

# SEISMOSCOPES

BY RAFAEL LOZANO-HEMMER



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# **GENERAL IMPORTANT INFORMATION**

This short section must be read for proper operation

# SEISMOSCOPES (2009)

BY RAFAEL LOZANO-HEMMER

## Technique

Modified XY Plotter, vibration sensor, computer, paper, metal stand.

## Description

The series “Seismoscopes” consists of devices that detect vibration around them, from footsteps to earthquakes, and record this vibration on paper using an automated XY-plotter. As each Seismoscope registers any seismic wave it is programmed to automatically draw an illustration of a single Skeptical philosopher, over and over again. The first Seismoscope, for example, always draws the portrait of Portuguese philosopher Francisco Sanches, author of the seminal treatise “That Nothing is Known”. The actual traces of the drawing follow a random path, although staying within the portrait image that has been burned into the memory of the device, --thus, every drawing is a different variation of the same portrait. The artwork is the device itself, not the drawings that it makes: the collector or curator may give these drawings away, they may exhibit them as a pile on the floor or hang them neatly on the walls.

## Electrical details

The piece needs 300W peak consumption, 15W average, 120V.

## Operation

\*\* Please “Appendix I - Installation” on page 13 for components information. \*\*

1. Install the pen cartridge in the provided pen holder and slide this into the plotter’s pen holder. The pen should be holding vertically once introduced in the plotter.

2. Connect the piece to electrical power via an extension cable. Seismoscopes comes with a 3 prong power plug (NEMA 5–15). You will need to use a step-down transformer (and maybe an adapter) to connect this plug to a 240 volts circuit. Refer to “Appendix III - Voltage conversion” on page 17 for a detailed description.

2. To turn the piece ON, plug the above mentioned power plug in to the wall outlet. The iPod will prompt you with a button that says “Tap to Unlock“. After taping this button, next tap the Seismoscopes icon in the iPod’s dock.

3. To turn the piece OFF, unplug the power plug from the wall.

## **Maintenance**

Please do not clean the iPod's touch screen surface with Windex or soap. Use a lint-free cloth and screen liquid cleaner, such as Kensington Screen Guardian found in computer stores.

The metal table and sensor-pod are painted with robust black paint, which makes the piece more scratch resistant. Use normal soapy water or spray on cleaners to clean the metal.

We recommend cleaning the piece at least every 2 months.

## **Placement instructions**

The sensor-pod can be hung on a wall or placed on the floor. Since Seismoscopes detects vibrations it is recommended to place the sensor-pod in a place where vibrations are most likely to be transferred to, such as wooded floors, plaster walls or wooded supports beams. Try to avoid placing it on carpets, concrete floors or concrete walls, since vibrations get either absorbed or have a difficult time reaching the sensor.

If installed on the wall, we usually recommend to install the sensor-pod in order to have it vertically centered at 150 centimeters (59 inches) away from the ground.

The metal stand can sit on any floor or leveled surface. Do not install the sensor-pod too far away from the metal stand as it will pull on the signal cable coming from the sensor-pod and this could damage it.

# DETAILED TECHNICAL INFORMATION

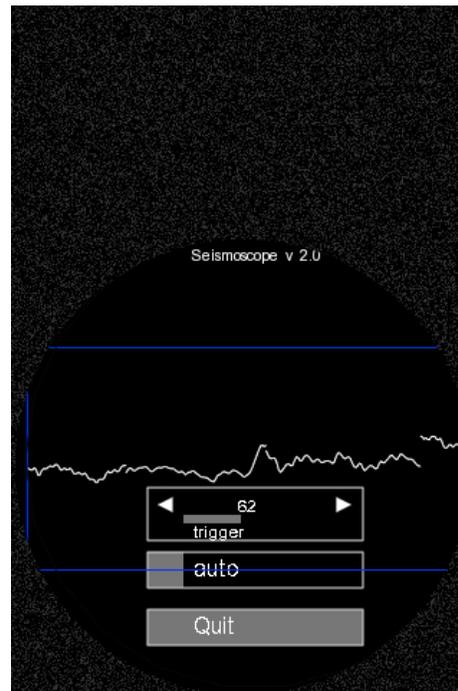
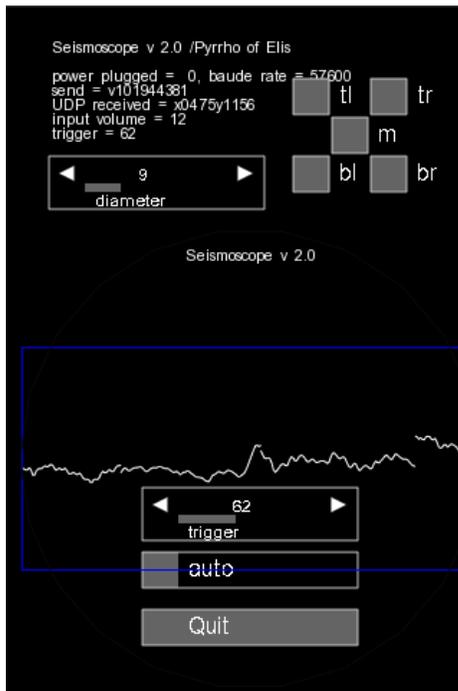
## Software

