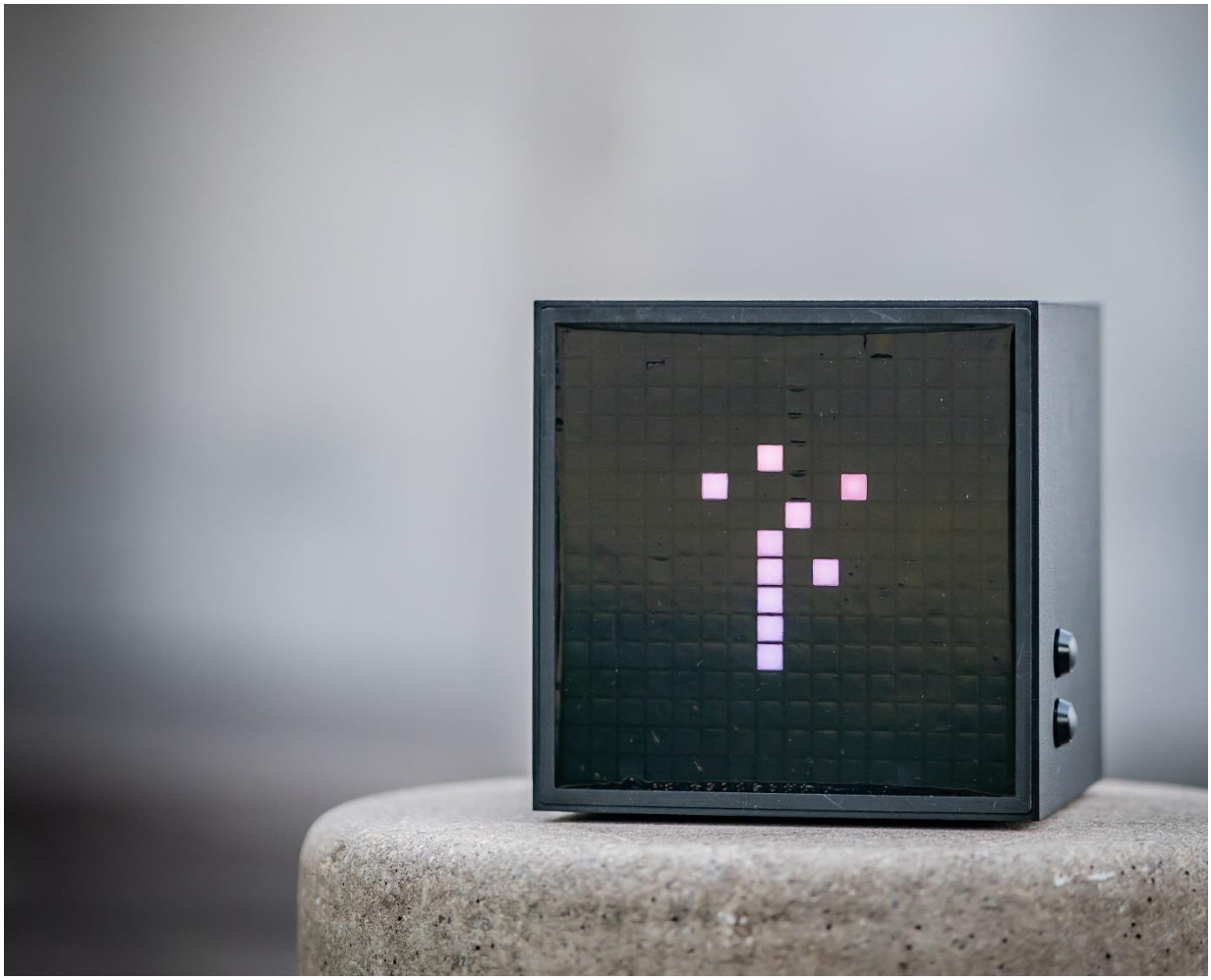


illuminai

Documentation & Help

Version: 1.0

Index

Principle of working with illuminai

The principle of working with illuminai will change the way you've been looking at light configuration.

The main change is that you try to avoid manual interactions which affect immediate changes. This is the dedicated job of Murph, you're acquainted illuminai AI light controlling box, Murph provides live commands in Midi to feed your entertainment system.

The following chapters will explain how to handle Murph and will give you examples of how to configure your light or entertainment system in your club environment.

Understanding electronic music

For the time being Murph only understands electronic music. From Deep House, House, Tech House to Techno, everything at hand. Although there are different AI models with different interpretations of each style of electronic music. See Chapter: Models.

Via the Audio IN connection Murph will continuously listen to your live music stream. Murph will do over 30 DPS (decision per seconds) while listening to your live music stream. Meaning if there will be a drop or an intermezzo Murph is able to react faster than a human to run a fitting visualization, eg. a strobe effect for a drop.

Nevertheless, Murph had to be trained to understand the principles of music, therefore there are some patterns Murph is usually looking for, these patterns are meant to be mapped to the light / entertainment system.

Patterns

Murph will primarily differentiate between states and events. At illuminai we call states: themes and events, well we call them events too. Parallel Murph also looks out for possible Mixing parts during the set and there is a heat - index (intense of sound), which is constantly given.

Important! All changes are always sent beat synched and not instantly! The tolerance between decision and beat can be configured (see Chapter configuration)

Themes

Themes describe the way the music feels at the moment. Themes describe states and are not to be changed all the time. For example, a track might start *Smooth*, rises with a *Crescendo*, a *Drop* cuts the flow and there the *Main Theme* starts (either full or light).

MainThemeFull	Full spectrum of sound of the track. Intensive Track with active bassline and theatrics. ➔ When mapped this theme should trigger the illumination program with the most intense spectrum
MainThemeLight	Full spectrum of sound of the track. Medium Intensity. Still a lot of groove, but not main floor main time situation ➔ When mapped this theme should be an groovy, but easy light term
Crescendo	Increasing sound, theatrics, mostly before a drop ➔ When mapped, keep in mind, to let the illumination be positive progressive
Decrescendo	Decreasing sound can be after at the floor just rocked to save energy or between tracks ➔ When mapped, keep in mind, to let the illumination be degressive
Smooth	Relaxing sounds, lower bpms, smooth atmosphere, can be in between tracks or very smooth tracks as a whole. Can contain groove, but more dub like than anything else.

