

NAFF

3D INSTRUMENTS

SPAT CURVE



USER MANUAL

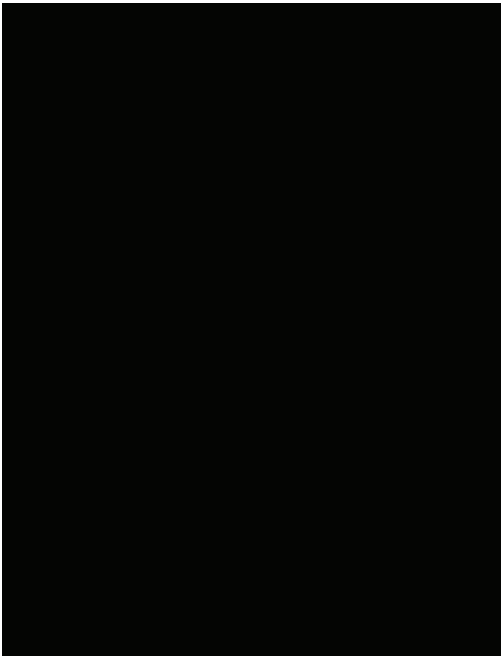


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1.0 Introduction

1.1. Welcome

Welcome to Nine Angles For Forte and thank you for your purchase. The following are author based 3D instruments based on sampling created by composer Pablo García-Valenzuela for the live performance and studio production of 3D music. They are playable via Atmos, Ambisonics or channel based multichannel systems . All instruments are timbre-creative, meaning that they do not intend to represent or substitute any specific instrument. They do intend, however, to elaborate unique and creative sounds via complex effects (removable by the user). They also present sensitive capabilities for live performance via Round Robins, musical dynamics created from the recordings themselves and additional modulation in Kontakt. Importantly, all instruments behave spatially depending on dynamics, which is a direct gesture controlled by the performer, but in some cases also depending on pitch.

These instruments were conceived for traditional physical interfaces for the live performance or studio composition of electronic music, such as MIDI keyboards and MIDI drum sets. They are mostly useful, in the author's opinion, for rhythmic and melodic music. However, this is not to say that they were designed for Pop or Mainstream music as their timbres are rather "experimental" - their spectral content has been modified somewhat beyond the classical harmonic spectra. They are probably best suited for Experimental and/or Progressive 3D Rock music, modern Rap music and modern Electronic Dance genres.



That said, since the user has control and automation capability over the Dry/Wet parameter, he/she can easily eliminate all effects and keep the original dry sample in 3D format. This can give the user full flexibility to transform the sound creatively in any personal way to satisfy Electroacoustic Music and/or other Spectral Music needs. Furthermore, since these are MIDI instruments, the user can venture onto other physical types of interesting interfaces for live performances such as sensors (so long they read MIDI).

IMPORTANT NOTE BEFORE YOU PROCEED: Understanding the Output Configuration here is ESSENTIAL. Please do not underestimate the section dedicated to this topic further below in this manual as otherwise the instruments will not work, neither in stand alone mode nor via a DAW.

¹ Ideally through a dome-like channel based system with 17 different positions at specific angles but adaptable to smaller systems, probably as low as 7-8 loudspeakers. This does not apply to Atmos or Ambisonics as these technologies will translate all positions perfectly using their own speaker configuration.



1.0 Introduction

1.2. What You Get

1.2.1. Sample-Based 3D Sound

Design: 17 positions

All samples are high quality 3D recordings of various instrumental sources, which ensures a proper multi-directional representation of sound, in a comb-filter-free Live Room that has a balanced RT60 of approximately 0.6s (on all bands). This type of sound source can then be played on a 17 channel (17 positions) dome-like multichannel system as well as on other smaller multichannel systems (more info on this later on) and beautifully translated by Atmos systems (using a simple configuration, explained in detail further below).

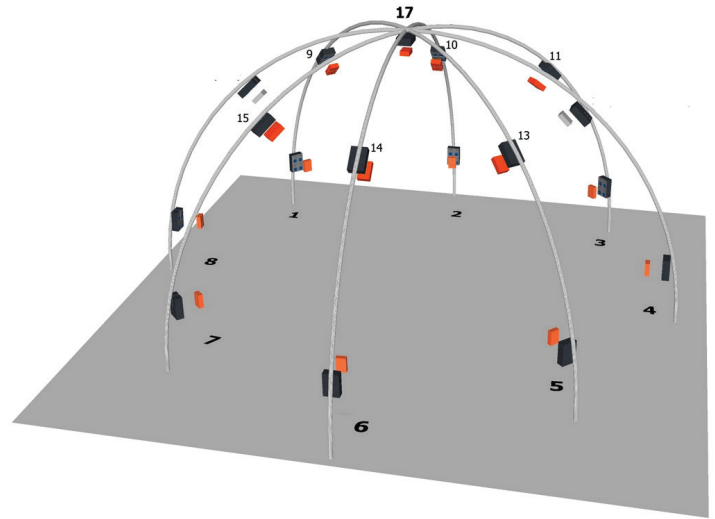


Fig. 1. Dome Multichannel System - SIV 15-17 3D.

1.2.2. Creative Approach: Timbre and Live Dynamics Reaction

As explained in the introduction, these instruments intend to have their own timbre and not to substitute actual instruments, even though they all come from careful instrumental 3D sampling of horn sections, trombones, marimbas, drums etc. But, more importantly, they all react live to some type of spatial behavior depending on musical dynamics. The musician, once each instrument has been learnt, will be able to control the spatial effect for the audience, which will result either on speed of movement (3D panning), shape of movement or speed/shape of effects movement and position change.

1.2.3. Ensemble: 16x 3D Instruments

An initial set of 16 instruments, Spat Curve, have been created here in such a way that they all work as a self-contained ensemble or as a small orchestra. This means that the user will have all of the low to high pitched instruments, percussion, acoustic-like, electronic and world-like timbres/envelopes needed to compose a full piece.

1.2.4. Core Sampling Strategies

All instruments have numerous Round Robins, as high as 15, and have been sampled using up to 5 different dynamics for realistic results. Despite the fact that the general idea is to create unique timbres, and not to imitate real instruments, this was carefully crafted for the same reason.

1.0 Introduction

1.2.5. Modulation, Automation and Effects: Overview

Additional modulation for velocity-volume and velocity-cutoff frequency was applied once again for the purpose of realism. All effects are external and come from high quality tools (convolution etc). These, of course, can be mapped on keyboard knobs and/or automated on a studio session. Finally, all external effects can be removed manually allowing the user to process the original sounds creatively and differently in any way while preserving the spatial behavior, the performance sensitivity and the internal modulation.

1.2.6. Adaptability to Multichannel Systems

Additional modulation for velocity-volume and velocity-cutoff frequency was applied once again for the purpose of realism. All effects are external and come from high quality tools (convolution etc). These, of course, can be mapped on keyboard knobs and/or automated on a studio session. Finally, all external effects can be removed manually allowing the user to process the original sounds creatively and differently in any way while preserving the spatial behavior, the performance sensitivity and the internal modulation.



Fig. 2. Dome Multichannel System - 17ch 3D.

1.3. Live and Studio Performance

As MIDI controlled software, these instruments are designed to be used both for live concert and for studio production. The latency is always at play but so long you are not using some of the live binaural processing methods available out there, specially in Atmos, it is manageable and effective. Keep reading the following Setup section for specific details on how to configure Atmos, Ambisonics and Channel Based sessions via a DAW, as well as convenient downloads to make your work flow faster and the system requirements needed.

1.3.1. Atmos

A minimum of a 7.1.4 Atmos configuration should be used in order to translate the 17 main directions of the sampling method. Once you understand the angles for each direction it should be a straight forward panning configuration in any Atmos session to make them work beautifully. Further info follows.



1.3.2. Ambisonics

An IEM Plugin Suite or similar is needed in order to translate the 17 main directions of the sampling method. Once you understand the angles for each direction it should be a straight forward Ambisonic configuration what you need in order to make them work beautifully. Further info follows.

1.3.3. Channel-Based

A specific dome-like multichannel system with specific angles and distances in between speakers is needed in order to translate the 17 main directions of the sampling method. Once you understand the angles for each direction it should be a straight forward output configuration (physical outputs) per software channel in order to make them work perfectly. It is possible to use smaller channel based systems but this should be done only if you are ok with creative results.

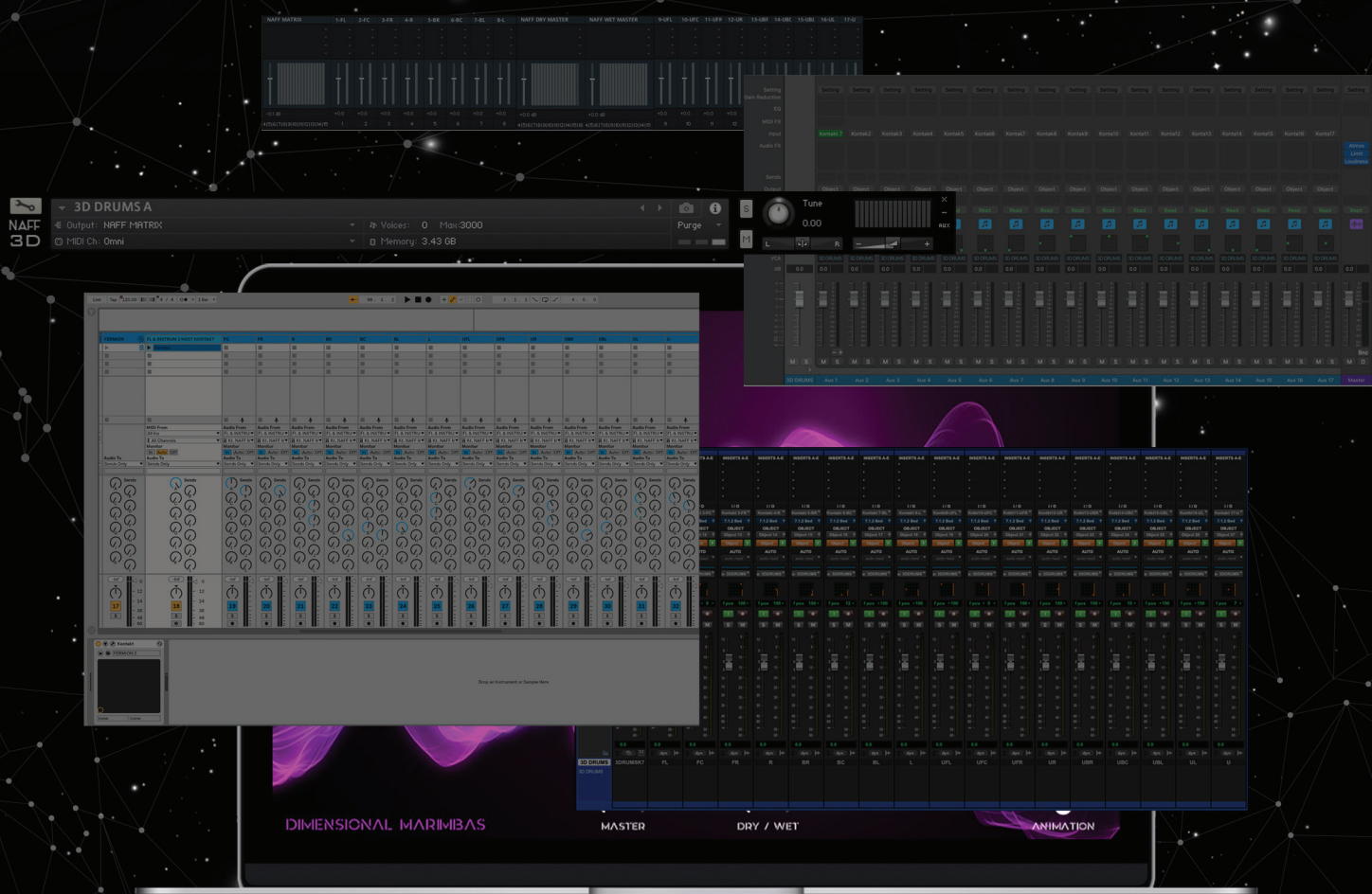


NAFF

3D INSTRUMENTS

SPAT CURVE

2.0 SETUP



2.0 Setup

2.1. Kontakt Installation / Authorization

All Kontakt Installation and authorization methods should be dealt with directly with Native Instruments. You do not need the full Kontakt version but the Kontakt Player version in order to play these instruments. However, some of them, such as 3D Drums, may benefit from the full version so you can access the buses and process each component separately at your own will (toms, kick, snares, etc...).

