

Connect.Audio v2

MacGruber's Tutorial Series

This guide is intended to give you a quick intro into using my Connect plugin and the ConnectAudio external app.

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Introduction

Connect.Audio is intended to control external E-Stim devices via audio signals from your soundcard. The intention is that your VaM scene can take control of your E-Stim device causing pleasure, punishment or a mixture of both.

It consists of a VaM plugin and a matching external application you need to run on the same machine as VaM. Both should find each other automatically once your pressed "Connect" in the VaM plugin UI.

The VaM plugin sends commands via network to the application using VaM's trigger system. This should allow you to integrate this into existing scenes easily.

The application runs one so called *Behavior* per audio channel, which outputs signals your E-Stim power box can then amplify. A new command from your VaM scene interrupts running Behaviors that use the same channel(s).

Note that this software needs to be calibrated to the correct volume level for your devices. This is covered in the last section.

E-Stim Safety

- E-Stim is safe, if applied correctly!
- Prefer battery powered devices and devices build in countries that have reasonable safety standards.
- **Read the fucking manual of your power box!**
- Don't apply E-Stim near anything vital like brain, heart and lungs. As rule of thumb, do not apply electrodes anywhere above waist area. Careful with readjusting electrodes while the power is on. Theoretically the current could flow through your hands and arms into your heart.
- Don't use if you have a heart condition or similar.
- Always use water-based lubricant or specialized electrode gel.
- **Use this software at your own risk!** As in any software by "random people from the internet", there might be bugs. When using this software, **always stick to intensity levels you can handle.**

Hardware needed

Obviously, you need an E-Stim power box that allows for direct audio input. I'm using two [ABox devices](#) by a UK based company called E-Stim Systems. These are available through various shops. The ABox pretty much directly takes the audio signal from your soundcard and just amplifies it.

Potential Alternatives

E-Stim Systems also builds the [2B power box](#), which is claimed to have "true stereo audio processing". It's probably very similar to the ABox, just with two channels in one device. However, I don't have the thing, so I can't actually try. If you happen to have the device, please report back if it works.

Another option might be the [Erosteck ET312B](#), which also has stereo audio input. Same here, I don't have it, so I can't be sure its compatible.

Electrodes, Lubricant and Cables

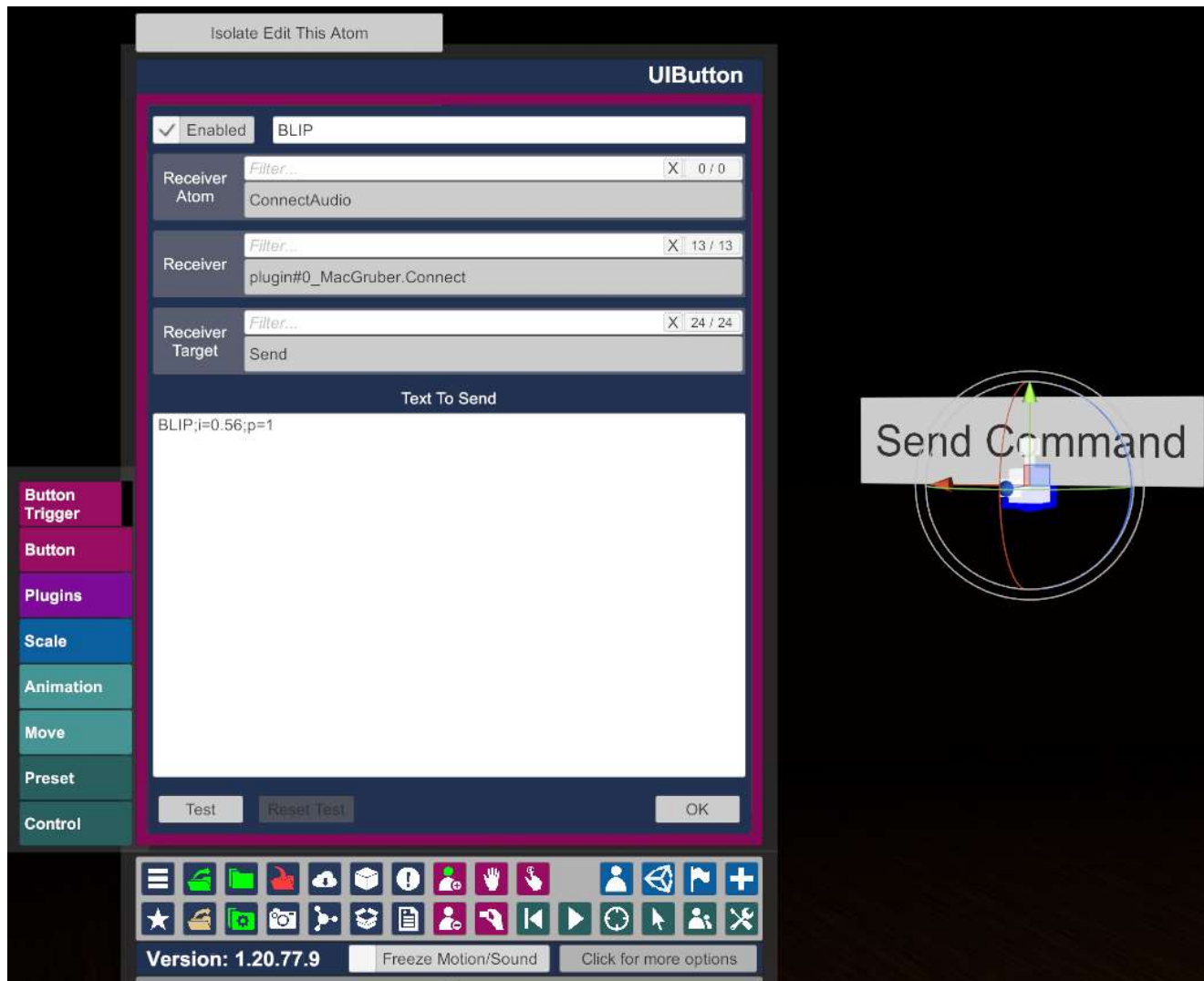
In addition to the power box you will need electrodes. Cheap electrode pads are often included, but these often fall off, if you don't secure them somehow. Also, these can only be used a few times. Silicon electrodes are usually the better choice, as they can be cleaned more easily and are far more durable.