	➔ When mapped, work with smooth combinations, fine changes

Events

Events are independent to themes but can unlock fantastic light / entertainment combinations combined with themes.

Events can always raise and execute, events are short time, an event is fired, and another one can directly follow afterwards.

Drop	The moment when the kick (usually the first of 4 by 4) reappears in the sound spectrum ➔ When mapped this theme should trigger a pure drop event (eg. a strobe)
Build Up	Build Up event fires, if an additional sound element adds up in the music ➔ This can be added as a subliminal element
Intermezzo	The music is playing and interrupted - can be a short stop, a divertimento, everything not like the just running composition ➔ When mapped, keep in mind this can often happen
Vocal	As soon as there are vocals, this event is fired. ➔ When mapped, think of a fading light program

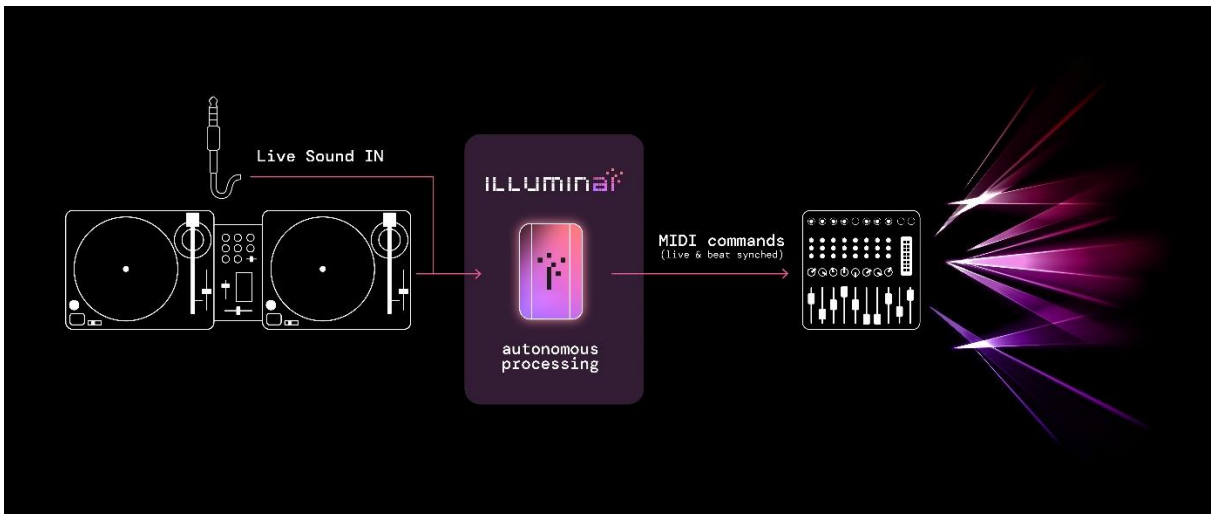
Connection

First setup

Basically, you got Murph connected to your system in 60 seconds:

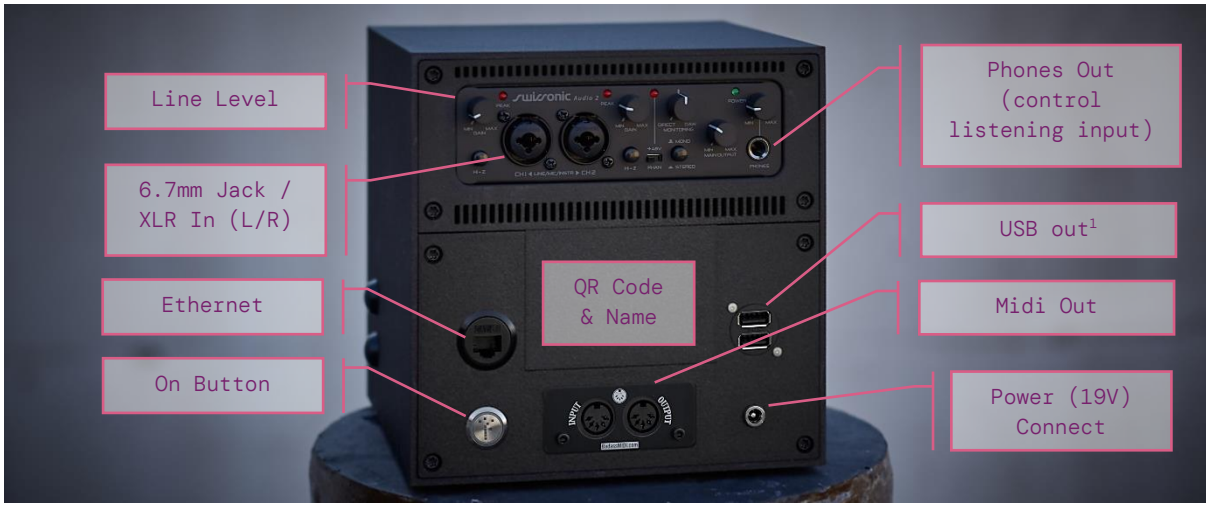
- Connect Murph to Power and activate her via the Power - Button
- Connect one of your mixer outs (L/R) to Murph. Adjust the Level ins, so that there is nearly no peaking (red flashing)
- Connect your Light Control Mixer via USB - to Midi to Murph[1]

Done!



Music -> Murph -> Light Controlling

Murph Backside Description



[1] In the upcoming version of Murph Midi will be directly available via USB as well

Mapping Midi Notes

Types of Midi Note “Events”

If it comes to mapping the outs of Murph to the light “programs” there is no end to your creativity.

