ASTRAL User's Manual

General Idea

ASTRAL is a probabilistic filter/sequencer. An input is connected to a filter group, and once the play button is clicked, filtered copies of the input will be heard. Timing and filtering properties of those copies depend on the state of filter group's parameters.

Each filter group can have its own input. Alternatively, many filter groups can share the same input. In ASTRAL an input should be a mono .wav file with maximum duration of 30 seconds.

ASTRAL's filter groups have independent generators that set timing of the filters. A filter group consists of many parameters. They include filter's cut-off frequency, amplitude, and location in the space. In addition, the filter impulse response's type, duration, harmonic content, and effects are also defined by the user.

In ASTRAL all of these filtering parameters are in fact random variables, each having its own probability distribution function.

Mixer Panel

In the mixer panel, the user can see, edit and visually compare basic filter parameters of all filter groups in real time.

1. Filter Group Name Row
   Click on the pencil icon to edit group notes.
2. Filter Group Impulse Response Row
   Click to open the impulse response window, to edit impulse response start and end time probability functions, and see the mean impulse response's Fourier transform magnitude (Mean filter's frequency response.) More information on the mean impulse response is provided later in the filter impulse response panel section of this document.
3. Filter Group Inputs Row
   Use dropdown to select the connected input. If no input is selected, only the impulse responses will be heard.
4. Filter Group Generators Row
   Click to open group's generator window to control the timing of filters.
5. Filter Group Solo Mute Row
6. Filter Group Amplitude Row
   Click to open group's amplitude window to edit its probability function.
7. Amplitude Function Button

Click to open group's amplitude function window to apply frequency-dependent adjustments to the filter amplitudes.

8. Filter Group Space Row
   Choose Stereo or 3D, and click on the space scene to open window and edit space probability functions.
9. Filter Group Frequency Row
   Click to open group's frequency window to edit its probability function.
10. Filter Group Mono Switch
    Click to bypass all space effects.
11. Filter Group Edit Dropdown
    Use to copy, paste and reset all group parameters.
12. Filter Group Impulse Switch
    Click to bypass filtering.
13. Mixer Side Bar
    Click to open the side bar to see the loaded inputs and probability surface control button. Click on an input to edit its start and end probability functions and see its mean Fourier transform magnitude.

Frequency / Amplitude panel

In this panel, users can define probability functions for frequencies and amplitudes of the filters
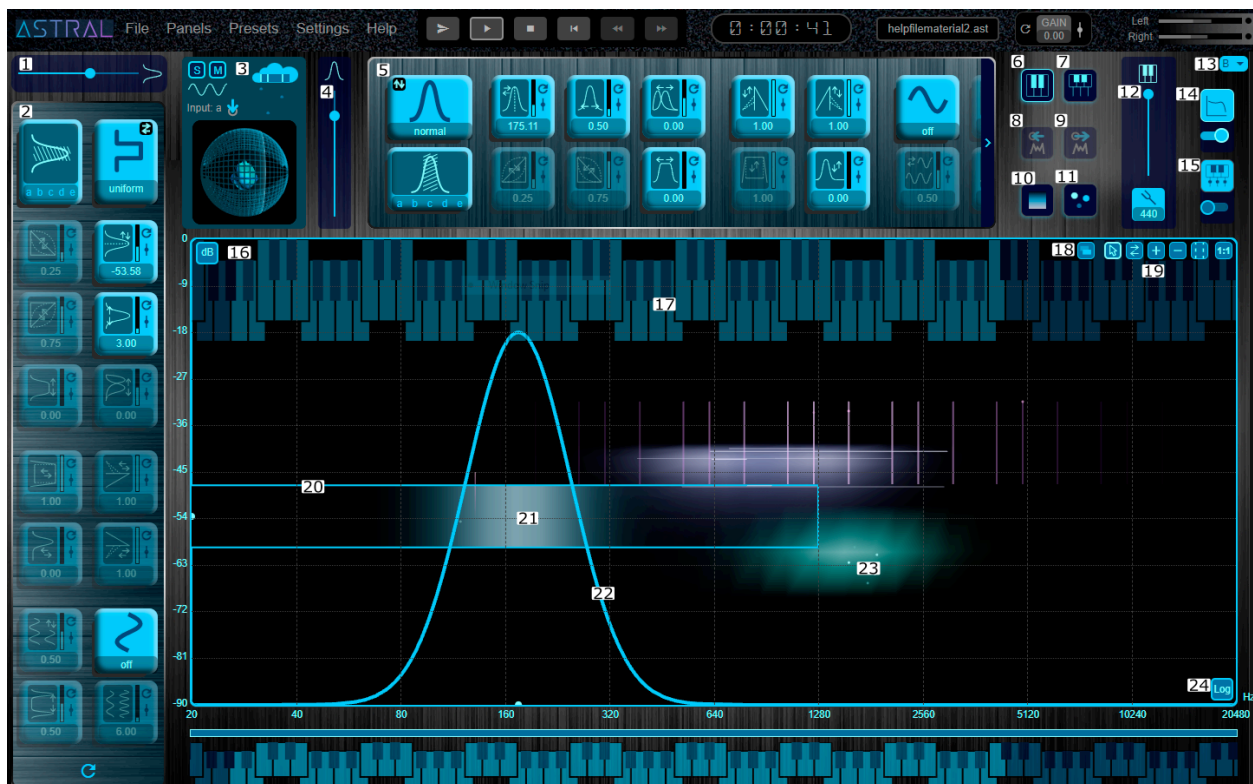
1- Amplitude Probability Function Scale Factor
   Use to scale the probability function. This only affects the visualization of the function but has no effect on the output sound.
2- Amplitude Probability Function Parameter Buttons
3- Filter Group Information Summary
4- Frequency Probability Function Scale Factor
   Use to scale the probability function. This only affects the visualization of the function but has no effect on the output sound.
5- Frequency Probability Function Parameter Buttons