Always use water-based lubricant or specialized electrode gel to improve the electric contact. This makes the intensity less random and more controllable.

Needed cables are usually included with the power boxes and electrodes, however you might want to double check. Also, some manufacturers may use incompatible connector standards. Note that the ABox is a single channel device, if you want to operate two of them you will need additionally a 3.5mm Y-cable to split the stereo signal into two mono.

Integrate the VaM Plugin into your scene

On the VaM side you can add the *Connect* plugin to any atom or just add an “Empty” atom and rename it to something that can be easily found. Then you can hook up other things to send commands by using VaM’s trigger system. For example, here we are using an UIButton atom, but this works with anything else that uses VaM triggers, including Acidbubbles Timeline, MacGruber LogicBricks and other plugins.



The text you send to the plugin is the name of the Behavior you would like to run on the server, optionally followed by parameters separated by semicolon. Currently supported parameters are:

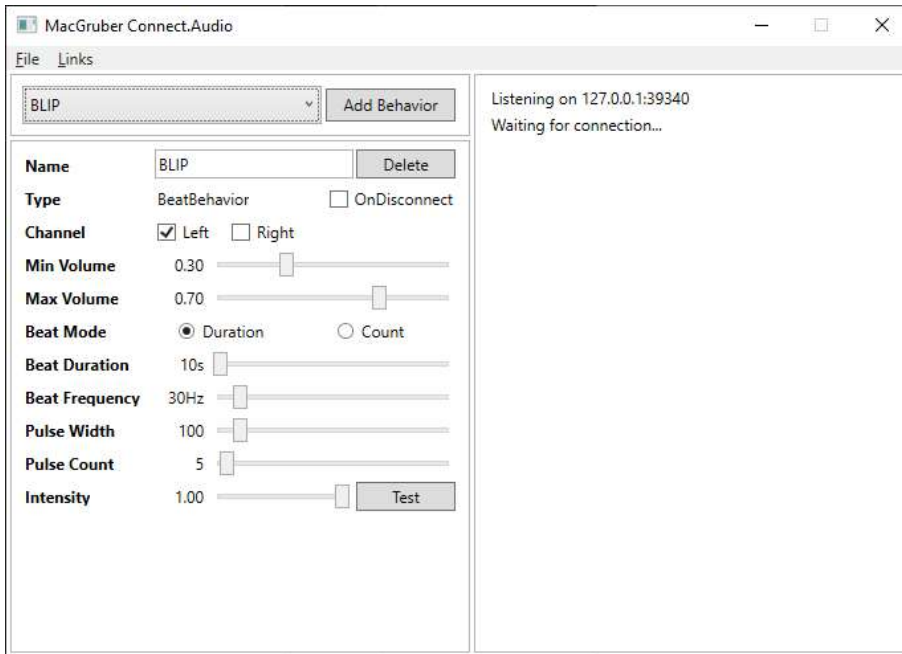
- **i=VALUE** Override Intensity with a VALUE between 0.0 and 1.0
- **p=VALUE** Override Priority with VALUE. Running Behaviors can only be interrupted by Behaviors of equal or higher priority. Default priority is 5.

