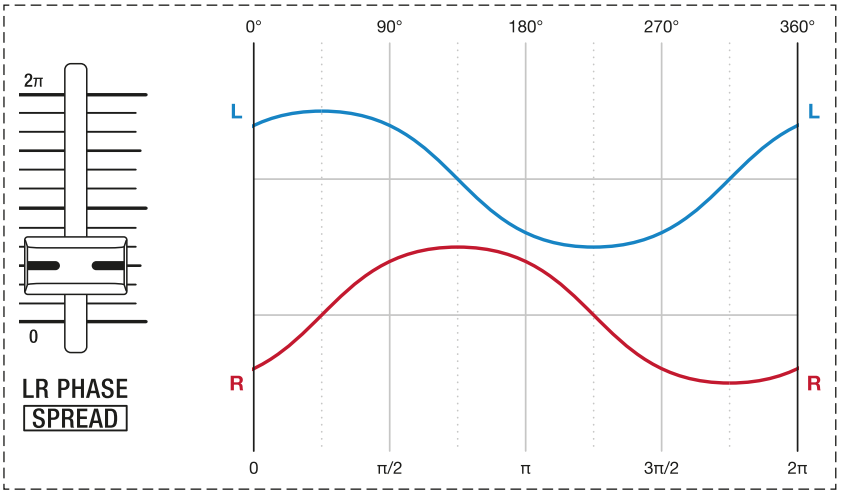
| Setting | Clock Division | LFO 1 Duty Cycle Duration |
|---|---|---|
|  | Dotted 1/16 note | 3/8 of 1 beat |
|  | 1/8 note triplet | 1/3 of 1 beat |
|  | 1/16 note | 1/4 of 1 beat |
|  | Dotted 1/32 note | 3/16 of 1 beat |
|  | 1/16 note triplet | 1/6 of 1 beat |

**DELAY:** This fader determines the time it takes for the LFO modulation to start affecting the sound as soon as you play a note.

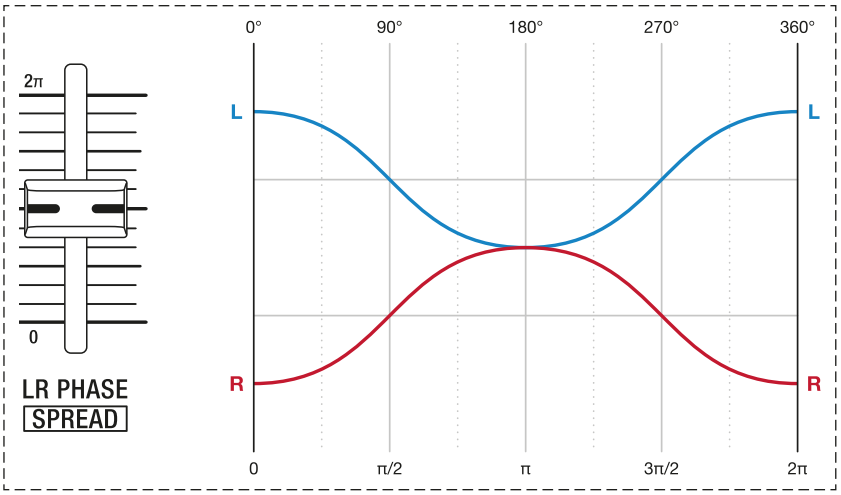
**LR PHASE:** In binaural mode, this fader controls the left-right channel phase relationship, in other words the effect of LFO 1 on the stereo field. With this single control, you can induce complex stereo modulations of the low-pass filter's cutoff frequency, the VCA level, and DDS 2's pitch and pulse width.



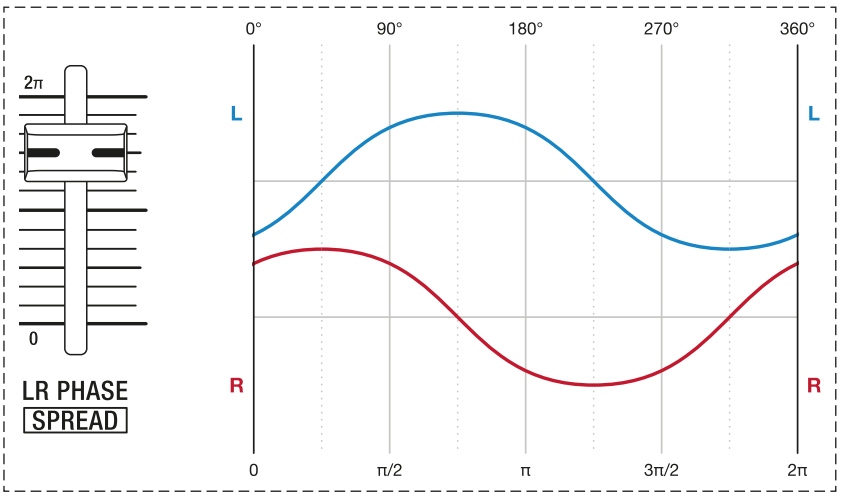

The left-right phase when **LR PHASE** is set to 0% (0).



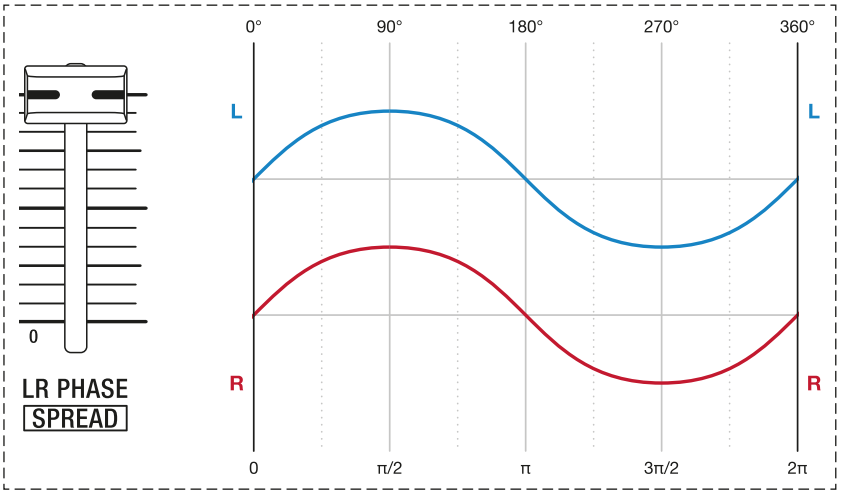

The left-right phase when **LR PHASE** is set to 25% (π/2).




The left-right phase when **LR PHASE** is set to 50% (π).




The left-right phase when **LR PHASE** is set to 75% (3π/2).

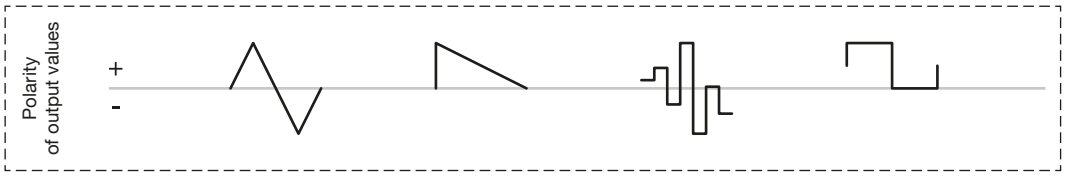



The left-right phase when **LR PHASE** is set to 100% (2π).

**SPREAD:** When binaural mode is disabled, the **LR PHASE** fader turns into a pan spread control, allowing you to adjust how far the non-binaural voices are spread in the stereo panorama. At its lowest setting, all voices are centred. At its highest setting, all voices are alternately hard-panned between the left and right channels.

*In **SOLO** and **LEGATO** modes, non-binaural voices are not panned. In these instances, **SPREAD** only controls phase offsets for LFO 1.*

**WAVEFORM:** In low-frequency mode, this rotary switch allows you to choose from four different waveforms: triangle, reverse sawtooth, sample & hold or square.




LFO 1 waveforms.

- **Triangle** can be used to produce vibrato effects as it alternates equally between positive and negative values. This is a bipolar waveform.
- **Reverse sawtooth** and **square** generate positive values that allow for pulsating sounds or modulations. The square wave can also be used to create trill-like effects at higher rates.
- **Sample & hold** produces random positive or negative values for the duration of one duty cycle. This waveform can be used to create either subtle movements or wild effects. With **RATE** set to its highest value, sample & hold will generate a white noise signal.

- **HF:** Selecting this option enables high-frequency mode, which allows for rates between 20 Hz and 20 kHz. In this mode, LFO 1 can be used either as a drone or as a constant modulation source for audio rate modulation. By default, LFO 1 is set to a sine wave in this mode.

- **HF TRK:** Selecting this option enables high-frequency mode with key tracking. In this mode, LFO 1 can be used either as a third oscillator or as a dynamic modulation source for audio rate modulation. The tuning of LFO 1 can be matched to that of DDS 1 and DDS 2 with the **RATE** fader. By default, LFO 1 is set to a sine wave in this mode.

The **MODE** toggle switch allows you to choose between three types of LFO behaviours:

- **FREE:** With this setting, LFO 1 is free-running.

- **ONCE:** With this setting, LFO1 only goes through one duty cycle when you play a note. In this mode, LFO 1 can also be used as a simple envelope whose shape is determined by the selected waveform.

- **RESET:** With this setting, the phase of LFO 1 will be reset each time you play a note.

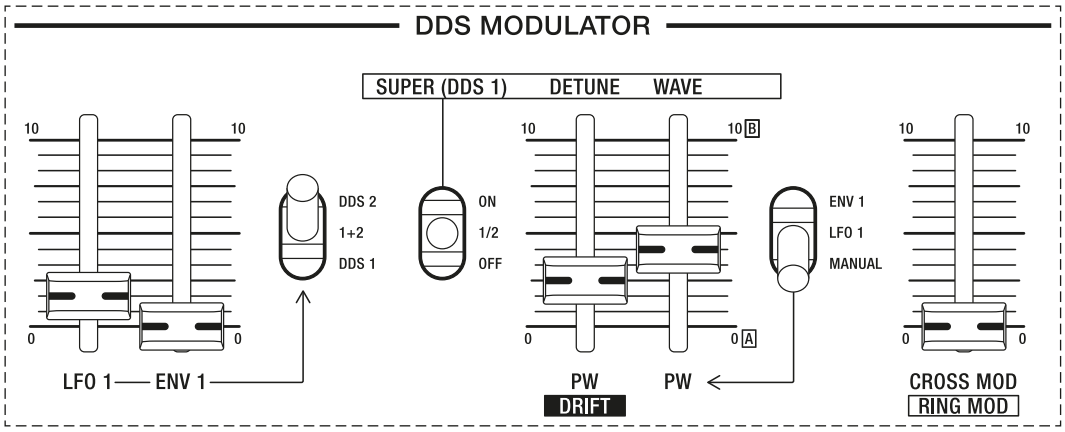
When LFO 1 is set to one of the two high-frequency modes, you can use the **MODE** toggle switch to select one of the following modes:

- **NORM:** With this setting, LFO 1 acts as a modulation source in high-frequency mode.

- **DDS 1:** With this setting, the audio signal from LFO 1 in high-frequency mode is routed to the channel of DDS 1. The output signals from LFO 1 and DDS 1 are summed, so you can crossfade between this summed signal and the audio signal from DDS 2 in the mixer section.

- **DDS 2:** With this setting, the audio signal from LFO 1 in high-frequency mode is routed to the channel of DDS 2. The output signals from LFO 1 and DDS 2 are summed, so you can crossfade between this summed signal and the audio signal from DDS 1 in the mixer section.

# DDS Modulator

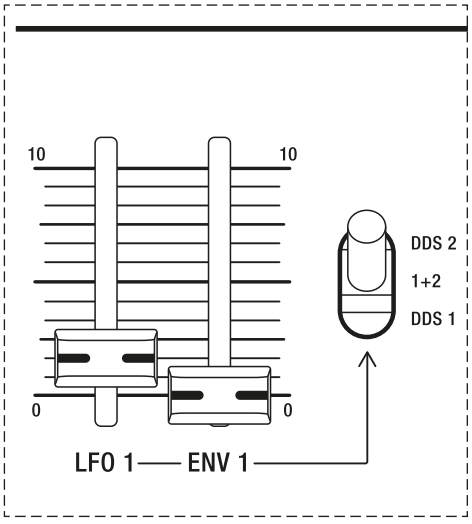



The DDS Modulator section.

This section provides dedicated controls for modulating the Super Gemini's oscillators in numerous ways to add tonal variety to your sounds.

The first subsection contains controls for modulating the pitch of one or both oscillators. The second subsection allows you to set and modulate parameters specific to both DDS 1 and the pulse wave of DDS 2. The third subsection controls the amount of cross modulation applied.

## Modulation Parameters




The pitch modulation controls in the DDS Modulator section.

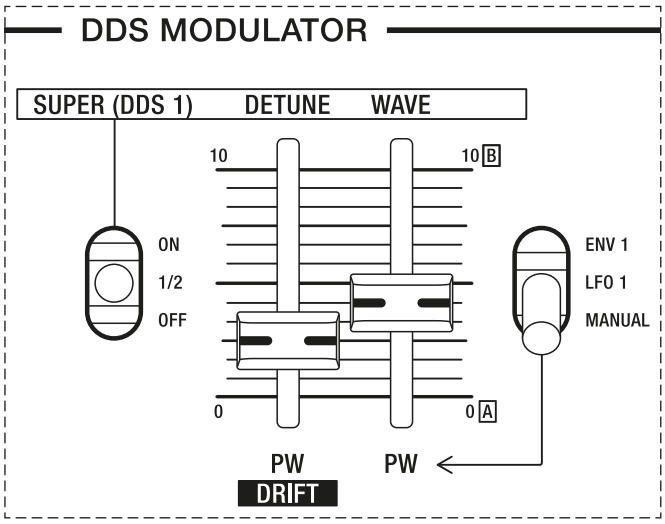
**LFO 1:** This fader controls the amount of pitch modulation by LFO 1.

**ENV 1:** This fader controls the amount of pitch modulation by envelope 1.

The oscillator selector toggle switch allows you to select the modulation destination for pitch modulation controlled by LFO 1 and/or envelope 1:

- **DDS 1:** With this setting, the modulation is mapped to DDS 1.
- **1 + 2:** With this setting, the modulation is mapped to both oscillators.
- **DDS 2:** With this setting, the modulation is mapped to DDS 2.

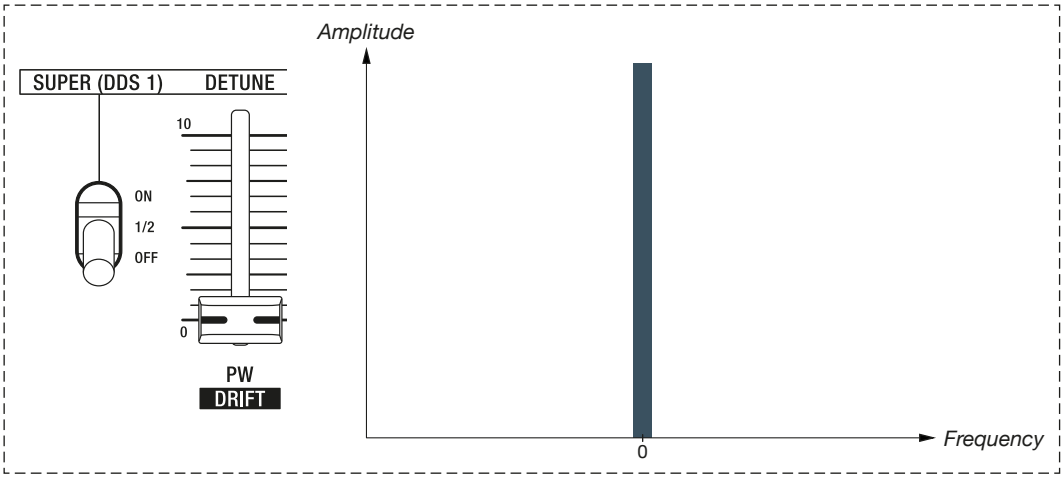
*Binaural pitch modulation controlled by LFO 1 can only be achieved with DDS 2 because its phase is reset to zero each time you play a note, whereas DDS 1 is free-running. When an oscillator is free-running, there is no fixed starting point from which to offset its phase.*



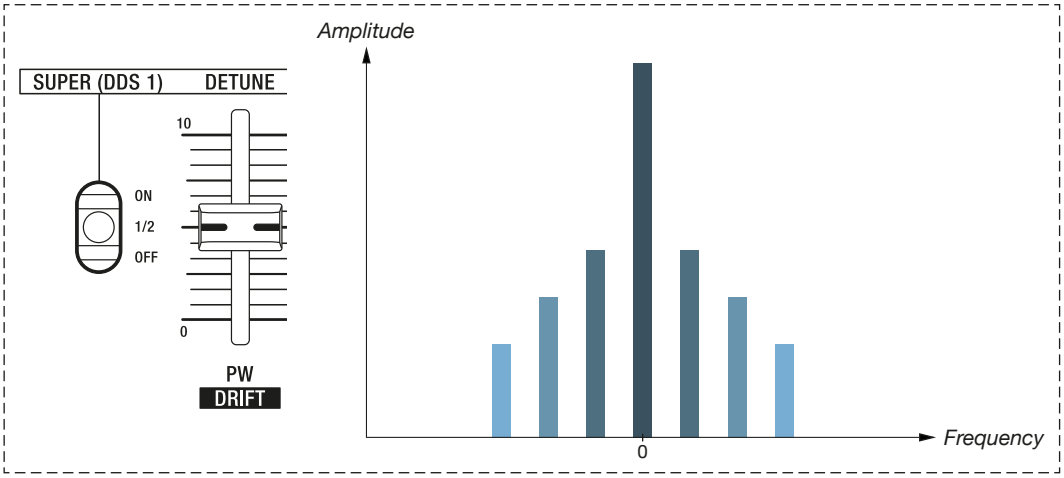

The Super mode, wave modulation and pulse width controls in the DDS Modulator section.