2.2. Output Configuration

Understanding the Output Configuration for “NAFF 3D Instruments” is ESSENTIAL. Otherwise you cannot make these instruments work, neither in Stand Alone mode nor in any DAW. The download for this purpose is called **“NAFF 3Di.cfg”** and is offered further below. However, depending on the Kontakt version you have, or even on your preferred DAW version, this output configuration can easily change when opened and not work as expected. Therefore, this section explains exactly how this output console should look like in Kontakt in case you have to re-configure it yourself. It is divided in four main parts:

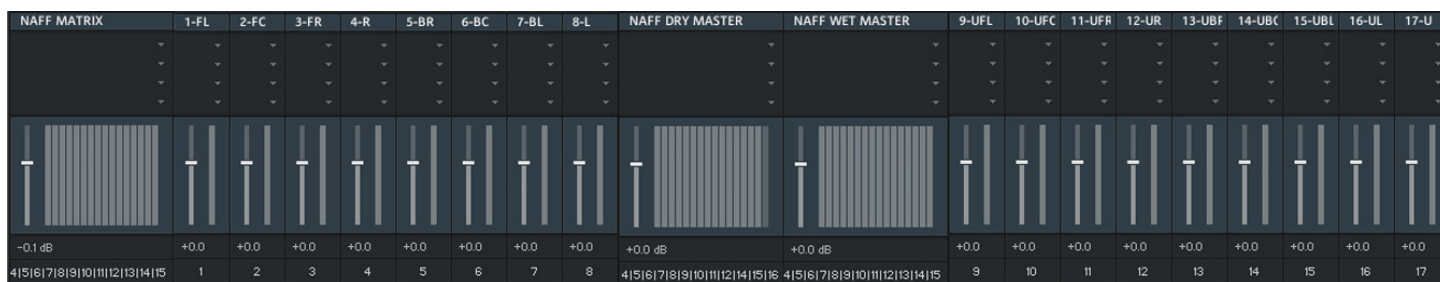


Fig. 3. Output Configuration for Kontakt - **NAFF 3Di**.

I) A general 16 channel output called **NAFF MATRIX** (or whatever you like to call it) should be placed at the extreme left of Kontakt’s console (you may have to click on “VIEW/Outputs (F2)” to see this console). This ensures that whenever you open a 3D Instrument, Kontakt will select this multichannel configuration as the default output and therefore accept it as a multichannel instrument:

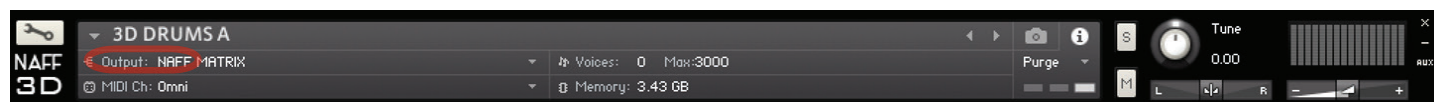


Fig. 4. Default Instrument Output.

2.0 Setup

II) **17 Mono Channels** follow that correspond to the 17 positions illustrated in Fig. 1. These channels are what any DAW will recognize as a “Plugin Input” from Kontakt (which can turn into a physical output) and are essential for a DAW configuration (more details and examples below). The names are not important, but their number, order and position are important:

Table 1. Channel Numbering / Order, Names and Position (See Fig. 1)

1-FL	Channel 1 - Front Left	315-330° Horizontal - 0° Vertical
2-FC	Channel 2 - Front Center	0/360° Horizontal - 0° Vertical
3-FR	Channel 3 - Front Right	30-45° Horizontal - 0° Vertical
4-R	Channel 4 - Right	90° Horizontal - 0° Vertical
5-BL	Channel 5 - Back Right	135° Horizontal - 0° Vertical
6-BC	Channel 6 - Back Center	180° Horizontal - 0° Vertical
7-BL	Channel 7 - Back Left	225° Horizontal - 0° Vertical
8-L	Channel 8 - Left	270° Horizontal - 0° Vertical
9-UFL	Channel 9 - Up Front Left	315-330° Horizontal - 45° Vertical
10-UFC	Channel 10 - Up Front Center	0/360° Horizontal - 45° Vertical
11-UFR	Channel 11 - Up Front Right	30-45° Horizontal - 45° Vertical
12-UR	Channel 12 - Up Right	90° Horizontal - 45° Vertical
13-UBR	Channel 13 - Up Back Right	135° Horizontal - 45° Vertical
14-UBC	Channel 14 - Up Back Center	180° Horizontal - 45° Vertical
15-UBL	Channel 15 - Up Back Left	225° Horizontal - 45° Vertical
16-UL	Channel 16 - Up Left	270° Horizontal - 45° Vertical
17-U	Channel 17 - Up	0/360° Horizontal - 90° Vertical

III) Further multichannel slots are found at the far right of the console called **NAFF DRY MASTER**.



IV) And finally NAFF WET MASTER.

- NAFF DRY MASTER and NAFF WET MASTER are key elements because they allow you to balance effects or get rid of them entirely and process the 3D sound source at will.
- Physical outputs and numbering for your particular interface or system are found by: **clicking on the small numbers under each of the Kontakt channels** (see Fig. 3), **assigning a “plugin number” and then a physical output**. The plugin number can be routed to a physical output of your system via an external output on your DAW or directly on Stand Alone. This manual cannot predict your system, but **you should NOT be changing this plugin numbering structure** on the console configuration because this will completely change the routing of the instruments.
- Should you run into problems, this is the correct plugin numbering for each channel in this console:

Table 1. Correct Plugin Numbering for all Channels

NAFF MATRIX	1-16
17 Multi Mono	1-17
NAFF DRY MASTER	1-8 / 9-11 / 13-15 / 17 (EXCLUDE 12 and 16)
NAFF WET MASTER	1-14 / 16-17 (EXCLUDE 15)

- The user path to place and keep this Output Configuration, called **“NAFF 3Di.cfg”**, on a Mac, once you have downloaded it (see Downloads below), or in case you create your own, is:
 - Option + Go / Library / Application Support / Native Instruments / Kontakt / Default / Output Section Presets
- Once in Kontakt you can upload via:
 - Output Section / Presets / Batch Configuration / User / **“NAFF 3Di.cfg”**
- If you are using Windows then just follow the path in which Native Instruments installs application support for Kontakt and make sure you find the “User” folder for the Output Section.
- Final note: so long you position each channel in the proper way within the 3D field, the names can change. Dolby will use different names but this is not important, what matters is the direction of each source.

2.3. System Requirements

- A minimum of 24 GB of RAM is strongly recommended for the use of several instruments at once.
- RAM is more important than the speed of the processor. Older i7 (Mac) processors with 24 GB RAM have been tested using many instruments in one single session presenting no problems.
- Of course, modern M1, M2 and M3 (Mac) processors are more desirable, and the more RAM the better.

2.0 Setup

2.4. Stand Alone

- Follow the exact same process above (Section 2.2. Output Configuration) and load (or configure yourself) the output console called **“NAFF 3Di.cfg”**
- Respect the original plugin numbering structure (under each channel slot).
- If necessary change (by “transposing”) the plugin numbers in a way that they correspond to your physical outputs, but make sure you understand and keep respecting the relationship between the original numbering and speaker direction.

Table 1, above, makes this very clear.

• A word of advice: If you do this, a common mistake would be to “transpose” the plugin number structure only in one of the slots (for example NAFF MATRIX). No, you need to “transpose” all plugin numbers accordingly on ALL of the four main slots already described:

- NAFF MATRIX
- NAFF DRY MASTER
- 17 Mono Channels
- NAFF WET MASTER



2.5. Stand Alone

2.5.1. Pro Tools

This session contains all instruments loaded, individually and in groups (depending on timbral character). For convenience, as well as to aid this overview, all tracks have been grouped into folders and are therefore hidden.

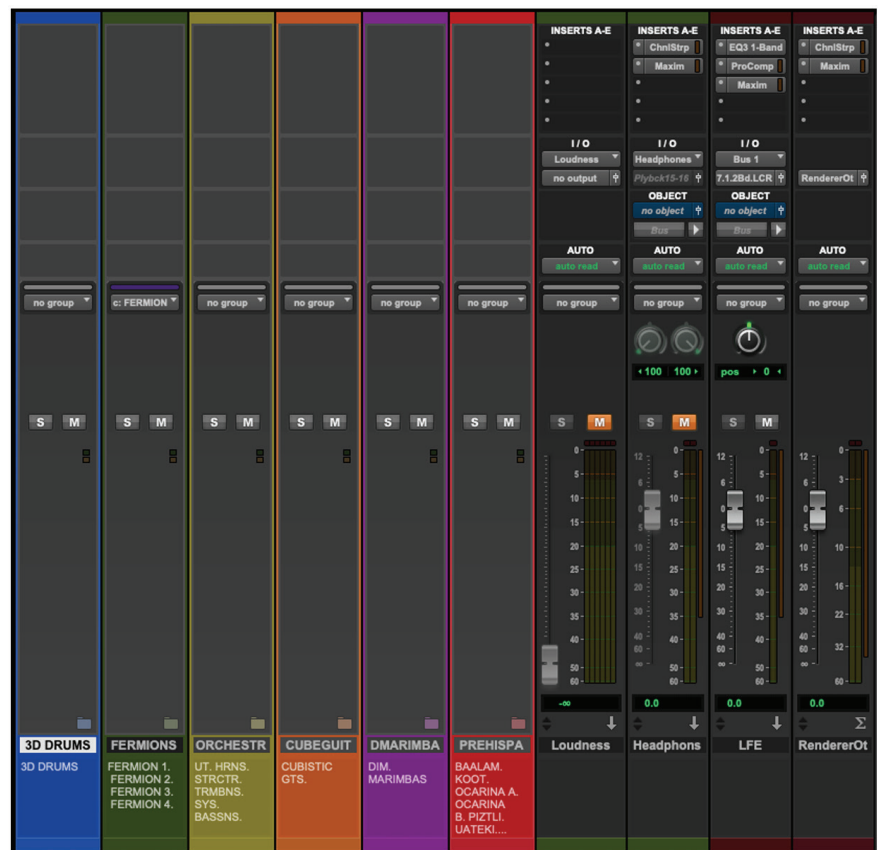


Fig. 5. Pro Tools session.



Fig. 6. Atmos Configuration of an individual instrument in ProTools.

Now we have an open folder containing all tracks that make up one single instrument. The Important things to notice are:

- An instrument track (named here as “3DDRUMSK7”, far left) contains the Kontakt plugin, where no input or output/object is necessary.
- 17 audio tracks follow, named according to the 17 positions of the 3D sound system. See Table 1.
- Each of these 17 audio tracks must have sequential inputs from the Kontakt plugin loaded on the instrument track ((named here as “3DDRUMSK7”, far left). These inputs come, and are named, from the **“NAFF 3Di.cfg”** Output Configuration explained in Section 2.2.
- Each of these 17 audio tracks must have sequential “Object” outputs and must be panned according to Table 1 (above).
- We recommend channels 1-8 to have a Height of 50% but you can experiment with lower values.
- We recommend channels 9-17 to have a 100% Height but you can experiment with 75% Height for channels 1-16 and 100% Height for channel 17 (specially if you choose lower Height values for channels 1-8).
- The specific physical output numbering for your loudspeakers depends on your system.

A final word of advice: when bouncing you may have to record the MIDI into the audio tracks for each of the instruments.

2.0 Setup

2.5.2. Notes on Logic

Any DAW (Digital Work Station) that supports Atmos must be configured in the same way just described above (Section 2.5.1). The differences will be minimal and are not worth discussing here because the changes that take place are related to the way the Atmos Renderer is loaded and routed (internal or external), not the way Kontakt instruments work. Therefore, the same strategy of one instrument channel and 17 extra channels representing all directions must be applied. Inputs, outputs and Object panning would be identical. However, in the case of Logic, Auxiliary tracks should be used for the 17 extra channels. Below we find an example that illustrates an Atmos configuration using a Spat Curve instrument:

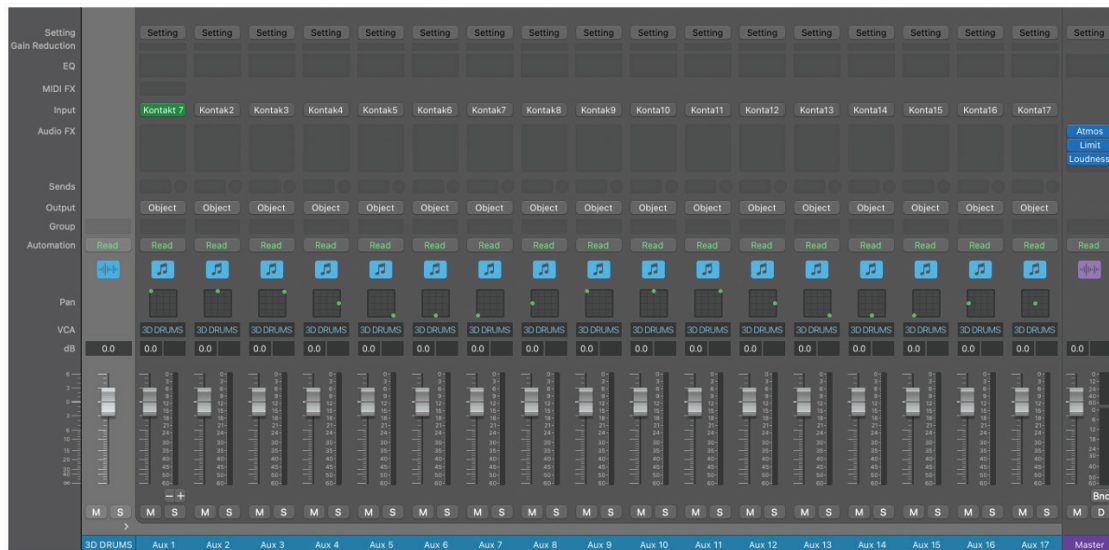


Fig. 7. Atmos Configuration of an individual instrument in Logic.

