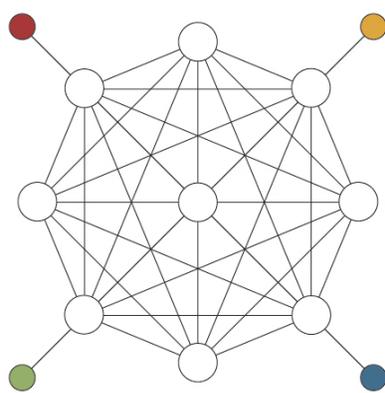
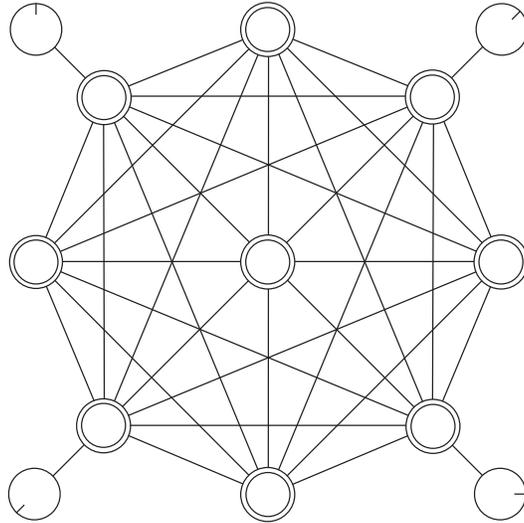


# ndial

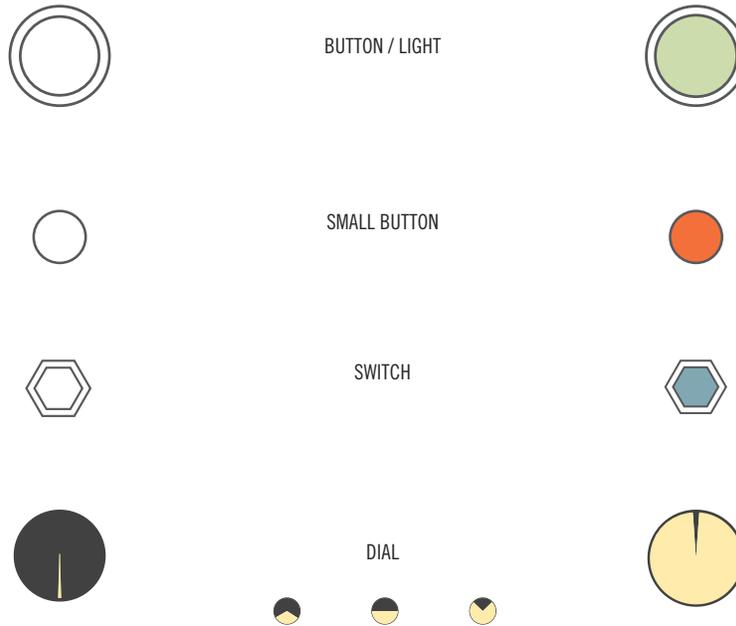


CONTROLS AND OPERATIONS



The purpose of this manual is to describe the functions and controls of the ndial interface. The ndial connects to a computer and running a software program that selects samples at random from a live or prerecorded sound source and maps them to the interface. Broadly, the ndial is an 8-step sampling sequencer that goes around instead of along. From the interface, a player can match pulses, record live samples, manually manipulate patterns, add effects and reanimate materials in time. Samples are displayed as glowing buttons on the ndial's surface, providing visual feedback and encouraging players to experiment with geometric patterns. The system combines the expressive nature of a musical instrument with the unpredictability of playing a game, and because control of the sound worlds is limited, preconceived strategies give way to the matters at hand.

# CONTROLS



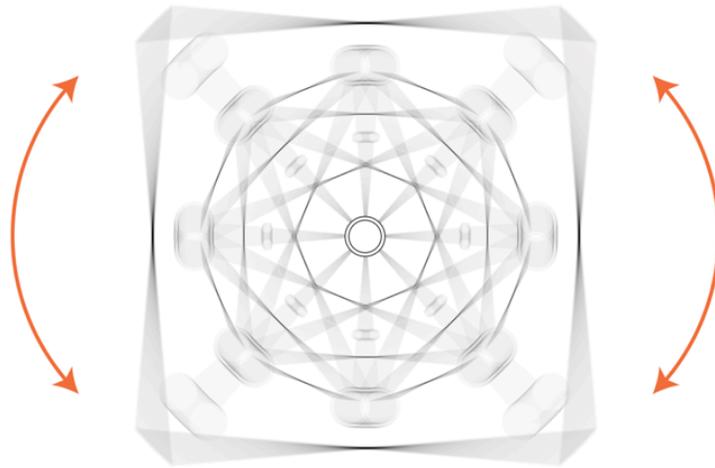
# QUICK START

The fastest way to get up and running. Using default sound worlds and effects.  
For new players, reading the manual first is encouraged.