The **SUPER (DDS 1)** toggle switch enables you to activate super mode. Super mode is a unique feature that takes advantage of the Super Gemini's stereo signal path and the fact that DDS 1 contains seven free-running oscillators: a centroid oscillator and six 'sister' oscillators. In both available super modes, DDS 1's six 'sister' oscillators can be dynamically de-phased in the stereo field, resulting in wide and thick single oscillator sounds. You have the choice between three options:

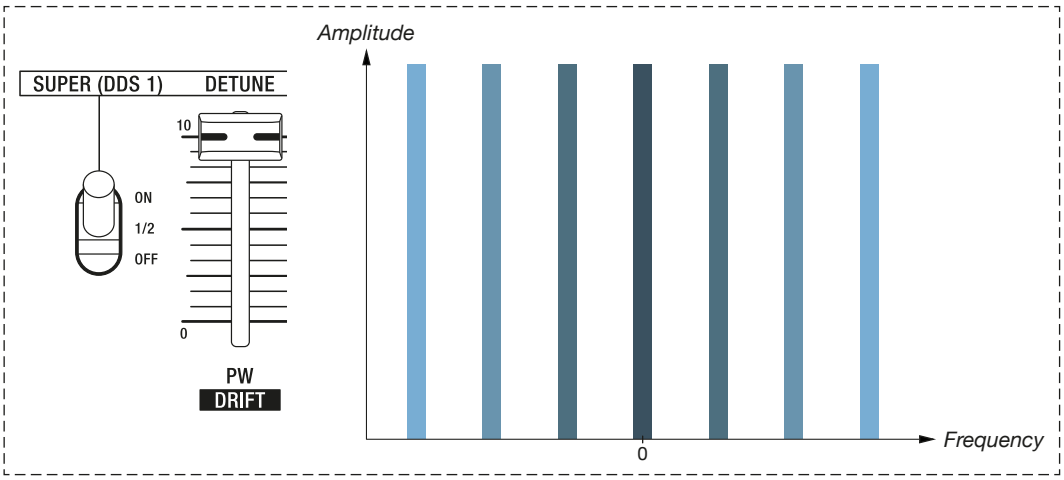
- **OFF:** Selecting this option disables super mode. In this mode, the **DETUNE** parameter has no effect.
- **1/2:** Selecting this option enables super mode for DDS 1 at half depth. In addition, the phase of the DDS 1 waveforms is reset with each key press. This is useful for flanging sounds when **DETUNE** is set to higher values, or for punchy sounds when **DETUNE** is set to zero.
- **ON:** Selecting this option enables super mode for DDS 1 at full depth.




DDS 1's centroid oscillator. When super mode is off, only this oscillator generates a sound.




DDS 1's centroid oscillator and its six sister oscillators spread to both sides when super mode is set to 1/2 and the detune parameter is set to 50%.




DDS 1's centroid oscillator and its six sister oscillators spread to both sides when super mode is enabled at full depth and the detune parameter is set to 100%.

**PW/DETUNE:** This fader controls the pulse width of DDS 2's pulse wave. With super mode enabled, this fader also controls the amount of detune spread applied to DDS 1. Increasing the amount noticeably thickens the sound of DDS 1 as stacked versions of the same waveform are detuned.

**DRIFT:** In shift mode, the **PW**/**DETUNE** fader controls the amount of randomisation applied to various parameters, including the pitch of the oscillators, filters and envelopes, among others. Use **DRIFT** to either add a pleasing amount of oscillator movement or to achieve extreme detuning.

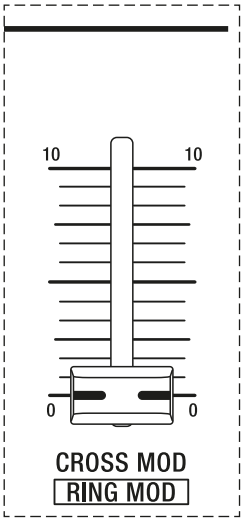
**PW/WAVE:** This fader controls the amount of pulse width modulation applied to DDS 2's pulse wave. In addition, this fader controls the amount of wave modulation applied to DDS 1. The latter allows you to morph either between two adjacent DDS 1 waveforms or between the currently loaded alternative waveforms assigned to channels **A** and **B** (see pages 32-33). This feature allows you to create a large amount of hybrid waveforms.

When set to the lowest position (**A**), you will hear either only the DDS 1 waveform currently selected with the **WAVEFORM** control, or the alternative waveform assigned to channel **A** if the **WAVEFORM** control is in the rightmost position.

When set to the highest position (**B**), you will hear either only the DDS 1 waveform to the right of the waveform currently selected with the **WAVEFORM** control, or the alternative waveform assigned to channel **B** if the **WAVEFORM** control is in the rightmost position.

The toggle switch to the right allows you to select the modulation source for pulse width modulation (**PW**) and wave modulation (**WAVE**):

- **MANUAL:** With this setting, you can manually interpolate either between two adjacent DDS 1 waveforms or between the currently loaded alternative waveforms assigned to channels **A** and **B**. When DDS 2 is set to pulse wave, this fader controls the pulse width of DDS 2's pulse wave.
- **LFO 1:** With this setting, LFO 1 acts as the modulation source.
- **ENV 1:** With this setting, envelope 1 acts as the modulation source.




The cross modulation fader in the DDS Modulator section.

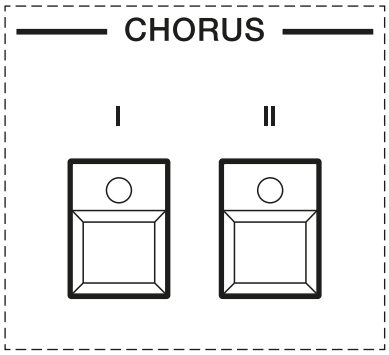
**CROSS MOD:** This fader controls the amount of cross modulation. By default, DDS 2 modulates DDS 1 with exponential FM. Use this parameter to create complex or bell-like timbres.

*Enabling hard sync reverses the default cross modulation routing, resulting in DDS 2 being frequency modulated by DDS 1. Since in this case DDS 2 is forced to restart its duty cycle with DDS 1 while DDS 1 is responsible for the fundamental frequency, any changes applied to DDS 2 will alter the harmonic content of the sound, the depth of which is controlled with the **CROSS MOD** fader. This allows for results similar to wave folding or phase modulation.*

*When DDS 2 is set to **RING** mode, the **CROSS MOD** fader applies additional cross modulation to the carrier (DDS 1).*

The Super Gemini features two 24-bit effects to add the finishing touch to your sounds: A classic dual-mode stereo chorus as well as a stereo delay that can be modulated and synchronised to the arpeggiator and sequencer or to an external clock source. The effects are routed in series, with the chorus being the first and the delay being the last in the signal chain.

## Chorus




The chorus section.

The Super Gemini's chorus effect is a simple and effective design that can be used to thicken your sound even further.

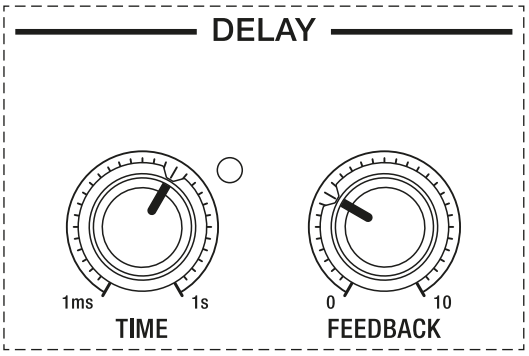
**Chorus I:** Selecting this option activates a subtle chorus effect.

**Chorus II:** Selecting this option activates a denser chorus effect that is modulated at a higher rate.

**Chorus I + II:** Enabling both options at the same time creates a third and even more intense chorus effect, similar to the distinctive ensemble effect used in vintage string machines.

*Intense chorus effects can be useful when you only use one oscillator for a patch and therefore need a tool to thicken the overall sound. A subtle chorus is useful for adding some movement to an already rich sounding patch.*

# Delay

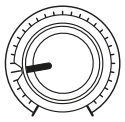
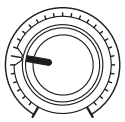
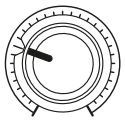
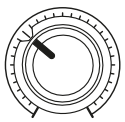


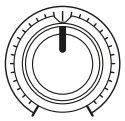
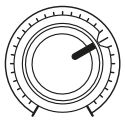
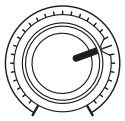
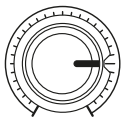
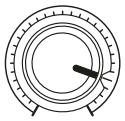
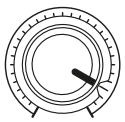

The delay section.

**TIME:** This control allows you to adjust the delay time over a range of 1 millisecond to 1 second. The LED at the top right of this control provides a visual indication of the delay time.

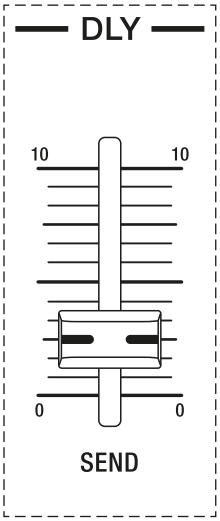
If you enable the **SYNC** option in the arpeggiator and sequencer section, the delay time will be synchronised to either the internal clock as set by the **TEMPO** control (see page 78) or an external MIDI clock signal (see pages 91-92). When synchronised, the **TIME** control enables you to adjust the delay time in clock divisions that are relative to the internal or external tempo.

The following table lists the clock divider settings for the synchronised delay time:

| Setting | Clock Division | Delay Time |
|---|---|---|
|  | 1/32 note triplet | 1/12 of 1 beat |
|  | Dotted 1/64 note | 3/32 of 1 beat |
|  | 1/32 note | 1/8 of 1 beat |
|  | 1/16 note triplet | 1/6 of 1 beat |
|  | Dotted 1/32 note | 3/16 of 1 beat |

| Setting | Clock Division | Delay Time |
|---|---|---|
|  | 1/16 note | 1/4 of 1 beat |
|  | 1/8 note triplet | 1/3 of 1 beat |
|  | Dotted 1/16 note | 3/8 of 1 beat |
|  | 1/8 note | 1/2 of 1 beat |
|  | 1/4 note triplet | 1/3 of 2 beats |
|  | Dotted 1/8 note | 3/4 of 1 beat |
|  | 1/4 note | 1 beat |
|  | 1/2 note triplet | 1/3 of 4 beats |
|  | Dotted 1/4 note | 1 1/2 beats |
|  | 1/2 note | 2 beats |
|  | Whole note triplet | 1/3 of 8 beats |

**FEEDBACK:** This control allows you to adjust how long the delay signal is repeated. Low settings result in fewer repeats, which is useful for creating slapback effects in conjunction with short delay times. When this control is turned fully clockwise, the delay signal is repeated indefinitely with no decay or degradation.




The delay send fader.

**SEND:** This fader controls how much of each layer's output is fed into the delay effect. Higher settings result in a wet effect mix, while lower settings emphasise the dry signal.

## Delay Freeze

The Super Gemini also features a delay freeze function that enables you to create sound-on-sound loops while you are performing. Follow the steps below to access this feature:

1. Turn off the Super Gemini.
2. Connect a single or dual footswitch to the delay freeze input on the rear panel. When using a single footswitch, it controls the upper layer delay freeze function. When a dual footswitch is connected, the left pedal controls the upper layer delay freeze function, while the right pedal controls the lower layer delay freeze function.
3. Power cycle the Super Gemini. The connected footswitch will auto-calibrate for polarity when the instrument is switched on.

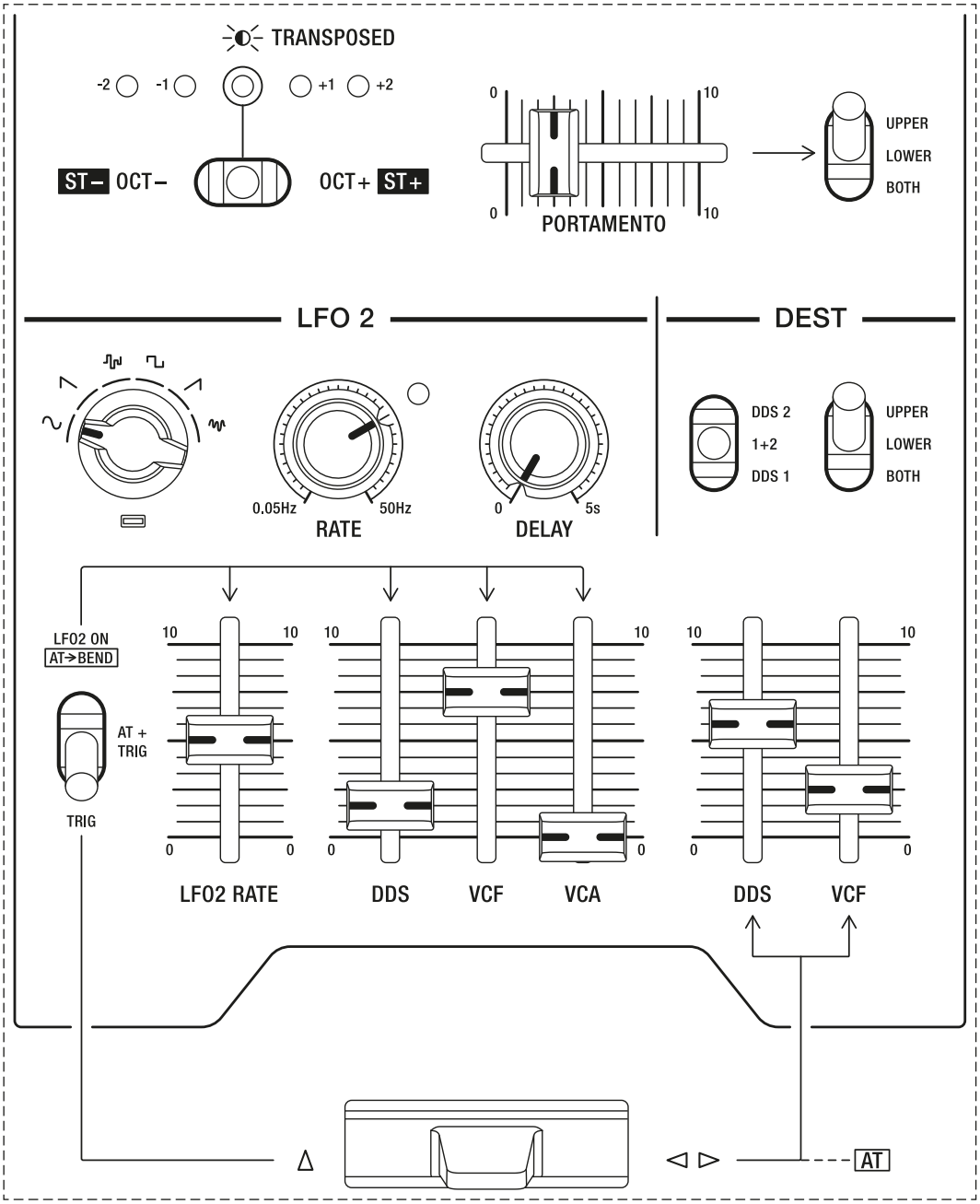
To add notes or chords to the delay loop, release the footswitch while playing. Once you hold down the footswitch, new notes will no longer be added to the delay loop while its current content loops endlessly.

Use the **SEND** control to set the level of the delay loop, the **TIME** control to set the length of the delay loop and the **FEEDBACK** control to ensure that looped notes are repeated at a constant level. Delay freeze works best with long delay times and moderate amounts of delay feedback.

*You can also control the delay freeze function via MIDI. It sends and receives MIDI data via CC69.*

# PERFORMANCE CONTROL SECTION

Conceived as a true performance instrument that will greatly enhance your expressiveness, the Super Gemini features a comprehensive performance control section in addition to its ribbon controller and a 61-note velocity-sensitive Fatar keyboard capable of polyphonic aftertouch. Settings in the performance control section can affect both layers either individually or together.

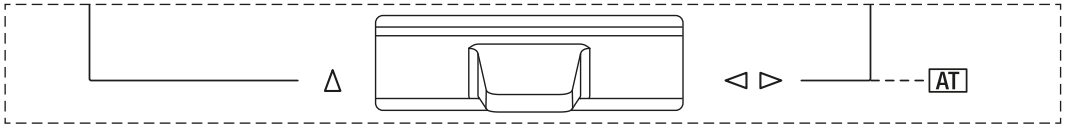



The Super Gemini's performance control section.

The performance control section allows for a number of different modulations and features immediate and versatile controls that can be easily accessed and adjusted while playing.

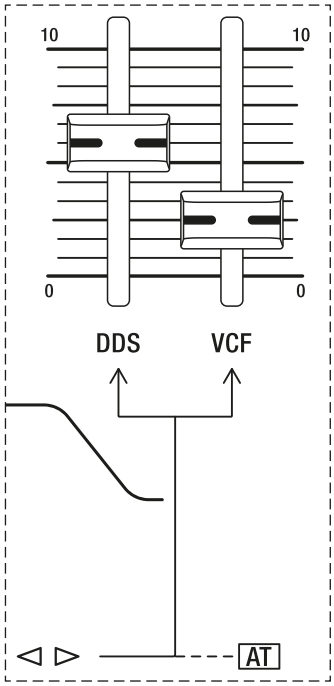
# The Bender

The bender can be used to modulate both the pitch of the oscillators and the cutoff frequency of the low-pass filter. It responds to horizontal (left/right) as well as vertical (upwards) movements.




The bender.

*A pressure pad is used to measure the vertically applied force and convert it to a modulation amount. The lever is not designed to be pushed up in the same way it can be moved sideways.*




The section relevant to the bender assignment.

