Sensors

In the Blackbox we have a whole range of sensors you can hook up to your computer to read, interpret and manipulate data. In this book we dive in to some of them

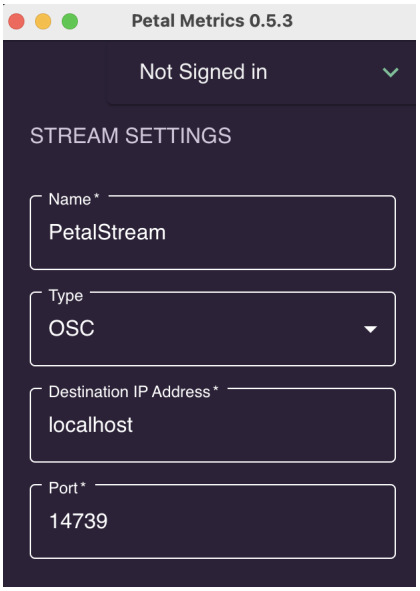
- wearable sensors
  - Muse 2 EEG headband
  - Genki Wave
- position tracking
  - Full body mocap
  - Leap Motion

wearable sensors

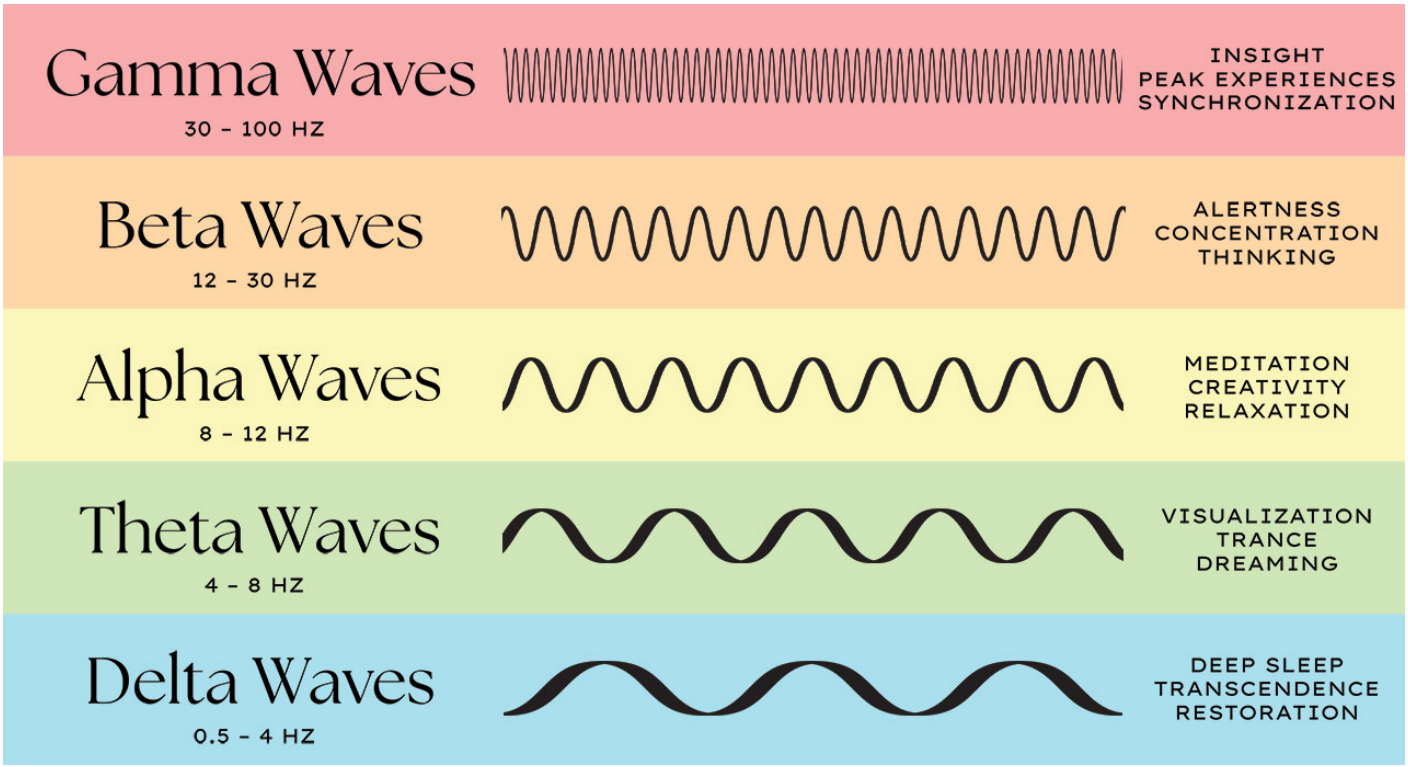
wearable sensors

Muse 2 EEG headband

Muse is a smart headband that acts as your personal meditation coach. Using advanced EEG brain sensors, Muse can detect your brain activity and provide you with real-time feedback in the form of gentle audio sounds through your headphones (regular use in the Muse app). Primarily advertised as a neurofeedback tool, the headband tracks heart rate (**PPG + Pulse Oximetry**), angular velocity (**gyroscope**), proper acceleration (**accelerometer**), and electroencephalography (**dry electrodes**) to assist you in your meditation sessions.

