Assembly Guide

This is a step-by-step guide to help you assemble Xzyborg. All measurements are in millimeter. You will need the following materials and sensors:

- 4mm-thick MDF plate (500x500)
- plastic casing (size depends on your circuit layout as well as power source)
- M6 bolts and nuts
- PCB board
- aluminum tape
- solid core wire
- stranded wire
- 2 types of velcro tape (with and without adhesive side)
- adjustable belt
- glue gun

- Bela system
- 2 ADX377 accelerometer sensors
- 16 capacitive sensors (DIY)
- 4 SPST buttons
- 4 green LED's

First, let's have a look at the hardware layout in figure 1 as well as the signal flow within the pure data patch in figure 2 to get an overview.

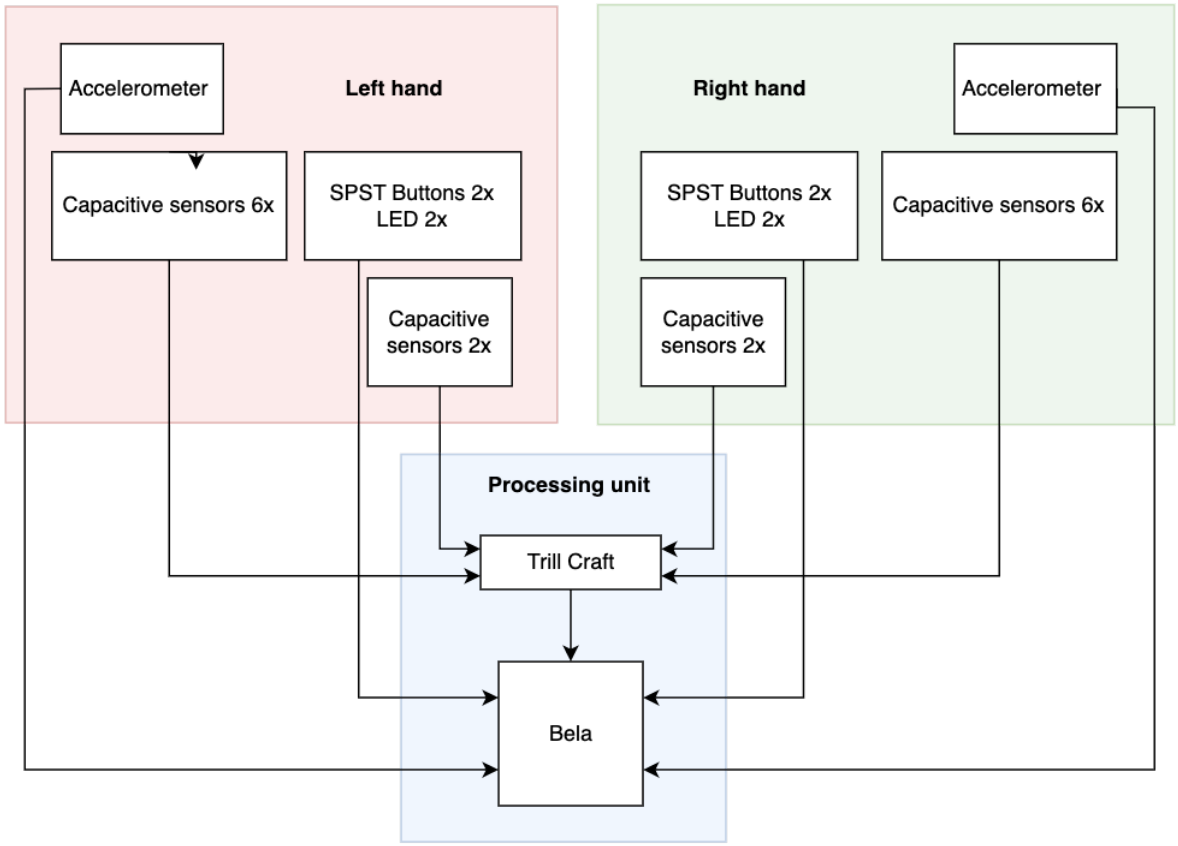


Figure 1: Hardware layout