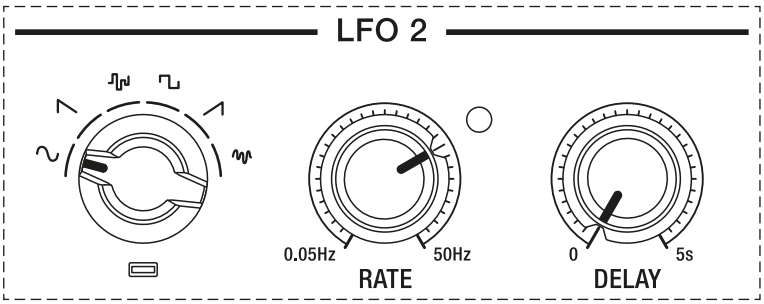
**DDS:** This fader controls how much the bender affects the pitch of the oscillators. The maximum pitch-bend range is one octave. The oscillator selector toggle switch above this control determines which oscillator is affected by pitch modulation (see page 71).

**VCF:** This fader controls how much the bender affects the cutoff frequency of the low-pass filter. With this fader set to the highest position, the filter can be fully opened or fully closed when the bender is moved horizontally.

# LFO 2 (Low Frequency Oscillator 2)

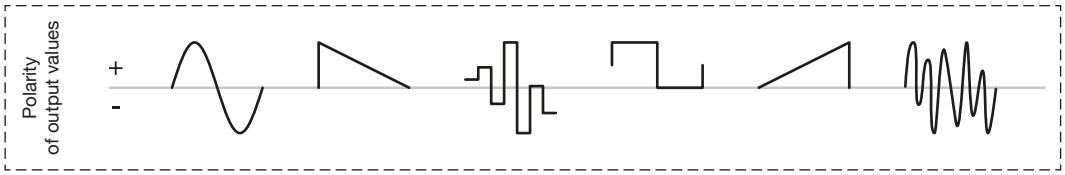
The second LFO generates six waveforms and can be used to modulate the frequency of the oscillators to produce a vibrato effect, to modulate the low-pass filter's cutoff frequency for periodic harmonic changes, or to modulate the VCA level to create tremolo style effects.

LFO 2 can be triggered by pushing the bender upwards or by applying aftertouch. In addition, it can be switched on permanently. The type and amount of modulation controlled by LFO 2 is determined by the faders **DDS**, **VCF** and **VCA** located below LFO 2's primary controls.




The primary LFO 2 controls.

**WAVEFORM:** This rotary switch allows you to choose from six different waveforms: sine, reverse sawtooth, sample & hold, square, sawtooth or sample & glide.

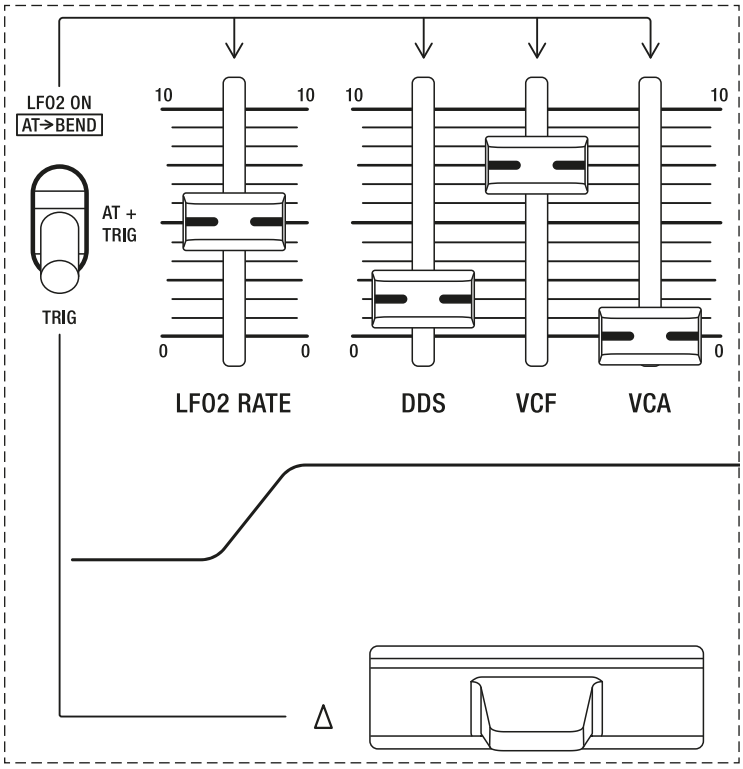



LFO 2 waveforms.

- **Sine** can be used to produce vibrato effects as it alternates equally between positive and negative values. This is a bipolar waveform.
- **Reverse sawtooth**, **square** and **sawtooth** generate positive values that allow for pulsating sounds or modulations. The square wave can also be used to create trill-like effects at higher rates.
- **Sample & hold** produces random positive or negative values for the duration of one duty cycle. **Sample & glide** also generates random values, but glides from one value to the next. Both waveforms can be used to create either subtle movements or wild effects. With **RATE** set to its highest value, both waveforms will generate a white noise signal.

**RATE:** This control determines the rate of LFO 2. The LED at the top right of this control provides a visual indication of the rate.

**DELAY:** This control determines the time it takes for the LFO modulation to start affecting the sound as soon as you play a note.




The LFO 2 trigger and destination controls.

The leftmost toggle switch determines how LFO 2 is triggered:

- **TRIG:** With this setting, pushing the bender upwards will trigger LFO 2.
- **AT + TRIG:** With this setting, both aftertouch and pushing the bender upwards will trigger LFO 2. If you use the bender and apply pressure to a key at the same time, only the gesture with the greater effect on triggering LFO 2 will control the modulation depth.
- **ON (AT -> BEND):** With this setting, LFO 2 is permanently on. Additionally, aftertouch is now set to trigger the same modulations controlled by horizontal bender movements.

**LFO 2 RATE:** This fader determines how much vertical bender movements and/or aftertouch affect the rate of LFO 2. The harder you press the bender or a key, the more the rate increases.

**DDS:** This fader controls the amount by which LFO 2 modulates the pitch of the oscillators. The oscillator selector toggle switch in the destination section determines which oscillator is affected by pitch modulation.

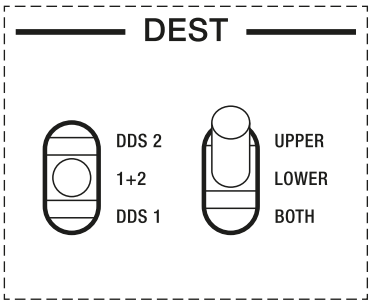
**VCF:** This fader controls the amount by which LFO 2 modulates the low-pass filter's cutoff frequency.

**VCA:** This fader controls the amount by which LFO 2 modulates the VCA level.

*When selected as a modulation desination, LFO 2 responds polyphonically. For example, if you use envelope 1 to modulate the rate of LFO 2, each time you play a note, the rate of LFO 2 will be modulated according to the envelope shape. The phase of the per-voice LFOs can be synchronised again by toggling the leftmost toggle switch in the performance control section.*

## Oscillator and Layer Selection

In the destination section you can specify which oscillator to modulate per layer and select the layer to which you would like to apply the modulation settings for the bender and LFO 2.




The destination section.

The oscillator selector toggle switch determines which oscillator is affected by the pitch modulation controlled by horizontal bender movements and LFO 2. You have the choice between three options:

- **DDS 1:** With this setting, only the pitch of the first oscillator will be affected by the bender and LFO 2.
- **1 + 2:** With this setting, the pitch of both oscillators will be affected by the bender and LFO 2.
- **DDS 2:** With this setting, only the pitch of the second oscillator will be affected by the bender and LFO 2.

Use the layer selector toggle switch to select the layer for which you would like to adjust modulation settings related to the bender and LFO 2. You have the choice between three options:

- **BOTH:** Select this option if you want to create the same bender and LFO 2 specific modulation settings for both layers. If you toggle to this position from either **UPPER** or **LOWER**, the current settings for the upper layer are applied to both layers.
- **LOWER:** Select this option if you want to create bender and LFO 2 specific modulation settings for the lower layer.
- **UPPER:** Select this option if you want to create bender and LFO 2 specific modulation settings for the upper layer.

Suppose you would like individual pitch-bend ranges for two pad sounds layered in dual mode. A pitch-bend range of one octave (+/- 12 semitones) should be applied to the oscillators of the upper layer and a pitch-bend range of a fifth (+/- 7 semitones) should be applied to the oscillators of the lower layer:

1. Toggle the layer selector switch to **UPPER**.
2. Toggle the oscillator selector switch to **1 + 2**.
3. Move the rightmost **DDS** fader to the highest position.
4. Toggle the layer selector switch to **LOWER**.
5. Toggle the oscillator selector switch to **1 + 2**.
6. Move the rightmost **DDS** fader to the position where the pitch-bend range equals a fifth.

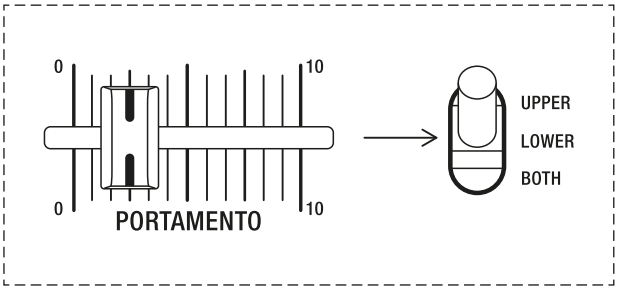
Moving the bender horizontally to its extreme positions bends the pitch of the upper layer oscillators by an octave, while bending the pitch of the lower layer oscillators by a fifth. This allows you to introduce complex harmonic relations by moving just one performance control. After tweaking the settings to your liking, make sure to save either the performance or both patches.

## Portamento

When portamento is enabled, the pitches of the notes you play slide from one note to another. The higher the portamento time, the longer it takes for a note to slide to the pitch of the following note.

The portamento time is also determined by the intervals between the played notes. Smaller intervals result in faster pitch slides, while larger intervals result in slower pitch slides.

When you change chords, each note slides at a different rate depending on the pitch of each note and the intervals between the triggered voices.




The portamento fader.

**PORTAMENTO:** This fader controls the amount of time it takes to slide from one pitch to the next. When set to the leftmost position, portamento will have no effect. When set to the rightmost position, the portamento time for an octave interval is 10 seconds.

Use the layer selector toggle switch to select the layer for which you would like to adjust the portamento setting. You have the choice between three options:

- **BOTH:** Select this option if you want the same portamento setting for both layers. If you toggle to this position from either **UPPER** or **LOWER**, the current setting for the upper layer is applied to both layers.
- **LOWER:** Select this option if you want to adjust the portamento setting for the lower layer.
- **UPPER:** Select this option if you want to adjust the portamento setting for the upper layer.

Suppose you would like individual portamento settings for two monophonic lead sounds layered in dual mode:

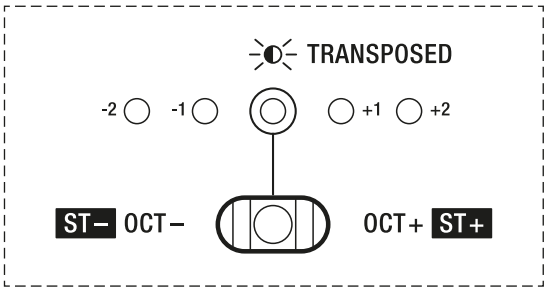
1. Toggle the layer selector switch to **UPPER**.
2. Adjust the portamento time to taste.
3. Toggle the layer selector switch to **LOWER**.
4. Adjust the portamento time to taste.

When playing legato style, the pitches of both sounds slide at different rates, causing both layers to be momentarily out of tune with each other, which in turn fattens up the overall sound. After tweaking the settings to your liking, make sure to save either the performance or both patches.

# Octave Selector & Transpose Function

The Super Gemini's octave selector toggle switch allows you to switch octaves over a range of five octaves. The switch is spring-loaded, allowing for expressive use when playing notes.

The currently selected octave is indicated by the lit LEDs above the toggle switch, with **+2** being the highest octave and **-2** being the lowest.




The octave selector toggle switch.

Use the layer selector toggle switch next to the **PORTAMENTO** fader to select the layer for which you would like to adjust the octave setting. You have the choice between three options:

- **BOTH:** Select this option if you want the same octave setting for both layers. If you toggle to this position from either **UPPER** or **LOWER**, the current setting for the upper layer is applied to both layers.
- **LOWER:** Select this option if you want to adjust the octave setting for the lower layer.
- **UPPER:** Select this option if you want to adjust the octave setting for the upper layer.

In shift mode, you can use the octave selector toggle switch to transpose the pitch globally by +/- 12 semitones. If you transpose upwards, the two LEDs on the right will start flashing. If you transpose downwards, the two LEDs on the left will start flashing.

*If you adjust the global transpose setting, the middle octave LED will continue to flash even after exiting shift mode to indicate that the default global tuning has been changed.*

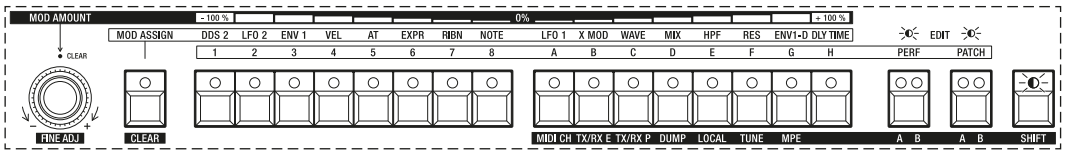
# Global Fine Tune

In addition to the transpose function, you can also fine-tune the Super Gemini globally. To adjust the global fine-tuning, press **SHIFT** and then rotate the **MOD AMOUNT** encoder called **FINE ADJ** in shift mode.

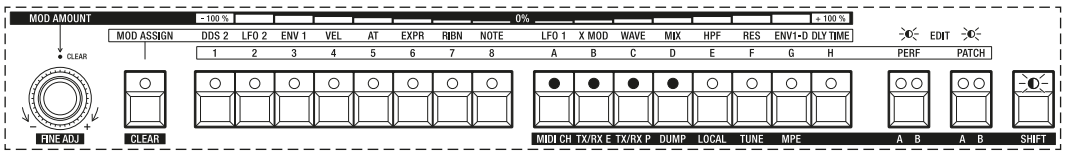
Turning the **FINE ADJ** encoder clockwise increases the frequency. Turning the control counter-clockwise decreases the frequency. You can adjust the global fine-tuning over a range of +/- 100 cents. Pressing the **FINE ADJ** encoder clears the current fine-tune setting and resets it to 440 Hz.

As soon as you touch or move the **FINE ADJ** encoder, the LEDs of buttons **1**-**8** and **A**-**H** indicate the current fine-tune setting. The printed top row above buttons **1**-**8** and **A**-**H** serves as a legend for the current fine-tune setting, indicated by the lit LEDs.

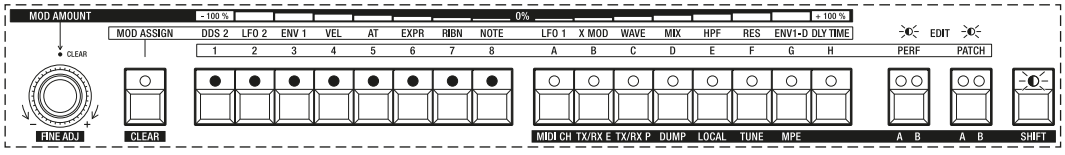
In the first example, the lit LEDs of buttons **1**-**8** and **A**-**H** indicate a global fine-tune setting of 0 cents or 440 Hz, which is the default:




In the second example, the lit LEDs of buttons **1**-**8** and **A**-**H** indicate a global fine-tune setting of +50 cents:




In the third example, the lit LEDs of buttons **1**-**8** and **A**-**H** indicate a global fine-tune setting of -100 cents:

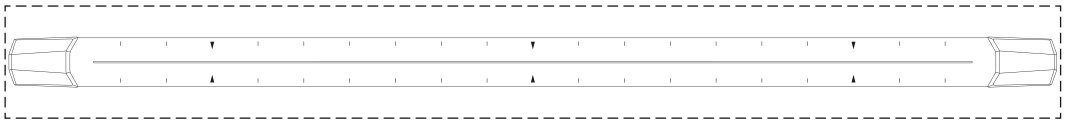



*If you set the global fine-tune to anything other than 440 Hz, the middle octave LED will continue to flash even after exiting shift mode to indicate that the default global tuning has been changed.*

# RIBBON CONTROLLER

In addition to its polyphonic aftertouch keyboard, the Super Gemini is also equipped with a custom-designed ribbon controller to further increase the expressiveness of your performance. By default, the ribbon controller is mapped to control the pitch of the oscillators. The scope of the pitch-bend range depends on your finger position:

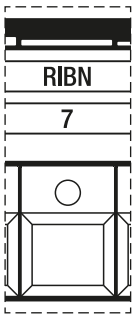
- To achieve the maximum range of a pitch bend upwards, place your finger at the bottom of the ribbon controller and slide it to the top.
- To achieve the maximum range of a pitch bend downwards, place your finger at the top of the ribbon controller and slide it down.



The ribbon controller.

*Pitch bends controlled by the ribbon controller only affect notes held on the keyboard. During the release stage of the envelopes, the ribbon controller no longer affects the pitch of the notes.*

You can also map the ribbon controller to various modulation destinations using the modulation matrix. See pages 83-88 for more information on how to use the modulation matrix.




The ribbon controller as a modulation source in the modulation matrix.

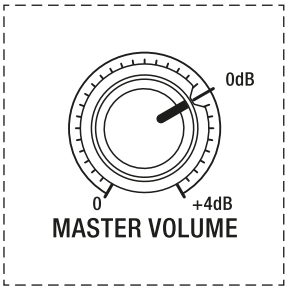
*When you assign the ribbon controller to any modulation destination using the modulation matrix, the ribbon controller no longer controls the pitch of the oscillators. If you clear all modulation mappings to the ribbon controller as a modulation source in the modulation matrix (see page 88), pitch control is enabled again.*

*The ribbon controller always sends a coarse/fine pair of MIDI CC messages: CC2 (MSB) and CC34 (LSB). When the ribbon controller is used in default mode to control the pitch of the oscillators, it does not receive MIDI CC messages. However, it sends and receives MIDI CC messages when used as a modulation source in the modulation matrix.*

# ADDITIONAL CONTROLS & PARAMETERS

In addition to patch-related parameters, the Super Gemini also features overarching controls and parameters that either affect the instrument as a whole or are relevant for setting up a performance.