The piece includes custom-made software that runs on an iPod touch, which is housed inside the Sensor-Pod. There are some software tools that may be useful if you would like to optimize the performance of the system. Remove the front cover of the Sensor-Pod to gain access to the iPod located inside. It is also recommended to hold the pod in order to have the iPod in vertical position, with its charging cable located at the bottom.



### Accessing the piece's menu

To change settings in the software, double tap the iPod's screen until you see the settings pages as in one of these shown in the images below.



## **Within the menu, there is few controls to adjust the reaction of the piece**

**We do recommend that if ever you modify the trigger or the Auto setting, you should cycle thru the whole settings pages once. Once you get back to the page where you can press Quit, do that and then proceed to start the software as previously described.**

### **1. Trigger**

In order to have this setting effective, the setting Auto should be disabled. This sets the sensor's vibration trigger threshold. Press your finger on either the left or right white triangle to decrease or increase the trigger value. The blue threshold lines will move closer or further away from the vibration graph. When the graph's peaks go past the lines the system is being triggered and a line will be drawn on the sheet of paper. We recommend to never set the trigger level too low. If a person silently stands next to the artwork and the plotter draws, the trigger value should be raised. We basically want the trigger value to be right on the edge where someone speaking is triggering the system, while someone silent doesn't.

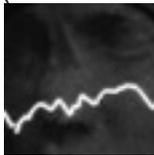
### **2. Auto**

When pressing this button a black X will mark that the button is enabled and the system will automatically draw lines on the sheet of paper. Trigger value (actual vibrations/sounds in the room) will be ignored. This setting is good to use if you want to produce a larger amount of drawings in a short time.

### **3. Quit**

Select this to exit the program entirely, this will take you to the iPod's desktop. If you would like to relaunch the program, click on the Seismoscopes icon that is on the iPod's dock. Please note it is not necessary to quit the program to turn the piece off; you can simply unplug the main power to the Seismoscopes. As a result the software will quit automatically and after a few minutes the iPod will turn off.

To turn the piece back On plug the main power plug back in to the wall outlet. The iPod will prompt with a button that says "Tap to Unlock". After tapping this button, next tap the Seismoscope icon (shown below) in the iPod's dock.



### **4. Corner buttons**

These buttons don't need to be used. They are only needed for calibrating a new XY plotter. When tapping these button the drawing pen moves either to the top left (tl), top right (tr), middle (m), bottom left (bl) or bottom right (br).

## **Preliminary troubleshooting steps**

### **The plotter doesn't react.**

Make sure the power cable coming from one of plotter's legs is well connected to a charged and stable 120 volts AC source. If it wasn't connected, feed electricity, look at the iPod and see if there is any action in screen, if so, the plotter should be moving within a minute.

Make sure the XLR cable from the sensor-pod is well connected to the XLR port on the plotter table. If already connected, disconnect it, wait 10 seconds and plug it back.

Make sure the settings in software are as following: auto should be disabled, trigger level should be set to 1. If while having these settings the plotter still doesn't react, deeper verifications should be done with assistance of studio. However, if the plotter now move, fine tune the trigger level to something higher, as explained in "1. Trigger" on page 9

### **The plotter is always moving, even without movement near it.**

Make sure the settings in software are as following: auto should be disabled, trigger level should be set to a value where it allows someone silently standing next to the piece to not trigger the system. Follow instructions as explained in "1. Trigger" on page 9

### **The drawings are quite light.**

Make sure the pen cartridge still have ink inside. Before removing the cartridge from the plotter, ensure to disconnect plotter from AC circuit to avoid movement during operation and, therefore, possible damages to the plotter.

If the cartridge still has enough ink in, make sure the sure the trigger setting in software is set to a value low enough to trigger more often, while still having it high enough to allow someone silently standing next to the piece to not trigger the system. Follow instructions as explained in "1. Trigger" on page 9

## Troubleshooting assistance

Prior to contact Antimodular studio for a problem with your artwork, ensure you went thru the preliminary troubleshooting steps from the previous section.