2.6. DAW - AMBISONICS - Reaper - Notes on IEM PLUGINS

The IEM Plug-in Suite, available for free at plugins.iem.at, can translate a multi-directional source, such as ours, into Ambisonics, both for multichannel setups and for binaural processing. This is certainly worth exploring in detail. In terms of binaural processing, for example, the latency is much less, and therefore superior, than the same binaural type of rendering in Atmos.

The exact plugins that you must use are:

- MultiEncoder
- BinauralDecoder
- AllRADecoder (or SimpleDecoder)

However, rather than re-writing the great tutorial they have already written, for Reaper by the way (excellent DAW, specially flexible for multichannel set ups), it is best to just forward their own link:

- https://plugins.iem.at/docs/tutorial_basicrouting/

We would need to be working with 4th Order Ambisonics. Stay tuned for future tutorials on our YouTube channel!



2.7. DAW - Channel Based - Notes on Reaper and Ableton Live

Channel-based setups require, ideally, a 17 channel dome system configured exactly as Table 1 indicates, above. It is possible to use smaller systems by clustering channels in an intelligent way (balancing volumes of cluster channels and/or adding further delay). The results, however, may vary, depending on your experience, from a reasonable realistic outcome to a fully creative one (which is also valid).

Reaper has an incredible flexibility when it comes to multichannel configurations, channel ordering, naming and channel routing. It is not very intuitive, as it differs in many ways to other types of DAW, but once you study their manual the full potential unveils. It seems it can also host Atmos, and certainly Ambisonics, but in this case we are focusing on channel-based setups. The following image illustrates one of Reaper's multi-output configurations in one single and convenient track:

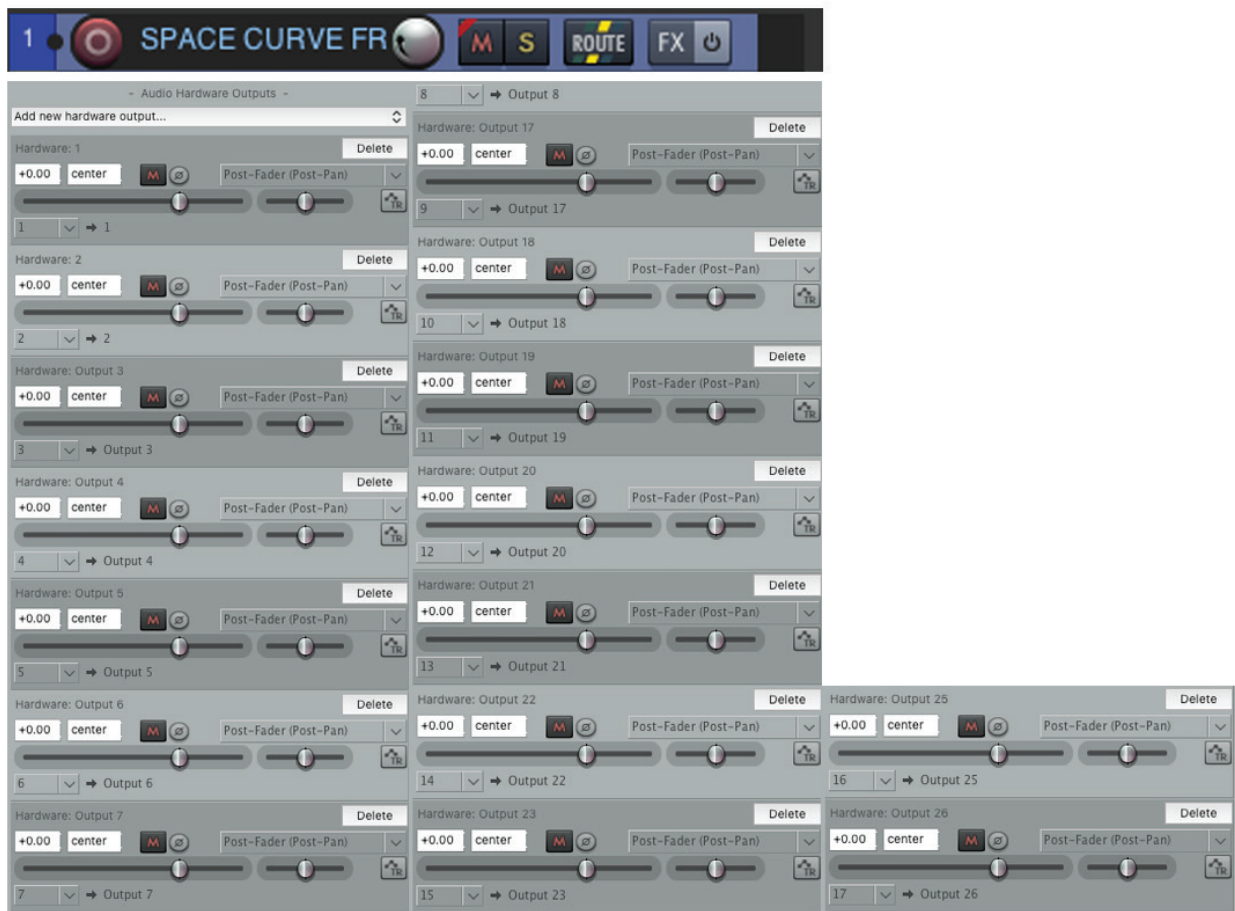


Fig. 8. Reaper Configuration - Channel-based.

- The numbering on the left refers to Reaper's internal channel ordering.
- The numbering on the right refers to your particular physical outputs, which must belong to a speaker placed in the way Table 1 describes, above.

2.0 Setup

Ableton Live may have limitations because “Sends” are the most convenient way to configure multichannel setups. But Live allows for only 12 Sends, or used to, so this is insufficient for us. However you can always attempt direct outputs (“Ext”). Below we can find an image that illustrates a Spat Curve 3D instrument configured in Live. The strategy is very similar to Pro Tools and Logic, above, except that this is a Channel-based approach and no Atmos or Ambisonics are involved:

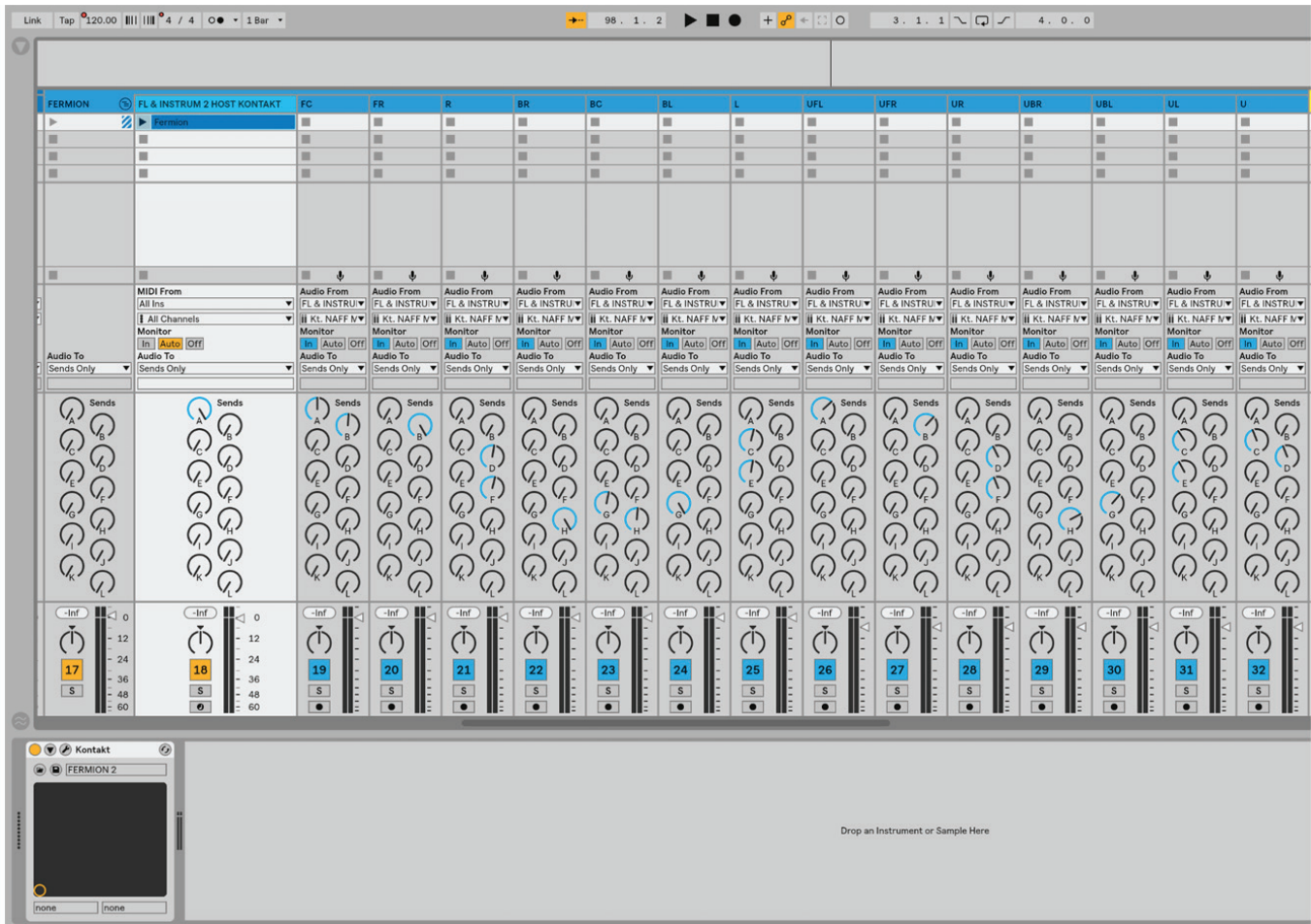


Fig. 9. Ableton Live Configuration - Channel-based.

- It is worth noticing that below the “Audio From” on each channel, which must belong to the track in which Kontakt is inserted (“Fermion” in this case, named as “FL & INSTRUM 2 HOST KONTAKT” - not fully visible), there is a secondary input in which the 17 NAFF MATRIX internal channels from the “NAFF 3Di.cfg” console (see Section 2.2) must be selected. Unfortunately, Live in this case does not show the actual names of the console (which is why they all appear to be the same) but one can select them by counting them (sequentially).

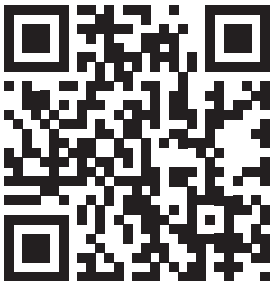
2.0 Setup

- It is also worth noticing that this particular session reduces the 17 position/channels of Spat Curve to 8 output channels (speakers) via the Sends. The levels of these positions/channels that overlap are slightly mixed. This could also be done using 12 speakers, 7 speakers and even 5 speakers, but for 5 speakers further creative strategies would be desirable (delay difference increases, wet-reverb increases in overlapping channels, etc...).
- Finally, one could avoid “Sends” and go straight to the “Ext” outputs in Live and therefore straight to physical outputs (speakers).

2.8. Downloads

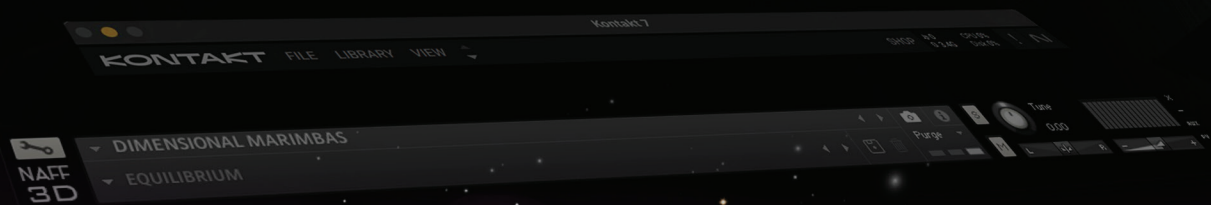


- Notes:
 - The Atmos session, for convenience, should open in Binaural format.
- You can then change the session to real multichannel 7.1.4.