In the future there will be a fully configurable interface for the outgoing commands from Murph. Currently you have a variety of different types of signals you can handle at your light station:

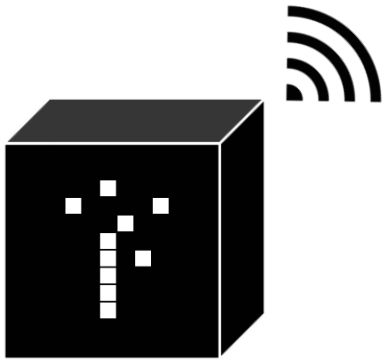
- Midi Notes
  - Single Transition events on Themes
  - Recurring beat based on toggling events on Themes
  - Events
  - Time triggered events (eg. for fog machines)
- Midi CC Values
  - General music atmosphere meter

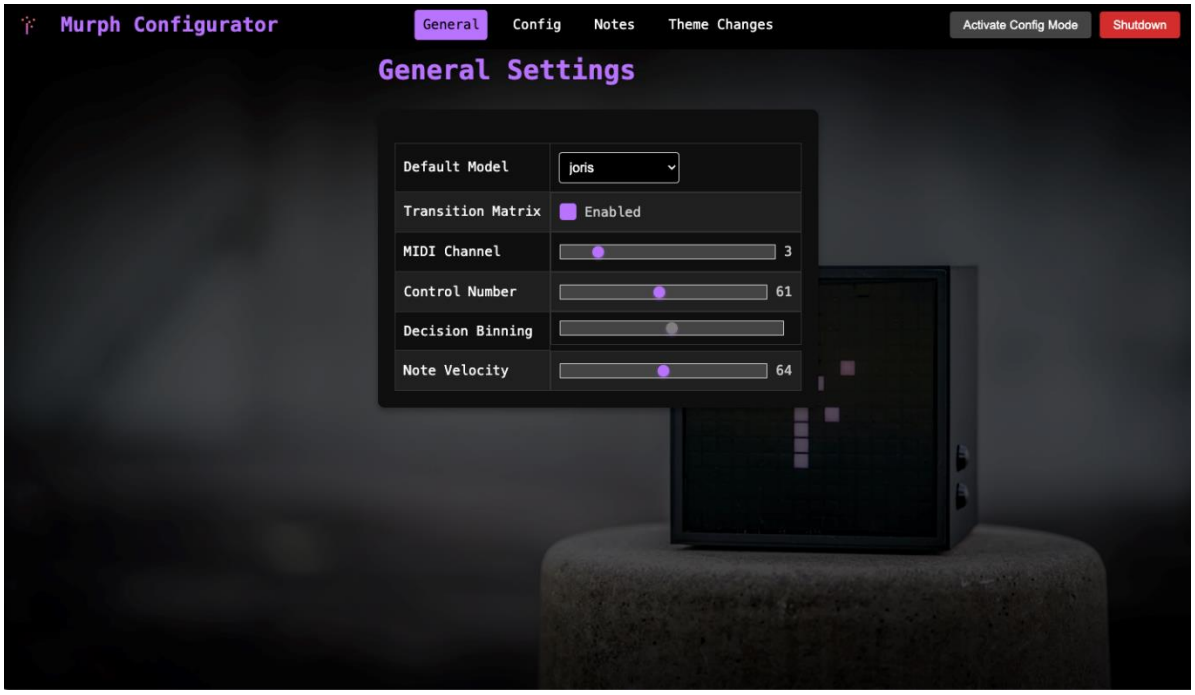
There is an administrator interface to easily configure your midi channel, map midi notes, cc values and more to the lightning console. So, let’s dive into the administration interface.

Administrator Interface

Connect to the administrator interface

1. Activate WLAN on the device you want to use to connect to Murph
2. Scan the QR code with your device -> you should automatically be connected with the WLAN
3. Alternatively look for WLAN with the same name as your box
4. Now open any Browser on your device and go to 10.42.0.1:3000
5. You have access to the Murph administrator interface





Once the administrator interface is opened there are 4 selectable tabs in the top middle and two buttons on the right.

Tabs

General	General settings for Murph
Config	Deep Dive settings for beats and midi cc values
Notes	Ui for mapping and configuring midi notes to the lightning console
Theme Changes	Postprocess the AI outcome if you dare to ;)

Buttons

Activate Config Mode	Activates / Deactivates configuration mode
Shutdown	Initiates system shutdown of Murph

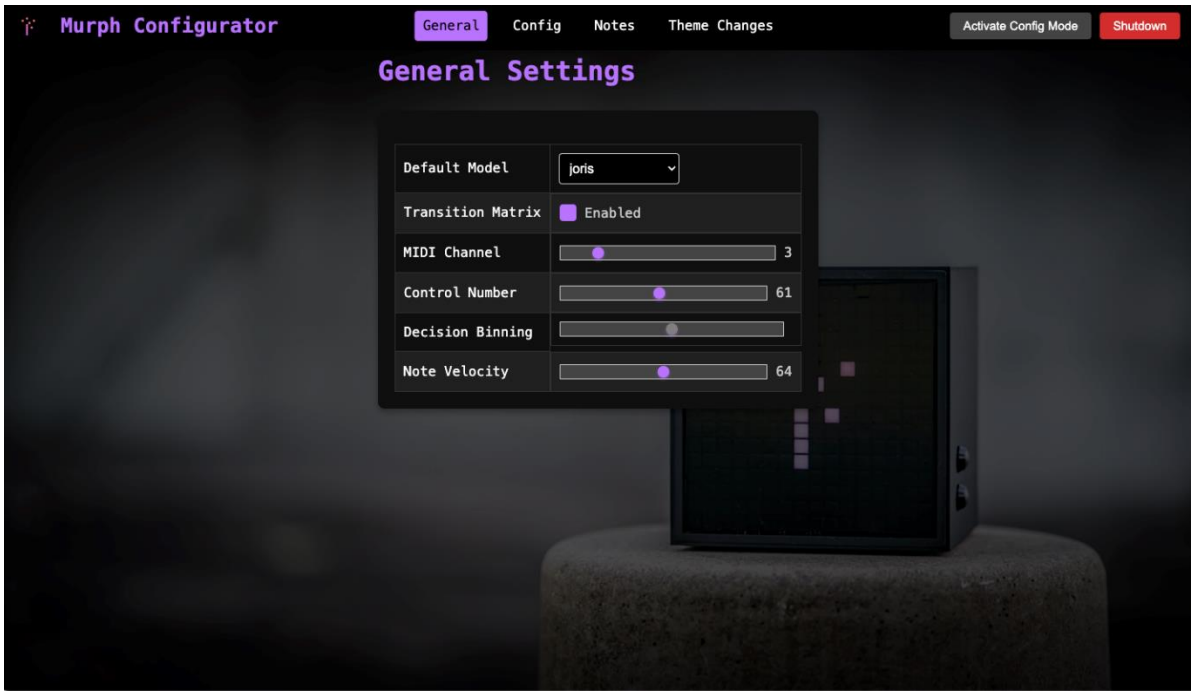
Configuration Mode

The configuration stops all the outgoing midi commands. This mode is used best for mapping all the midi notes to your lightning console. In the notes tab you can trigger each midi note separately.