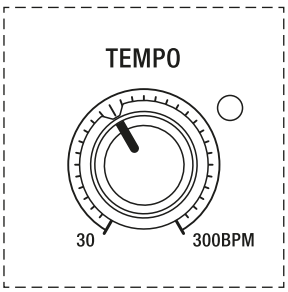
## Master Volume




The master volume control.

**MASTER VOLUME:** This parameter controls the Super Gemini's master volume as well as the headphone volume. Turning the control fully clockwise increases the volume to a maximum of +4 decibels. This is the only control whose setting is not stored with a performance or patch.

## Tempo



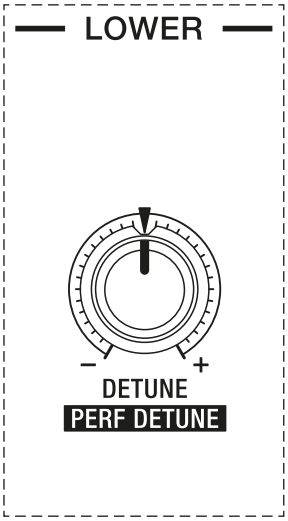

The tempo control.

**TEMPO:** This control allows you to adjust the playback speed of the arpeggiator or sequencer. The tempo can be as slow as 30 BPM or as fast as 300 BPM. The LED at the top right is your visual click track, indicating the current tempo by flashing according to the set tempo rate.

*When the Super Gemini is synchronised to an external MIDI clock source, the **TEMPO** control has no effect. In this case, use the **CLK DIV** control in the arpeggiator and sequencer section to set the playback speed in clock divisions relative to the external tempo.*

# Detune

This parameter is only available for the lower layer. It allows you to either slightly detune the lower layer relative to the upper layer to thicken a dual mode performance, or detune an entire performance to compensate for pitch offsets caused by cross modulation. Its setting is stored with a performance.

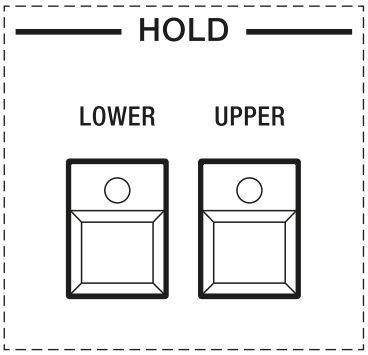



The lower layer detune control.

**DETUNE:** This control determines the fine-tune setting for the lower layer. Turning the control clockwise increases the frequency. Turning the control counter-clockwise decreases the frequency. You can adjust the fine-tuning over a range of +/- 7 semitones.

**PERF DETUNE:** In shift mode, the **DETUNE** control allows you to detune a performance. Turning the control clockwise increases the frequency. Turning the control counter-clockwise decreases the frequency. You can adjust the tuning over a range of +/- 7 semitones.

# Hold




The hold mode buttons for both layers.

**UPPER:** With this option enabled, the notes of the upper layer will continue to be sustained after you release all keys.

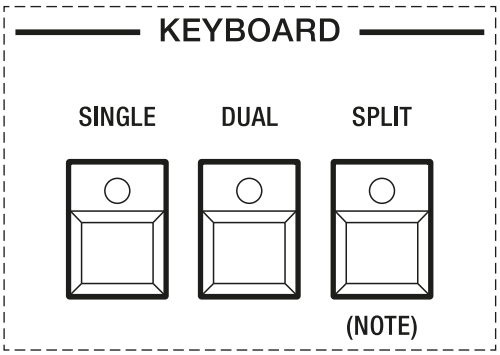
**LOWER:** With this option enabled, the notes of the lower layer will continue to be sustained after you release all keys.

*If you activate the hold function of one of the layers while the arpeggiator is switched on, the arpeggio of the respective layer will continue to play without you having to hold down a key. As soon as you release all keys and play a new chord, a new arpeggio is generated.*

*If you activate the hold function of one of the layers while the sequencer is switched on, the sequence of the respective layer can be transposed according to the keys you play.*

# Keyboard

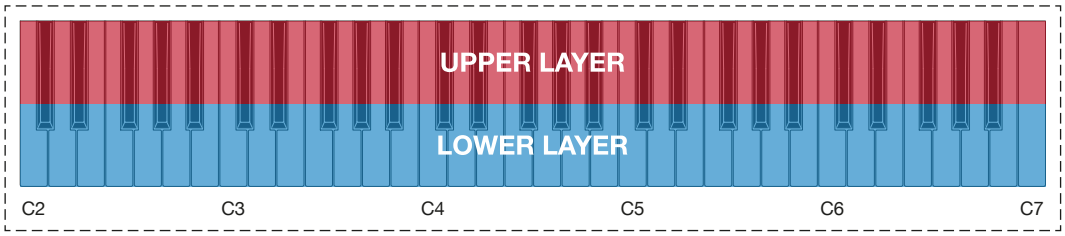
In the keyboard section you can set the mode of a performance.




The keyboard section.

**SINGLE:** In single mode, only one layer with 20-voice polyphony is active. In binaural mode, the number of voices is halved to ten voices. By default, single mode is set to the upper layer. You can switch between layers by using the select buttons in the layer section.

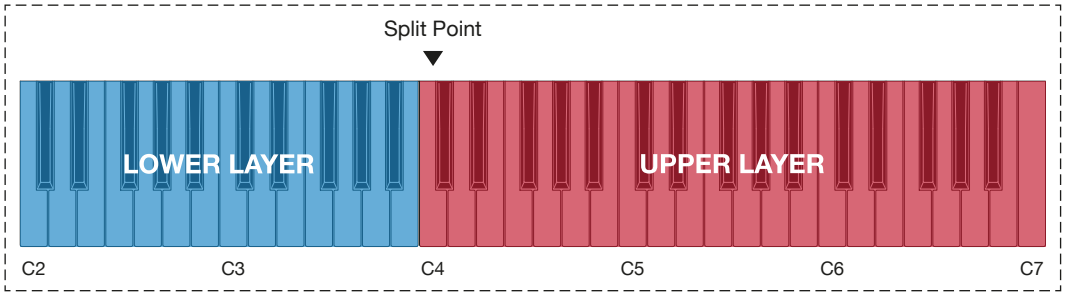
**DUAL:** In dual mode, the upper and lower layers are stacked, with the 20 available voices split evenly between the two. If you activate binaural mode for a layer, its respective voice-count will be reduced to five.




Dual mode.

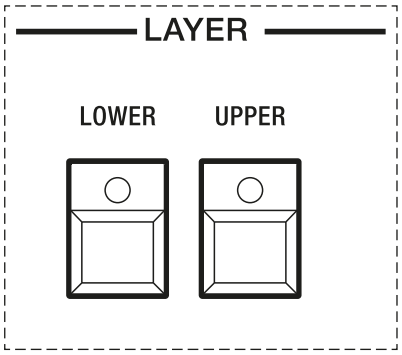
**SPLIT:** In split mode, the upper and lower layers are mapped either side of a split point on the keyboard, with the 20 available voices split evenly between the two. If a layer is set to binaural mode, it will be limited to five voices. The upper layer is assigned to all keys above the designated split point, while the lower layer is assigned to all keys below.

Hold **SPLIT** and play a note to set the split point. The split point is the first note of the upper layer. By default it is set to C4.



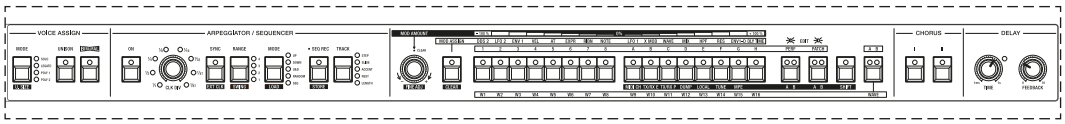

Split mode.

# Layer




The layer section.

The select buttons in the layer section allow you to toggle between each layer's patch settings, which are set in the shared controls section for both layers.



The front panel area that contains shared controls for both layers.

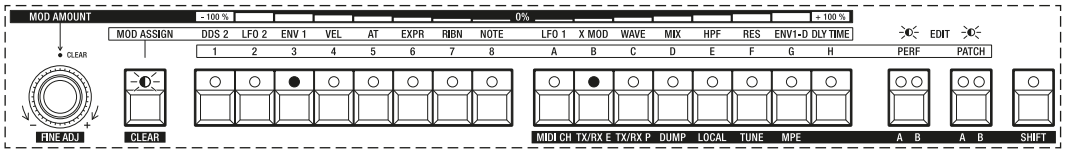
**UPPER:** Press this button to load a patch into the upper layer or to access the patch-specific voice assign, arpeggiator and sequencer, modulation matrix, alternative waveform, chorus and delay settings for the upper layer.

**LOWER:** Press this button to load a patch into the lower layer or to access the patch-specific voice assign, arpeggiator and sequencer, modulation matrix, alternative waveform, chorus and delay settings for the lower layer.

# USING THE MODULATION MATRIX

The top panel and the performance control section provide you with numerous options for assigning a variety of modulation sources to several different modulation destinations. You can go beyond these possibilities by using each layer's modulation matrix.

The modulation matrix is accessed via the front panel section which contains the numbered and lettered select buttons and there are two different methods of creating modulation mappings that are described below.




The front panel section relevant to the modulation matrix.

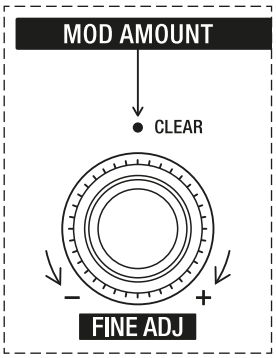
Before we dive into the different ways you can create modulation mappings, it's important to note how buttons **1**-**8** and **A**-**H** behave in the context of the modulation matrix.

The modulation matrix is entered by pressing the **MOD ASSIGN** button. Its LED will then flash, indicating that you are now in modulation assign mode. In this mode, buttons **1**-**8** represent eight modulation sources, while buttons **A**-**H** represent eight modulation destinations.

The following modulation sources and destinations are available to you:

| | **Modulation Source** | | **Modulation Destination** |
|---|---|---|---|
| 1 | DDS 2 | A | LFO 1 Rate |
| 2 | LFO 2 | B | Cross Modulation |
| 3 | Envelope 1 | C | Wave Modulation |
| 4 | Velocity | D | Oscillator Mix |
| 5 | Aftertouch | E | High-Pass Filter Cutoff Frequency |
| 6 | Expression Pedal/CV | F | Low-Pass Filter Resonance |
| 7 | Ribbon Controller | G | Envelope 1 Decay |
| 8 | Note Number | H | Delay Time |

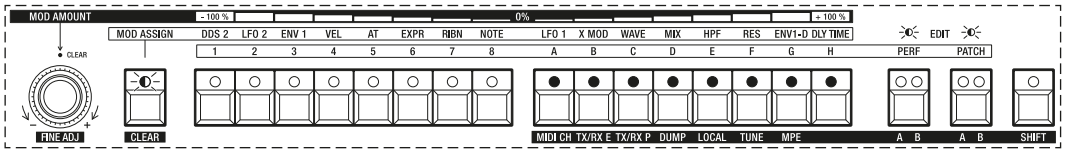
The modulation amount, i.e. the depth at which a modulation source modulates a modulation destination, is determined by using the **MOD AMOUNT** encoder.



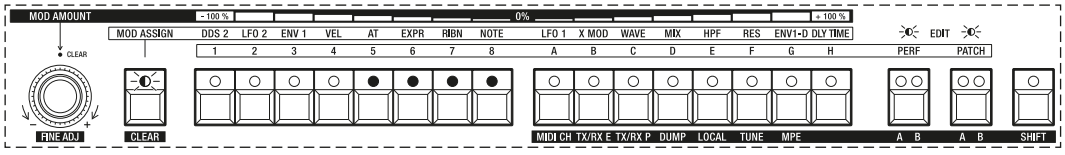

The endless encoder used for dialling in the modulation amount.

By turning the **MOD AMOUNT** encoder, you can adjust the modulation amount over a range of -100% (negative modulation amount) to +100% (positive modulation amount). The LEDs of buttons **1**-**8** and **A**-**H** indicate the respective setting. The printed top row above buttons **1**-**8** and **A**-**H** serves as a legend for the modulation amount, indicated by the lit LEDs.

In the first example, the lit LEDs of buttons **1**-**8** and **A**-**H** indicate a modulation amount of +100%:




In the second example, the lit LEDs of buttons **1**-**8** and **A**-**H** indicate a modulation amount of -50%:



# Matrix Destination Mappings

This method of creating modulation mappings allows you to assign any of the eight fixed sources to any of the eight fixed destinations with individual modulation amounts:

1. Press the **MOD ASSIGN** button. Its LED will start flashing, indicating that you have entered the modulation matrix.

2. Flashing LEDs of buttons **1**-**8** indicate which modulation sources are actively modulating, while flashing LEDs of buttons **A**-**H** indicate which modulation destinations are currently modulated.

3. To create a modulation mapping by first selecting a source, press any modulation source button (**1**-**8**). Its LED will then light up. If this source is actively modulating any destination in the matrix, the LEDs of the respective buttons (**A**-**H**) will flash.

   Press any destination button to create a mapping. The LEDs of the source and destination buttons will then light up continuously, indicating the mapping lock.

4. To create a modulation mapping by first selecting a destination, press any modulation destination button (**A**-**H**). Its LED will then light up. If this destination is currently modulated by any source in the matrix, the LEDs of the respective buttons (**1**-**8**) will flash.

   Press any source button to create a mapping. The LEDs of the source and destination buttons will then light up continuously, indicating the mapping lock.

5. After creating a modulation mapping, use the **MOD AMOUNT** encoder to dial in the modulation amount. The LEDs of buttons **1**-**8** and **A**-**H** indicate the respective setting.

6. To return to the initial ‘view’ of the modulation matrix as described in step 2, press the **MOD ASSIGN** button. Otherwise, press any source or destination button to create a new mapping or to edit an existing mapping.

7. Press the **MOD ASSIGN** button once more to exit the modulation matrix.

*The modulation sources represented by buttons **1**-**8** can also modulate destinations other than those represented by buttons **A**-**H** (see “Direct Parameter Mappings”).*

# Direct Parameter Mappings

This alternative method of creating modulation mappings allows you to assign any modulation source present in the modulation matrix to front panel parameters that are not present in the modulation matrix:

1. Press the **MOD ASSIGN** button. Its LED will start flashing, indicating that you have entered the modulation matrix.

2. Flashing LEDs of buttons **1**-**8** indicate which modulation sources are actively modulating, while flashing LEDs of buttons **A**-**H** indicate which modulation destinations are currently modulated.

3. To create a direct parameter mapping, press and hold any of the eight modulation source buttons (**1**-**8**). To increase the potential of LFO 1, this method also applies to the button labelled **LFO 1**.

4. While holding the selected modulation source button, move any patch-related parameter on the front panel you wish to modulate. An LED scroll across buttons **1**-**8** and **A**-**H** indicates a mapping lock.

5. After creating a modulation mapping, use the **MOD AMOUNT** encoder to dial in the modulation amount. The LEDs of buttons **1**-**8** and **A**-**H** indicate the respective setting.

6. To return to the initial ‘view’ of the modulation matrix as described in step 2, press the **MOD ASSIGN** button. Otherwise, press and hold one of the eight modulation source buttons to create a new mapping.

7. Press the **MOD ASSIGN** button once more to exit the modulation matrix.

*When the modulation sources represented by buttons **1**-**8** are modulating destinations outside the modulation matrix, the respective LEDs are flashing as well.*

*If a parameter cannot be assigned as a modulation destination, there will be no LED scroll. In general, only parameters represented by continuous controls are assignable. This excludes toggle and rotary switches.*

The following table lists the modulation destinations available per layer when direct parameter mappings are created:

| | Modulation Destination | | Modulation Destination |
|---|---|---|---|
| 1 | DDS 2 Tune | 13 | Envelope 2 Decay |
| 2 | Low-Pass Filter Cutoff Frequency | 14 | Envelope 2 Sustain |
| 3 | VCF Envelope Amount | 15 | Envelope 2 Release |
| 4 | VCF LFO 1 Amount | 16 | LFO 1 Delay |
| 5 | VCF DDS 2 Amount | 17 | LFO 1 LR Phase |
| 6 | VCA Envelope Level | 18 | LFO 2 Rate |
| 7 | VCA LFO 1 Amount | 19 | LFO 2 Delay |
| 8 | VCA DDS 2 Amount | 20 | DDS Modulator LFO 1 Amount |
| 9 | Envelope 1 Attack | 21 | DDS 2 Pulse Width/DDS 1 Detune |
| 10 | Envelope 1 Sustain | 22 | Portamento Time |
| 11 | Envelope 1 Release | 23 | Delay Send |
| 12 | Envelope 2 Attack | 24 | Delay Feedback |

# Clearing Modulation Mappings

To clear all modulation mappings:

1. Press **MOD ASSIGN** to enter the modulation matrix.
2. Press the **MOD AMOUNT** encoder or hold **SHIFT** and press the **MOD ASSIGN** button.
3. An LED scroll across buttons **1**-**8** and **A**-**H** indicates that all modulation assignments have been cleared.

To clear all modulation mappings from a particular modulation source:

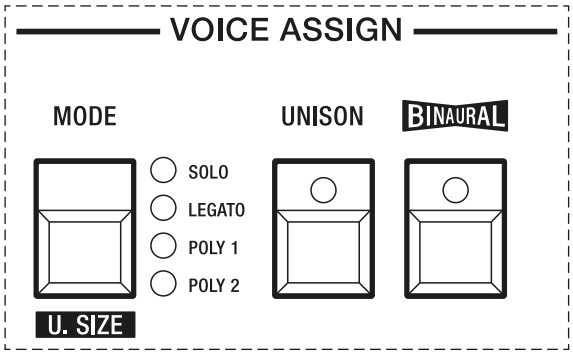
1. Press **MOD ASSIGN** to enter the modulation matrix.
2. Press the button assigned to the desired modulation destination.
3. Press the **MOD AMOUNT** encoder or hold **SHIFT** and press the **MOD ASSIGN** button.
4. An LED scroll across buttons **1**-**8** and **A**-**H** indicates that all modulations controlled by the selected modulation source have been cleared.