1. [Download Onism software.](#)
2. Plug ndial into computer via USB. Center light will turn on.
3. Open Onism and click “connect” in the software (green).
4. Shuffle the ndial.

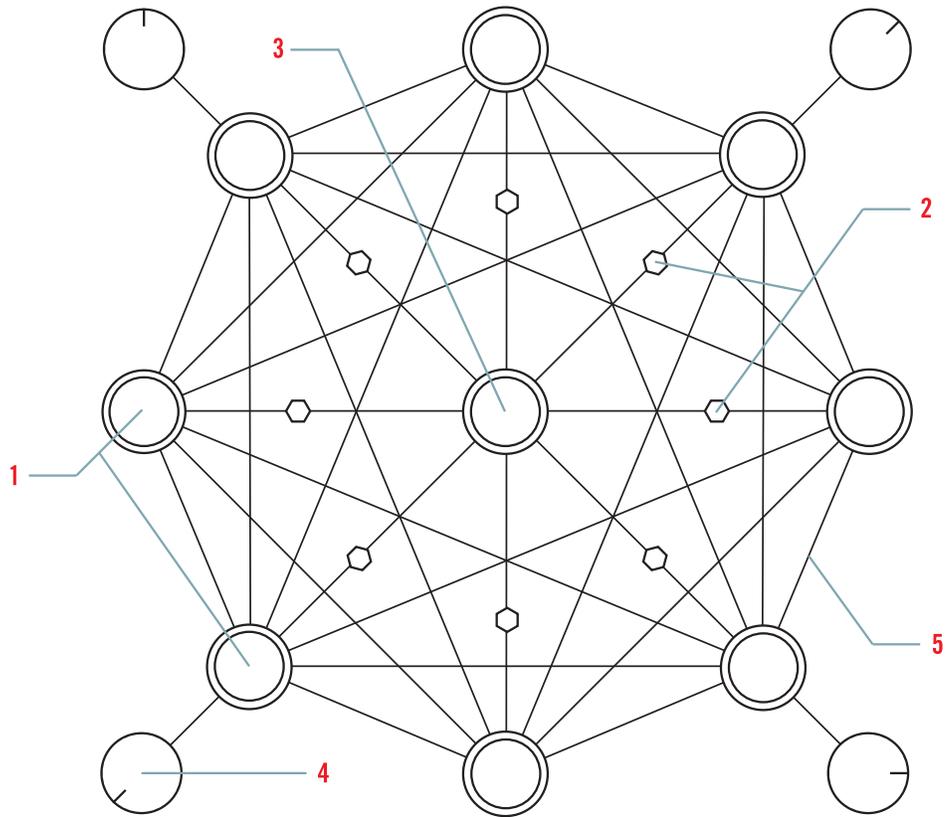
# SHUFFLING

One of the first things that you will notice is that the dial spins. It has an internal gyroscope that measures angular momentum and if the dial is turned abruptly, it chooses eight new sound events from the active world and maps them to the steps of the interface, shuffling the samples. The sensitivity is such that slight movements won't trigger a shuffling, it requires a decisive turn. It is the player asking the program to deal again.



There is no simple way for the player to choose specific samples for a particular step. There are plenty of hardware and software systems that have this functionality, but the dial is not built for realizing preconceived patterns. The shuffling mechanism forces the player to let go and explore potentials that cannot be figured beforehand. In navigating the unpredictable, we are forced to actively listen; refiguring musical expression as emerging from the interplay of people, technologies and references/materials, rather than from the mind of a composer or improviser alone.

# INTERFACE



- 1 TRIGGER BUTTONS
- 2 ON/OFF TOGGLES
- 3 SHIFT BUTTON / POWER LIGHT
- 4<sup>1</sup> STEPS DIAL / SEND 1
- 4<sup>2</sup> RANDOMNESS DIAL / SEND 2
- 4<sup>3</sup> DRY VOLUME / PULSE DIVISION
- 4<sup>4</sup> PITCH DIAL / SEND 3
- 5 PATTERN

## 1 TRIGGER BUTTONS

Momentary glowing arcade-style push buttons function as both indicators (actuators) and triggers (sensors). They are everything. When a step is triggered, its button glows. If a button is held the sequencer will repeatedly trigger the sample. If more than one button is held, the program will arpeggiate between them. Trigger buttons have additional functions when used in combination with the shift button, discussed below ( 3 ).