After the mapping, the configuration mode has to be deactivated again. Activating and deactivating configuration mode is also shown on Murphs LED display.

General Settings

On the General Settings Tab the basic core features of Murph can be configured.

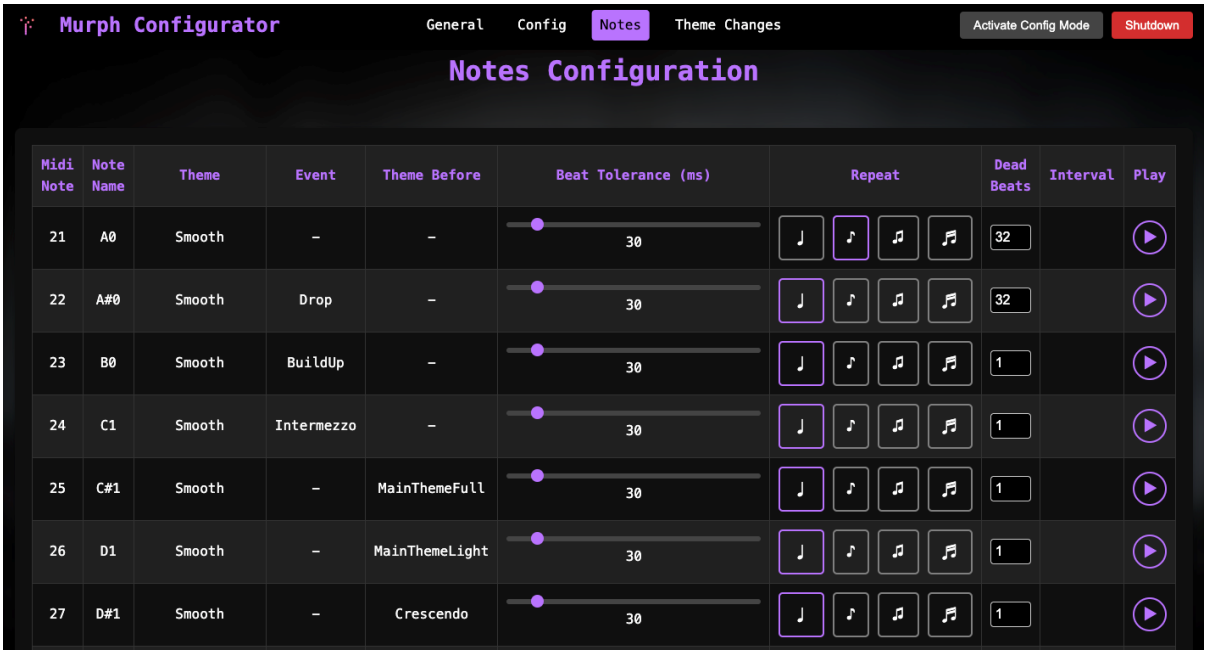


Default Model	Choose the starting AI Model of Murph (Index and description of the AI Models are in the appendix.
Transition Matrix	A fine graded postprocessing over the decisions of Murph to remove possible glitches. *Attention: depending on the chosen AI model this setting might heavily affect the way Murph runs decisions.*
Midi Channel	Set the Midi channel where Murph should send the commands
Control Number	Set the Midi Channel on which Murph sends the CC Values for intense of sound
Decision Binning	Either you activate the Transition Matrix or alternatively you bin decisions of Murph. Select the intense of decision binning from 1 - 5.

	Attention: depending on the chosen AI model this setting might heavily affect the way Murph runs decisions.
Note Velocity	This is a pure Midi setting and defines how intense the Notes are sent (originally meant for the volume of each midi note)

Notes Configuration

First select the “Notes” page to configure your events. With the play button on the right, each Midi note can be triggered separately to easy up the mapping to the entertainment system.



In the above selection all different types / selection possibilities are illustrated for the theme: Smooth.

Theme Notes

Explained and tagged with possible examples of how you could attach it to your entertainment system.

Midi Note	Note Name	Theme	Event	Theme Before	Description
21	A0	Smooth	-	-	The note without connection to other events or with no preceding Theme will always be played each time, when a

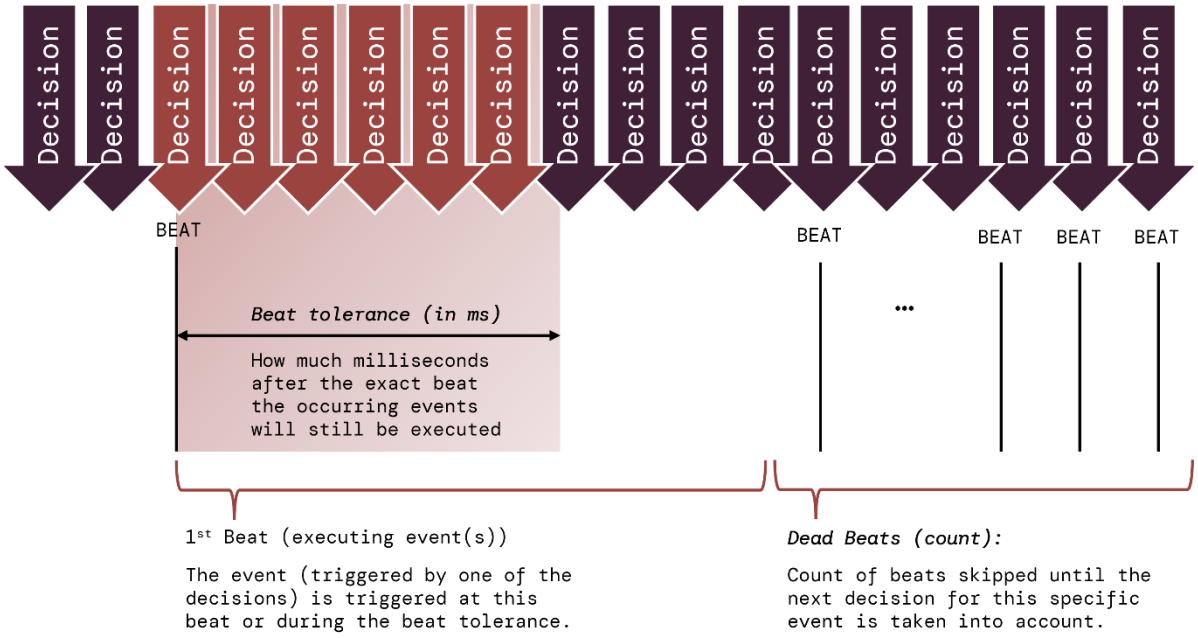
					beat (a forth of four) is played. Eg. attach this event to a set of moving heads to start and rotate when event occurs. So they will always do their edge move fitting to theme and beat.
23	B0	Smooth	BuildUp	-	Combination of themes and events. During the theme smooth the event BuildUp occurs. Eg. attach this event to something you want to be shown on top of your theme configuration for Smooth. Some flashing Washes, a short strobe blink or an LED Screen animation.
28	E1	Smooth	-	Decrescendo	Combination of an occurring theme and a preceding theme. Eg. in this scenario having the theme "Smooth" being occurred after a "Decrescendo" means the sound is getting slower, energy is currently taken out. So this events can be taken for general program changes (among different programs for smooth)