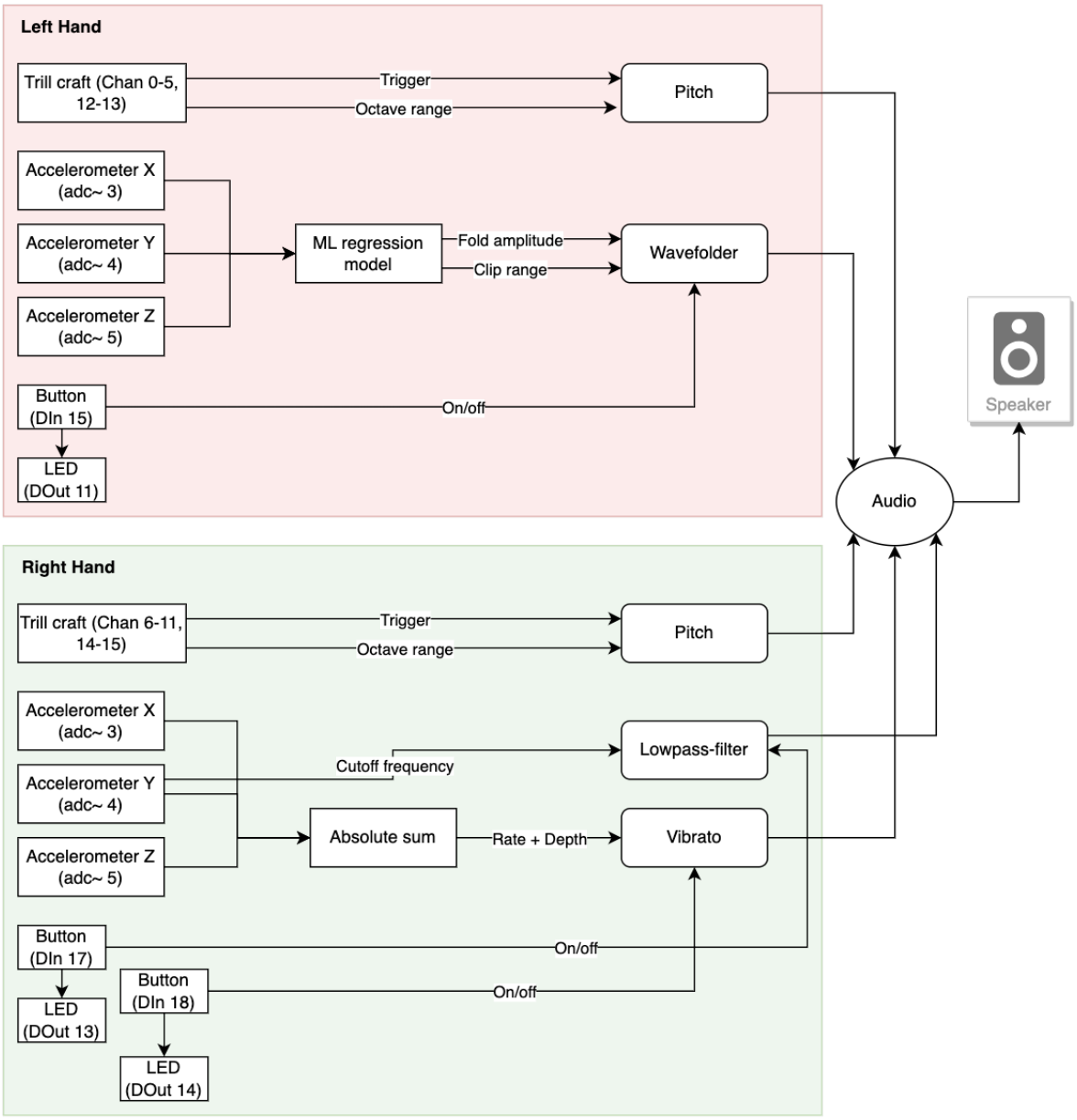


Figure 2: Signal flow diagram

Let's cut the frame. You find the dimensions in figure 3. A bandsaw is perfect for this job. After cutting, drill 6mm holes into all parts and fix the plates together with M6 bolts and nuts. Don't forget the 3 mm holes for the LED's as well as 8mm holes for the buttons. I used a dremel sawblade for cutting the strap band slits. Next, you will need the velcro tape with an adhesive side. Cut four rectangles for each hand to size and fix it to the frame. This will function as fixation points for the circuit board, accelerometer, and capacitive sensors. By using velcro tape you are able to customize the placement of the capacitive sensors in a way that fits your hands.