6- Keyboard Toggle

7- Keyboard Lines Toggle

8- Connected Input's Fourier Transform Magnitude Toggle

9- Group's Mean Output Toggle

10- Probability Function Surface Controls

11- LEDs (Random Sample Visualizations) Controls

12- Keyboard Positioning and Tuning

   The tuning will also apply to the group's frequency grid.

13- Group Selector

14- Amplitude Function Button

   Click to open group's amplitude function window to apply frequency-dependent adjustments to filter amplitude values.

15- Frequency Grid Window

   Click to open group's frequency grid window to multiple the frequency probability function by a grid of specific pitches.

16- Amplitude axis dB / Linear Toggle

17- Standard Extended Keyboard

18- Use to switch between frequency and amplitude probability functions

19- Diagram Control Buttons

20- Amplitude Probability Function

21- Probability Surface

22- Frequency Probability Function

23- LEDs (Random Sample Visualizations)

24- Frequency axis Log / Linear Toggle

Frequency Grid Window
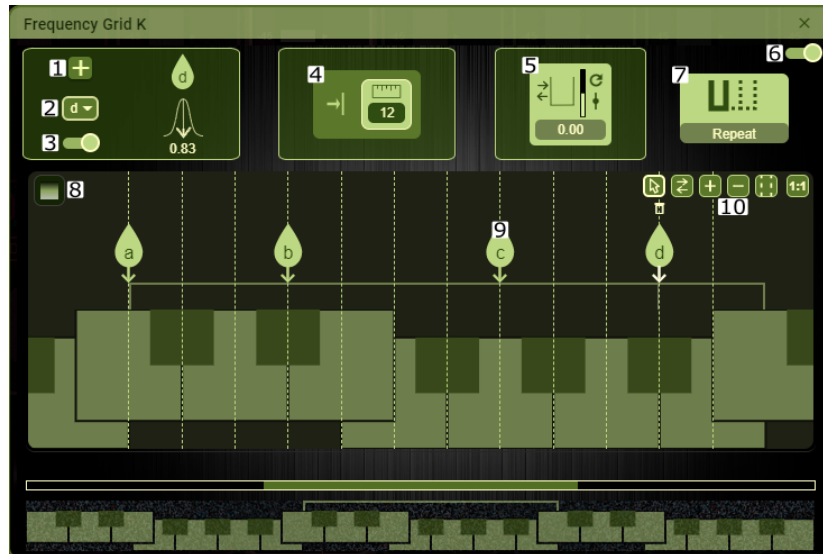
1- Add Node Button
   Use the button or double click above the keyboard
2- Select Node Menu
3- Node's Active / Inactive Switch
4- Ruler and Align Buttons
5- Frequency Grid Phase
6- Frequency Grid Active / Inactive Switch
7- Frequency Grid Type Selector
   Choose between a repeated octave pattern or a full-scale mode
8- Probability Surface Controls
9- A Frequency Grid Node
   Click to open window and edit probability function for its position
10- Diagram Control Buttons