NAFF 3D INSTRUMENTS SPAT CURVE

3.0 INSTRUMENTS



3.0 Instruments

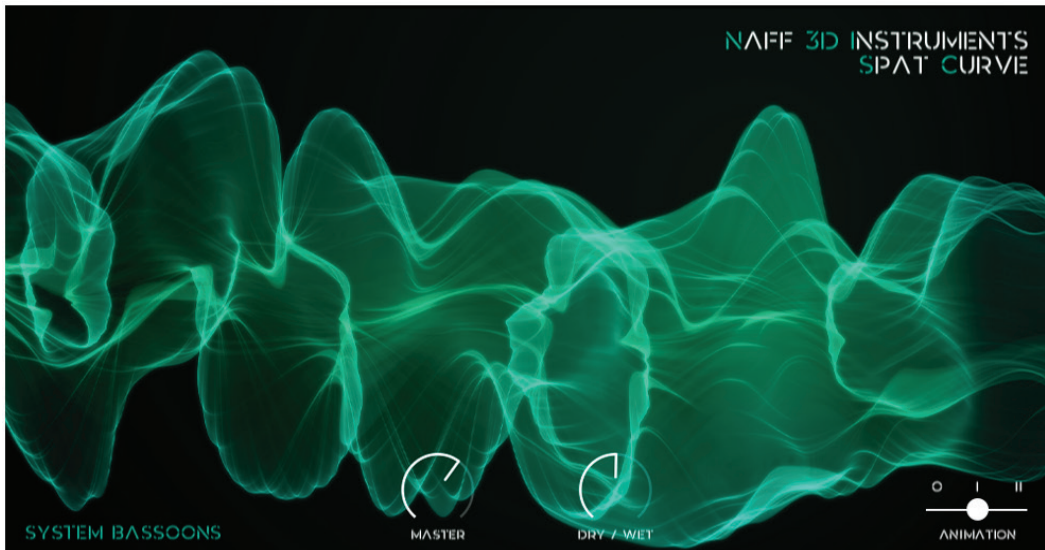
- All instruments follow the “Core Sample Strategies” described in Section 1.2.4.
- All instruments include graphic animation on the performance view, which can be either switched off or set to two different modes: Glow and Reactive. Please refer to Section 3.9.
- There are three main engines: 1 knob (Master Volume) for the Fermions / 2 knobs (Master Volume + Dry/Wet level) for most of the instruments / Multi-knob (Mixing Console) for the 3D Drums Instrument.



- All instruments use a high number of simultaneous voices, due to the multi-directional nature of the sources, which is why we need an acceptable computer power. This should be respected, although it can be mentioned that lowering the number of voices may produce, in some percussive sounds, interesting creative results. In general, you must respect the number of voices and always maintain a very high number of them.

3.0 Instruments

3.1. SYSTEM BASSOONS



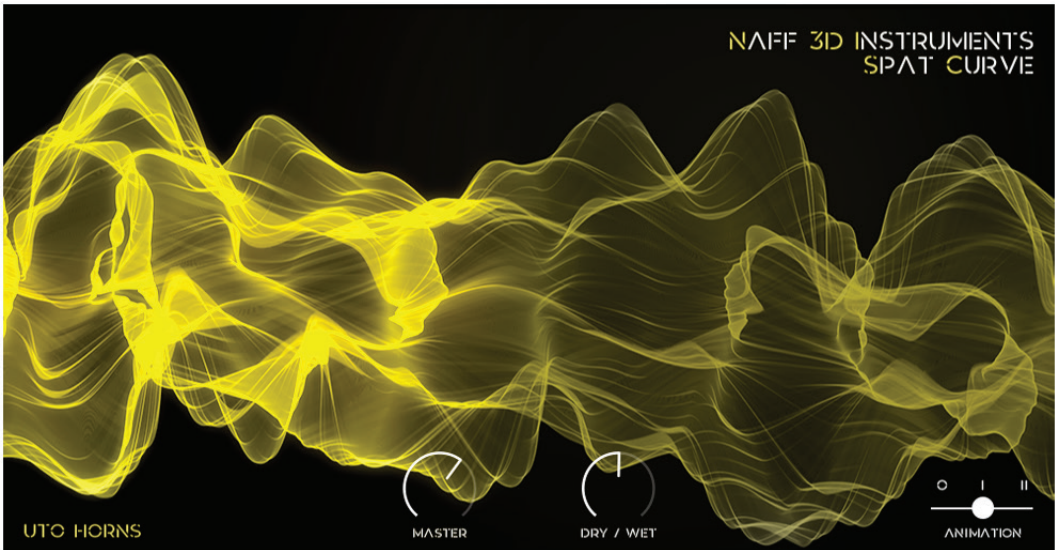
GENERAL	SOURCE	Four-piece bassoon ensemble distributed around the ears.
	DESCRIPTION / BEHAVIOR	Processed bassoon ensemble; non-localizable, 3D “surround feel”; effect movement depending on musical dynamics (slow for low velocities, fast for high velocities); pitch bend; live and studio options to different timbres via modulation wheel: vibrato and flutter.
	KNOBS (automatable)	<ul style="list-style-type: none">• Master Volume.• Dry/Wet balance.

OPTIONS	MODULATION WHEEL - POSITION	RESULT
		NORMAL (M.W. UP)
		VIBRATO (M.W. MIDDLE)
		FLUTTER (M.W. DOWN)






3.0 Instruments

3.2. UTO HORNS

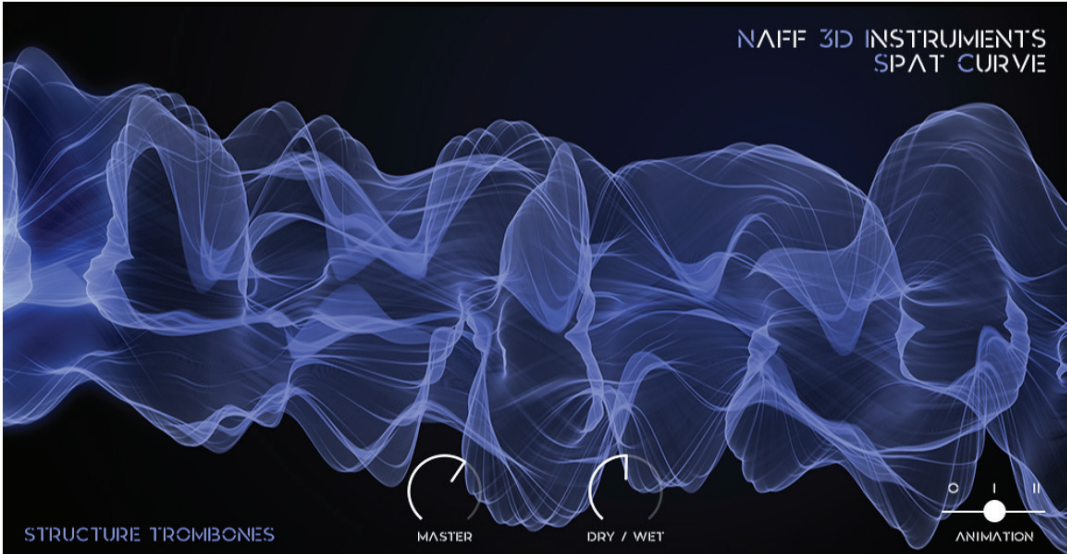


GENERAL	SOURCE	Eight-piece French Horn ensemble distributed around the ears.
	DESCRIPTION / BEHAVIOR	Processed horn ensemble; non-localizable, 3D “surround feel”; effect movement depending on musical dynamics (slow for low velocities, fast for high velocities); pitch bend; live and studio options to different behaviors via Modulation Wheel: long (pad), short (staccato), crescendo.
	KNOBS (automatable)	<ul style="list-style-type: none">• Master Volume.• Dry/Wet balance.



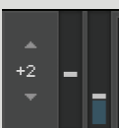

OPTIONS	MODULATION WHEEL - POSITION	RESULT
		LONG (M.W. UP)
		SHORT (M.W. MIDDLE)
		CRESCENDO (M.W. DOWN)

3.0 Instruments

3.3. STRUCTURE TROMBONES



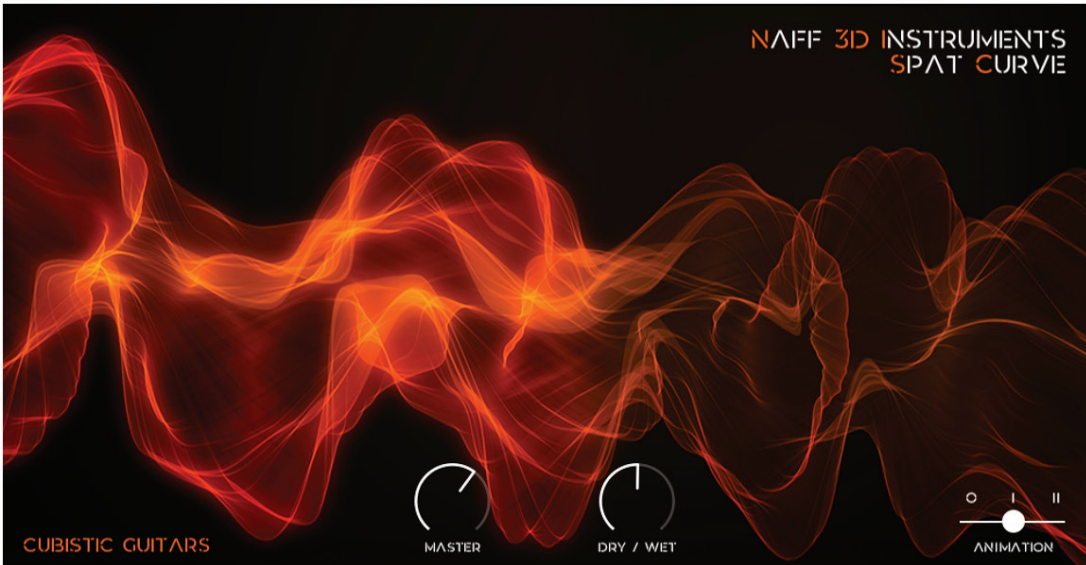
GENERAL	SOURCE	Full frontal trombone ensemble.
	DESCRIPTION / BEHAVIOR	Processed trombone ensemble; front-localizable, 3D FX; dry and effect movement depending on musical dynamics (slow for low velocities, fast for high velocities); pitch bend; live and studio options to different behaviors via Modulation Wheel: long (pad), short (attack), glissandi up, glissandi down.
	KNOBS (automatable)	<ul style="list-style-type: none"> • Master Volume. • Dry/Wet balance.

OPTIONS	MODULATION WHEEL - POSITION	RESULT
		LONG (M.W. UP)
		SHORT (M.W. HALF-UP)
		GLISS DOWN (M.W. HALF-DOWN)
		GLISS UP (M.W. DOWN)



3.0 Instruments

3.4. CUBISIC GUITARS

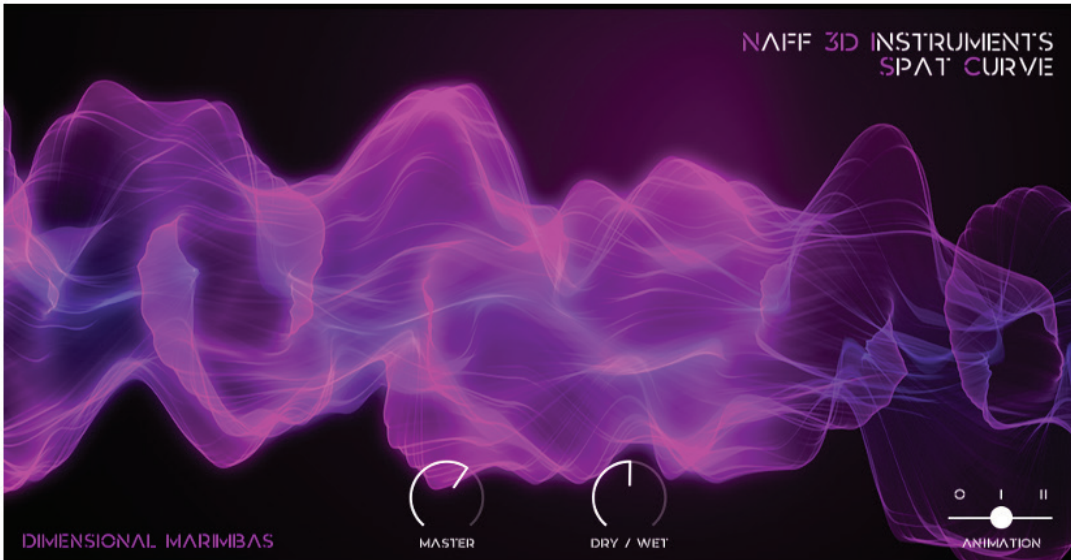


GENERAL	SOURCE	Full frontal trombone ensemble.
	DESCRIPTION / BEHAVIOR	Processed trombone ensemble; front-localizable, 3D FX; dry and effect movement depending on musical dynamics (slow for low velocities, fast for high velocities); pitch bend; live and studio options to different behaviors via Modulation Wheel: long (pad), short (attack), glissandi up, glissandi down.
	KNOBS (automatable)	<ul style="list-style-type: none">• Master Volume.• Dry/Wet balance.