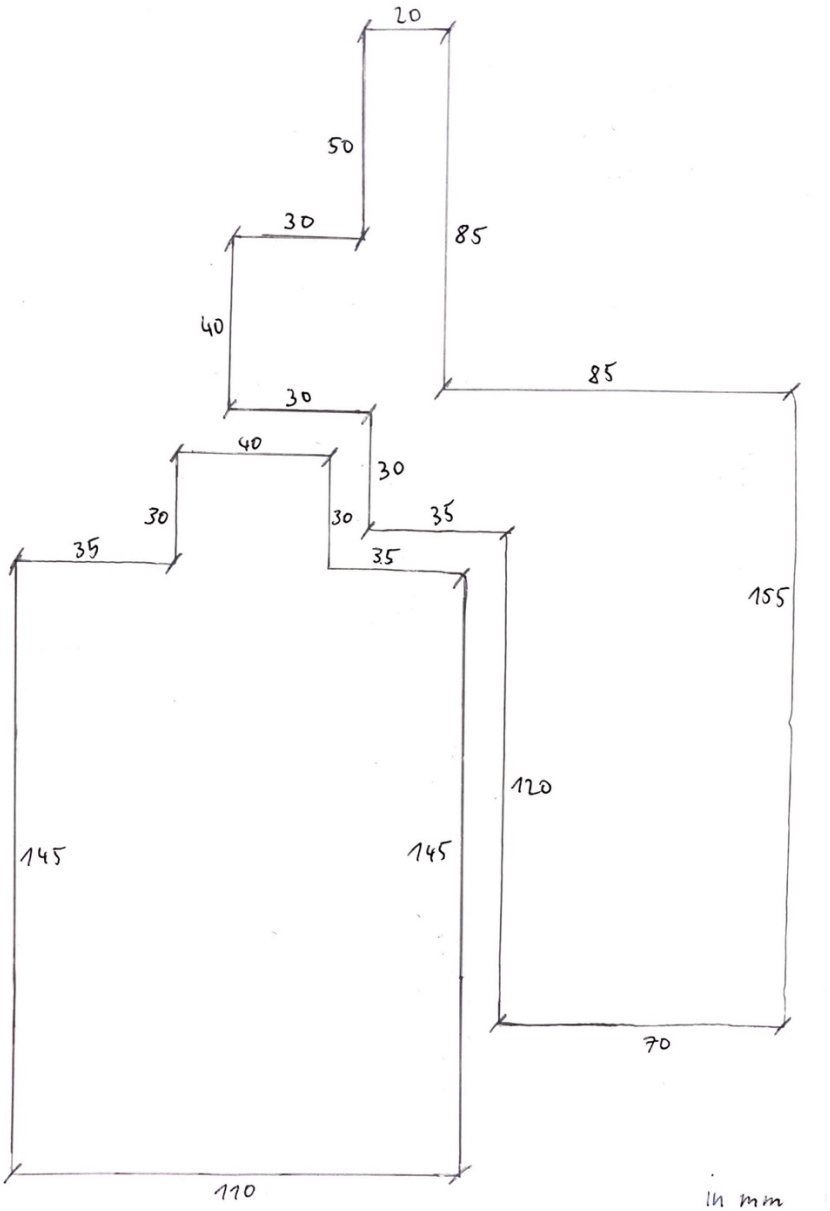


Figure 3: Dimensions of base and top plate

The capacitive sensors are made from PCB board, aluminum tape, adhesive tape, stranded wire and velcro. This is a great opportunity to put on your favorite album and start building, since you will need 16 of these. Cut 20x20 squares from the PCB board as well as 20x60 strips from the aluminum tape. Then, place your stranded wire onto the conductive side of the PCB board and wrap the aluminum tape around. Give it another wrap in adhesive tape to protect the sensor from excessive wear. Cut another 20x20 square from the velcro tape and stick it to the sensor. Do this 16 times. After you finished, place everything on the frame and check the ergonomics.

Use the glue gun to fix the buttons and LED's in place.