Filter Impulse Response Panel

In this panel users can define characteristics of filter impulse responses in the time domain. These include general impulse response type, duration, added harmonic content, and impulse response effects.
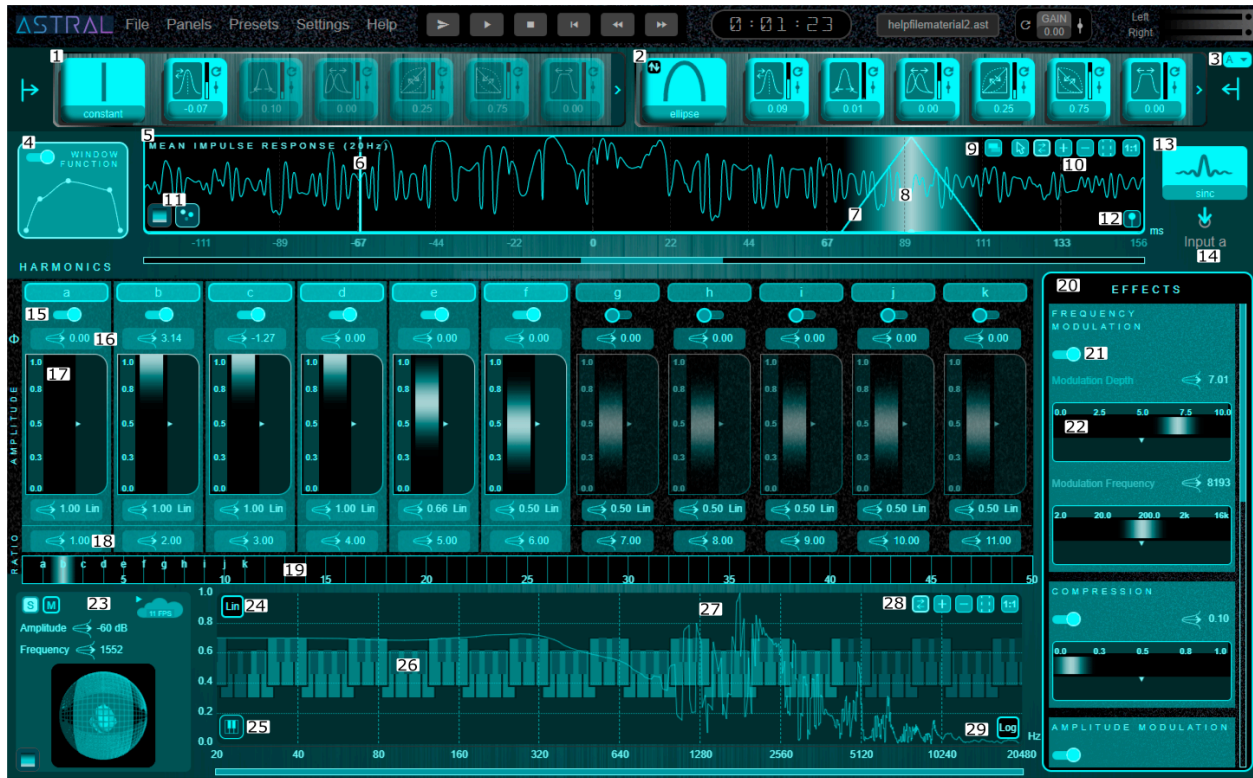
1- Impulse Response Start Time Probability Function Parameter Buttons

2- Impulse Response End Time Probability Function Parameter Buttons

3- Group Selector

4- Window Function
Click to open window and edit with spline points.

5- Normalized Mean Impulse Response Visualized at 20 Hz.
The mean impulse response is a signal calculated with the mean values of filter parameters.

6- Impulse Response Start Time Probability Function

7- Impulse Response End Time Probability Function

8- Probability Surface

9- Use to switch between start and end probability functions

10- Diagram Control Buttons

11- Probability Surface and LED Controls

12- Filter Group Impulse Switch
Click to bypass filtering.