OPTIONS	MODULATION WHEEL - POSITION	RESULT
		NORMAL (M.W. UP)
		MUTE (M.W. HALF-UP)
		GLISS DOWN (M.W. HALF-DOWN)
		GLISS UP (M.W. DOWN)

3.0 Instruments

3.5. DIMENSIONAL MARIMBAS



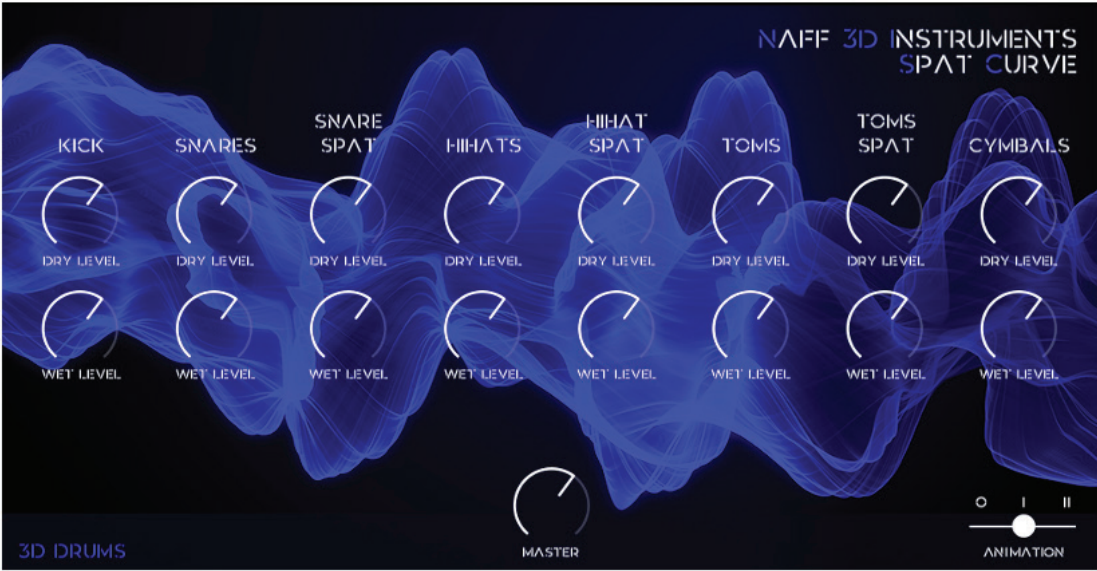
GENERAL	SOURCE	Four-piece bassoon ensemble distributed around the ears.
	DESCRIPTION / BEHAVIOR	Processed marimba; unpredictable soft-localization (each note has a different position); effect movement depending on musical dynamics (slow for low velocities, fast for high velocities); live and studio options to different behaviors via Modulation Wheel: normal and random glissandi.
	KNOBS (automatable)	<ul style="list-style-type: none"> • Master Volume. • Dry/Wet balance.

OPTIONS	MODULATION WHEEL - POSITION	RESULT
		NORMAL (M.W. UP)
		RANDOM GLISS (M.W. DOWN)



3.0 Instruments

3.6. 3D DRUMS



GENERAL	SOURCE	Full Acoustic Drum Set; 3D sampled front-left-right.
	OVERVIEW	<ul style="list-style-type: none">• This set can remain 3D-frontal or 3D-spatial (moving around the 3D sound system) depending on the drummer's choices while playing live.• 9 RR / 5x natural dynamics.• All elements, unless indicated as "Spat", are frontal, or frontal leftright, with 3D moving effects (removable).• "Snare Spat", "Hi Hats Spat" and "Toms Spat" they all change position throughout the 3D sound system on each hit. Therefore, spatial rhythms can be created.• Toms can be configured to not move (except front-left and front-right as any recorded drum set), move only on high dynamics (high velocity) or move always. This achievable depending on what octave is chosen for the MIDI notes of the toms (see the full table below).• It is advisable to always use at least two drum pads for the snares and two HH pads. This way the drummer can choose, while playing live, when to remain frontally fixed and when to create spatial rhythms. Remember that spatial rhythms and effects take much of our perception attention and that good spatial music should always have contrasts and leave space for other instruments to move around too.• Note: spatially fixed toms, snares and cymbals (those who are not labelled as "spat") are grouped together due to Kontakt's channel limitations.

3.0 Instruments

3.6. 3D DRUMS

GENERAL	DESCRIPTION / BEHAVIOR	Complex; see separate table below.
	KNOBS (automatable)	<ul style="list-style-type: none"> • Master Volume. • 8x Dry level for each element. • 8x Wet level for each element. • Note: spatially fixed toms, snares and cymbals are grouped together due to Kontakt's channel limitations.

DESCRIPTION / BEHAVIOR

DRUM PART & FX	MIDI NOTE	INDIVIDUAL BEHAVIOR DESCRIPTION	GROUP BEHAVIOR DESCRIPTION	RESPONDS TO FADER AND BUS
KICK	C1	FRONT CENTER / DRY FIXED / MOVING FX	3D FIXED FRONT	"KICK" & "FX LEVEL / BUS 1 & 2
RIM SHOT	C#1	FRONT CENTER / DRY FIXED / MOVING FX		"SNARES" & "FX LEVEL / BUS 3 & 4
SNARE 1 (LOW)	D1	FRONT CENTER / DRY FIXED / MOVING FX		"SNARES" & "FX LEVEL / BUS 3 & 4
SNARE 2 (HIGH)	E1	FRONT CENTER / DRY FIXED / MOVING FX		"SNARES" & "FX LEVEL / BUS 3 & 4
TOM 5	F1	FRONT FAR RIGHT / DRY FIXED / MOVING FX		"TOMS" & "FX LEVEL / BUS 7 & 8
TOM 4	G1	FRONT MID RIGHT / DRY FIXED / MOVING FX		"TOMS" & "FX LEVEL / BUS 7 & 8
TOM 3	A1	FRONT CENTER / DRY FIXED / MOVING FX		"TOMS" & "FX LEVEL / BUS 7 & 8
TOM 2	B1	FRONT MID LEFT / DRY FIXED / MOVING FX		"TOMS" & "FX LEVEL / BUS 7 & 8
TOM 1	C2	FRONT FAR LEFT / DRY FIXED / MOVING FX		"TOMS" & "FX LEVEL / BUS 7 & 8
HH HIT	F#1	FRONT MID RIGHT / DRY FIXED / MOVING FX		"HIHATS" & "FX LEVEL / BUS 5 & 6
HH PEDAL	G#1	FRONT MID RIGHT / DRY FIXED / MOVING FX		"HIHATS" & "FX LEVEL / BUS 5 & 6
HH SOFT OPEN	A#1	FRONT MID RIGHT / DRY FIXED / MOVING FX		"HIHATS" & "FX LEVEL / BUS 5 & 6
HH OPEN	C3	FRONT MID RIGHT / DRY FIXED / MOVING FX		"HIHATS" & "FX LEVEL / BUS 5 & 6
HH CUT	C#3	FRONT MID RIGHT / DRY FIXED / MOVING FX		"HIHATS" & "FX LEVEL / BUS 5 & 6
CYMBAL 1 (CHINA)	C#2	UP FRONT FAR LEFT / DRY FIXED / MOVING FX		"CYMBALS" & "FX LEVEL / BUS 9 & 10
CYMBAL 1 CUT (CHINA)	D2	UP FRONT FAR LEFT / DRY FIXED / MOVING FX		"CYMBALS" & "FX LEVEL / BUS 9 & 10



3.0 Instruments

3.6. 3D DRUMS

DRUM PART & FX	MIDI NOTE	INDIVIDUAL BEHAVIOR DESCRIPTION	GROUP BEHAVIOR DESCRIPTION	RESPONDS TO FADER AND BUS
CYMBAL 2 (CRASH A)	E2	UP FRONT MID LEFT / DRY FIXED / MOVING FX		"CYMBALS" & "FX LEVEL / BUS 9 & 10
CYMBAL 2 CUT (CRASH A)	F#2	UP FRONT MID LEFT / DRY FIXED / MOVING FX		"CYMBALS" & "FX LEVEL / BUS 9 & 10
CYMBAL 3 (CRASH B)	G2	UP FRONT MID RIGHT / DRY FIXED / MOVING FX		"CYMBALS" & "FX LEVEL / BUS 9 & 10
CYMBAL 3 CUT (CRASH B)	G#2	UP FRONT MID RIGHT / DRY FIXED / MOVING FX		"CYMBALS" & "FX LEVEL / BUS 9 & 10
CYMBAL 4 (BELL RIDE)	D#2	MID UP FRONT AND MID LEFT / DRY FIXED / MOVING FX		"CYMBALS" & "FX LEVEL / BUS 9 & 10
CYMBAL 4 (RIDE)	F2	MID UP FRONT AND MID LEFT / DRY FIXED / MOVING FX		"CYMBALS" & "FX LEVEL / BUS 9 & 10
CYMBAL 5 (CRASH C)	A2	UP FRONT FAR RIGHT / DRY FIXED / MOVING FX		"CYMBALS" & "FX LEVEL / BUS 9 & 10
CYMBAL 5 CUT (CRASH C)	A#2	UP FRONT FAR RIGHT / DRY FIXED / MOVING FX		"CYMBALS" & "FX LEVEL / BUS 9 & 10

HH HIT SPAT	F#2	FRONT MID RIGHT / DRY STEP MOVEMENT / MOVING FX	3D SEQUENTIAL SPAT	"HH SPAT" & "FX LEVEL / BUS 13 & 14
SNARE 2 (HIGH) SPAT	E3	FRONT CENTER / DRY STEP MOVEMENT / MOVING FX		"SNR SPAT" & "FX LEVEL / BUS 11 & 12
TOM 5 SPAT ALL	F3	FRONT MID RIGHT / DRY STEP MOVEMENT / MOVING FX		"TOMS SPAT" & "FX LEVEL / BUS 15 & 16
TOM 4 SPAT ALL	G3	FRONT MID RIGHT / DRY STEP MOVEMENT / MOVING FX		"TOMS SPAT" & "FX LEVEL / BUS 15 & 16
TOM 3 SPAT ALL	A3	FRONT CENTER / DRY STEP MOVEMENT / MOVING FX		"TOMS SPAT" & "FX LEVEL / BUS 15 & 16
TOM 2 SPAT ALL	B3	FRONT MID LEFT / DRY STEP MOVEMENT / MOVING FX		"TOMS SPAT" & "FX LEVEL / BUS 15 & 16
TOM 1 SPAT ALL	C4	FRONT FAR LEFT / DRY STEP MOVEMENT / MOVING FX		"TOMS SPAT" & "FX LEVEL / BUS 15 & 16

TOM 5 SPAT DYN	F4	FRONT FAR RIGHT / DRY DYNAMICS-DEPENDENT MOVEMENT / MOVING FX	3D DYNAMICS SEQUENTIAL SPAT	COMBINATION OF THE ABOVE
TOM 5 SPAT DYN	G4	FRONT MID RIGHT / DRY DYNAMICS-DEPENDENT MOVEMENT / MOVING FX	LOW DYNAMICS: FRONT (FROM 3D FIXED FRONT)	COMBINATION OF THE ABOVE
TOM 5 SPAT DYN	A4	FRONT CENTER / DRY DYNAMICS-DEPENDENT MOVEMENT / MOVING FX	HIGH DYNAMICS: STEP SPAT (FROM 3D STEP SPAT)	COMBINATION OF THE ABOVE
TOM 5 SPAT DYN	B4	FRONT MID LEFT / DRY DYNAMICS-DEPENDENT MOVEMENT / MOVING FX		COMBINATION OF THE ABOVE
TOM 5 SPAT DYN	C5	FRONT FAR LEFT / DRY DYNAMICS-DEPENDENT MOVEMENT / MOVING FX		COMBINATION OF THE ABOVE