Beat Tolerance & Dead Beats

The AI of illuminai runs approximately 30 decisions per seconds (DPS). Nevertheless, an event will only be executed on a beat (eg. each 0.5 seconds when running at 120 bpm).

With the help of beat tolerance, the after beat - "tolerated execution time" can be defined for each event.

This could be necessary in case some events are regularly recognized a little too late. *Standard tolerance per Midi Note is set to 30ms.*



Dead beats on the other hand define the count of beats this specific event won't be triggered again. Ensuring Murph is not triggering the same event repeatedly.

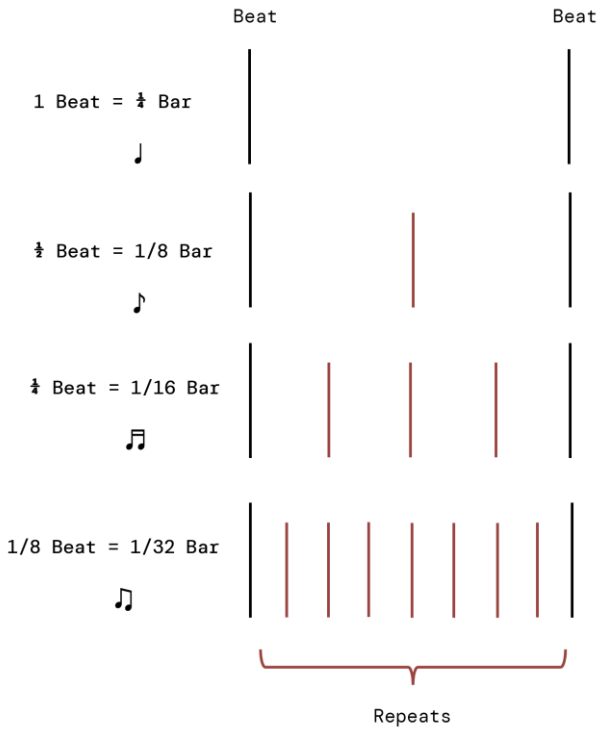
Standard Dead Beat setting per Midi Note is 1 to avoid hick hack.

Repeat

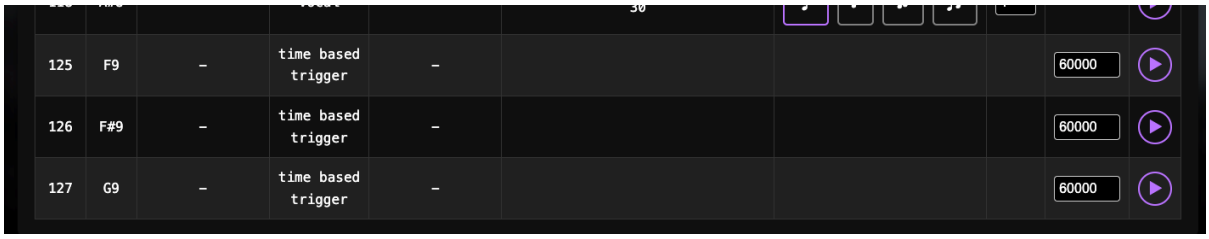
Another special rule applicable is to the Repeat.

If a program or a shot on the connected light / entertaining system is toggled by an event…the event can be automatically re-toggled in synch with the beat.

From 1 to a maximum of 8 toggles per beat can be chosen.



Interval (ms): Time based event triggers



Scrolling to the end of the notes view, there are 3 notes (currently 125 - 127).

These notes are reserved / foreseen for fog machines or other commands which need a timed action.