13- Group's Impulse Response Type Selector

14- Group's Connected Input

15- Harmonic's Active / Inactive Switch

16- Harmonic's Phase
Click to open harmonic's phase window to edit its probability function.

17- Harmonic's Amplitude
Click to open harmonic's amplitude window to edit its probability function.

18- Harmonic's Ratio to Fundamental
Click to open harmonic's ratio window to edit its probability function.

19- Ratio to Fundamental Visualization Area

20- Harmonic Effects Window

21- Harmonic Effect's Active / Inactive Switch

22- A Harmonic Effect

Click to open a harmonic effect window to edit its probability function.

23- Filter Group Information Summary

24- Amplitude dB / Linear Toggle

25- Keyboard Toggle

26- Keyboard

27- Mean Impulse Response Fourier Transform Magnitude

28- Diagram Control Buttons

29- Frequency Log / Linear Toggle

Space Panel

If the software is in binaural mode, the space panel provides probability density functions coupled with recorded HRTFs to give users the freedom to control 3D localization of individual filters.
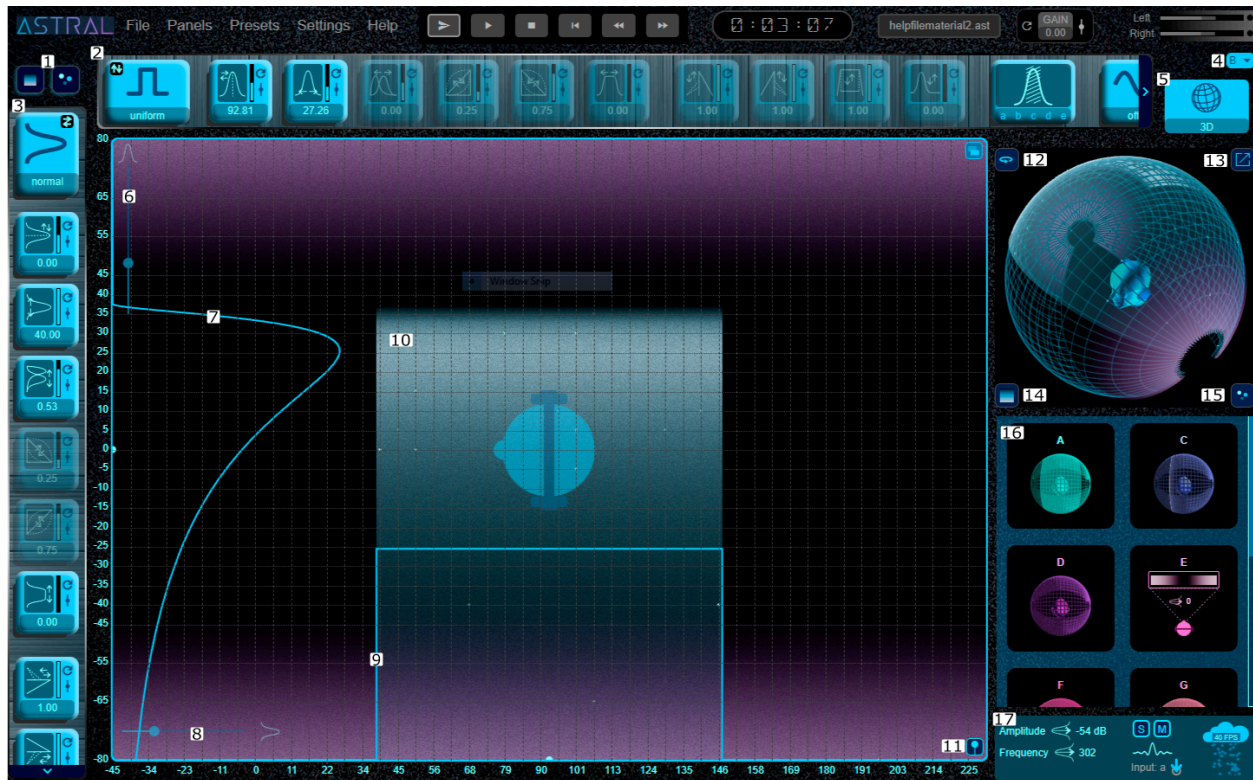
1- Probability Surface and LED Controls

2- Elevation Probability Function Parameter Buttons

3- Azimuth Probability Function Parameter Buttons

4- Group Selector

5- Group Space Type Selector

6- Elevation Probability Function Scale Factor

7- Azimuth Probability Function

8- Azimuth Probability Function Scale Factor

9- Elevation Probability Function

10- Probability Surface

11- Filter Group Mono Switch

Click to bypass all space effects.