3.0 Instruments

3.6. 3D DRUMS

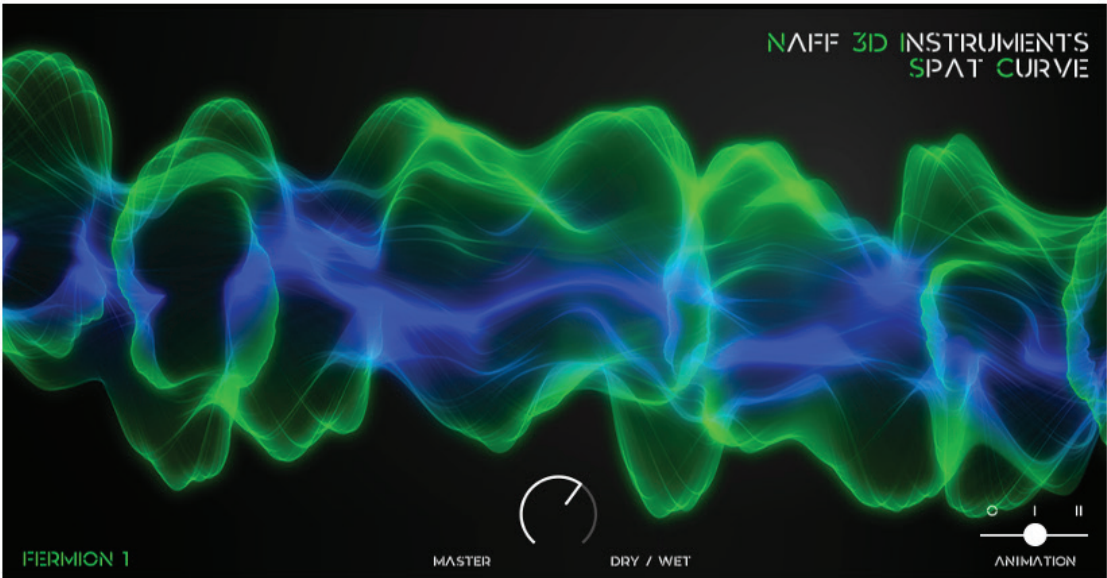
DRUM PART & FX	MIDI NOTE	INDIVIDUAL BEHAVIOR DESCRIPTION	GROUP BEHAVIOR DESCRIPTION	RESPONDS TO FADER AND BUS
KICK	C1	FRONT CENTER / DRY FIXED / MOVING FX	3D FIXED FRONT	"KICK" & "FX LEVEL / BUS 1 & 2
RIM SHOT	C#1	FRONT CENTER / DRY FIXED / MOVING FX		"SNARES" & "FX LEVEL / BUS 3 & 4
SNARE 1 (LOW)	D1	FRONT CENTER / DRY FIXED / MOVING FX		"SNARES" & "FX LEVEL / BUS 3 & 4
SNARE 2 (HIGH)	E1	FRONT CENTER / DRY FIXED / MOVING FX		"SNARES" & "FX LEVEL / BUS 3 & 4
TOM 5	F1	FRONT FAR RIGHT / DRY FIXED / MOVING FX		"TOMS" & "FX LEVEL / BUS 7 & 8
TOM 4	G1	FRONT MID RIGHT / DRY FIXED / MOVING FX		"TOMS" & "FX LEVEL / BUS 7 & 8
TOM 3	A1	FRONT CENTER / DRY FIXED / MOVING FX		"TOMS" & "FX LEVEL / BUS 7 & 8
TOM 2	B1	FRONT MID LEFT / DRY FIXED / MOVING FX		"TOMS" & "FX LEVEL / BUS 7 & 8
TOM 1	C2	FRONT FAR LEFT / DRY FIXED / MOVING FX		"TOMS" & "FX LEVEL / BUS 7 & 8
HH HIT	F#1	FRONT MID RIGHT / DRY FIXED / MOVING FX		"HIHATS" & "FX LEVEL / BUS 5 & 6
HH PEDAL	G#1	FRONT MID RIGHT / DRY FIXED / MOVING FX		"HIHATS" & "FX LEVEL / BUS 5 & 6
HH SOFT OPEN	A#1	FRONT MID RIGHT / DRY FIXED / MOVING FX		"HIHATS" & "FX LEVEL / BUS 5 & 6
HH OPEN	C3	FRONT MID RIGHT / DRY FIXED / MOVING FX		"HIHATS" & "FX LEVEL / BUS 5 & 6
HH CUT	C#3	FRONT MID RIGHT / DRY FIXED / MOVING FX		"HIHATS" & "FX LEVEL / BUS 5 & 6
CYMBAL 1 (CHINA)	C#2	UP FRONT FAR LEFT / DRY FIXED / MOVING FX		"CYMBALS" & "FX LEVEL / BUS 9 & 10
CYMBAL 1 CUT (CHINA)	D2	UP FRONT FAR LEFT / DRY FIXED / MOVING FX		"CYMBALS" & "FX LEVEL / BUS 9 & 10



3.0 Instruments

3.7. FERMIONS

3.7.1. FERMION 1



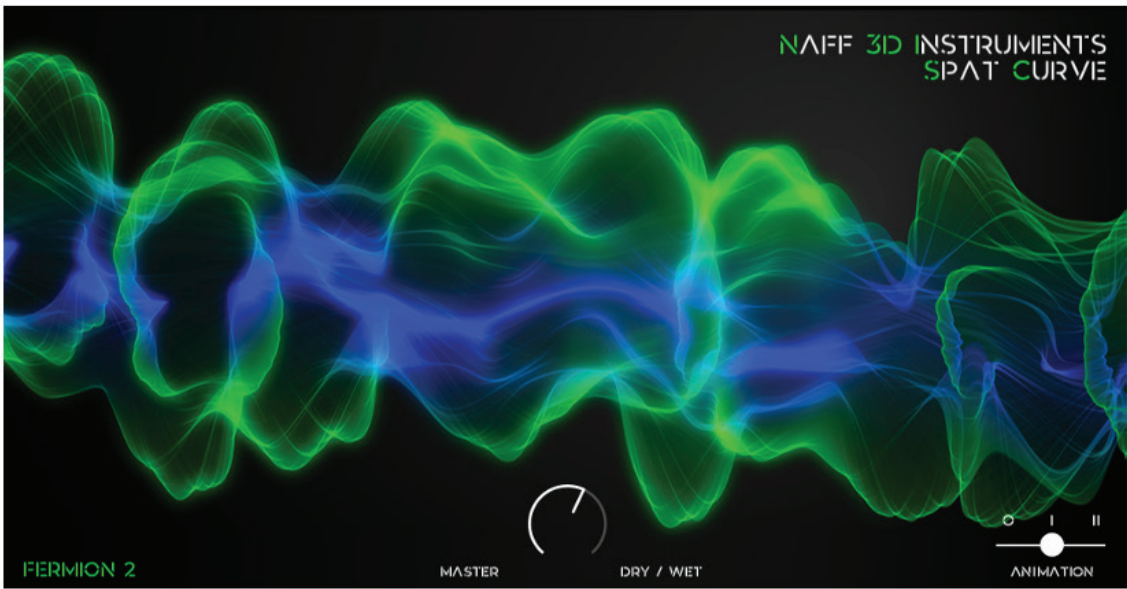
GENERAL	SOURCE	Original synthesis by NAFF; electronic 3D re-sampling.
	DESCRIPTION / BEHAVIOR	Aggressive electronic bass; extended pitch bend; three different behaviors via the Modulation Wheel: Spatial glissandi (5 RR), short anacrusis-like (5 RR) and steady-front.
	KNOBS (automatable)	• Master Volume.

O P T I O N S	MODULATION WHEEL - POSITION	RESULT
		SPATIAL GLISS (M.W. UP)
		SHORT ANACRUSIS (M.W. MIDDLE)
		STEADY FRONT (M.W. DOWN)

3.0 Instruments

3.7. FERMIONS

3.7.2. FERMION 2



GENERAL	SOURCE	Original synthesis by NAFF; electronic 3D re-sampling.
	DESCRIPTION / BEHAVIOR	Softer electronic bass; extended pitch bend; three different behaviors via the Modulation Wheel: spatial glissandi (5 RR), short anacrusis-like (5 RR) and steady-front.
	KNOBS (automatable)	• Master Volume.

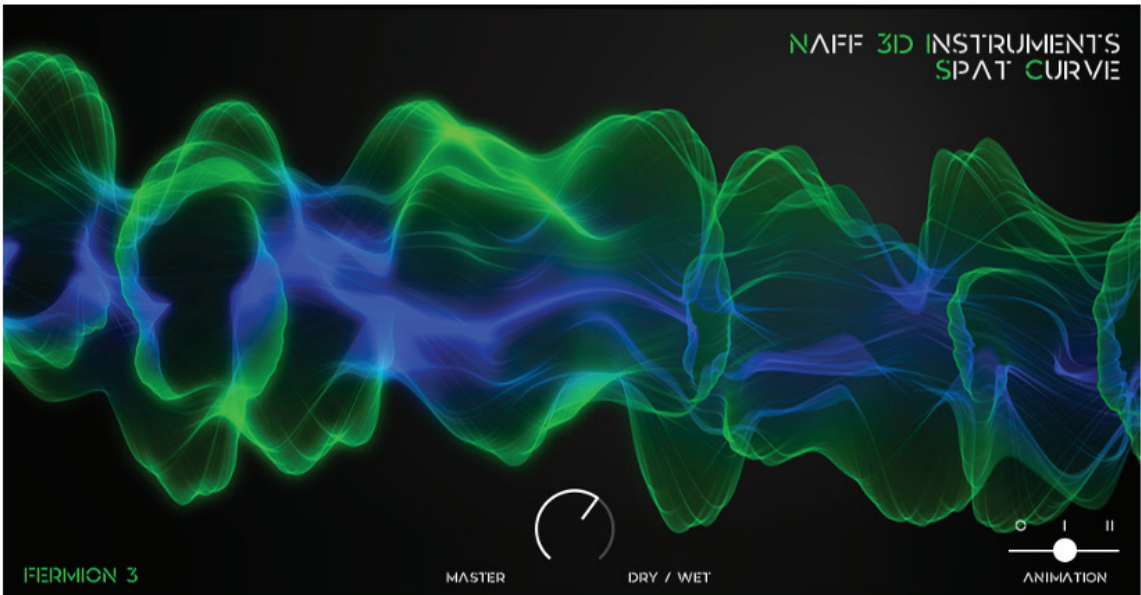
OPTIONS	MODULATION WHEEL - POSITION	RESULT
		SPATIAL GLISS (M.W. UP)
		SHORT ANACRUSIS (M.W. MIDDLE)
		STEADY FRONT (M.W. DOWN)





3.0 Instruments

3.7. FERMIONS

3.7.3. FERMION 3



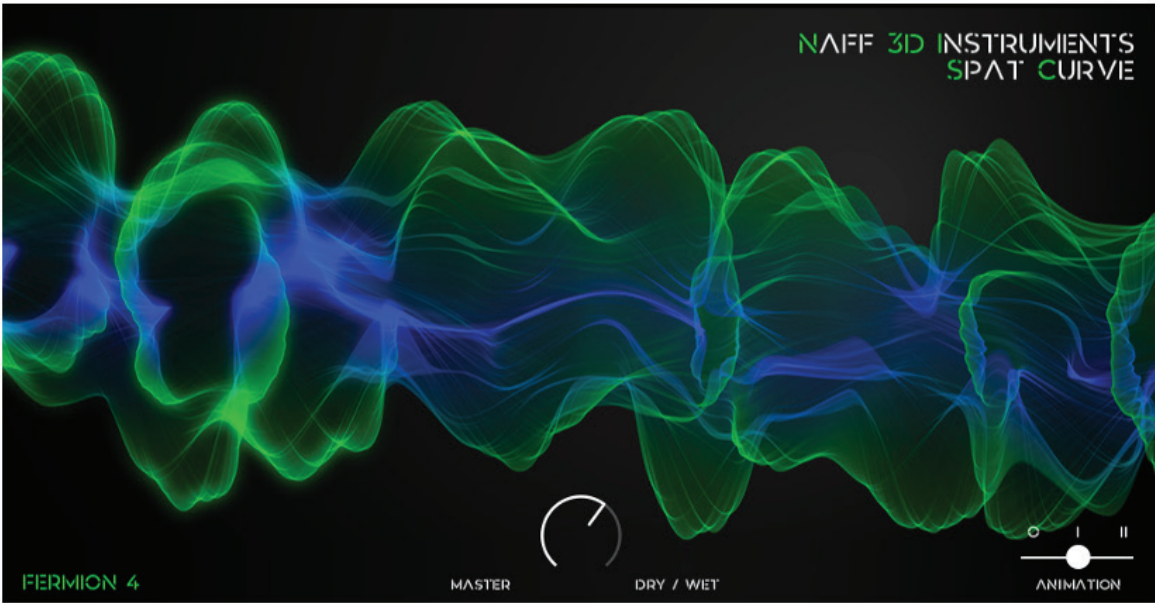
GENERAL	SOURCE	Original synthesis by NAFF; electronic 3D re-sampling.
	DESCRIPTION / BEHAVIOR	Aggressive electronic lead; extended pitch bend; two different behaviors via the Modulation Wheel: steady-front and 120 BPM synced spatial pulse with controllable speed via the expression slider (5 RR) and bar contraction via musical dynamics: <ul style="list-style-type: none">• PP - Slow (2 Bars @120BPM), low doppler.• P - Slow (1 Bar @120BPM), low doppler.• MF - Moderate (1/2 Bars @120BPM), moderate doppler.• F - Fast (1/4 Bars @120BPM), high doppler.• FF - Very fast (1/8 Bars @120BPM), highest doppler.
	KNOBS (automatable)	• Master Volume.

OPTIONS	MODULATION WHEEL - POSITION	RESULT
		STEADY FRONT (M.W. UP)
		SPATIAL PULSE (M.W. DOWN)

3.0 Instruments

3.7. FERMIONS

3.7.4. FERMION 4



GENERAL	SOURCE	Original synthesis by NAFF; electronic 3D re-sampling.
	DESCRIPTION / BEHAVIOR	Softer electronic lead; extended pitch bend; two different behaviors via the Modulation Wheel: steady-front and 120 BPM synced spatial pulse with controllable speed via the expression slider (5 RR) and bar contraction via musical dynamics: <ul style="list-style-type: none">• PP - Slow (2 Bars @120BPM), low doppler.• P - Slow (1 Bar @120BPM), low doppler.• MF - Moderate (1/2 Bars @120BPM), moderate doppler.• F - Fast (1/4 Bars @120BPM), high doppler.• FF - Very fast (1/8 Bars @120BPM), highest doppler.
	KNOBS (automatable)	• Master Volume.