To clear all modulation mappings to a particular modulation destination:

1. Press **MOD ASSIGN** to enter the modulation matrix.
2. Press the button assigned to the desired modulation destination.
3. Press the **MOD AMOUNT** encoder or hold **SHIFT** and press the **MOD ASSIGN** button.
4. An LED scroll across buttons **1**-**8** and **A**-**H** indicates that all modulations assigned to the selected modulation destination have been cleared.

# VOICE ASSIGN

In the voice assign section you can specify for each layer how the Super Gemini's voices are distributed when a note is played. Here you have the choice between two polyphonic and two monophonic modes, as well as various unison modes and the option to turn binaural mode on or off.




The voice assign section.

**MODE:** This button allows you to choose from four different voice assign modes:

- **SOLO:** In solo mode, the Super Gemini behaves like a monophonic synthesizer, meaning that only one note can be played at a time. With each note played, the envelopes are retriggered.
- **LEGATO:** In legato mode, the Super Gemini behaves like a monophonic synthesizer, meaning that only one note can be played at a time. This mode differs from solo mode in that each time a note is played while playing the legato style, the envelopes are not retriggered.
- **POLY 1:** This mode gives you full polyphony per layer. The total number of voices depends on whether you are in single, dual or split mode and whether binaural mode is activated or not. When new notes are played, the release stages of all notes overlap, allowing smooth transitions between notes. This is the instrument's default mode.
- **POLY 2:** This mode gives you full polyphony per layer. The total number of voices depends on whether you are in single, dual or split mode and whether binaural mode is activated or not. The release stage of overlapping notes is curtailed in this mode.

**UNISON:** In unison mode, the Super Gemini's voices are stacked for massive sounds. Enabling unison in solo and legato modes stacks all available voices for each note played. In all polyphonic modes, the total number of stacked voices available is divided by the number of voices currently triggered. For example, playing two notes simultaneously in single mode with binaural mode enabled results in five stacked voices per note (ten stacked binaural voices divided by two notes).

**U. SIZE:** Press **SHIFT** and the **MODE** button to access the unison size settings, which allow you to determine how the voices are stacked in unison mode. The number of lit LEDs indicate how the voices are going to be handled:

- **1 LED:** Half of all available voices are stacked.
- **2 LEDs:** All available voices are stacked.
- **3 LEDs:** All available voices are stacked as an octave.
- **4 LEDs:** All available voices are stacked as octave and fifth.

**BINAURAL:** Use this button to turn binaural mode on or off. The Super Gemini defaults to binaural mode, in which its 20 voices are twinned to form either ten stereo ‘super voices’ in single mode or five stereo ‘super voices’ in dual or split mode.

The left and right channels are assigned a complete synthesizer voice per layer. Starting with the stereo oscillators, parameters of both channels of each ‘super voice’ may be independently controlled, enabling you to create gorgeous stereo images.

When binaural mode is disabled, the Super Gemini switches to a monaural signal path with either 20 voices in single mode or ten voices in dual or split mode.

In non-binaural mode, the **LR PHASE** fader in the LFO 1 section turns into a pan spread control (**SPREAD**), allowing you to adjust how far the non-binaural voices are spread in the stereo panorama. At its lowest setting, all voices are centred. At its highest setting, all voices are alternately hard-panned between the left and right channels.

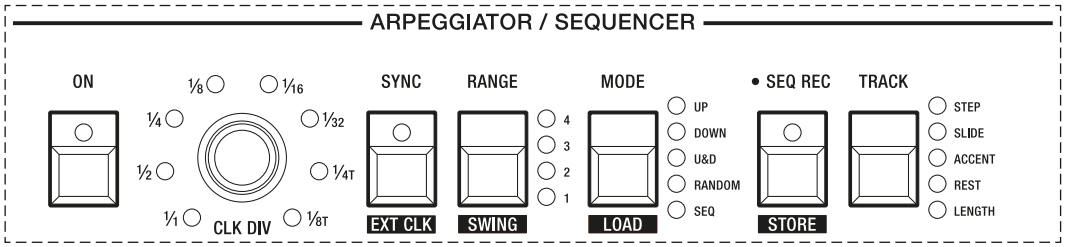
*In **SOLO** and **LEGATO** modes, non-binaural voices are not panned. In these instances, **SPREAD** only controls phase offsets for LFO 1.*

To generate a true monaural signal for each layer:

1. Press **BINAURAL** to disable binaural mode.
2. Set **LR PHASE** (or **SPREAD** in this mode) to zero.

# ARPEGGIATOR & SEQUENCER

The Super Gemini features a flexible arpeggiator as well as a simple yet powerful 64-step sequencer. By combining different arpeggios and sequences in dual or split mode, you can create complex rhythm patterns.




The arpeggiator and sequencer section.

## Clock Parameters

**CLK DIV:** This control allows you to set the playback speed in clock divisions relative to the tempo set with the **TEMPO** control on the left side of the front panel or an external MIDI clock source. The currently selected clock division, for example quarter notes, eighth notes or quarter note triplets, is indicated by a lit LED. Pressing the **CLK DIV** encoder resets the clock division to 1/16.

**SYNC:** With this option enabled, the rate of LFO 1 and the delay time will be synchronised to the playback speed of the arpeggiator or sequencer as set by the **TEMPO** control or an external clock source. You can then use the **RATE** fader in the LFO 1 sections and the **TIME** control in the delay section to adjust the corresponding parameter values in clock divisions. If this option is disabled, LFO 1 and the delay time will be free-running.

**EXT CLK:** Press **SHIFT** and then the **SYNC** button to enter the external clock settings. When the arpeggiator or sequencer is synchronised to an external MIDI clock source, you can use the **CLK DIV** control to set the playback speed in clock divisions relative to the external tempo. If you enable MIDI Clock Receive, the **TEMPO** control will have no effect.

Once you have accessed the external clock settings, you can enable the following options:

- **BUTTON 1:** MIDI Clock Transmit. When enabled (LED lit), MIDI clock signals are transmitted.
- **BUTTON 2:** MIDI Clock Receive. When enabled (LED lit), MIDI clock signals are received. In addition, the Super Gemini will respond to MIDI Start/Stop messages.
- **BUTTON 3:** Reserved for future use.

- **BUTTON 4:** MIDI Stop Message Receive. When enabled (LED lit), each of the two **HOLD** buttons "arms" the respective layer's sequencer while the latter waits for a MIDI start message to start playback. In this mode, the sequencer will stop playback when a MIDI Stop message is received, even if the external MIDI clock is still running.

  When this option is disabled (LED flashing), each of the two **HOLD** buttons will start and stop the respective layer's sequencer asynchronously. A MIDI Start message will "snap" the sequence back into the correct timing, but a MIDI Stop message will be ignored if the external MIDI clock is still running.

  In both modes, transport control is achieved via Note On/Off messages. This gives you easy control over when a sequence should start or stop, and also allows you to transpose a sequence.

To exit the external clock settings, press **SHIFT** again.

*Please note that you can either enable option 1 or option 2. As soon as you enable one of these options, the other is automatically disabled.*

*If you enable MIDI Clock Receive, the arpeggiator or sequencer won't respond until a MIDI clock signal is received.*

*The Super Gemini automatically switches to MIDI Clock Receive when it detects an external MIDI clock signal. You can manually disable this setting after a MIDI clock signal was detected, or choose not to send MIDI clock signals from an external sequencer or a DAW to the Super Gemini to enable arpeggiator or sequencer playback regardless of external clock signals.*

**SWING:** Press **SHIFT** and then the **RANGE** button to access the current swing setting. You can choose from five different swing settings, the first of which is off. When set to 1, the amount of swing is subtle. Set to the other extreme (4), the swing will be very pronounced. Try using different swing amounts to find the best rhythmic feel for your arpeggio or sequence.

# Arpeggiator Mode

When you turn on the arpeggiator and play a chord, the arpeggiator will generate an arpeggio based on its settings and the notes you hold. There are many ways to change the way the currently held chord is arpeggiated.

**ON:** Press this button to turn the arpeggiator on or off. When the LED of this button is lit, the arpeggiator is active, unless **MODE** is set to **SEQ**, in which case sequencer mode is selected.

**RANGE:** In arpeggiator mode, this button allows you to choose from four different octave settings:

- **1:** The notes you actually hold on the keyboard will be arpeggiated.
- **2:** The notes you actually hold on the keyboard and the corresponding notes in the octave above will be arpeggiated.
- **3:** The notes you actually hold on the keyboard and the corresponding notes in the two octaves above will be arpeggiated.
- **4:** The notes you actually hold on the keyboard and the corresponding notes in the three octaves above will be arpeggiated.

**MODE:** This button allows you to choose from five different playback modes:

- **UP:** The arpeggio moves from the lowest note to the highest note.
- **DOWN:** The arpeggio moves from the highest note to the lowest note.
- **U&D:** The arpeggio moves from the lowest note to the highest note and back to the lowest note.
- **RANDOM:** All held notes will be arpeggiated in random order.
- **SEQ:** With this option selected, sequencer mode is enabled. For more details on the sequencer see pages 94-97.

*If you change playback modes while the arpeggiator is on, sequencer mode will be skipped, allowing you to smoothly cycle through the four arpeggiator playback modes without interruptions.*

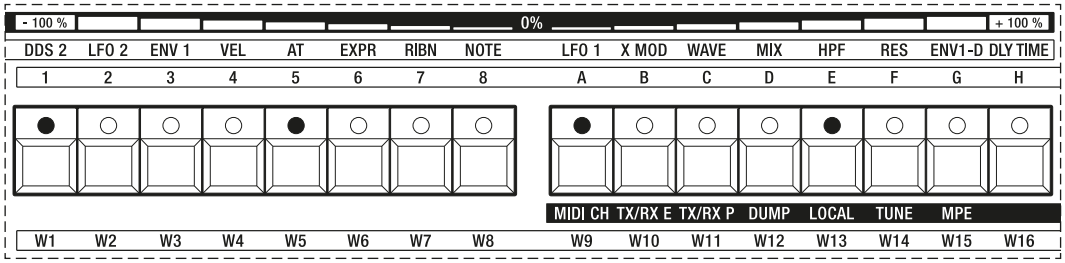
*If you activate the hold function of one of the layers while the arpeggiator is switched on, the arpeggio of the respective layer will continue to play without you having to hold down a key. As soon as you release all keys and play a new chord, a new arpeggio is generated.*

# Sequencer Mode

In sequencer mode, the Super Gemini allows up to 64 steps to be recorded with programmable step, slide, accent, rest and sequence length settings.

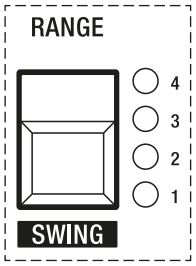
Up to 16 sequences can be stored and recalled. Although a sequence can be linked to a patch when saved, the independent sequencer memory allows you to try out different sequences with each patch.

Once sequencer mode is enabled, buttons **1**-**8** and **A**-**H** turn into a series of 16 steps, with each of the buttons representing a step in the sequence.




The numbered and lettered buttons in sequencer mode with steps 1, 5, 9 and 13 activated.

The sequence represented by the 16 step buttons is divided into 4 pages so that all 64 steps can be displayed. Which page you are on is indicated by the four LEDs next to the **RANGE** button.




The range select button.

During recording and playback, the sequencer automatically jumps to the next page if the sequence is longer than 16 steps.

**ON:** Press this button to turn the sequencer on or off. When the LED of this button is lit, the sequencer is active, unless **MODE** is set to one of the arpeggiator playback modes, in which case arpeggiator mode is selected.

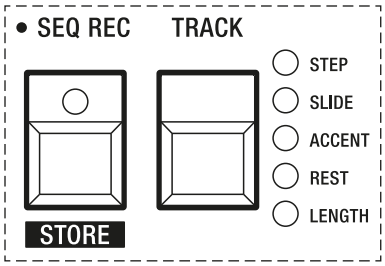
**RANGE:** In sequencer mode, this button enables you to jump to the following pages of the step sequence:

- **1:** The 16 buttons display page 1 of the sequence: steps 1-16. This is the default page when you enter sequencer mode.
- **2:** The 16 buttons display page 2 of the sequence: steps 17-32.
- **3:** The 16 buttons display page 3 of the sequence: steps 33-48.
- **4:** The 16 buttons display page 4 of the sequence: steps 49-64.

**MODE:** Selecting the option **SEQ** enables sequencer mode. For all other playback modes related to the arpeggiator, see page 93.

**SEQ REC:** Pressing this button arms the sequencer for recording. Its LED will then flash, indicating that you are now in recording mode.

**TRACK:** This button allows you to step through the five available sequencer tracks. As you select one of the options, the sequence of steps represented by the 16 buttons will update accordingly.




The **SEQ REC** button and the **TRACK** button LEDs that indicate which track is currently selected.

- **STEP:** This track is selected by default when you enter sequence recording mode. It allows you to record notes or chords step by step. Before you can start recording, press the step button you wish to start from – in most cases this will be the first step. The respective LED will then start flashing to indicate that this step is ready for recording. Steps are recorded as soon as you start playing notes. A note or chord is recorded after you released all keys. The sequencer then advances to the next step. Recorded steps are represented by lit LEDs.

*If you want to edit or re-record a step, simply press the corresponding step button. Its LED will start flashing, indicating that the sequencer is now waiting for you to play a new note or chord. Once you've done so, the LED will stop flashing and the sequencer will advance to the next step.*

- **SLIDE:** This track allows you to specify which steps are tied together. When portamento is set to a non-zero value, a pitch slide occurs between tied notes of different pitches. To tie steps together, press adjacent step buttons. For example, if you would like to tie steps 3 and 4 together, press buttons **3** and **4** while on page 1 of the sequence. Active ties are indicated by lit LEDs.
- **ACCENT:** This track allows you to specify which steps should be accented. With accents you can emphasise the level and brightness of notes or chords if the **DYNAMICS** switch in the VCA section of each layer is set to either **1/2** or **ON**. This is useful for adding dynamic variety to your sequence. Active accents are indicated by lit LEDs.
- **REST:** This track allows you to specify which steps to omit. An active rest causes the note or chord you recorded to that step to be skipped. Active rests are indicated by unlit LEDs.
- **LENGTH:** This track allows you to define the length of a sequence. First use the **RANGE** button to select the page on which the last step of the sequence should be. Then press the button corresponding to the step you wish to be the last step in the sequence. For example, if you would like your sequence to be eight steps long, make sure you are on page 1 and then press button **8**. To indicate active steps, the LED representing the last step in the sequence and all steps before it light up. After the last step is triggered, the sequence starts over.

*When you're in recording mode and **TRACK** is set to **STEP**, you can also record the position of the bender as you play notes.*

*When the sequencer is switched on and **SEQ REC** is flashing, you can use the remaining voices, i.e. the voices not used for the current sequence, to play along with the sequence.*

*If you activate the hold function of one of the layers, the sequence of the respective layer can be transposed according to the notes you play. Transposition is relative to middle C (C4). For example, if you play a note above middle C, the sequence will be transposed up that interval above middle C.*

## Clearing a Sequence

In case you would like to start from scratch again, use the following shortcut for clearing a sequence:

1. Hold the **SEQ REC** button.
2. Press the **MOD ASSIGN** button.

## Loading and Storing Sequences

**LOAD:** Hold **SHIFT** and press the **MODE** button to load a sequence. The LEDs of buttons **1**-**8** and **A**-**H** indicate which of the 16 available sequences is currently selected. Press any of the other 15 buttons to load a different sequence.

Let's say you would like to load sequence 12:

1. Hold **SHIFT** and press the **MODE** button.
2. Press button **D**. Its LED will light up to indicate that sequence 12 is now loaded.

Why not spend some time loading different sequences to try out which one works best with the current patch?

**STORE:** Hold **SHIFT** and press the **SEQ REC** button to store a sequence. The LEDs of buttons **1**-**8** and **A**-**H** indicate which of the 16 available sequences is currently selected. Press any of these buttons for 3 seconds to store the current sequence.

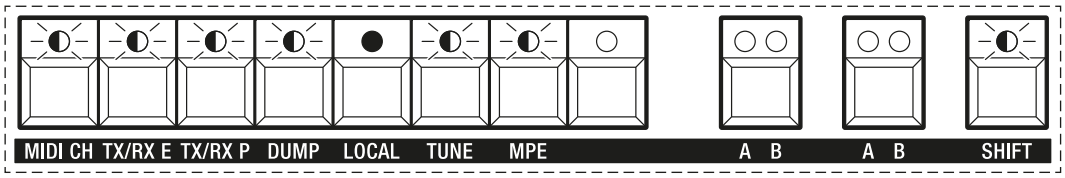
Let's say you would like to store your sequence to memory location 4:

1. Hold **SHIFT** and press the **SEQ REC** button.
2. Press and hold button **4** for 3 seconds. The LEDs of buttons **1**-**8** and **A**-**H** will flash once to indicate that your sequence is now saved.

# GLOBAL SETTINGS

The global settings allow you to define how the Super Gemini behaves and responds on a global level, i.e. regardless of individual performance or patch settings. To access the global settings, simply press the **SHIFT** button. If you press **SHIFT** again, you exit the global settings.

*Any changes applied to the global settings will be automatically saved after a few seconds of no interaction with the instrument.*




The global settings section.

**MIDI CH:** Press this button to specify which base MIDI channel the Super Gemini should respond to. The LEDs of buttons **1**-**8** and **A**-**H** indicate which of the 16 available MIDI channels is currently selected. Press any of the other 15 buttons to select a different MIDI channel.

The MIDI channel selected here is assigned to the upper layer, while the MIDI channel one number above is assigned to the lower layer. For example, if you set the base MIDI channel to 5, MIDI channel 5 is assigned to the upper layer and MIDI channel 6 to the lower layer.