Note: *The command interpreter is designed to be FAST so you can fire multiple commands per second, if needed. However, that means it is STUPID and can't handle any unexpected symbols like whitespaces in the command. The log in the application will tell you if the command was not understood.*

Connect.Audio

On the application side you need to setup a number of the before mentioned behaviors. This is hopefully straightforward:

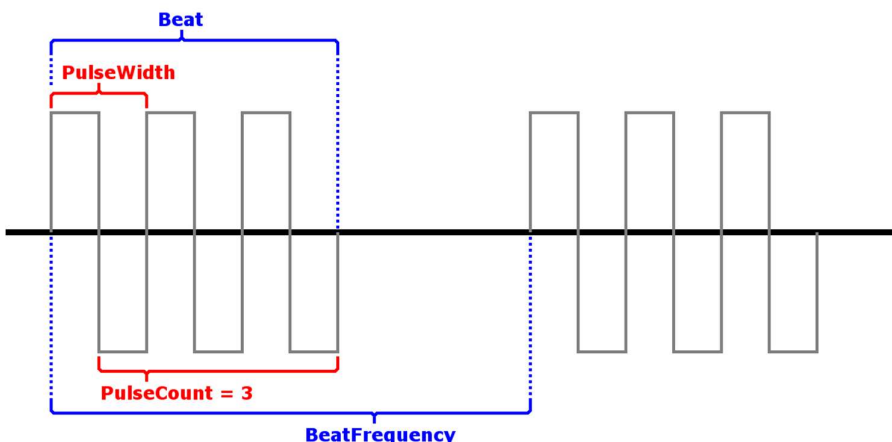
- Press the “Add Behavior” button to add one. Currently there are two types to choose from, which are explained in more detail on the following pages.
- Use the drop-down menu to select which behavior to configure.
- Use the “Delete” button to delete a behavior.
- Use File -> Save to save your setup into a JSON file.
- Obviously, File -> Load is for loading that again.



Common to all behaviors is that each has a **Name**, which is used to trigger it from VaM. With the **OnDisconnect** checkbox you can indicate whether this behavior should automatically be triggered when the client disconnects, e.g. the player did quit VaM or the network died. With the **Channel** checkboxes you control whether this runs on the left, right or both audio channels.

Beats and Pulses

The audio output of the application is a series of *Beats*. Each Beat then consists of a number of *Pulses* of a generated square shaped audio wave. What this means is best explained in a picture:



BeatBehavior

The BeatBehavior produces a number of regular *Beats*.

MinVolume / MaxVolume: Intensity values from 0.0 to 1.0 are mapped onto this volume range.

Beat Mode: How the length of the behaviour is defined: Either by a duration in seconds or a number of beats.

Beat Frequency: Number of Beats per second. Note that your frequency can't be so high that it's shorter than the duration of a single Beat. You will get a continuous wave in that case.

Pulse Width: Duration of a single pulse, measured in samples. We operate at 44100 samples per second, which is a standard all common audio hardware should support.

Pulse Count: Number of pulses in a Beat.

Intensity: See Min/Max Volume. This is the default intensity when it's not overridden with the command from VaM.

Test: Use the test button to try out your settings quickly without needing VaM. Press again to stop.

Name	BLIP	Delete
Type	BeatBehavior	<input type="checkbox"/> OnDisconnect
Channel	<input checked="" type="checkbox"/> Left <input type="checkbox"/> Right	
Min Volume	0.30	<input type="range"/>
Max Volume	0.70	<input type="range"/>
Beat Mode	<input type="radio"/> Duration <input checked="" type="radio"/> Count	
Beat Count	1	<input type="range"/>
Beat Frequency	30Hz	<input type="range"/>
Pulse Width	100	<input type="range"/>
Pulse Count	5	<input type="range"/>
Intensity	1.00	<input type="range"/> Test

ClearBehavior

Does nothing except clearing the currently playing audio.

Name	CLEAR	Delete
Type	ClearBehavior	<input type="checkbox"/> OnDisconnect
Channel	<input checked="" type="checkbox"/> Left <input checked="" type="checkbox"/> Right	

Calibration

At least when using the ABox device only a rather narrow volume range leads to useful results:

- The application uses your system default audio as output. Potentially you need to switch the system default temporarily to whatever output you connected your power box to. Some sound cards do this automatically once you plug in the cable, though.
- When using VaM in desktop mode it also uses the system default audio. You might want to mute VaM in that case using the “Volume Mixer” panel in Windows to avoid sounds in the scene interfering with E-Stim. This application is mostly intended to be used in VR, where audio would play on your headset instead of the default device.
- Test and adjust your calibration first using a low intensity setting on the power box. Only go to higher intensities after the volume is kind of right.
- For calibration of the output volume use the system volume slider as well as the min/max volume sliders for each behavior to find the minimum and maximum levels needed. The ABox has some LEDs indicating the input level, which are very helpful for this.
- For your most intense behavior you will want a maximum amplitude slightly below the peak level. Due to the signal being cut off at the peak, a higher volume might result in lower intensity output from the powerbox. The point where that changes is the point you need to find for the MaxVolume slider.
- For your least intense behavior the minimum should be chosen somewhere about half of the LED scale.
- Needed volume levels may vary depending on the behavior settings Pulse Width, Pulse Count and Beat Frequency. It takes some trial and error.
- Needed volume levels may vary depending on electrodes used, kind of lubricant used and humidity of your skin, etc. Therefore it's recommended to calibrate before every use.
- Everything seems right, but you don't get anything more than a minor pulse out of the device? Possibly one of the cables or electrodes makes a bad connection, there is a shortcut due to electrodes placed too close to each other....or your battery is simply almost empty.