## 2 ON/OFF TOGGLES

Toggles turn steps on and off. The sequencer does not trigger a step that is toggled off. Toggles can create empty spaces in the pattern.

## 3 SHIFT BUTTON / POWER INDICATOR (THE LIGHT IS ON IF CONNECTED)

**Changing sound banks.** Like a shift key on a computer, pressing the center button remaps the trigger buttons and dials on the face of the ndial to access a second layer of control (Galaxy Level). If the player presses one of the trigger buttons while the center button is down the sound world associated with that button enters the queue. Next shuffle, that sound world will activate. Each of the 8 steps can be associated with a different recording, meaning 8 records (Sound Worlds) can be 'on call' and activated directly from the interface. The order of operations takes a bit of getting used to, but switching banks is a powerful technique for changing the direction of a trip.

**Secondary functions.** Each of the four dials have secondary functions as well, discussed in the dial descriptions below, but the way the ndial remaps the dials between layers is consistent. When the shift button is pressed, the system stores the dial's state and switches control to its secondary functions. When the shift button is released, the dial returns to its primary function, but turning the dial has no effect until the dial is turned past its stored state. The same is true in reverse for the secondary controls. This prevents data and thus sound from jumping when moving between control layers and allows one dial to control two continuous functions.

**Power.** The shift button glows when the device is on (connected to a computer).

## 4<sup>1</sup> STEPS DIAL / SEND<sup>1</sup>

The steps dial allows for changes to be made to the length of the sequences. A sequence can be 1 to 8 steps long and the dial is mapped in 8 equal sections. If the player truncates the sequence, to say, 5 steps, the excluded 3 steps are still active for triggering but will not automatically play in the sequence.

The steps dial introduces the first of three effects sends, which work much like a send on a mixer. Using the secondary function (shift+dial) the player sends the dry signal to a preconfigured effect. Effect 1 defaults to a long reverb but custom effects can be easily swapped in via the software.

## 4<sup>2</sup> CHAOS DIAL / SEND<sup>2</sup>

The chaos dial randomizes the steps. As the dial is turned clockwise the probability that the next step will be random increases. The algorithm is like picking numbers out of a hat. Steps are selected randomly until the last step is picked and the hat is empty, at which point all steps are again fair game. This method produces little step repetition but steps can be repeated manually using the triggers.

The second function is effect 2, a delay that is linked to the tempo, similar to a DJ echo. The architecture is the same, sending the dry signal to the specified effect.

## 4<sup>3</sup> DRY VOLUME DIAL / PULSE RESOLUTION

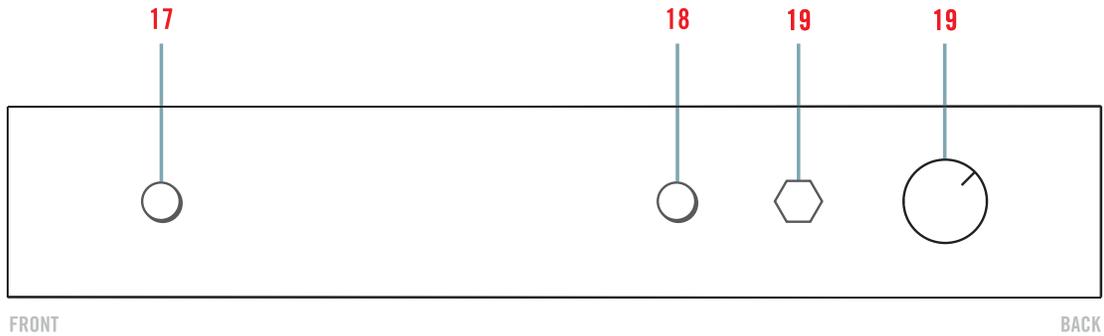
The dry volume dial affects the amplitude of all triggered events, but has no influence over the effect sends, allowing the player to remove the unprocessed samples from the mix, leaving only the effected sound.

The secondary function changes the pulse resolution. Divisions of 2, 4, 8, 16, & 32 allow for compression and expansion of the pattern within the pulse.