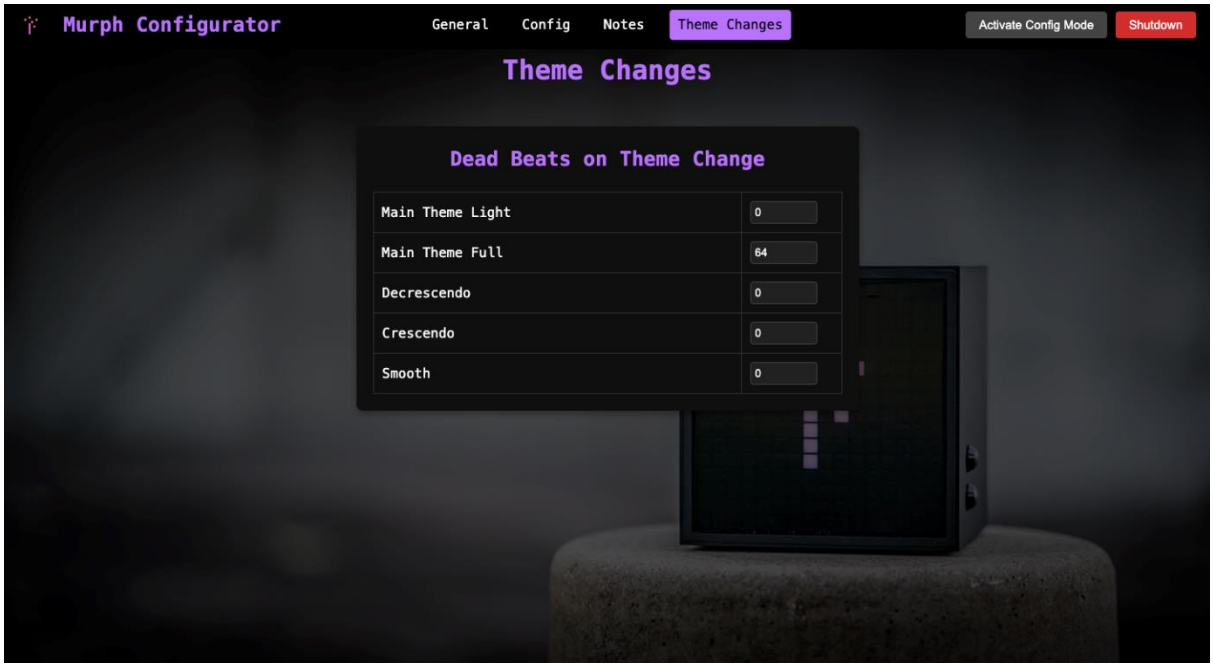
The interval defines the time in between automatic triggers -> once activated.

Eg. you want to run your fog machine every 15 minutes. Map one of the notes to the fog machine out of your lightning console. Now calculate: 15 min x 60s x 1000ms = 900'000 ms. Enter 900'000 to the interval of the note you mapped.

Attention: The interval notes are not active per se. Imagine your venue nearly empty in the beginning, there is no need for fog yet. Once you want the fog / the time-based triggers run, you do a long press on the upper button of Murph -> the interval notes are activated. You can deactivate them the same way.

Theme Changes

As described earlier in this document Themes have a permanent character. There might come the moment, where the environment requests a certain security not changing the “Theme Interpretation” too often.



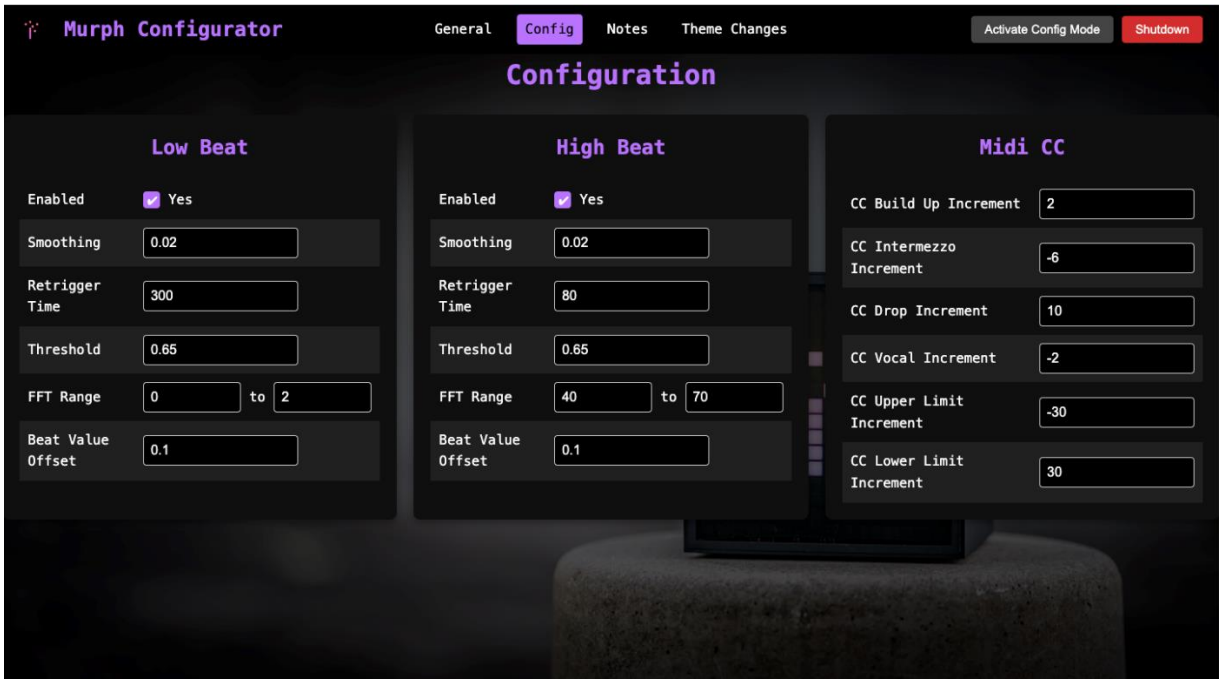
The Tab “Theme Changes” handles this specific circumstance. It is important to understand, that a theme change is not the same as a Theme trigger (eg. the basic Midi Note of each Theme).

A Theme Change happens when Murph decides that it is no longer MainThemeLight, but MainThemeFull.

After such a change each Theme can be coupled with Dead Beats. This implies that no matter what Murph is currently interpreting, the theme will not change until the specified count of dead beats is through (eg. @MainThemeFull 64 Beats).

Attention: This configuration should be handled with care because it actively overrides the AI decisions and might affect the fluent steering of the light / entertainment system.

Configuration



The Configuration Tab offers a couple of deeper settings for Murph experts.

Low Beat / High Beat

These settings will directly affect the beat recognition of High and Low Beat. The FFT Range Start and End represent the frequency spectrum considered to measure and find a beat in.

Attention: Change only if you really know what you are doing.