*Do not connect a USB cable when using the MIDI DIN ports. The Super Gemini does not support simultaneous DIN and USB MIDI.*

**TX/RX E:** Press this button to determine how parameter changes are sent and received via MIDI. You can combine the following options:

- **BUTTON 1:** MIDI CC Transmit. When enabled (LED lit), parameter changes are transmitted as continuous controller messages.
- **BUTTON 2:** MIDI CC Receive. When enabled (LED lit), parameter changes are received as continuous controller messages.
- **BUTTON 3:** NRPN mode. When enabled (LED lit), parameter changes are transmitted as unregistered parameter number messages at a resolution of 14 bits if MIDI CC Transmit is also enabled.

To exit this parameter, press **TX/RX E** again.

*When MIDI CC Receive is enabled, the Super Gemini will always respond to both parameter changes sent in 7 and 14 bit resolution.*

**TX/RX P:** Press this button to determine whether program change messages should be transmitted and received via MIDI. You can combine the following options:

- **BUTTON 1:** When enabled (LED lit), program change messages are transmitted.
- **BUTTON 2:** When enabled (LED lit), program change messages are received.

To exit this parameter, press **TX/RX P** again.

**DUMP:** Reserved for future use.

**LOCAL:** This button toggles Local Control on or off. Disabling Local Control can be useful if you want to control external MIDI devices or avoid MIDI data loops while recording in a DAW.

- **ON:** When Local Control is on (LED lit), the Super Gemini's front panel controls and keyboard are connected to the internal sound engine.
- **OFF:** When Local Control is off (LED not lit), the Super Gemini's front panel controls and keyboard have no effect on its sound engine.

*With Local Control disabled and MIDI CC Transmit and Receive enabled, MIDI data is still transmitted through the MIDI outputs.*

**TUNE:** Press this button to auto-tune the Super Gemini's filters for calibration purposes. The LEDs of Buttons **1**-**8** and **A**-**H** will indicate the progress of the auto-tune process from left to right until 12 LEDs are lit. As soon as the filter calibration is complete, the LEDs will turn off.

**MPE:** Reserved for future use.

**GLOBAL RESET:** If your Super Gemini is not behaving as expected, you can reset the global parameters to their default settings:

1. Turn on the Super Gemini.
2. Press and hold either the **MANUAL UPPER** or the **MANUAL LOWER** button for 5 seconds until all LEDs turn on and off again.
3. The auto-tune process starts automatically. Release the above button and wait for the auto-tune process to complete.

*Saved data such as performances, patches, alternative waveforms and sequences are not affected by a global reset.*

# FILE MANAGEMENT

By connecting your Super Gemini to a computer, you can easily access and organise performances, patches, alternative waveforms and sequences stored on the instrument. This is useful for sharing and backing up related files, as well as freeing up the Super Gemini's internal storage.

Follow the steps below to unlock the Super Gemini's patch drive:

1. Turn off the Super Gemini.
2. Connect the Super Gemini to your computer using the included USB cable.
3. Hold the **PATCH** button and turn on the Super Gemini to unlock its patch drive. The LEDs of buttons **1**-**8** and **A**-**H** light up to indicate the loading progress.
4. Once the LEDs indicate that the Super Gemini is in patch mode, release the **PATCH** button.

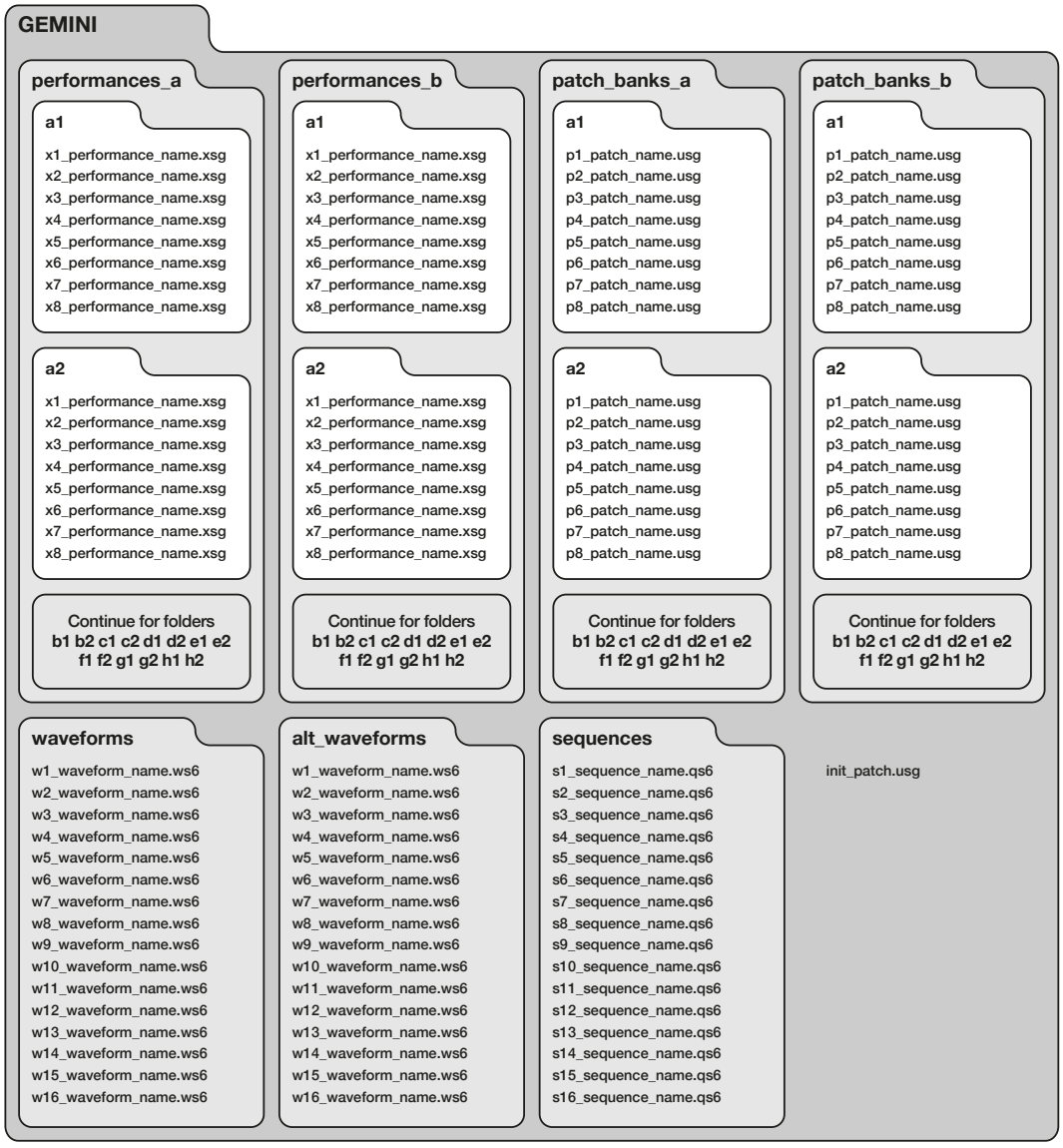
The Super Gemini's patch drive appears on your computer's desktop as a drive named **GEMINI** and can be accessed like any other flash drive.

The patch drive contains the init patch file and seven folders:

- 'performances_a' (the first group of 128 performances),
- 'performances_b' (the second group of 128 performances),
- 'patch_banks_a' (the first group of 128 patches),
- 'patch_banks_b' (the second group of 128 patches),
- 'waveforms' (the first group of 16 alternative waveforms),
- 'alt_waveforms' (the second group of 16 alternative waveforms) and
- 'sequences'.

The folders 'performances_a' and 'performances_b' each contain up to 16 subfolders: One for each bank of performances. Within each of the bank folders 'a1' to 'h2' up to 8 performance files are stored. The folders 'patches_a' and 'patches_b' each contain up to 16 subfolders: One for each bank of patches. Within each of the bank folders 'a1' to 'h2' up to 8 patch files are stored. The folders 'waveforms' and 'alt_waveforms' each contain up to 16 waveform files. The folder 'sequences' contains up to 16 sequence files.

*If the patch drive is unlocked, you will not be able to play the Super Gemini, only manage or modify the files stored on it.*




The file structure of the Super Gemini's patch drive.

# File Name Convention

The first character of each file – **x**, **p**, **w** or **s** – is used to prefix performance, patch, waveform and sequence files. The second character is used to indicate the memory location of the performance, patch, waveform or sequence. Use numbers 1-8 for performances and patches. Use numbers 1-16 for alternative waveforms and sequences.

**Performance files:** x1_performance_name.xsg

**Patch files:** p1_patch_name.usg

**Waveform files:** w1_waveform_name.ws6

**Sequence files:** s1_sequence_name.qs6

After the prefix, the number and an underscore, performance, patch, waveform and sequence names can be freely defined to make it easier for you to identify the files. However, you should avoid spaces and use underscores instead.

# Loading Performances Stored to Your Computer

1. Follow steps 1-4 on page 101 to unlock the Super Gemini's patch drive.
2. The Super Gemini's patch drive appears on your computer's desktop as a drive named **GEMINI** and can be accessed like any other flash drive.
3. Click on the icon of the **GEMINI** drive.
4. Navigate to the folder 'performances_a' or 'performances_b'.
5. Open the desired bank folder (**a1**-**h2**).
6. Copy and paste the performance files you would like to transfer to the Super Gemini to the folder you selected in the previous step.
7. If necessary, edit the name prefix of the performance files you copied and pasted, so that it matches the desired performance location. Make sure to manually delete the performances you would like to replace in the selected folder if the names of the new performances are not identical to the names of the old performances. Empty the trash on your computer so that the files are indeed deleted from the **GEMINI** drive.

# Loading Patches Stored to Your Computer

1. Follow steps 1-4 on page 101 to unlock the Super Gemini's patch drive.
2. The Super Gemini's patch drive appears on your computer's desktop as a drive named **GEMINI** and can be accessed like any other flash drive.
3. Click on the icon of the **GEMINI** drive.
4. Navigate to the folder 'patch_banks_a' or 'patch_banks_b'.
5. Open the desired bank folder (**a1**-**h2**).
6. Copy and paste the patch files you would like to transfer to the Super Gemini to the folder you selected in the previous step.
7. If necessary, edit the name prefix of the patch files you copied and pasted, so that it matches the desired patch location. Make sure to manually delete the patches you would like to replace in the selected folder if the names of the new patches are not identical to the names of the old patches. Empty the trash on your computer so that the files are indeed deleted from the **GEMINI** drive.

# Loading Waveforms Stored to Your Computer

1. Follow steps 1-4 on page 101 to unlock the Super Gemini's patch drive.
2. The Super Gemini's patch drive appears on your computer's desktop as a drive named **GEMINI** and can be accessed like any other flash drive.
3. Click on the icon of the **GEMINI** drive.
4. Navigate to the folder 'waveforms' or 'alt_waveforms'.
5. Copy and paste the waveform files you would like to transfer to the Super Gemini to the folder you selected in the previous step.
6. If necessary, edit the name prefix of the waveform files you copied and pasted, so that it matches the desired waveform location. Make sure to manually delete the waveforms you would like to replace if the names of the new waveforms are not identical to the names of the old waveforms. Empty the trash on your computer so that the files are indeed deleted from the **GEMINI** drive.

*UDO will periodically release more waveform packs which can be downloaded from udo-audio.com/support.*

# Loading Sequences Stored to Your Computer

1. Follow steps 1-4 on page 101 to unlock the Super Gemini's patch drive.
2. The Super Gemini's patch drive appears on your computer's desktop as a drive named **GEMINI** and can be accessed like any other flash drive.
3. Click on the icon of the **GEMINI** drive.
4. Navigate to the folder 'sequences'.
5. Copy and paste the sequence files you would like to transfer to the Super Gemini to the folder you selected in the previous step.
6. If necessary, edit the name prefix of the sequence files you copied and pasted, so that it matches the desired sequence location. Make sure to manually delete the sequences you would like to replace if the names of the new sequences are not identical to the names of the old sequences. Empty the trash on your computer so that the files are indeed deleted from the **GEMINI** drive.

# Backing up Performances to Your Computer

1. Connect the Super Gemini to your computer using the included USB cable.

2. The Super Gemini's patch drive appears on your computer's desktop as a drive named **GEMINI** and can be accessed like any other flash drive.

3. Click on the icon of the **GEMINI** drive.

4. Click on the folder 'performances_a' or 'performances_b' and copy and paste it to your computer's hard drive. You may also navigate to one of the 16 bank folders (**a1**-**h2**) or a single performance file within those folders to copy and paste it to your computer's hard drive.

# Backing up Patches to Your Computer

1. Connect the Super Gemini to your computer using the included USB cable.

2. The Super Gemini's patch drive appears on your computer's desktop as a drive named **GEMINI** and can be accessed like any other flash drive.

3. Click on the icon of the **GEMINI** drive.

4. Click on the folder 'patch_banks_a' or 'patch_banks_b' and copy and paste it to your computer's hard drive. You may also navigate to one of the 16 bank folders (**a1**-**h2**) or a single patch file within those folders to copy and paste it to your computer's hard drive.

# Backing up Waveforms to Your Computer

1. Connect the Super Gemini to your computer using the included USB cable.

2. The Super Gemini's patch drive appears on your computer's desktop as a drive named **GEMINI** and can be accessed like any other flash drive.

3. Click on the icon of the **GEMINI** drive.

4. Click on the folder 'waveforms' or 'alt_waveforms' and copy and paste it to your computer's hard drive. You may also navigate to a single waveform file within those folders to copy and paste it to your computer's hard drive.

# Backing up Sequences to Your Computer

1. Connect the Super Gemini to your computer using the included USB cable.

2. The Super Gemini's patch drive appears on your computer's desktop as a drive named **GEMINI** and can be accessed like any other flash drive.

3. Click on the icon of the **GEMINI** drive.

4. Click on the folder 'sequences' and copy and paste it to your computer's hard drive. You may also navigate to a single sequence file to copy and paste it to your computer's hard drive.

## Changing the Init Patch

Store the patch you would like to be the new init patch as ‘init_patch.usg’ on your computer. You may insert any additional information between the name ‘init_patch’ and the file extension ‘usg’. For example, you could name it ‘init_patch_binaural_extravaganza.usg’.

After naming and saving your custom init patch, copy it to the Super Gemini’s patch drive:

1. Unlock the Super Gemini’s patch drive:
   - Turn off the Super Gemini.
   - Connect the Super Gemini to your computer using the included USB cable.
   - Hold the **PATCH** button and turn on the Super Gemini to unlock its patch drive. The LEDs of buttons **1**-**8** and **A**-**H** light up to indicate the loading progress.
   - Once the LEDs indicate that the Super Gemini is in patch mode, release the **PATCH** button.
2. Connect the Super Gemini to your computer using the included USB cable.
3. The Super Gemini’s patch drive appears as a disk drive named **GEMINI** on your computer.
4. Delete the init patch file ‘init_patch.usg’ from the **GEMINI** drive and make sure to empty the trash if you are a macOS user.
5. Copy the desired init patch file from your computer to the **GEMINI** drive. If asked if you want to copy files without properties, choose ‘yes’.
6. Make sure the file transfer is complete.
7. Turn off the Super Gemini, wait a few seconds and turn it on again.

*If no init patch file is stored on the patch drive, the Super Gemini will load the last active patch upon power cycle. If no patch file is stored on the patch drive, the Super Gemini will start in manual mode.*

# Storing New Waveform Packs to the Super Gemini

Additional waveforms packs can easily be stored on the Super Gemini's patch drive:

1. Download additional waveform packs to your computer from udo-audio.com/support.
2. Extract the .zip file on your computer (not on the Super Gemini itself) and rename the extracted folder to 'waveforms' or 'alt_ waveforms', depending on which folder you would like to replace.
3. Follow steps 1-4 on page 101 to unlock the Super Gemini's patch drive.
4. The Super Gemini's patch drive appears on your computer's desktop as a drive named **GEMINI** and can be accessed like any other flash drive.
5. Delete the waveform folder you would like to replace and make sure to empty the trash if you are a macOS user.
6. Copy the new waveform folder to the **GEMINI** drive.
7. Power cycle the Super Gemini.

# Creating Your Own Alternative Waveforms

If you would like to create your own alternative waveforms for DDS 1, make sure that the files meet the following standards:

- 16-bit signed integer format samples
- Normalised, single-cycle waveform with 4096 points (8192 bytes)
- Bandlimited at sampling frequency/8 (Nyquist/4), i.e. frequency content above 512 Hz in your 4096 point waveform should be removed
- Binary file containing no header data and file extension '.ws6'

# Setting up the Super Gemini as a MIDI Device in a DAW

Follow the steps below to use your Super Gemini in conjunction with a DAW:

1. Connect the Super Gemini to the MIDI ports of your audio interface (in case your audio interface is equipped with MIDI ports) or the USB port of your computer.

2. Once the Super Gemini is connected to your MIDI equipped audio interface or your computer, make sure your DAW is sending and receiving the MIDI data you would like the Super Gemini to receive and send via the MIDI ports of your audio interface or the USB port of your computer. Note that if you have connected the Super Gemini via its MIDI ports, you cannot directly select the Super Gemini as a MIDI device, only the audio or MIDI interface that the Super Gemini is connected to.

3. Make sure all devices are set to the correct MIDI channel.

4. Set the global parameter **LOCAL** to ‘off’ to avoid any MIDI data loops during recording and playback.

# CHEAT SHEET

The following tables provide an overview of all shortcuts, each parameter's secondary function, the various functions of the select buttons and the global settings.