## 4<sup>4</sup> PITCH DIAL / SEND 3

The pitch dial stretches the reference recording (effecting both time and pitch) enabling the player to scale the frequency and time of the entire pattern. This function operates pre-send and adjustments to the pitch dial are also sent to the effects. The dial goes from 0% to 100% in half a turn, lingers for about 12 degrees at 100% (the original frequency/speed) and then continues at a steeper rate to 400%, providing more space to play on the slow'ing side of ordinary while adding range to the higher-faster end. The second function of the pitch dial is the last effect send (send 3), defaulting to a second reverb with a different character than effect 1.

## RIGHT



### 6 SAMPLE CHANGE BUTTON

If the player holds down a trigger button and then hits the sample change button, the system will randomly select a new sample for that step, allowing the player to change the sample of a single step without changing the entire pattern. For example, if samples are being pulled from bank A, the player can switch to bank B (or live mode) and use the button+shift method to change one of the steps, creating a pattern that combines elements from more than 1 source.

### 7 TAP TEMPO

The player can set or match tempos using the tap tempo button. It 'listens' to a series of presses and sets the pulse based on the averaged intervals. This function is helpful in synching to the beat of pre-existing players or material.

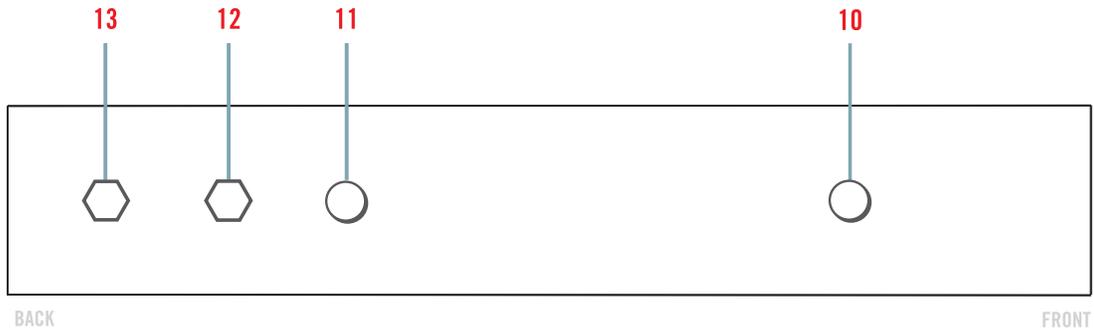
### 8 TEMPO TOGGLE

The pulse toggle changes the tempo mode. When on, pulled towards the front of the interface, the tempo is set by an external pulse. This allows multiple ndials to sync to the same clock. When pointing back towards the tempo dial, the tempo dial takes precedence and the external source and tap-tempo are both disabled.

### 9 TEMPO DIAL

The tempo dial adjusts the pulse speed of the sequence. Its range can be set in the software. Used along with the Pulse Resolution dial, the sequencer speed can be quite slow (around a second per step) or very fast (8 loops or 64 steps per second) Players may also set default tempos for each reference, thereby loading preset tempos when switching between banks (especially helpful with beat-based music in which the beat of the reference is retained).

# LEFT



## 10 CLEAR BUTTON

The clear button is like a panic button... clearing all samples. It can also be used as a method for instant silence. All samples and effects are cut! If the ndial is shuffled after being cleared it will repopulate the steps from whatever bank is selected and resume the sequence.

## 11 LIVE BUTTON

Holding down the live button records a live input and populates whatever bank is selected with the recorded events. The system looks for transients or sharp attacks and defines a new sample at each transient. Once the record button is released the samples are saved and available from the selected bank. Banks can be locked in the software to prevent certain banks from being overwritten.

## 12 RECORD TOGGLE

When the player flips the record toggle up, the NDIAL records the output to an audio file that is saved on the computer. This is a quick and easy way to record loops and patterns discovered while playing the NDIAL. Recorded files are saved to the desktop and labeled with the time of the recording.

## 13 MODE TOGGLE

**ndial** has two modes, pulse mode (toggle down) and free mode (toggle up). Pulse mode is the standard sequencer mode, automatically moving through steps in time and quantizing events to the beat. In free mode, the ndial is a triggering system, allowing players to play samples without being tethered to the beat. Changing modes can be used as a method for play, effectively starting and stopping the pattern without disrupting the sound like the clear button.

# FRONT



## 14 MASTER VOLUME DIAL

The master volume dial controls the amplitude of all the sound processed through the system. The dry signal, the effect sends, and master EQ, any live input, everything. The dial responds such that it corresponds to perceived amplitude.