12- Auto Rotate Toggle

13- Large View Toggle

14- Probability Surface Controls

15- LED (Random Sample Visualizations) Controls

16- Other Group's Current Space Distributions

Click to open a group's space window to edit its probability function(s).

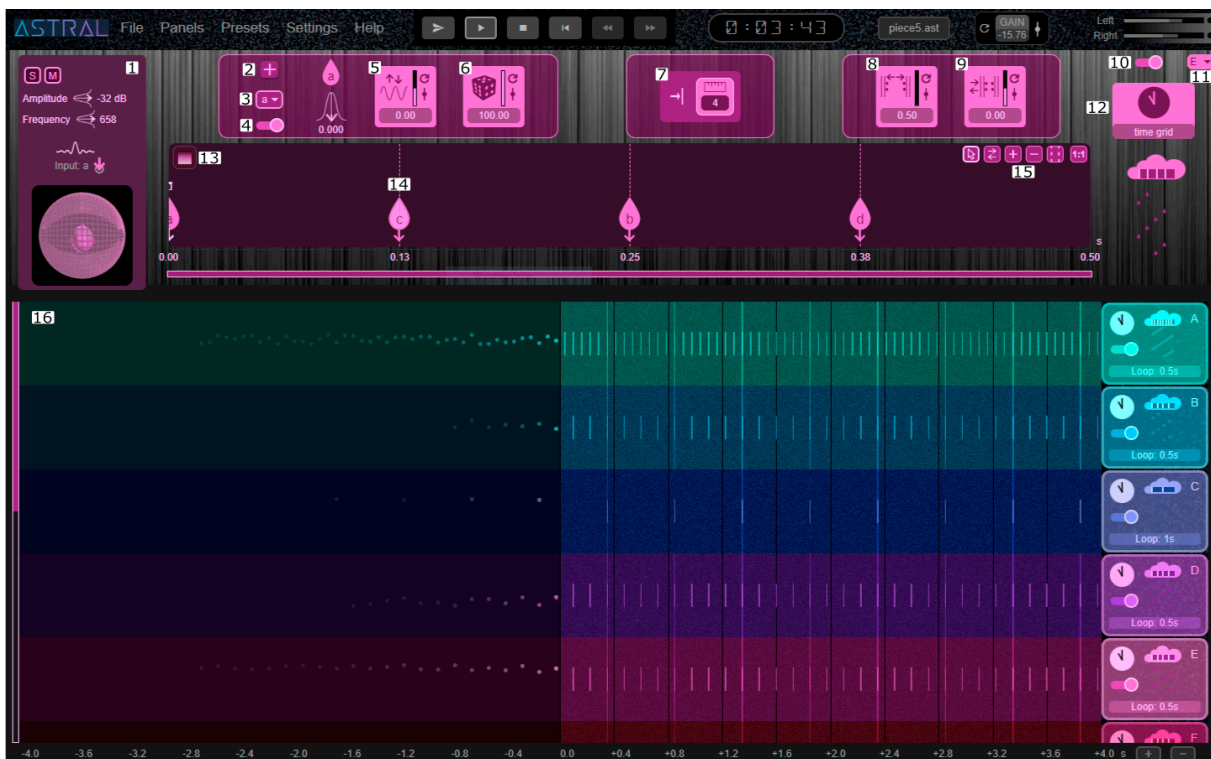17- Filter Groups Information Summary

Input Panel

Loaded inputs are visualized in the input panel. Start and end probability functions can be defined, and an envelope may be applied to each input.

1- Connected Group's Generator
Click to open the generators window to edit its properties.
2- Input Start Time Probability Function Parameter Buttons
3- Input End Time Probability Function Parameter Buttons
4- Probability Surface and LED Controls
5- Input Start Time Probability Function
6- Input Signal
7- Input End Time Probability Function
8- Use to switch between start and end probability functions
9- Diagram Control Buttons
10- Input Impulse Switch
Click to bypass the input.
11- Input's Fourier Transform Magnitude
Click to open widow
12- Input's Envelope
Click to open window and edit with spline points.