## Shortcuts

| Combination | Function |
|---|---|
| **SHIFT** + **PERF** | Select performance group B |
| **SHIFT** + **PATCH** | Select patch group B |
| **SHIFT** + **MANUAL UPPER** or **LOWER** | Load init patch into the upper/lower layer |
| Press and hold button **1**-**8** in performance mode | Store performance |
| Press and hold button **1**-**8** in patch mode | Store patch |
| Press and hold any of the buttons **1**-**8** in mod assign mode + move parameter control | Map a fixed modulation source to a parameter not available in the modulation matrix |
| **SHIFT** + **MOD ASSIGN** after entering the modulation matrix | Clear all modulation mappings |
| **SHIFT** + **MOD ASSIGN** after selecting a modulation source (buttons **1**-**8**) | Clear all mappings from that modulation source |
| **SHIFT** + **MOD ASSIGN** after selecting a modulation destination (buttons **A**-**H**) | Clear all mappings to that modulation destination |
| Press and hold **SPLIT** + note on keyboard | Set split point |
| **SEQ REC** + **MOD ASSIGN** | Clear sequence |
| Press and hold either **MANUAL UPPER** or **MANUAL LOWER** for 5 seconds | Reset global settings |

# Secondary Parameter Functions

| Parameter | Mode | Function |
|---|---|---|
| DDS 2 Mode | DDS 2 Range = LFO | Sub-Oscillator<br>Off = Sub-oscillator off<br>Square = Square wave sub-oscillator<br>Sine = Sine wave sub-oscillator |
| LR Phase | Binaural off | Pan Spread |
| LFO 1 Mode | LFO 1 Wave = HF/HF TRK | LFO 1 Routing<br>Norm = LFO 1 as audio rate modulation source<br>DDS 1 = LFO 1 signal through DDS 1 channel<br>DDS 2 = LFO 1 signal through DDS 2 channel |
| PW/Detune | Shift | Drift |
| Mix | Shift | Pan |
| Envelope 1 Attack | Shift | Envelope 1 Attack Hold |
| Envelope 1 Decay | Shift | Envelope 1 Decay Hold |
| Envelope 2 Decay | Shift | Envelope 2 Decay Hold |
| Detune | Shift | Performance Detune +/- 7 semitones |
| Voice Assign Mode | Shift | Unison Size<br>1 = Half of all available voices<br>2 = All available voices<br>3 = Octave<br>4 = Fifth + octave |
| Arpeggiator Range | Shift | Swing Amount<br>0 LEDs = No swing<br>1 LED = Swing setting 1<br>2 LEDs = Swing setting 2<br>3 LEDs = Swing setting 3<br>4 LEDs = Swing setting 4 |
| Arpeggiator Mode | Shift | Load sequence 1-16 (buttons **1**-**8**, **A**-**H**) |
| Seq Rec | Shift | Store sequence 1-16 (buttons **1**-**8**, **A**-**H**) |

# Multifunctional Select buttons

| Buttons | Mode | Function |
|---|---|---|
| **1**-**8** | Performance | Load performance 1-8 |
| **1**-**8** | Patch | Load patch 1-8 |
| **1**-**8** | Mod Assign | Select modulation source |
| **A**-**H** | Performance | Select performance bank A1-H2 |
| **A**-**H** | Patch | Select patch bank A1-H2 |
| **A**-**H** | Mod Assign | Select modulation destination |
| **1**-**8**, **A**-**H** | Wave | Load alternative waveform 1-32 |
| **1**-**8**, **A**-**H** | Sequencer | Step programming |
| **1**-**8**, **A**-**H** | Load sequence | Load sequence 1-16 |
| **1**-**8**, **A**-**H** | Store sequence | Store sequence 1-16 |

# Global Settings (Shift Mode)

| Parameter | Function |
|---|---|
| **MIDI CH** | Set MIDI channel 1-16 (buttons **1**-**8**, **A**-**H**) |
| **TX/RX E** | 1 = MIDI CC Transmit on/off<br>2 = MIDI CC Receive on/off<br>3 = NRPN Mode on/off |
| **TX/RX P** | 1 = Program Change Messages Transmit on/off<br>2 = Program Change Messages Receive on/off |
| **DUMP** | Reserved for future use |
| **LOCAL** | Local Control on/off |
| **TUNE** | Filter Auto-Tune |
| **MPE** | Reserved for future use |
| **EXT CLK** | External Clock Settings<br>1 = MIDI Clock Transmit on/off<br>2 = MIDI Clock Receive on/off<br>3 = Reserved for future use<br>4 = MIDI Stop Message Receive on/off |
| Octave selector toggle switch | Global Transpose +/- 12 semitones |
| **FINE ADJ** | Global Fine Tuning +/- 100 cents |

# MIDI SPECIFICATIONS

## System Real-Time Messages

| Control Function | Transmit | Receive |
|---|---|---|
| MIDI Timing Clock | Yes | Yes |
| Start | Yes | Yes |
| Stop | Yes | Yes |

## Channel Messages

| Control Function | Transmit | Receive |
|---|---|---|
| Note Off | Yes | Yes |
| Note On | Yes | Yes |
| Polyphonic Key Pressure | No | Yes |
| Control Change | See “Global Settings” (pages 98-99) | See “Global Settings” (pages 98-99) |
| Program Change | See “Global Settings” (page 99) | See “Global Settings” (page 99) |
| Channel Pressure | Yes | Yes |
| Pitch Bend | Yes | Yes |

# Continuous Controller Messages

The table below lists the continuous controller messages (CCs) that are mapped to the controls of the Super Gemini. These messages are transmitted and/or received according to the **TX/RX E** configuration in the global settings (see pages 98-99).

| CC# | Value Range | Parameter Name |
|---|---|---|
| 0 | 0-127 | Bank Select |
| 1 | 0-127 | Modulation Lever |
| 2 | 0-127 | Ribbon Coarse |
| 3 | 0-127 | Tempo |
| 4 | 0-127 | Foot Controller |
| 5 | 0-127 | Portamento Time |
| 6 | 0-127 | Data Entry MSB |
| 7 | 0-127 | VCA Envelope Level |
| 8 | - | - |
| 9 | 0-127 | Mod Amount/Fine Adjust |
| 10 | 0-127 | Pan |
| 11 | 0-127 | Expression |
| 12 | 0-127 | Delay Time |
| 13 | 0-127 | Delay Feedback |
| 14 | 0-15 | Sequence Load |
| 15 | - | - |
| 16 | 0 = Triangle<br>21 = Rev Sawtooth<br>43 = Random<br>64 = Square<br>85 = HF<br>107 = HF TRK | LFO 1 Waveform/HF Mode |
| 17 | 0-127 | LFO 1 Rate |
| 18 | 0-127 | LFO 1 Delay |
| 19 | 0-127 | LFO 1 LR Phase/Pan Spread |

| CC# | Value Range | Parameter Name |
|---|---|---|
| 20 | 0 = Free/Norm<br>43 = Once/DDS 1<br>85 = Reset/DDS 2 | LFO 1 Mode |
| 21 | 0-127 | DDS LFO 1 Amount |
| 22 | 0-127 | DDS Envelope 1 Amount |
| 23 | 0 = DDS 1<br>43 = Both<br>85 = DDS 2 | DDS Modulator Destination |
| 24 | 0 = Off<br>43 = 1/2<br>85 = On | Super Mode |
| 25 | 0-127 | PW/Detune |
| 26 | 0-127 | PW/Wave Modulation |
| 27 | 0 = Manual<br>43 = LFO 1<br>85 = ENV 1 | PW/Wave Modulation Source |
| 28 | 0-127 | Cross Modulation |
| 29 | 0 = Sine<br>21 = Sawtooth<br>43 = Square<br>64 = Triangle<br>85 = White Noise<br>107 = Alternative Waveform | DDS 1 Waveform |
| 30 | 0 = 64’<br>21 = 32’<br>43 = 16’<br>64 = 8’<br>85 = 4’<br>107 = 2’ | DDS 1 Range |
| 31 | 0 = Sine<br>21 = Sawtooth<br>43 = Square<br>64 = Triangle<br>85 = White Noise<br>107 = Pulse | DDS 2 Waveform |
| 32 | 0-127 | Envelope 1 Decay Hold |
| 33 | 0-127 | Envelope 2 Decay Hold |
| 34 | 0-127 | Ribbon Fine |
| 35 | 0-127 | DDS 2 Tune |
| 36 | 0 = Norm/Sub Osc Off<br>43 = Ring/Sub Osc Square<br>85 = Sync/Sub Osc Sine | DDS 2 Mode |

| CC# | Value Range | Parameter Name |
|---|---|---|
| 37 | 0-127 | Oscillator Mix |
| 38 | 0-127 | LSB for Control 6 (Data Entry) |
| 39 | - | - |
| 40 | - | - |
| 41 | 0 = Off<br>43 = 1<br>85 = 2 | VCF Drive |
| 42 | 0-127 | VCA LFO 2 Amount |
| 43 | 0 = Off<br>43 = 1/2<br>85 = On | VCF Keytrack |
| 44 | 0 = ENV 1<br>43 = 1 + 2<br>85 = ENV 2 | VCF Envelope Source |
| 45 | 0-127 | VCF Envelope Amount |
| 46 | 0-127 | VCF LFO 1 Amount |
| 47 | 0-127 | VCF DDS 2 Amount |
| 48 | 0 = Off<br>43 = 1/2<br>85 = On | VCA Dynamics |
| 49 | 0 = ENV 2<br>43 = Fixed Envelope 1<br>85 = Fixed Envelope 2 | VCA Envelope Mode |
| 50 | 0 = Normal<br>43 = Inverted<br>85 = Loop | Envelope 1 Mode |
| 51 | 0 = Off<br>43 = 1/2<br>85 = On | Envelope 1 Keytrack |
| 52 | 0-127 | Envelope 1 Attack Hold |
| 53 | 0-127 | Envelope 1 Attack |
| 54 | 0-127 | Envelope 1 Decay |
| 55 | 0-127 | Envelope 1 Sustain |
| 56 | 0-127 | Envelope 1 Release |
| 57 | 0-127 | Envelope 2 Decay |

| CC# | Value Range | Parameter Name |
|---|---|---|
| 58 | 0-127 | Envelope 2 Sustain |
| 59 | 0 = Off<br>64 = On | Manual Mode |
| 60 | 0 = Trig<br>43 = AT + Trig<br>85 = LFO 2 On/AT->Bend | LFO 2 Trigger Source |
| 61 | 0 = DDS 1<br>43 = 1 + 2<br>85 = DDS 2 | Performance Control Destination |
| 62 | 0-127 | LFO 2 Rate |
| 63 | 0-127 | LFO 2 Delay |
| 64 | 0 = Off<br>64 = On | Sustain Pedal |
| 65 | 0 = Both<br>43 = Lower<br>85 = Upper | Portamento Layer Select |
| 66 | - | - |
| 67 | 0 = -2<br>26 = -1<br>51 = 0<br>77 = +1<br>102 = +2 | Octave Select |
| 68 | - | - |
| 69 | 0 = Off<br>64 = On | Delay Freeze |
| 70 | 0-127 | DDS LFO 2 Amount |
| 71 | 0-127 | VCF Resonance |
| 72 | 0-127 | Envelope 2 Release |
| 73 | 0-127 | Envelope 2 Attack |
| 74 | 0-127 | VCF Cutoff Frequency |
| 75 | 0-127 | VCF LFO 2 Amount |
| 76 | 0-127 | DDS Pitch Bend Amount |
| 77 | 0-127 | VCF Pitch Bend Amount |

| CC# | Value Range | Parameter Name |
|---|---|---|
| 78 | 0 = Solo<br>32 = Legato<br>64 = Poly 1<br>96 = Poly 2 | Voice Assign Mode |
| 79 | 1 = Half of all available voices<br>2 = All available voices<br>3 = Octave<br>4 = Fifth + octave | Unison Size |
| 80 | 0 = Off<br>64 = On | Binaural mode |
| 81 | 0 = Off<br>64 = On | Clock Sync |
| 82 | 0 = 1 octave<br>32 = 2 octaves<br>64 = 3 octaves<br>96 = 4 octaves | Arpeggiator Range |
| 83 | 0 = Swing 0<br>26 = Swing 1<br>51 = Swing 2<br>77 = Swing 3<br>102 = Swing 4 | Arpeggiator/Sequencer Swing |
| 84 | 0 = Off<br>64 = On | Arpeggiator/Sequencer External Clock |
| 85 | 0 = Up<br>26 = Down<br>51 = Up & Down<br>77 = Random<br>102 = Sequencer | Arpeggiator/Sequencer Mode |
| 86 | 0 = Off<br>64 = On | Arpeggiator/Sequencer On/Off |
| 87 | 0 = Off<br>64 = On | Arpeggiator/Sequencer Hold |
| 88 | - | - |
| 89 | - | - |
| 90 | - | - |
| 91 | 0-127 | Delay Send |
| 92 | 0-127 | VCA LFO 1 Amount |
| 93 | 0 = Off<br>32 = Chorus 1<br>64 = Chorus 2<br>96 = Chorus 1 & 2 | Chorus |
| 94 | 0-127 | Drift |

| CC# | Value Range | Parameter Name |
|---|---|---|
| 95 | 0-127 | HPF Cutoff Frequency |
| 96 | - | Data Increment |
| 97 | - | Data Decrement |
| 98 | 0-127 | Non-Registered Parameter Number (NRPN) - LSB |
| 99 | 0-127 | Non-Registered Parameter Number (NRPN) - MSB |
| 100 | 0-127 | Registered Parameter Number (RPN) - LSB |
| 101 | 0-127 | Registered Parameter Number (RPN) - MSB |
| 102 | - | - |
| 103 | - | - |
| 104 | 0 = Both<br>43 = Lower<br>85 = Upper | Modulation Layer |
| 105 | 0 = Sine<br>21 = Rev Sawtooth<br>43 = Sample & Hold<br>64 = Square<br>85 = Sawtooth<br>107 = Sample & Glide | LFO 2 Waveform |
| 106 | 0 = LFO<br>21 = 32’<br>43 = 16’<br>64 = 8’<br>85 = 4’<br>107 = 2’ | DDS 2 Range |
| 107 | 0 = Whole notes<br>16 = Half notes<br>32 = Quarter notes<br>48 = Eighth notes<br>64 = Sixteenth notes<br>70 = Thirty-second notes<br>96 = Quarter note triplets<br>102 = Eighth note triplets | Clock Divider |
| 108 | 0-127 | Lower Layer Detune |
| 109 | 0-127 | VCA DDS 2 Amount |
| 110 | 0-127 | LFO 2 Rate Modulation |
| 111 | 0-127 | Performance Detune |
| 112 | - | - |
| 113 | - | - |

| CC# | Value Range | Parameter Name |
|---|---|---|
| 114 | - | - |
| 115 | - | - |
| 116 | - | - |
| 117 | - | - |
| 118 | - | - |
| 119 | - | - |
| 120 | 0 | All Sound Off |
| 121 | 0 | Reset All Controllers |
| 122 | 0 = Off<br>64 = On | Local Control On/Off |
| 123 | 0 | All Notes Off |
| 124 | 0 | Omni Mode Off |
| 125 | 0 | Omni Mode On |
| 126 | 0 | Mono Mode On |
| 127 | 0 | Poly Mode On |

# Registered Parameter Numbers

The table below lists the registered parameter numbers (RPNs) that are mapped to the parameters of the Super Gemini. These messages are transmitted and/or received according to the **TX/RX E** configuration in the global settings (see pages 98-99).

| RPN | RPN MSB (CC101) | RPN LSB (CC100) | Data Entry Value | Parameter Name |
|---|---|---|---|---|
| 0 | 00H | 00H | MSB = +/- 12 semitones | Pitch Bend Sensitivity |
| 1 | 00H | 01H | 00H 00H = -100 cents<br>40H 00H = A440<br>7FH 7FH = +100 cents | Channel Fine Tuning |
| 2 | 00H | 02H | Only MSB used<br>00H = -12 semitones<br>40H = A440<br>7FH = +12 semitones | Channel Coarse Tuning |

# Non-Registered Parameter Numbers

The table below lists the non-registered parameter numbers (NRPNs) that are mapped to the global and patch-related parameters of the Super Gemini. These messages are transmitted and/or received according to the **TX/RX E** configuration in the global settings (see pages 98-99).