Midi CC

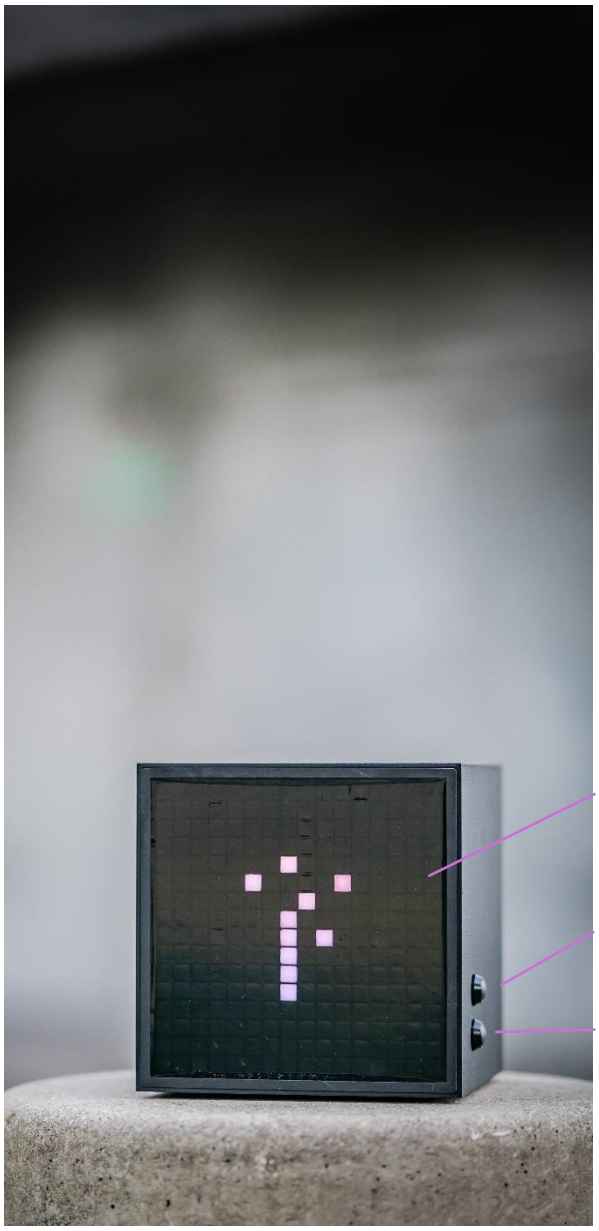
Via the several parameters all present CC values - Intense of Sound - can be changed.

Parameter	Standard Value	Description
Build Up Increment	2	For each “Build Up” event that CC value will be incremented by the value.
Intermezzo Increment	-6	For each “Intermezzo” event that CC value will be incremented by the value.
Drop Increment	10	For each “Drop” event that CC value will be incremented by the value
Vocal Increment	-2	For each “Vocal” event that CC value will be incremented by the value
Upper Limit Increment	-30	Midi CC has no higher value then 127. Once that level is reached, the level

		will be realigned according to the increment
Lower Limit Increment	30	Once Midi CC hits bottom (0). It will be re - levelled according to the increment.
CC Enabled	Yes	Activates or deactivates **the sending of changes** of the Midi CC values.

Live Interaction

Murph Frontside Description



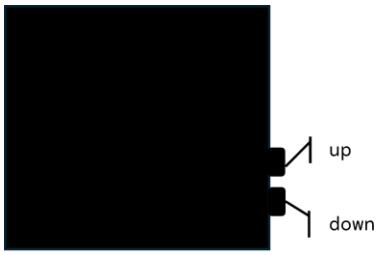
Murphs front panel is designed to support the artist during live operation. The two buttons on the right lower side trigger either the display to switch between different visualization modes and /or allow to switch between AI models.

Buttons

One button is responsible for switching through the LED views, with the other button different AI models can be selected.

Special

- ➔ If you press the top button and hold for a second or two, the “time-based events” will be set to “active”.
- ➔ If you press the lower button for a second or two, Murph will initialize the shutdown sequence.



On first tap	Directly following taps	Long tap
Next view	Next view	Time based events: On / Off
Show active model	Switch model	Shut down Murph

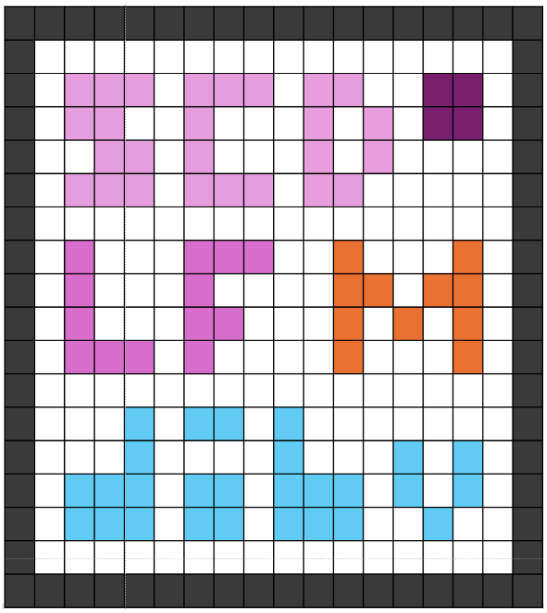
Views

Prediction View

The prediction view shows the upcoming and latest predictions by aid of color codes.

The first two rows represent all the themes, the third row all the events and at the end of the second row "**M**" indicates if the DJ is mixing.

The top right corner square will trigger / blink in synch with the beat



S: Smooth
C: Crescendo
D: Decrescendo
L: Main Theme Light
F: Main Theme Full

M: Mixing

d: Drop
i: Intermezzo
b: Build Up
v: Vocal

Screen Behavior

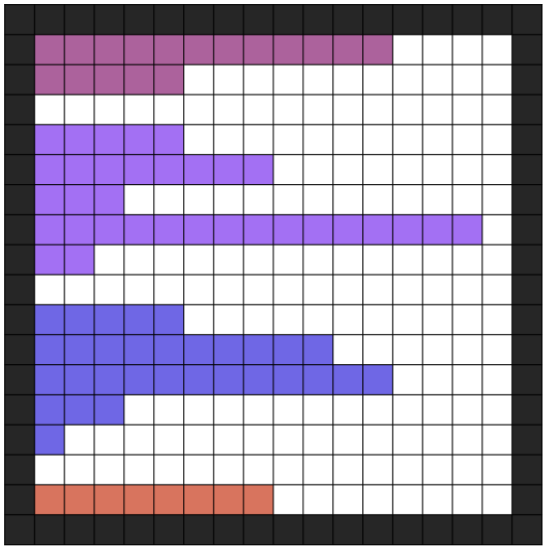
Behavior / Color	Reason	Description
Intensity	Reflects decision probability	The color intensity of each letter shown reflects the probability the decision will be caused. Once the intensity is at max, the decision will be triggered, and the color will switch to red.
Red	Currently triggered events and / or active themes	A letter displayed red means that the event bound to the letter has just been triggered or the theme bound to the letter is currently active
Fade Out	Passed events or themes	Once events have been triggered or themes have changed, the old event or theme will be faded out

⇨ *Mixing is handled the same way as a Theme.*

Live Configuration View

If there are unexpected actions and habits during the show, the live configuration view is designated to show a filtered neural network output to support debugging.