Generator Panel

In this panel, the user can define onset behavior of the filter groups. Every group filter generator, can be in either 'random' mode or 'time-grid' mode. In the random mode, a filtering rate (convolutions per second) is defined as general behavior of the generator. In contrast, the time grid mode allows for defining specific rhythm loops.

1- Filter Groups Information Summary
2- Add Node Button
3- Select Node Menu
4- Node's Active / Inactive Switch
5- Node's Amplitude Adjustment
6- Node's Existence Probability
7- Ruler and Align Buttons
8- Time Grid (Loop) Duration
9- Time Grid (Loop) Phase
10- Group Generator's Active / Inactive Switch
11- Group Selector
12- Group Generator Type Selector
13- Probability Surface Controls
14- A Time Grid Node
   Click to open window to edit its probability function.
15- Diagram Control Buttons
16- Other Group's Generator Conditions

Automation Panel

The software includes an automation panel, in which the user can automate the parameter behaviors in time.
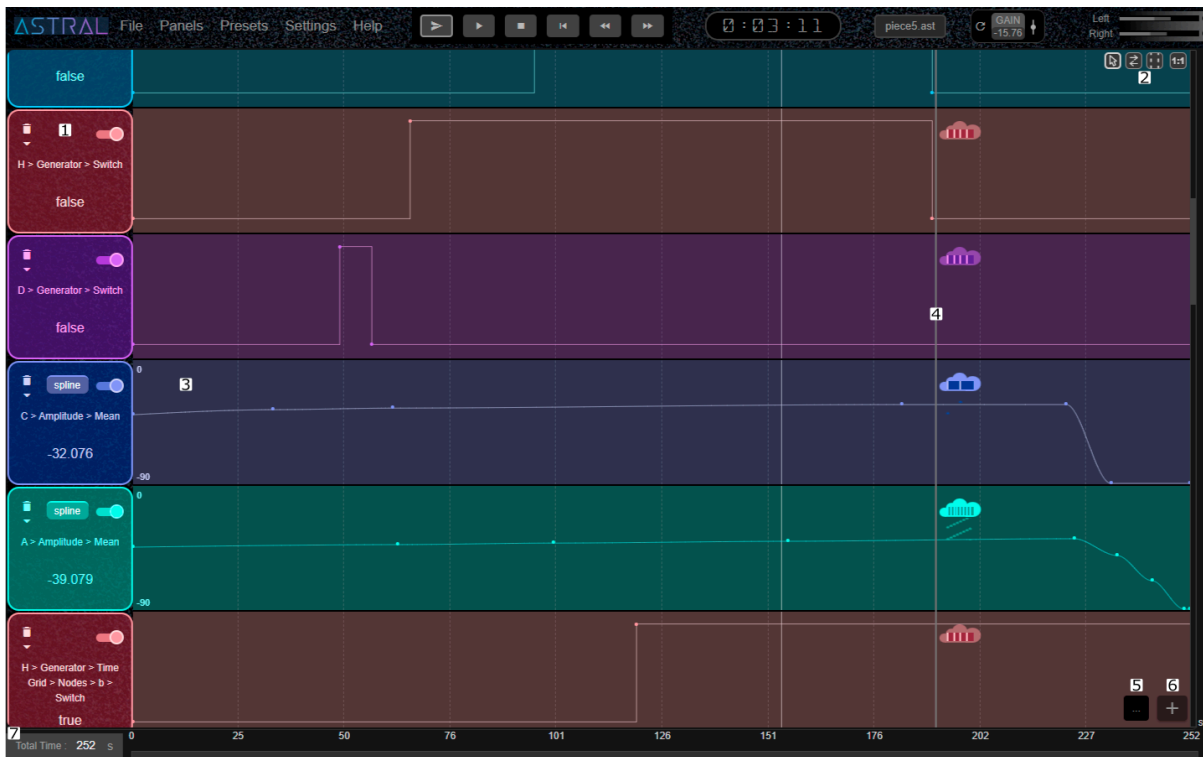
1- Automation Track Information
   Includes an active / inactive switch, parameter's name, delete and edit features.
2- Diagram Control Buttons
3- Automation Track Temporal Profile
   Double-click to add spline or line points to create an automation profile. Select and right click to use edit features.
4- Playback Time Line
5- Automation Features Menu
6- Add Automation Track