## 15 EQ TOGGLE

Like the master volume dial, The EQ affects the entire sound. The EQ toggle is a three position toggle that is off in the center position. A high-pass filter is active when the toggle is up and down activates a low pass filter. The EQ can be used to sweep through the frequency content of a reference, isolate registers or change the overall quality of a sound world. The equalizing function is helpful for



## 16 CUTOFF FREQUENCY DIAL

The cutoff frequency of both the hi- and low-pass functions is manipulated via the cutoff frequency dial. The default range (adjustable in the software) is 50Hz on the low end and 5000KHz on the high end. The default range manipulates the most perceptually sensitive part of the sound spectrum, privileging perceptual affect over maximum range.

## BACK



### 17 USB INPUT

The **ndial** connects to a computer using a standard USB2 instrument cable. Plug in the USB cable before starting the software.

### 18 SYNC INPUT

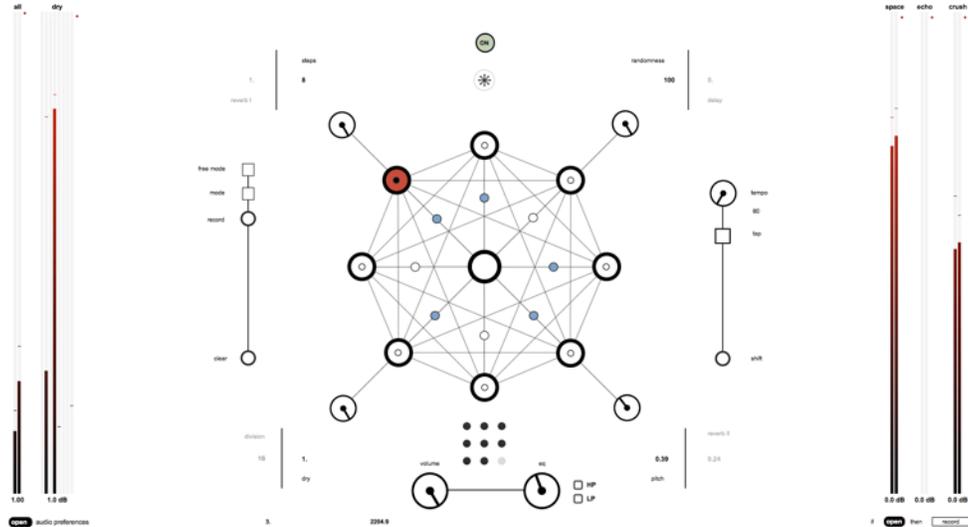
The sync input is an analog input, for connecting a photocell or distance sensor or any other type of analog sensor. The software looks for spikes in the incoming data and if the spikes exceed the threshold (which is adjustable in the software) the NDIAL will attempt to conform to the rhythm of the data spikes. This is useful for bringing outside information into the NDIAL system and synchronizing pulses across NDIALs. The sync input can also be remapped as an additional analog control, meaning the system can take cues from its environment. For instance, the amount of light can be mapped to overall tempo such that the pulse will slow down during a sunset.

### 19 TRIGGER OUTPUTS

The trigger outs extend NDIAL control into the environment. 8 digital triggers (with built-in 220ohm resistance) and 1 ground connection allow for easy connection to external lighting systems but they can also be used to trigger analog synthesizers, motors or microphones. Using the output triggers and simple external modules, one can easily create tightly synchronized mechanical or audiovisual experiences.

# ONISM

co-pilot program



The program is named Onism, a virtual replica of the ndial with additional options that let the player change effects, import new sound worlds and set default tempos and behaviors. Started as a quick way to randomly sequence samples in Max/MSP, Onism has grown to do many things, but Onism has never been rewritten, just added to. It projects well enough but is a huge mess inside.