Each line represents the probability of the neural network for the result to be true. Meaning for each section (except DPS), the longest line represents the theme / event or mix which is active now.



➔ NO MIX
➔ MIX

➔ MAIN THEME LIGHT
➔ MAIN THEME FULL
➔ DECRESCENDO
➔ CRESCENDO
➔ SMOOTH

➔ no event
➔ drop
➔ intermezzo
➔ build up
➔ vocal

➔ DPS (decisions per second)

DPS - Decisions per Seconds

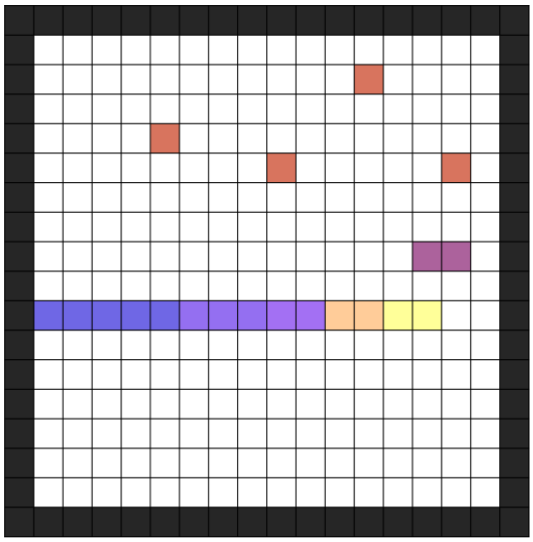
The first pixel of the line is constantly on and represents 0. Each following pixel represents 4 DPS. The illustrated view currently shows 8 pixels meaning: 7x4 = Murph is running on 28 DPS.

Additionally, each pixel has 4 different brightness, which illustrate the values 1 - 4.

The box is running well, when in between 26 and 32 DPS.

Midi View

The view shows each midi note as a pixel and lights them up once triggered. And the current active cc - values (music intensity) is shown as a single line.

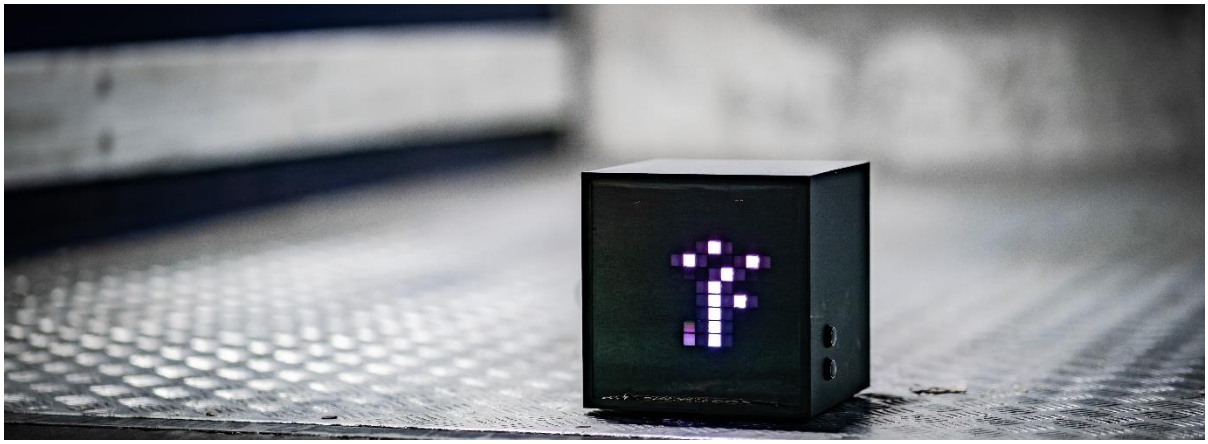


➔ 0 - 15
➔ 16 - 31
➔ 32 - 47
➔ 48 - 63
➔ 64 - 79
➔ 80 - 95
➔ 96 - 111
➔ 112 - 127

➔ CC 0 - 127 (8 per cell)

Illuminai Signature View

This view is just made to look nice and illuminate Murph in the best way possible. The pixel and glitches react on the low beat of the music and are meant to provide a utter most technoid feeling.

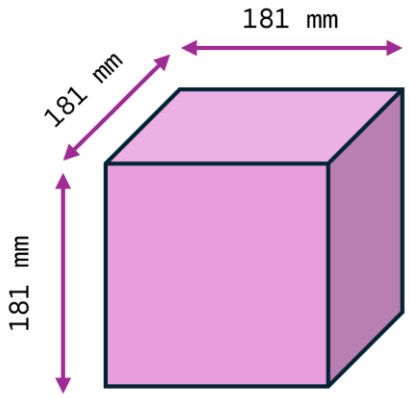


Models

In the model subsection AI models can be switched live during operation. Each model has its own intelligence and behavior with different types of music.

Joris	The most generic model. Joris works with all electronic music types from Deep House until Tech House
Blomqvist	Another generic model. This model is less sensitive regarding drops and other events
Carl	Carl is the best choice if the event is all about Tech House
Grace, Seth & Pfirter	These models do not make prisoners. All trained for solid techno events.
Teffli	Our first model, which was running live at an event. This model does not trigger any vocal events. Besides that it works very well.

Technical Specifications

Dimensions	
Weight	1485g (without power supply)
Current	19V
Power Consumption	21W
Connection	▪ 2 x XLR / 6.8mm JACK combo ▪ 1 x 6.3mm JACK Headphones ▪ 1 x RJ45 Ethernet ▪ 2 x USB 2.0 (no function yet) ▪ 1 x Midi In (no function yet) ▪ 1 x Midi Out
LED Display	16x16 RGB LEDs
Power On -> Ready	85s