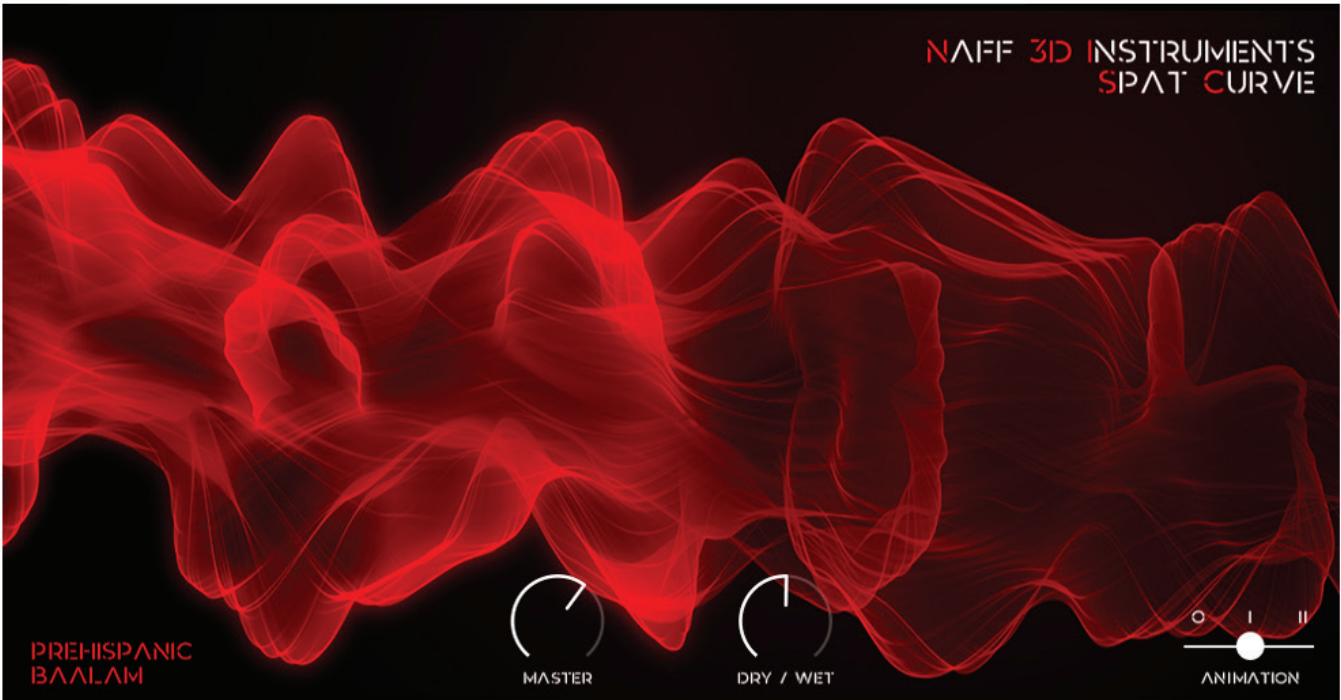
OPTIONS	MODULATION WHEEL - POSITION	RESULT
		STEADY FRONT (M.W. UP)
		SPATIAL PULSE (M.W. DOWN)



3.0 Instruments

3.8. PREHISPANIC

3.8.1. BAALAM

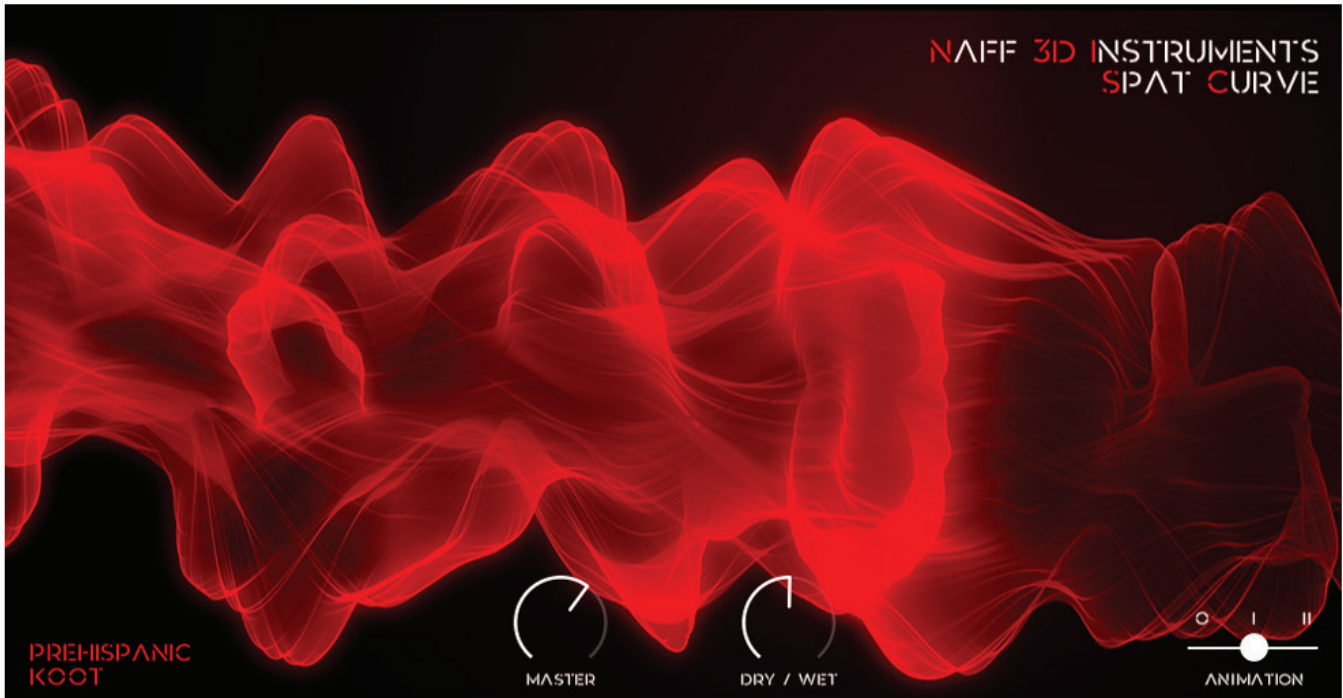


GENERAL	SOURCE	"Jaguar" whistle, 3D-front sampled.
	DESCRIPTION / BEHAVIOR	Processed "jaguar" whistle; dry and effect movement depending on musical dynamics (slow for low velocities, fast for high velocities); flat and soft-glissando behaviors with 3 RR, randomly distributed on different notes (no Modulation Wheel).
	KNOBS (automatable)	<ul style="list-style-type: none">• Master Volume.• Dry/Wet balance.

3.0 Instruments

3.8. PREHISPANIC

3.8.2. KOOT



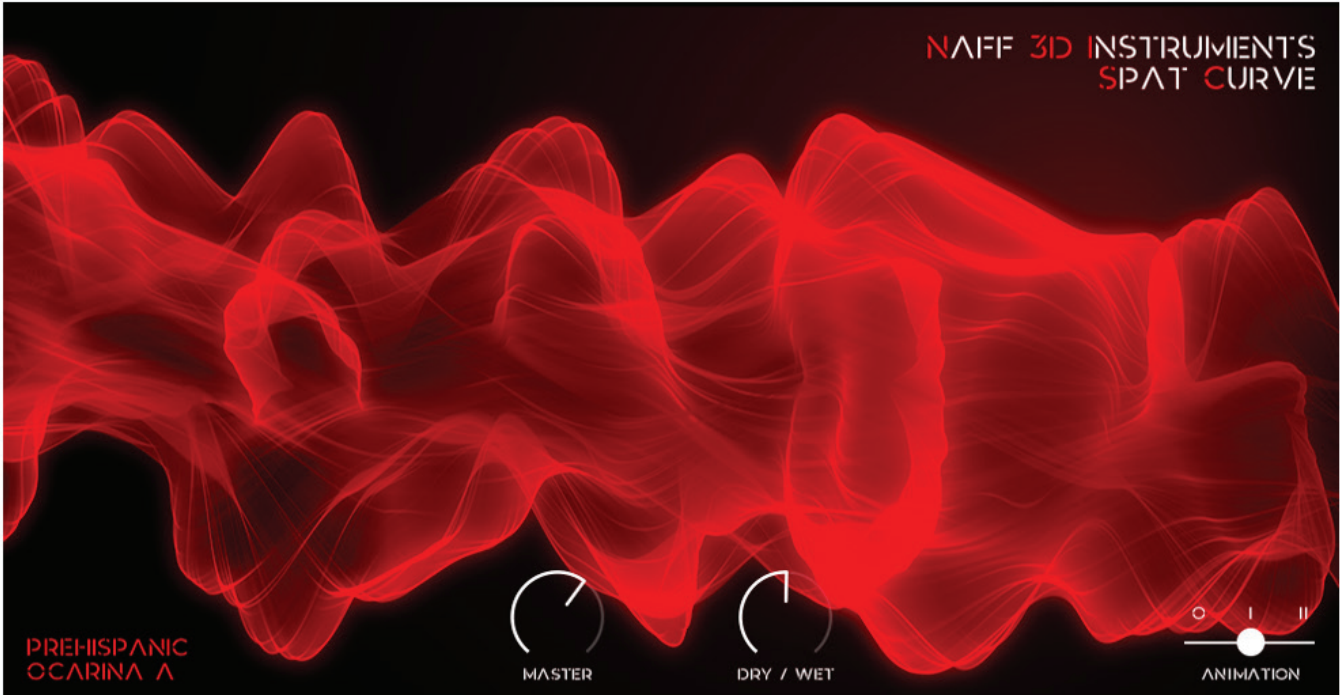
GENERAL	SOURCE	"Eagle" whistle, 3D-front sampled.
	DESCRIPTION / BEHAVIOR	Processed "eagle" whistle; dry and effect movement depending on musical dynamics (slow for low velocities, fast for high velocities); flat and soft-glissando behaviors with 3 RR, randomly distributed on different notes (no Modulation Wheel).
	KNOBS (automatable)	<ul style="list-style-type: none">• Master Volume.• Dry/Wet balance.



3.0 Instruments

3.8. PREHISPANIC

3.8.3. OCARINA A

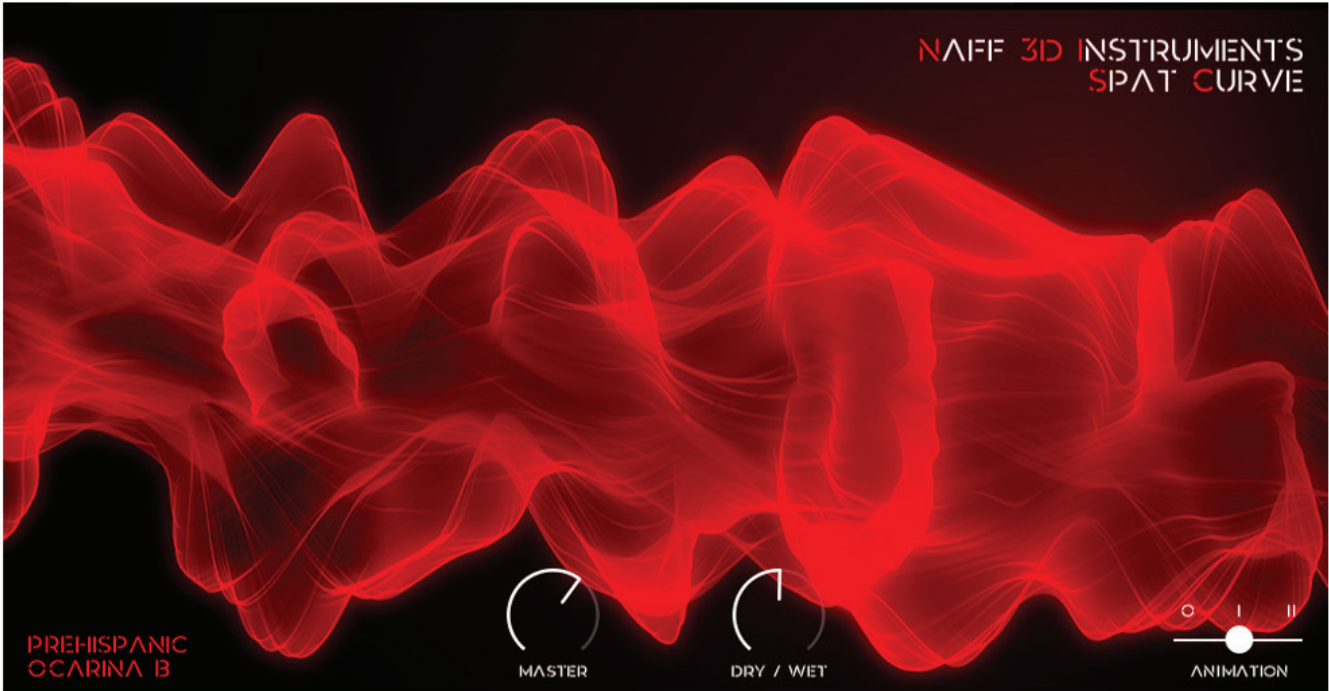


GENERAL	SOURCE	Type 1 “Ocarina” whistle, 3D-front sampled.
	DESCRIPTION / BEHAVIOR	Processed “ocarina” whistle; dry and effect movement depending on musical dynamics (slow for low velocities, fast for high velocities); flat, trill and soft-glissando behaviors with 3 RR, randomly distributed on different notes (no Modulation Wheel).
	KNOBS (automatable)	<ul style="list-style-type: none">• Master Volume.• Dry/Wet balance.