**The troubleshooting process will vary depending on the problem. In order to ease the process, it is recommended that you collect and transfer these information to the studio:**

- Date and time when the problem first happened;
- Description of the problem;
- Actions taken so far and conclusions;
- Detailed photographs (or videos) displaying the problem;
- Detailed photographs (or videos) of the suspected faulty component;
- Detailed photographs (or videos) of the whole artwork and its surroundings;
- Personnel involved;
- Other relevant details, such as any changes in the surroundings, etc.

## **Support (contact us)**

If you would like support for the piece please feel free to call Lozano-Hemmer's studio in Canada:

Antimodular Research  
4060 St-Laurent, studio 107  
Montréal Québec H2W 1Y9 Canada  
Tel 1-514-597-0917 Fax 1-514-597-2092  
info@antimodular.com  
www.antimodular.com

# APPENDIX I - INSTALLATION

## Components description

This artwork is made from the following components:

Component	Description
Metal stand	The stand is made of steel, painted with a durable black auto paint, with a satin finish. It houses the XY plotter and micro controller.
Sensor-Pod	The pod has a metal cover which is painted the same way then the stand is. The Pod houses the iPod touch, contact microphone and small electronics for sound amplification and power conversion.
iPod touch	It is used a jail broken, 2nd generation, 8.0 GB iPod touch, running the 3.0 or 3.1.2 firmware. The iPod's microphone input is used to analyze the vibrations. Over the WIFI the iPod communicates with the micro-controller.
Sensor	A 1.2kHz, 3.5K ohm impedance, 50 mm diameter, contact microphone is used a vibration sensor.
XY plotter	The plotter is a custom modified version of the Allendata-graph 910M XY RECORDER.
Custom-made Electronics	An Arduino Mini Pro micro-controller with an Atmel AT-mega328 chip is running custom firmware. A WiFi board is used to create a 802.11b WIFI adhoc network. Two MCP4725 digital to analog converter are used to communicate with the XY Plotter.
Pen holder	Three stainless steel cylinders in to which the ball point pen slides in. Each cylinder has a different weight and so draws a thicker or lighter line. "Appendix V - Pen information" on page 20
Pen	A Fisher Space Pen Refill Cartridge is used (#SPR1F or #SPR4F). "Appendix V - Pen information" on page 20

## Components connections

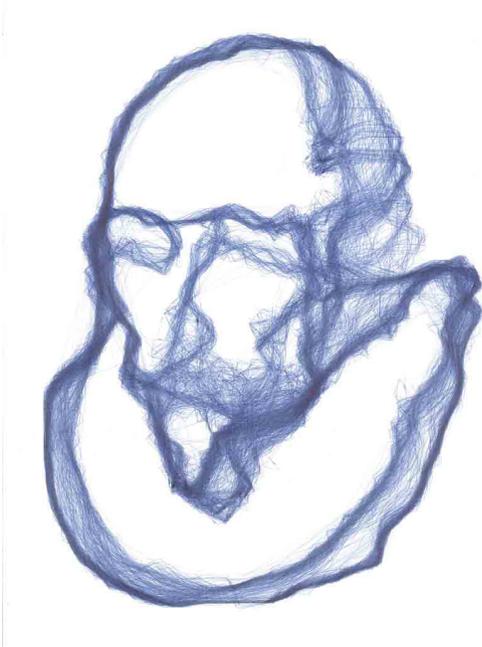
In order to have an operational artwork, the Sensor-pod should be connected to the Metal stand thru the DMX port. The Metal stand has a NEMA5-15 power plug/cord getting out from one of its legs: this should be plugged to a 120 volts socket. If your local current isn't 120V, you will need a step-down transformer as per "Appendix III - Voltage conversion" on page 17

## APPENDIX II - DIFFERENT SEISMOSCOPES TO DATE

At the end of the project, there will be approximately 20 Seismoscopes in total.

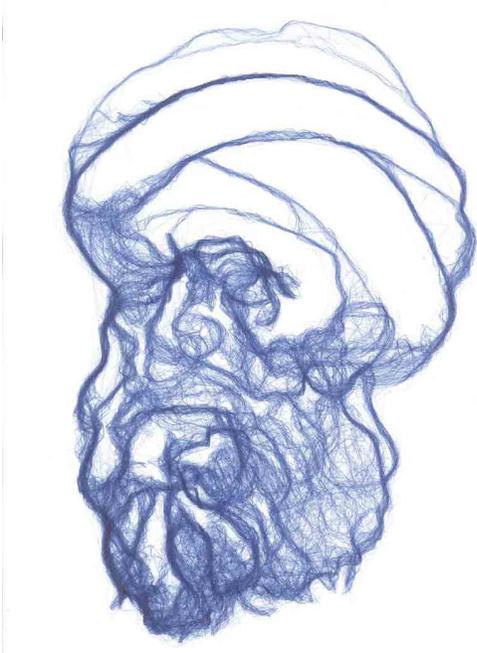
### Seismoscope 1: Francisco Sanches

Portuguese (1550-1623), author of "That Nothing is Known".



