**PureData OSC Accelerometer Bridge**

**&**

**TouchOSC Accelerometer Layout**

**User Guide**

**How to use the OSC Accelerometer Bridge**

* Open the OSC Accelerometer Bridge in PureData-extended
  + This will not work in the basic PureData application, you have to use PureData-extended
* If necessary, modify the incoming and outgoing ports to your desired values
  + Default incoming port is 7000
  + Default outgoing port is 8000
  + To change the incoming port, change the number in the “udpreceive 7000” object at the top
  + To change the outgoing port, change the number in the “connect localhost 8000” object at the bottom
* Make sure PureData is not in Edit mode
  + Your cursor should be a pointer, not a hand
  + Toggle Edit Mode in the Edit menu
* Click the “CONNECT” button at the bottom to connect to the outgoing port
* Enable the desired variables
  + Each of the outgoing variables are disabled on startup, they must be enabled individually before they will start streaming out
  + Use the TouchOSC layout to enable/disable individual variables (see below for details)
* That’s it. The enabled variables should now be streaming out through the outgoing port. Switch to your DAW or whatever you’re trying to control and assign each variable to the desired parameter(s). This process is easier if you enable only one outgoing variable at a time during the initial setup.

**How to use the TouchOSC layout**

* Setup
  + Transfer the layout to your phone
    - Open the layout file in the TouchOSC Editor
    - Click the Sync button at the top right
    - In the TouchOSC app settings menu:
      * Select Layout
        + Select Add from Editor
        + Enter your computer’s IP address (the computer and phone must be on the same network)
        + Select Download
  + Set TouchOSC settings
    - Make sure the Accelerometer Layout is selected from the layout menu
    - In the options menu, enable the “Accelerometer (/xyz)” option
* Page 1: variable toggles
  + Each toggle enables/disables the labeled variable from being sent out by the OSC Accelerometer Bridge
  + The labels on the bottom display the current time and battery level
* Page 2: input limits
  + Each variable has a minimum and maximum value
  + Increasing the minimum value or decreasing the maximum value will reduce the amount of rotation in between a value of 0 and 1
  + This is useful for times when you don’t want to have to do a full 180 degree rotation to go from a value of 0 to 1. For example, if you increase the minimum to the midpoint of the slider, half of the rotation positions will all send a value of 0 (these are the positions that would send values ranging from 0 to 0.5 under the default settings), while the other half of the positions will increase from 0 to 1 over the span of a 90 degree rotation.
  + You can also use these sliders to reverse the values sent out to the DAW (i.e. 0 becomes 1 and 1 becomes 0). To do this, set the sliders so that the minimum value is higher than the maximum value.
  + This is a difficult concept to explain, so just play around with the settings and you’ll see what it does.
* Page 3: output limits
  + Each variable has a minimum and maximum value
  + If you set the minimum at the midpoint of the slider, only values above 0.5 will be sent out. If you set the maximum at the midpoint of the slider, only values below 0.5 will be sent out.
  + This is useful if you are manipulating a parameter and you want to make sure it never goes below and/or above certain values.
* Rotation values
  + On my Nexus 5, the values represent these orientations. This may be different on other devices:
    - x = roll, rotating about the USB port on the bottom
      * 0 is with volume buttons straight up
      * 0.5 is with phone horizontal with screen facing straight up or straight down
      * 1 is with power button straight up
    - y = pitch, rotating to raise/lower the top/bottom edges where the USB and headphone ports are
      * 0 is with USB port straight up
      * 0.5 is with phone horizontal with screen facing straight up or straight down
      * 1 is with headphone port straight up
    - z = determines whether screen is face up or down
      * 0 is with screen facing straight down
      * 0.5 is face sideways, any edges are up
      * 1 is with screen facing straight up

**PureData OSC Accelerometer Bridge Signal Flow**

* All OSC data is received at the specified incoming port (default 7000)
* Unpacks accelerometer data received at /accxyz
  + Unpacks 3 float values labeled X, Y, and Z
* Math is performed on each value to get the values into the correct range
  + The values from the phone range from -10 to +10
  + Desired values range from 0 to 1
  + For each original value:
    - Add 10 (raises minimum to 0)
    - Divide by 20 (reduces maximum to 1)
* Additional math is performed to smooth the values
  + A moving average is calculated over a span of 10 data points
* Each value is split into 3 duplicate variables to make it easier to control multiple effects with a single accelerator orientation
  + The duplicate variables are sent out as:
    - /accx1
    - /accx2
    - /accx3
    - /accy1
    - /accy2
    - /accy3
    - /accz1
    - /accz2
    - /accz3
* All of the variables are sent back out at the outgoing port (default 8000)