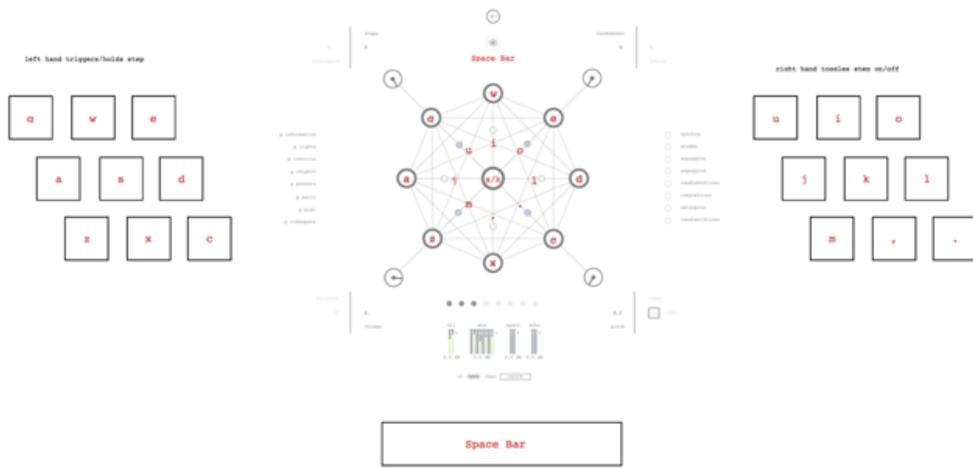


Figure 1 : Key Mode

F	1	<input type="radio"/>	80.	bartee
S	2	<input type="radio"/>	80.	chyp
F	3	<input type="radio"/>	80.	eggy
S	4	<input type="radio"/>	80.	mbira
F	5	<input checked="" type="radio"/>	80.	momo
F	6	<input type="radio"/>	80.	robyn
R	7	<input type="radio"/>	80.	watts
S	8	<input type="radio"/>	80.	arussell

All of the functions necessary for standard set-up of the ndial are available from the interface (presentation mode). There is also an ASCII mode that makes playing with Onism possible without the ndial, and, if you dig deeper, there are a few signposts to help guide you through the inner workings, but good luck. Email me with questions.

## 1 LOADING SOUND WORLDS AND SETTING TEMPOS

Sound Worlds are loaded using the panel in the upper right. Set samples (S) or file (F) or live recording (R) to tell Onism what type of sound world you are loading. You can drag and drop a folder of samples or a file into the name area to import a sound world. If you are recording a world live, make sure Onism has the correct input selected. Green arrows point to the active sound world.

Default tempos for each sound world are set to the left of the input field. When a new sound world is shuffled the sequence also sets the default tempo. To change sound worlds without changing tempos, see the Sample Change Button above.

## 2 CUSTOMIZING EFFECTS

There are three programmable effects that map to the secondary functions of dials 1, 2, & 3 respectively. The effects panel can be accessed from the main interface (via pop-up). To send to a custom effect, turn off the effect that you want to replace and just add a receive:e1 (for effect 1) as input to your effect and send:E1L and send:E1R (Stereo) out from your effect.

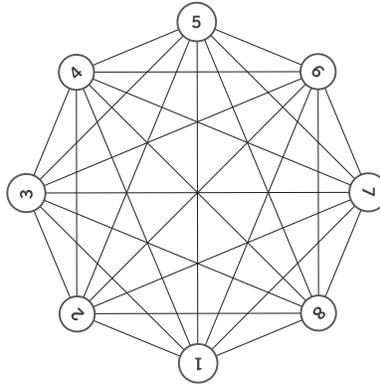
## 3 CONTROL MAPPINGS AND SENSITIVITY

You can change the control ranges for the four dials and the sensitivity of the shuffle gesture from the [control] pop up on the main interface panel.

## 4 FURTHER CUSTOMIZATION

External lighting controls, interface protocol, panning, and buffer control are also available from the front panel. To play around with the sequencing system you have to leave presentation mode. The internal signal flow general goes left to right.

# WORLDS



Each ndial accommodates up to eight sound worlds at a given time. A sound world can be made from a recording, a set of samples, or a live microphone/input. Sound world selection is an important aspect of playing the ndial. By choosing sound worlds, the player defines the universe in which they navigate.

Sound worlds are material. It doesn't matter if they are 8-bit fuzz, delicate paper crumpling, or Kate Bush songs, they are records of a past and they will push back and assert themselves. They will allow some trajectories, and refuse others. Some players head directly to points of friction. Other players look for hidden spaces between the samples. There is no right way to go, but worlds determine possibility spaces. Try different things. 50 people saying the word "no", the pizzicato movement of Tchaikovsky's fourth symphony, and applause recorded 9 seconds ago.

Each of these worlds presents different paths, a topology to navigate. Some world's are good for traveling far and hearing many spaces, other's require a more thorough search. If a player knows the source intimately, navigation becomes similar to reading a few selections from a favorite book. The horrors and constraints of building worlds live often prove worthwhile and can lead to wonderful places. Risk it. All worlds pulse, but you can freeze them. You can also just listen for while. This is not a race. There is always more time.