Random Variable Profile

In ASTRAL's automation panel, you can visualize a certain random variable's temporal probabilistic behavior by clicking on the automation features menu button.
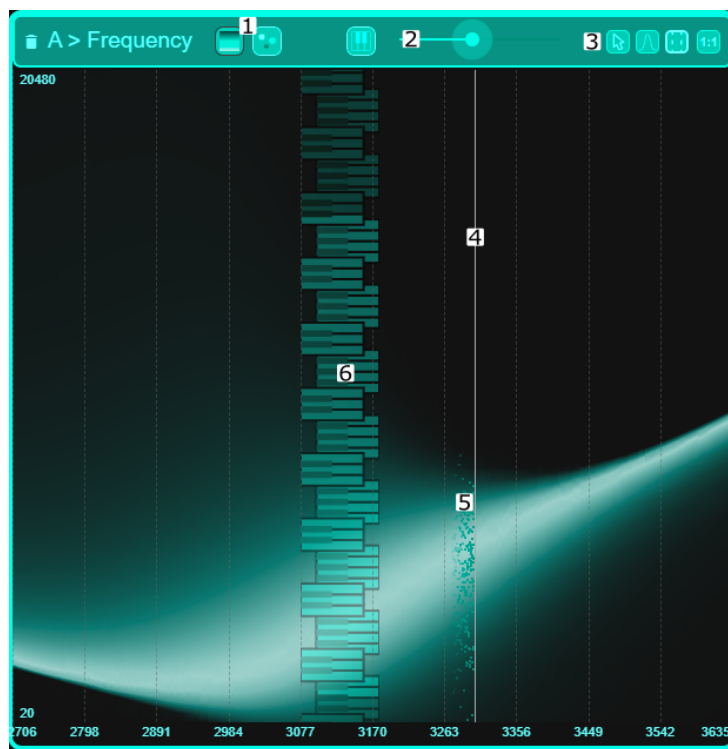
1. LED and surface controls
2. Keyboard positioning slider
3. Diagram control buttons
4. Playback time line
5. LEDs

6. General Probability Function Controls

1- Probability Function Type Selector and Inverse Toggle
2- Mean Parameter Button
   To change this parameter, you can also drag and move the probability function horizontally.
3- Deviation Parameter Button
   To change this parameter, you can also use option + vertical drag.
4- Skew Parameter Button
   To change this parameter, you can also use CTRL + horizontal drag.
5- Left Side Concave Factor Parameter Button
   To change this parameter, you can also hold SHIFT, and drag the left side of the probability function.
6- Right Side Concave Factor Parameter Button
   To change this parameter, you can also hold SHIFT, and drag the Right side of the probability function.
7- Pad at Mean Parameter Button
   To change this parameter, you can also hold SHIFT, and drag the top of the probability function.

1- Left Side Scale Factor Parameter Button
   To change this parameter, you can also drag the left side of the probability function and move vertically.
2- Right Side Scale Factor Parameter Button
   To change this parameter, you can also drag the right side of the probability function and move vertically.
3- Padded Part Scale Factor Parameter Button
   To change this parameter, you can also drag the padded part of the probability function and move vertically.
4- Floor Factor Parameter Button

To change this parameter, you can also drag the small circle at the bottom of the probability function vertically.

5- Probability Function Blocks Window Button
Use this window to block certain parts of the probability function.

1- Probability Function Modulation Type Selector
2- Probability Function Modulation Frequency
3- Probability Function Modulation Phase
4- Probability Function Modulation Range

The Header

1. Automated Play Button
Click to play while reading automation data
2. Output Gain

Quick Start

When you open Astral, a random preset is automatically loaded. To create your own projects, click on the File menu and click on New. In order to add your sound samples (inputs) to your project, click on the Panels menu and choose the Inputs panel. Click on the Add button and choose an audio file. Repeat this process to add more inputs if you need to. Click on the Panels menu and choose the Mixer panel. In the mixer panel, use the dropdown in the inputs row of a filter group, to assign an input to that filter group. Click on the play button, and adjust your filtering and sequencing parameters to achieve the desired sound. Use the Automation panel to make your parameters change in time.

Contact Us

You can email us with any questions and suggestions at contact@raindigit.com