Now for the soldering part. Refer to the circuit layout in figure 4 for this. I opted to solder everything onto a PCB board on the hand. The possibility to arrange everything neatly makes up for the additional solder work. After placement you only need to cut the right wire lengths and connect everything to your Bela. You also do not need to screw anything in since everything is fixed in place with velcro tape. I used a lot of female sockets for easy removal but you can directly solder everything to the board if you want. Finally, cut the other type of velcro tape to the appropriate length (a little more than your wrist circumference) and pull it through the slits in the frame.

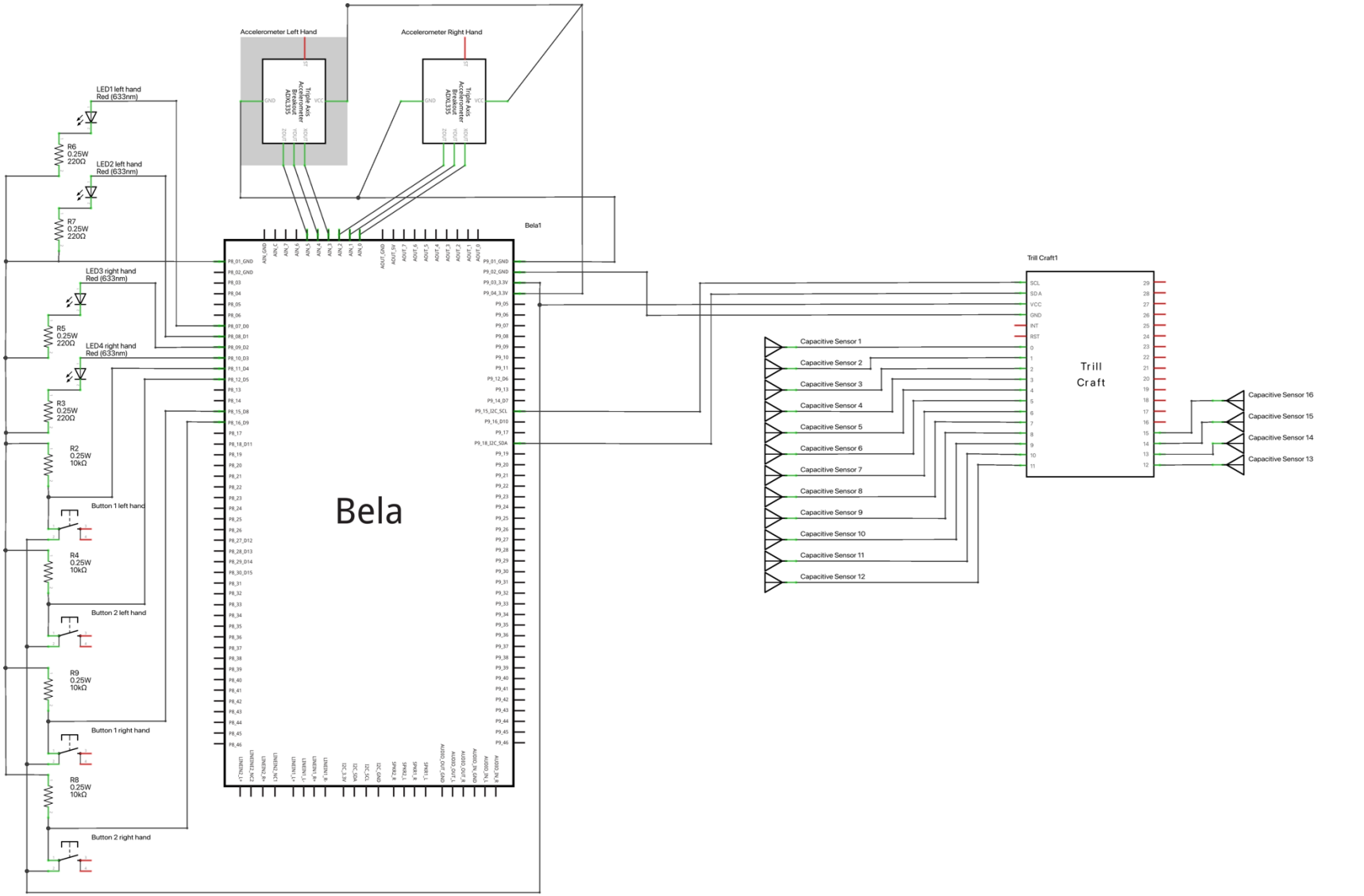
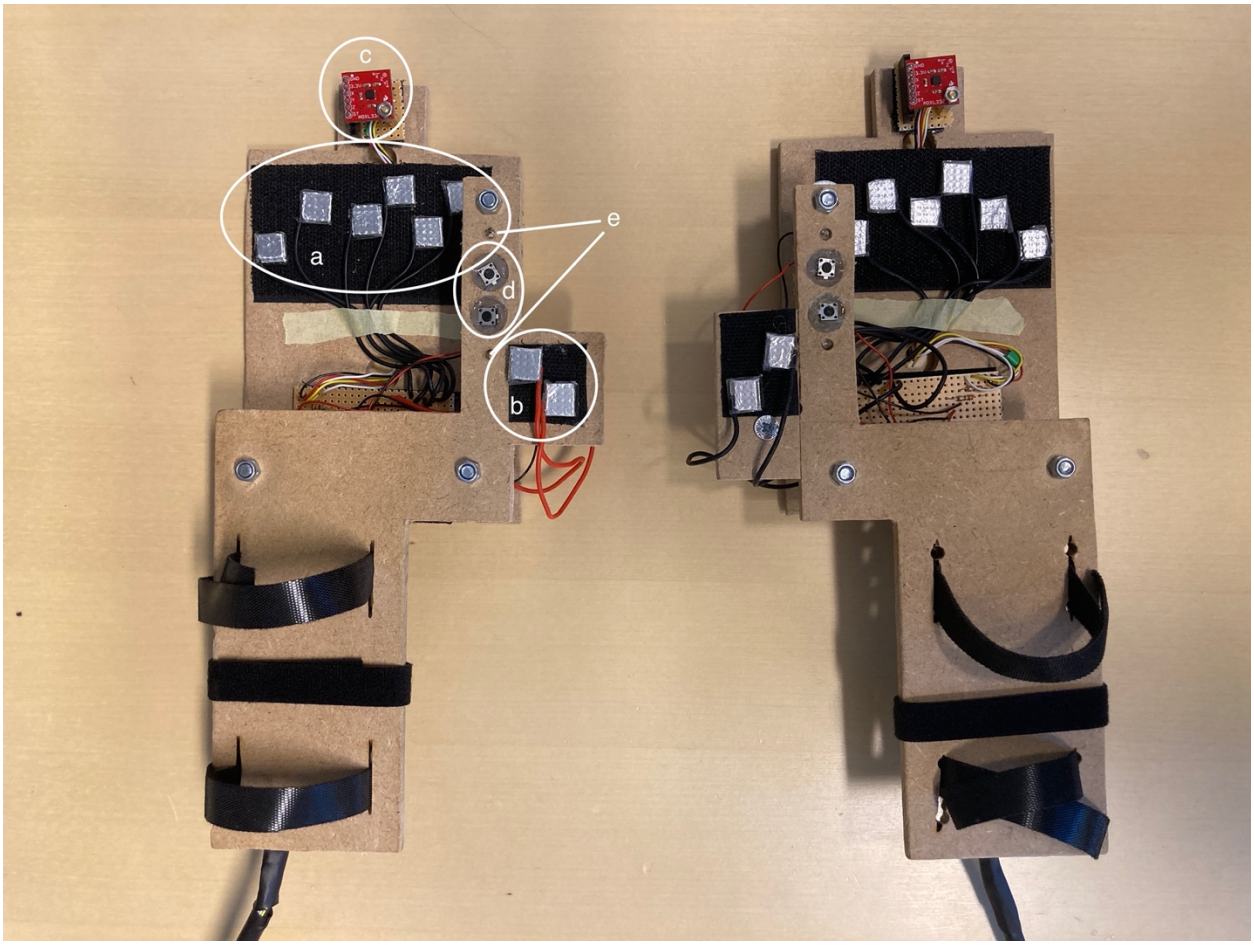


Figure 4: Electronics schematics

After you build and assembled everything, your system while look similar to this.



a - pitch keys (DIY capacitive touch sensors)
b - octave range keys
c- accelerometer sensor
d - effect on/off buttons
e - green LED's

Before you can play with it you need to load the project onto the Bela. Create a project in the Bela IDE and simply drag and drop all files in the main folder into the project. Make sure you installed the following pd libraries on bela: maxlib and else. Set the project name to boot on startup and change the block size to 128. Now you are ready to go, have fun playing!