# Global Parameters

| NRPN | NRPN MSB (CC99) | NRPN LSB (CC98) | Value Range | Parameter Name |
|---|---|---|---|---|
| 2051 | 10H | 03H | 0 = MIDI Channel 1<br>15 = MIDI Channel 16 | MIDI Channel |
| 2052 | 10H | 04H | 0 = Off<br>1 = On | MIDI Clock Transmit |
| 2053 | 10H | 05H | 0 = Off<br>1 = On | MIDI Clock Receive |
| 2055 | 10H | 07H | 0 = Off<br>1 = On | MIDI Program Change Transmit |
| 2056 | 10H | 08H | 0 = Off<br>1 = On | MIDI Program Change Receive |

# Patch-Related Parameters

| NRPN | NRPN MSB (CC99) | NRPN LSB (CC98) | Value Range | Parameter Name |
|---|---|---|---|---|
| 1024 | - | - | - | - |
| 1025 | 08H | 01H | 0-16383 | Modulation Lever |
| 1026 | - | - | - | - |
| 1027 | 08H | 03H | 0-16383 | Tempo |
| 1028 | - | - | - | - |
| 1029 | 08H | 05H | 0-16383 | Portamento Time |
| 1030 | - | - | - | - |
| 1031 | 08H | 07H | 0-16383 | VCA Envelope Level |
| 1032 | - | - | - | - |
| 1033 | 08H | 09H | 0-16383 | Mod Amount/Fine Adjust |
| 1034 | 08H | 0AH | 0-16383 | Pan |
| 1035 | 08H | 0BH | 0-16383 | Expression |
| 1036 | 08H | 0CH | 0-16383 | Delay Time |
| 1037 | 08H | 0DH | 0-16383 | Delay Feedback |
| 1038 | - | - | - | - |
| 1039 | - | - | - | - |
| 1040 | - | - | - | - |
| 1041 | 08H | 11H | 0-16383 | LFO 1 Rate |
| 1042 | 08H | 12H | 0-16383 | LFO 1 Delay |
| 1043 | 08H | 13H | 0-16383 | LFO 1 LR Phase/Spread |
| 1044 | - | - | - | - |
| 1045 | 08H | 15H | 0-16383 | DDS LFO 1 Amount |
| 1046 | 08H | 16H | 0-16383 | DDS Envelope 1 Amount |
| 1047 | - | - | - | - |
| 1048 | - | - | - | - |

| NRPN | NRPN MSB (CC99) | NRPN LSB (CC98) | Value Range | Parameter Name |
|---|---|---|---|---|
| 1049 | 08H | 19H | 0-16383 | PW/Detune |
| 1050 | 08H | 1AH | 0-16383 | PW/Wave Modulation |
| 1051 | - | - | - | - |
| 1052 | 08H | 1CH | 0-16383 | Cross Modulation |
| 1053 | - | - | - | - |
| 1054 | - | - | - | - |
| 1055 | - | - | - | - |
| 1056 | 08H | 20H | 0-16383 | Envelope 1 Decay Hold |
| 1057 | 08H | 21H | 0-16383 | Envelope 2 Decay Hold |
| 1058 | - | - | - | - |
| 1059 | 08H | 23H | 0-16383 | DDS 2 Tune |
| 1060 | - | - | - | - |
| 1061 | 08H | 25H | 0-16383 | Oscillator Mix |
| 1062 | - | - | - | - |
| 1063 | - | - | - | - |
| 1064 | - | - | - | - |
| 1065 | - | - | - | - |
| 1066 | 08H | 2AH | 0-16383 | VCA LFO 2 Amount |
| 1067 | - | - | - | - |
| 1068 | - | - | - | - |
| 1069 | 08H | 2DH | 0-16383 | VCF Envelope Amount |
| 1070 | 08H | 2EH | 0-16383 | VCF LFO 1 Amount |
| 1071 | 08H | 2FH | 0-16383 | VCF DDS 2 Amount |
| 1072 | - | - | - | - |
| 1073 | - | - | - | - |
| 1074 | - | - | - | - |

| NRPN | NRPN MSB (CC99) | NRPN LSB (CC98) | Value Range | Parameter Name |
|---|---|---|---|---|
| 1075 | - | - | - | - |
| 1076 | 08H | 34H | 0-16383 | Envelope 1 Attack Hold |
| 1077 | 08H | 35H | 0-16383 | Envelope 1 Attack |
| 1078 | 08H | 36H | 0-16383 | Envelope 1 Decay |
| 1079 | 08H | 37H | 0-16383 | Envelope 1 Sustain |
| 1080 | 08H | 38H | 0-16383 | Envelope 1 Release |
| 1081 | 08H | 39H | 0-16383 | Envelope 2 Decay |
| 1082 | 08H | 3AH | 0-16383 | Envelope 2 Sustain |
| 1083 | - | - | - | - |
| 1084 | - | - | - | - |
| 1085 | - | - | - | - |
| 1086 | 08H | 3EH | 0-16383 | LFO 2 Rate |
| 1087 | 08H | 3FH | 0-16383 | LFO 2 Delay |
| 1088 | - | - | - | - |
| 1089 | - | - | - | - |
| 1090 | - | - | - | - |
| 1091 | - | - | - | - |
| 1092 | - | - | - | - |
| 1093 | - | - | - | - |
| 1094 | 08H | 46H | 0-16383 | DDS LFO 2 Amount |
| 1095 | 08H | 47H | 0-16383 | VCF Resonance |
| 1096 | 08H | 48H | 0-16383 | Envelope 2 Release |
| 1097 | 08H | 49H | 0-16383 | Envelope 2 Attack |
| 1098 | 08H | 4AH | 0-16383 | VCF Cutoff Frequency |
| 1099 | 08H | 4BH | 0-16383 | VCF LFO 2 Amount |
| 1100 | 08H | 4CH | 0-16383 | DDS Pitch Bend Amount |

| NRPN | NRPN MSB (CC99) | NRPN LSB (CC98) | Value Range | Parameter Name |
|---|---|---|---|---|
| 1101 | 08H | 4DH | 0-16383 | VCF Pitch Bend Amount |
| 1102 | - | - | - | - |
| 1103 | - | - | - | - |
| 1104 | - | - | - | - |
| 1105 | - | - | - | - |
| 1106 | - | - | - | - |
| 1107 | - | - | - | - |
| 1108 | - | - | - | - |
| 1109 | - | - | - | - |
| 1110 | - | - | - | - |
| 1111 | - | - | - | - |
| 1112 | - | - | - | - |
| 1113 | - | - | - | - |
| 1114 | - | - | - | - |
| 1115 | 08H | 5BH | 0-16383 | Delay Send |
| 1116 | 08H | 5CH | 0-16383 | VCA LFO 1 Amount |
| 1117 | - | - | - | - |
| 1118 | 08H | 5EH | 0-16383 | Drift |
| 1119 | 08H | 5FH | 0-16383 | HPF Cutoff Frequency |
| 1120 | - | - | - | - |
| 1121 | - | - | - | - |
| 1122 | - | - | - | - |
| 1123 | - | - | - | - |
| 1124 | - | - | - | - |
| 1125 | - | - | - | - |
| 1126 | - | - | - | - |

| NRPN | NRPN MSB (CC99) | NRPN LSB (CC98) | Value Range | Parameter Name |
|---|---|---|---|---|
| 1127 | - | - | - | - |
| 1128 | - | - | - | - |
| 1129 | - | - | - | - |
| 1130 | - | - | - | - |
| 1131 | - | - | - | - |
| 1132 | 08H | 6CH | 0-16383 | Lower Layer Detune |
| 1133 | 08H | 6DH | 0-16383 | VCA DDS 2 Amount |
| 1134 | 08H | 6EH | 0-16383 | LFO 2 Rate Modulation |
| 1135 | 08H | 6FH | 0-16383 | Performance Detune |

Please see UDO's support site for the most up to date MIDI specification.

# GLOSSARY

The following list provides brief explanations of key terms printed on the Super Gemini's front panel as well as basic synthesis terminology used throughout this manual.

**Aftertouch (AT):** Aftertouch is a keyboard expression feature that allows you to modulate a sound via key pressure.

**Arpeggiator:** An arpeggiator generates arpeggios based on a chord you hold. An arpeggio is a 'broken chord' in which the notes of a chord are played one after the other in an order determined by the current playback mode setting.

**Bender:** A bender is a performance controller that can be moved along two axes: horizontal (left/right) and vertical (up). The corresponding gestures can impact the sound individually.

**Binaural:** The Latin term 'binaural' literally means 'with both ears'. In binaural mode, the 20 voices of the Super Gemini are twinned to form either ten stereo 'super voices' in single mode or five stereo 'super voices' in dual or split mode. The effect on the sound ranges from subtle to extreme stereo movement and an enhanced sense of spatial positioning compared to conventional monaural signal chains.

**Bi-timbrality:** A bi-timbral synthesizer is an instrument that can generate two different sounds simultaneously, each controlled by a different MIDI channel.

**Clock Signal:** A clock signal acts like a metronome. Typically, a square wave oscillating between high and low states at a constant frequency is used to sync instruments or parameters like sequencers, LFOs or time-based effects. An 'external' clock signal is fed into your instrument from another device, such as your DAW.

**Clock Sync:** This function allows you to synchronise modules of a system, such as an arpeggiator, a sequencer, LFOs, and time-based effects, to an internal or external clock signal. When synchronised, parameters like LFO rate or delay time will respond at a rate that is relative to the clock signal. Using different clock divisions (quarter notes, eighth notes, etc.) for each parameter allows you to create complex rhythmic effects.

**Cross Modulation (CROSS MOD, X MOD):** Cross modulation is a type of frequency modulation (FM) the result of which depends on the frequency ratio between both oscillators. It can be used to create complex, clangourous or bell-like timbres.

**Cutoff Frequency:** This filter parameter allows you to set the point at which the filter begins to subtract frequencies from the oscillators' signals to shape the sound.

**Delay Freeze:** The delay freeze function turns the Super Gemini's delay effect into a basic looper, allowing you to create sound-on-sound loops you can play along with.

**Detune Spread:** In super mode, this parameter determines the degree to which the six 'sister' oscillators of DDS 1 are detuned and stereo spread relative to DDS 1's centroid oscillator.

**Direct Digital Synthesis Oscillator (DDS):** Direct Digital Synthesis is the signal generation method employed by both oscillator cores of the Super Gemini. At its centre is a clock signal running three orders of magnitude higher than typical audio sample rates. This clock increments a counter through thousands of indices in your chosen waveform, generating samples once every 20-billionths of a second and interpolating between them. Each numerically controlled oscillator then uses its own DAC, also running at the same high sample rate, to convert the samples to analog voltages before being filtered by a preliminary analog low-pass filtering stage.

**Drive:** This parameter determines the degree to which the input signal of the Super Gemini's filter circuitry is overdriven. Its three settings allow you to choose between a pure signal, a gentle level-boost with resonance compensation and a hard saturation.

**Dual Mode:** In this mode, the upper and lower layers are stacked, with the 20 available voices split evenly between the two. If you activate binaural mode for a layer, its respective voice-count will be reduced to five.

**Envelope (ENV):** An envelope is a modulation source that defines how the signal or parameter it modulates evolves over time. Most envelope generators contain four stages that allow you to define the envelope's shape: attack, decay, sustain and release (ADSR). The Super Gemini's envelopes also feature a decay hold stage that determines the time it takes for the decay stage to begin after the attack stage reached its peak. In addition, the first envelope features an attack hold stage that determines the time it takes for the attack stage to begin after hitting a key.

**High-Pass Filter (HPF):** A high-pass filter subtracts frequency content below its cutoff frequency. The frequency content above the cutoff frequency remains unaffected, meaning the highs will pass through. Use this type of filter to make sounds thinner or brighter by reducing bass frequencies.

**Keyboard Tracking (KEYTRACK, TRK, NOTE):** Keyboard tracking is a type of modulation that uses the MIDI note number as a modulation source. Whatever is tied to keyboard tracking will respond relative to the pitch of the notes you play. In the Super Gemini's modulation matrix, keyboard tracking is freely assignable via the **NOTE** button.

**Layer:** In a bi- or multi-timbral synthesizer, a layer is essentially a placeholder for a patch. The Super Gemini allows you to play two layers at once, either in dual or in split mode. Each of the two layers contains its own patch. The 256 patch locations of the Super Gemini's internal memory are shared between both layers.

**Left-Right Phase (LR PHASE):** This parameter controls the left-right channel phase relationship of the Super Gemini's binaural sound engine, in other words the effect of LFO 1 on the stereo field.

**Loop:** A loop is essentially a repetition of a recording or shape, meaning once the end is reached, whatever is looped will start all over again. The Super Gemini features a loop option for the first envelope and also allows you to create loops with the Delay Freeze function.

**Low Frequency Oscillator (LFO):** An LFO is an oscillator that generates frequencies below the range of human hearing. It can be used to modulate pitch to create vibrato effects or to modulate the VCA level to create tremolo effects. The Super Gemini's first LFO can also be set to higher frequencies, allowing it to be used as a third oscillator, for drone effects, or for audio-rate modulations.

**Low-Pass Filter (LPF):** A low-pass filter subtracts frequency content above its cutoff frequency. The frequency content below the cutoff frequency remains unaffected, meaning the lows will pass through. Use this type of filter to make the sound warmer or to emphasise bass frequencies.

**MIDI:** Musical Instrument Digital Interface. MIDI is a standardised protocol that allows various devices from different manufacturers to communicate with each other. This not only includes instruments but also computers and several types of controllers.

**Mixer (MIX):** The mixer allows you to adjust the level of each oscillator in relation to the other.

**Modulation (MOD):** Modulation is the process of affecting a destination signal or parameter with a source signal. For example, you can have an LFO control the behaviour of an oscillator's frequency, or an envelope control the volume of a sound. Common modulation sources include LFOs, envelopes, regular oscillators, and performance controls like aftertouch and velocity.

**Oscillator:** Oscillators belong to the most basic and essential building blocks of a synthesizer. Without them, you could neither hear a sound nor shape or modulate what is generating an audio signal. Both of the Super Gemini's oscillators generate classic waveforms such as sine, triangle, sawtooth and square. In addition, the first oscillator (DDS 1) offers up to 64 digital sounding alternative waveforms.

**Patch:** A patch is a stored set of parameters which determine a sound's characteristics. A total of 256 patches can be stored in the Super Gemini's internal memory. They are organised in two groups (A and B) of 16 banks featuring 8 patches each.

**Performance:** Essentially, a performance is a snapshot of the entire Super Gemini, consisting of both layers and the settings for the performance control section (including LFO 2) as well as the global controls, except for **MASTER VOLUME**. A total of 256 performances can be stored in the Super Gemini's internal memory. They are organised in two groups (A and B) of 16 banks featuring 8 performances each.

**Portamento:** Portamento is a pitch-sliding effect between consecutive notes. The higher the portamento time, the longer it takes for a note to slide to the pitch of the following note. The portamento time is also determined by the intervals between the played notes: smaller intervals result in faster pitch slides, while larger intervals result in slower pitch slides.

**Pulse Width (PW):** The pulse width marks the duration a pulse signal is 'on'. It is commonly measured in percentages of a duty cycle. A duty cycle of 50% produces a square wave, meaning that the pulse signal is on for as long as it's off per duty cycle. Changing the on/off ratio alters the harmonic content, and thus changes the timbre. The sound of a pulse wave that has a duty cycle of more or less than 50% is thinner than that of a square wave and bears a nasal character. At a duty cycle of 0% or 100% there is no audible sound, as there is no change in amplitude that constitutes oscillation.

**Pulse Width Modulation (PWM):** Pulse width modulation affects how the pulse width changes over time while you are holding a note. The pulse width can be modulated by a modulation source such as an LFO or an envelope, resulting in a thicker or more harmonically interesting sound.

**Resonance:** This filter parameter emphasised the frequencies around the cutoff frequency. The Super Gemini's low-pass filter can be driven into self-oscillation if you set the resonance to its highest value. In this case, the filter generates a pitch determined by the cutoff frequency and a timbre that sounds like a sine wave.

**Ring Modulation (RING MOD, RING):** Essentially, ring modulation is a type of amplitude modulation as well as a form of frequency mixing. It combines two signals, a carrier and a modulator, and outputs their sum and difference while subtracting the frequencies of the original signals. The frequencies resulting from the sum and difference are called sidebands. If the modulator is a sine wave with a frequency of 1,000 Hz and the carrier is a sine wave with a frequency of 500 Hz, the ring modulator will output the sum 1,500 Hz (1,000 plus 500) and the difference 500 Hz (1,000 minus 500). In case the frequencies of the modulator and carrier are identical, only one sideband will be generated, as the difference would always be 0 Hz. When you apply ring modulation to harmonically rich waveforms, such as sawtooth or pulse, rather clangourous sounds will be generated due to the discordant harmonic relationships between the frequencies.

**Sequencer:** A sequencer is a modulation source that acts like a recording and playback device, sending control signals to a variety of parameters per step, the smallest unit of a sequence. The Super Gemini's sequencer allows recording of up to 64 steps and was primarily designed for recording and editing note events.

**Single Mode:** In single mode, only one layer with 20-voice polyphony is active. In binaural mode, the number of voices is halved to ten voices.

**Split Mode:** In split mode, the upper and lower layers are mapped either side of a split point on the keyboard, with the 20 available voices split evenly between the two. If a layer is set to binaural mode, it will be limited to five voices. The upper layer is assigned to all keys above and including the designated split point, while the lower layer is assigned to all keys below.

**Sub-Oscillator:** A sub-oscillator is an oscillator with a fixed waveform that is an octave or more below the frequency of the oscillator to which it is tied. In the case of the Super Gemini, the enabled sub-oscillator replaces the audio signal from DDS 2. Its waveform is either a sine or a square wave pitch-locked one octave below the frequency of DDS 1.

**Super Mode:** Super mode is a unique feature that takes advantage of the Super Gemini's stereo signal path. In both available super modes, DDS 1 can be dynamically de-phased in the stereo field, resulting in a thick, wide sound from a single oscillator.

**Swing:** Swing is a rhythmic variation in which the first and second consecutive notes of a two-part beat pattern are alternately lengthened and shortened. The Super Gemini offers five different swing settings when you engage arpeggiator or sequencer playback, ranging from none to pronounced. Use swing to make your pattern 'bounce'.

**Sync:** Also known as 'hard sync', this function forces DDS 2 to restart its duty cycle each time DDS 1's duty cycle begins. By setting the frequency of DDS 2 to a higher pitch than DDS 1, you can create complex and harmonically rich timbres, especially if you modulate the pitch of DDS 2, for instance with an envelope.

**Velocity (VEL):** Keyboard velocity allows a sound to respond dynamically when you hit a key. For example, if velocity controls the behaviour of the VCA, the softer you play, the quieter the sound will be. Conversely, the harder you hit the keys, the louder the sound.

**Voltage Controlled Amplifier (VCA):** A voltage-controlled amplifier controls volume of a sound. On the Super Gemini, envelope 2 is mapped to the VCA level by default. You can use this envelope to determine how a sound's volume evolves over time.

**Voltage Controlled Filter (VCF):** This is the module that gave subtractive synthesis its name. The voltage-controlled filters are integral to the Super Gemini's sonic character, shaping the sound of the oscillators by subtracting frequencies from their signals.

**Waveform:** A waveform describes the shape of a signal produced by an oscillator. Classic analog waveforms include shapes such as sine, sawtooth, square, pulse, triangle and white noise. A sine wave contains only the first harmonic, the fundamental, which is why it is considered the purest waveform. It is ideal for ‘glassy’ sounds or an added fundamental. A sawtooth wave contains both odd and even harmonics and is bright sounding. It can be used for creating brass, bass and string sounds. Square and pulse waves contain a wide range of odd harmonics. They sound hollow and can be used for reed-like sounds or basses. If you apply pulse width modulation to use a pulse wave, it can also be used for swirling string sounds. A triangle wave contains only odd harmonics and sounds very soft. It is particularly suitable for generating flute, organ or vocal sounds. White noise contains all frequencies and is the most common noise waveform. It is useful for creating wind or percussive sounds.

# SUPPORT INFORMATION

If you are experiencing any issues with your Super Gemini, contact our technical support at support@udo-audio.com.

Please provide the following information when you get in touch with us:

- Instrument name
- Serial number
- Firmware version
- Purchase date (new or used) and location (country, dealer)

If you haven't already done so, make sure to register your product through our website.

You may also visit our FAQ section or user forum to check if your question has already been answered.

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