3.0 Instruments

3.8. PREHISPANIC

3.8.4. OCARINA B



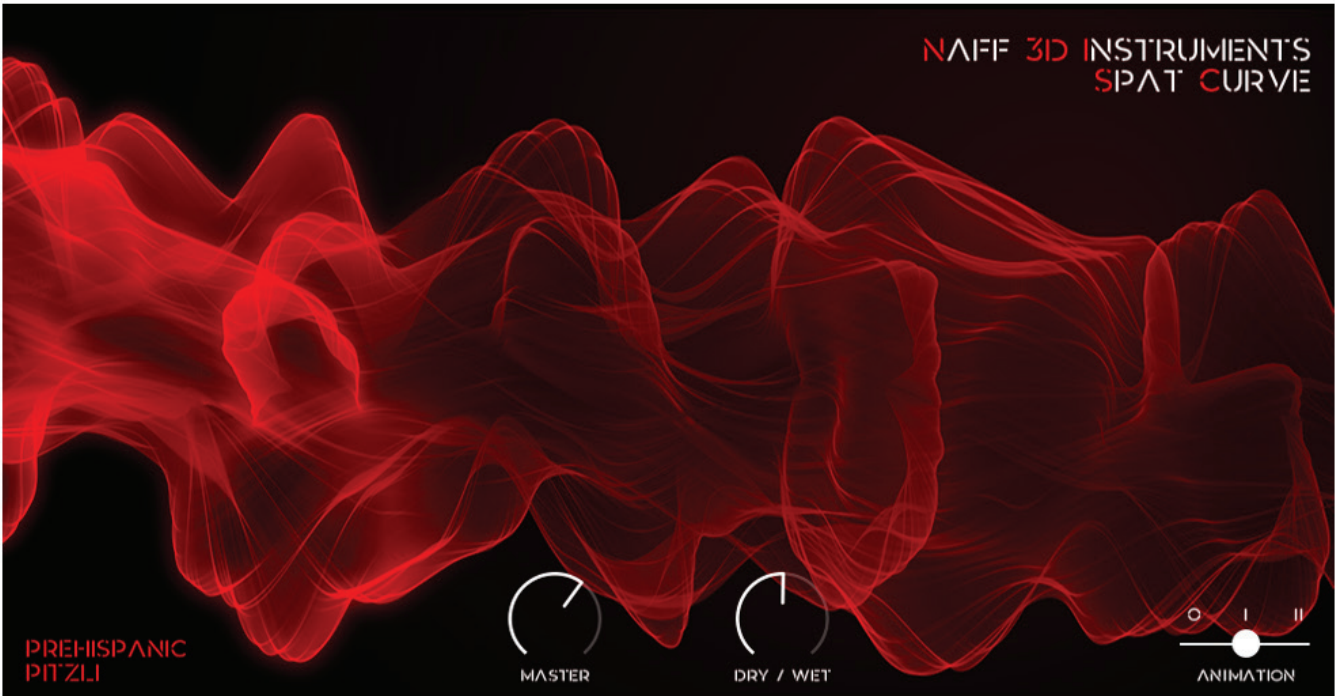
GENERAL	SOURCE	Type 2 “Ocarina” whistle, 3D-front sampled.
	DESCRIPTION / BEHAVIOR	Processed “ocarina” whistle; dry and effect movement depending on musical dynamics (slow for low velocities, fast for high velocities); flat, trill and soft-glissando behaviors with 3 RR, randomly distributed on different notes (no Modulation Wheel).
	KNOBS (automatable)	<ul style="list-style-type: none">• Master Volume.• Dry/Wet balance.



3.0 Instruments

3.8. PREHISPANIC

3.8.5. PIZTLI

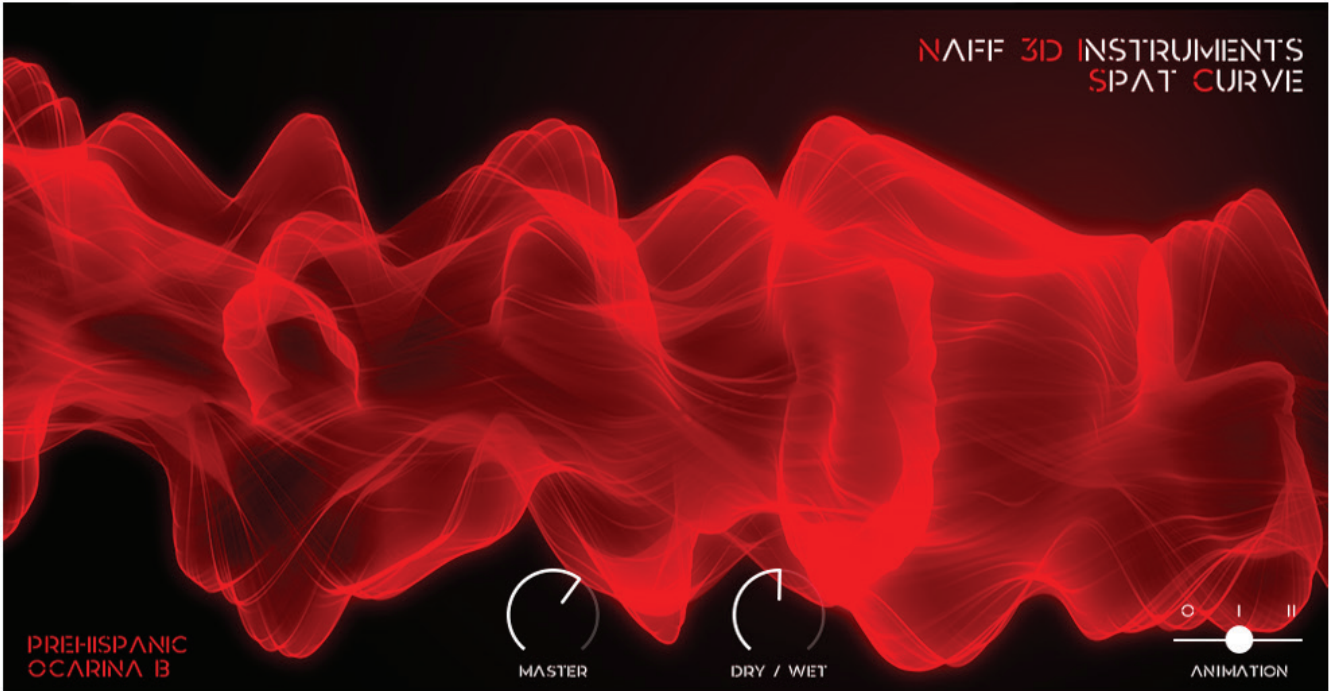


GENERAL	SOURCE	Ultra high pitched flute-like whistle, 3D-front sampled.
	DESCRIPTION / BEHAVIOR	Processed “flute” whistle; dry and effect movement depending on musical dynamics (slow for low velocities, fast for high velocities); “air-like”, long and short behaviors with 3 RR, randomly distributed on different notes (no Modulation Wheel).
	KNOBS (automatable)	<ul style="list-style-type: none">• Master Volume.• Dry/Wet balance.

3.0 Instruments

3.8. PREHISPANIC

3.8.6. UATEKI



GENERAL	SOURCE	Wooden stick-like percussion, 3D-front sampled.
	DESCRIPTION / BEHAVIOR	Processed wooden mini-percussion; each hit has a different and unpredictable location within the 3D sound system, making this instrument suitable for complex and random spatial rhythms; effect movement depending on musical dynamics (slow for low velocities, fast for high velocities); “tremolo” and hard-attack options with 18 different location RR, distributed on different octaves (no Modulation Wheel).
	KNOBS (automatable)	<ul style="list-style-type: none">• Master Volume.• Dry/Wet balance.



3.9. Animation on the Performance View

All instruments have a graphic background animation with 3 positions (via de slider-like knob).

ANIMATION OPTIONS

POSITION	VISUAL RESULT
0	OFF
I	GLOW
II	RECATIVE

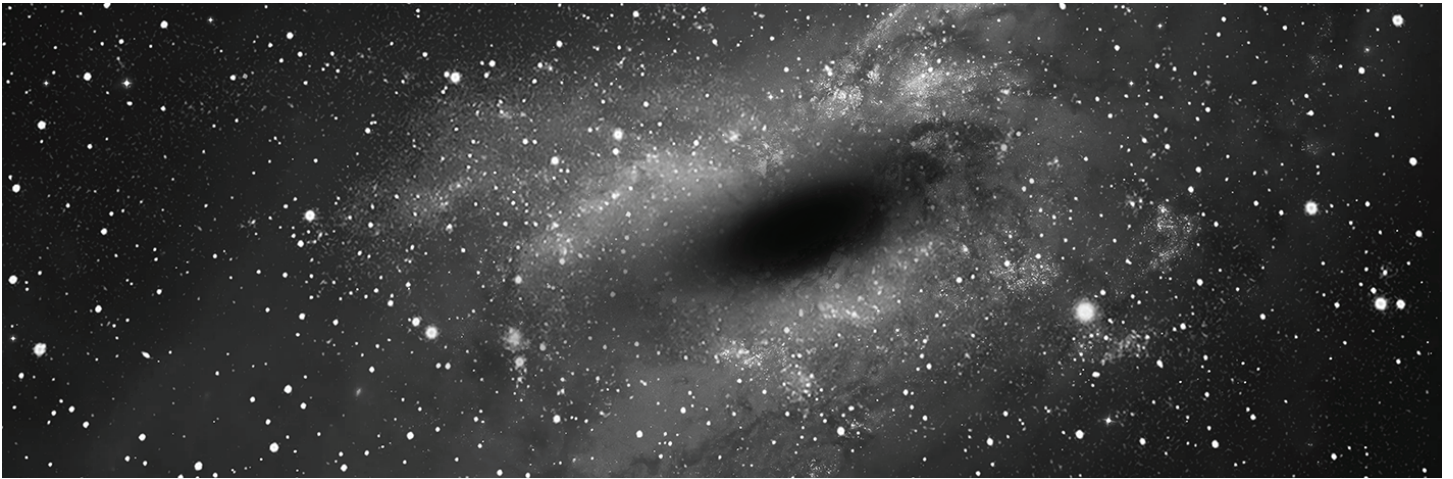
DESCRIPTION

OFF	No animation
GLOW	Subtle animation, not controllable, from left to right and right to left
REACTIVE	Reactive animation based on musical dynamics: low velocity animate via brightness a smaller area of the background and high velocity a larger area



4.0 Future

So far these instruments are mainly percussive-effective and/or texture-gesture-effective. It is up to the musician or composer to use them with musical taste. Spatial music can demand considerable perceptual attention from the listener, but since music always needs contrast and/or focus, fixed-frontal and 3D-moving resources here are very useful. These instruments comply with the adequate tools, both behavioral and timbral, for such a balanced purpose. However, future instruments from Nine Angles For Forte will be proposing a rather conceptual approach based on important physics concepts, as well as on the extrapolation of folk musical gestures. Stay tuned!



5.0 Troubleshooting

- All troubleshooting regarding Kontakt 7, Native Access and library installation issues should be dealt directly with Native Instruments.
- All troubleshooting related to Nine Angles For Forte's SPAT CURVE should only involve output configuration issues, for which Section 2.2 must be carefully studied and tested.
- For any other issues please contact Nine Angles For Forte directly (see below)



6.0 Credits

3D Instruments Design and Production: Pablo García-Valenzuela.

Audio Editing Assistants: Leonora Pérez Bouchot, Oscar Eduardo Mayorga Leal, Ricardo López Hernández.

Performance View Graphics Designer: Alex Vergara.

Product Artwork: Emiliano Minjarez and Gerardo Castro.

Instrument Scripting: Kornilios Kiriakidis

NKS Integration: Theodore Chatzilamprou

Video Director: Emiliano Minjarez.

Head of Led Installation: Marcos Sánchez.

Led Soldering and Technical Assistance: Leonora Pérez Bouchot, Oscar Eduardo Mayorga Leal.

Guest Drummer: Luis Miguel Costero

Design and Layout: Gerardo Castro (Jerry King) - Jk-ArtStudio.

Recorded and Filmed at NAFF [STUDIO]

Music by: NAFF

www.naff.mx

7.0 Contact

www.naff.mx

www.naff.mx/3Dinstruments

3dinstruments@naff.mx

YouTube channel and Social Media



N A F F . 9 A F F

[W www.naff.mx](http://www.naff.mx) [M 3dinstruments@naff.mx](mailto:3dinstruments@naff.mx)

N I N E A N G L E S F O R F O R T E