The Muse can be connected to your computer using Petal Metrics: https://petal.tech/downloads This tool allows you to send the EEG data to your computer through OSC.	

Brain waves are measured in hertz (Hz), which refers to cycles per second.



Muse 2 in Touchdesigner:

https://www.youtube.com/embed/Br0JXvuzWEI

This video covers how to connect the Muse 2 device into TouchDesigner.
Using OSC ports (muse app, paid) to get the data, we will build a simple generative animation controlled with the mind.

The connected app is *Mind Monitor (paid)*

Download muse_data.tox for touchdesigner use with and OSC app connected to the headset & get named channels.

Extra reads:

Interesting article on Medium : Muse 101 — How to start Developing with the Muse 2 right now

wearable sensors

Genki Wave

Wave Midi Ring : This MIDI controller can add dynamic effects with the tap of a finger, the click of a button, the wave of your hand.

connect to your computer via Softwave

Download the manual here

https://www.youtube.com/embed/TB789hiIJfA

Working with the Wave in Isadora:

Softwave software comes with presets on the left side in the interface. Preset 15 is already set to MIDI with channel 15. Go to Menu > Audio/MIDI settings. Here you can choose MIDI output. When you start Isadora it will show "Isadora Virtual In"

In Isadora you receive MIDI by setting your input channel in the Communications > Midi Setup window
Input ports:
Port 1: Wave

Use the Actor Control Watcher: Set Controller to the number of the channel you send MIDI to from

Softwave. Like channel 15.

In Softwave you can make your own presets and choose your own channel numbers.
Make a new preset by clicking + next to "Default Preset Blank" at the top of the presets list.
Choose "add function" and a function. In the bottom right of the new function press the MIDI icon > CC to choose a channel like 3.
In Isadora change yout control watcher controller channel to 3 to receive tha values.

Sometimes Isadora looses communication to the Wave, go to midi setup window change the port to none and choose wave again. Connection should be back.

position tracking

position tracking

Full body mocap

Motive/Optitrack TDB

Rokoko TBD

Als see https://bookstack.hku.nl/books/3d-depth-cameras/page/types-of-depth-cameras-alternatives-for-position-tracking
for 3d camera's, mediapipe and apps that allow body tracking through camera

position tracking

Leap Motion

With the Leap Motion you can track the movement of your hands.

You can buy Leap version 2 since 2023, the Leap 1 is still relevant.
Here you can find information on how to install the software for Leap1 and use it in Isadora and Touchdesigner

Leap1 + software SDK 3.2.1 (older version) works with PC and Isadora. New software SDK works with Leap1, TD and Apple Silicon Macs, provided the SDK file “libLeapC.5.dylib” is in the correct folder.

Windows:
Desktop/Laptop Computers > (Scroll down)Technical details > windows > Legacy downloads > V3.2.1

Direct link: V3.2.1 for Windows

Mac:

Desktop/Laptop Computers > Choose the new version

For Mac M1 & M2, Direct link v5.17.1 – Beta

Use Leap motion in Isadora on PC & Mac

For more info on how to use the Leap Motion read this and download and install the Leap Motion user actor.

Isadora mentions in the README file bij de user actor: If you want to run this plugin on an Apple Silicon (ARM/M1) based Mac, you'll have to enable Intel emulation (Rosetta) mode on the Isadora application. But if you work with Sonoma (Mac OS) this might not be the case. I found this online:
Does Rosetta work on Sonoma?
A major macOS Sonoma update cuts the compatibility of an array of software, resulting in all of them not working properly on a brand-new environment, such as apps designed for Intel Mac stop working on Apple Silicon Macs. This issue happens because of Rosetta 2 support incompatibility on macOS Sonoma.

More info about Leap motion and Isadora can be found here and here, also here.

Preperations to use Leap Motion with Touchdesigner on Mac (not yet tested on PC)

https://docs.derivative.ca/Leap_Motion_TOP

This info is not complete,
the SDK files are located in: /Library/Application Support/Ultraleap/LeapSDK
For Sonoma users: /Library/Applications/Ultraleap Hands Tracking (right mouse click > show package contents)/Contents/LeapSDK

Copy the files mentioned on this page to `TouchDesigner.app/(right mouse click > show package contents)contents/frameworks`