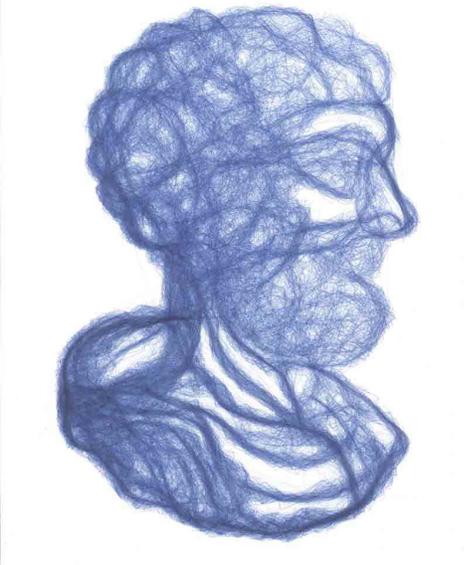
### Seismoscope 2: Abu Hamid Muhammad ibn Muhammad al-Ghazali

Persian (1058-1111), author of "The Incoherence of Philosophers".



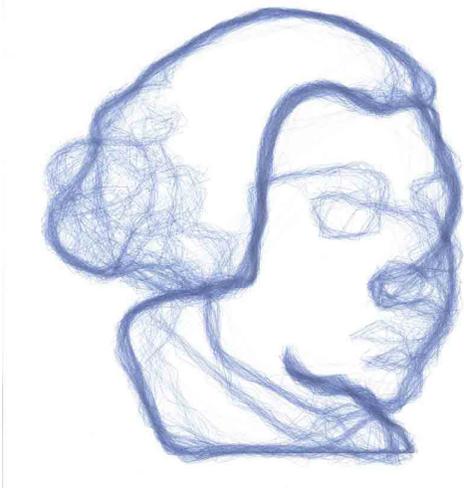
### **Seismoscope 3: Sextus Empiricus**

Greek (160-210), author of "Against the Mathematicians".



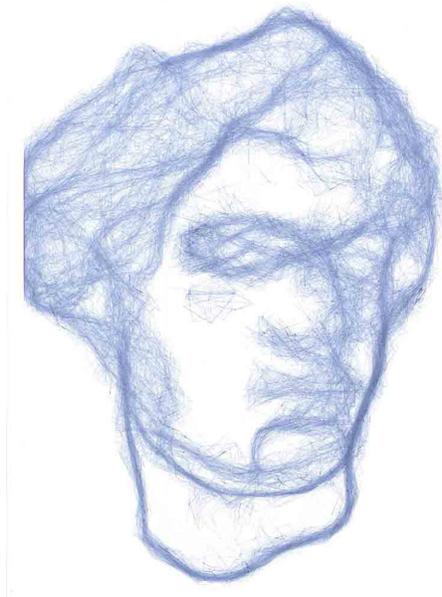
### **Seismoscope 4: David Hume**

Scottish (1711-1776), author of "An Enquiry concerning human understanding".



## **Seismoscope 5: Pyrrho of Elis**

Greek (360-270 BC), proponent of Acatalepsy (impossibility of comprehending a thing).



## **Seismoscope 6: Nicolas Malebranche**

French (1638-1715), dedicated his work to refute Cartesians.

## **Seismoscope 7: Juan Huarte de San Juan**

Spanish (1529-1588), author of “Examen de ingenios para las ciencias”.

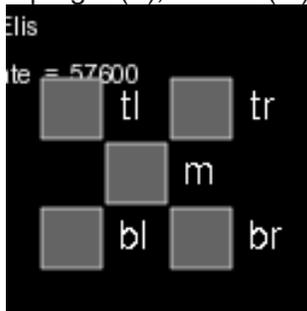
## **APPENDIX III - VOLTAGE CONVERSION**

In the early versions of the project, we were showing how to set the artwork to let it run on different voltage than 120 volts AC. However, due to different issues experienced, we no longer propose that solution as a standard. Instead, if local voltage is different than 120 volts AC, we do recommend using a step-down transformer for a proper functionality of the artwork..

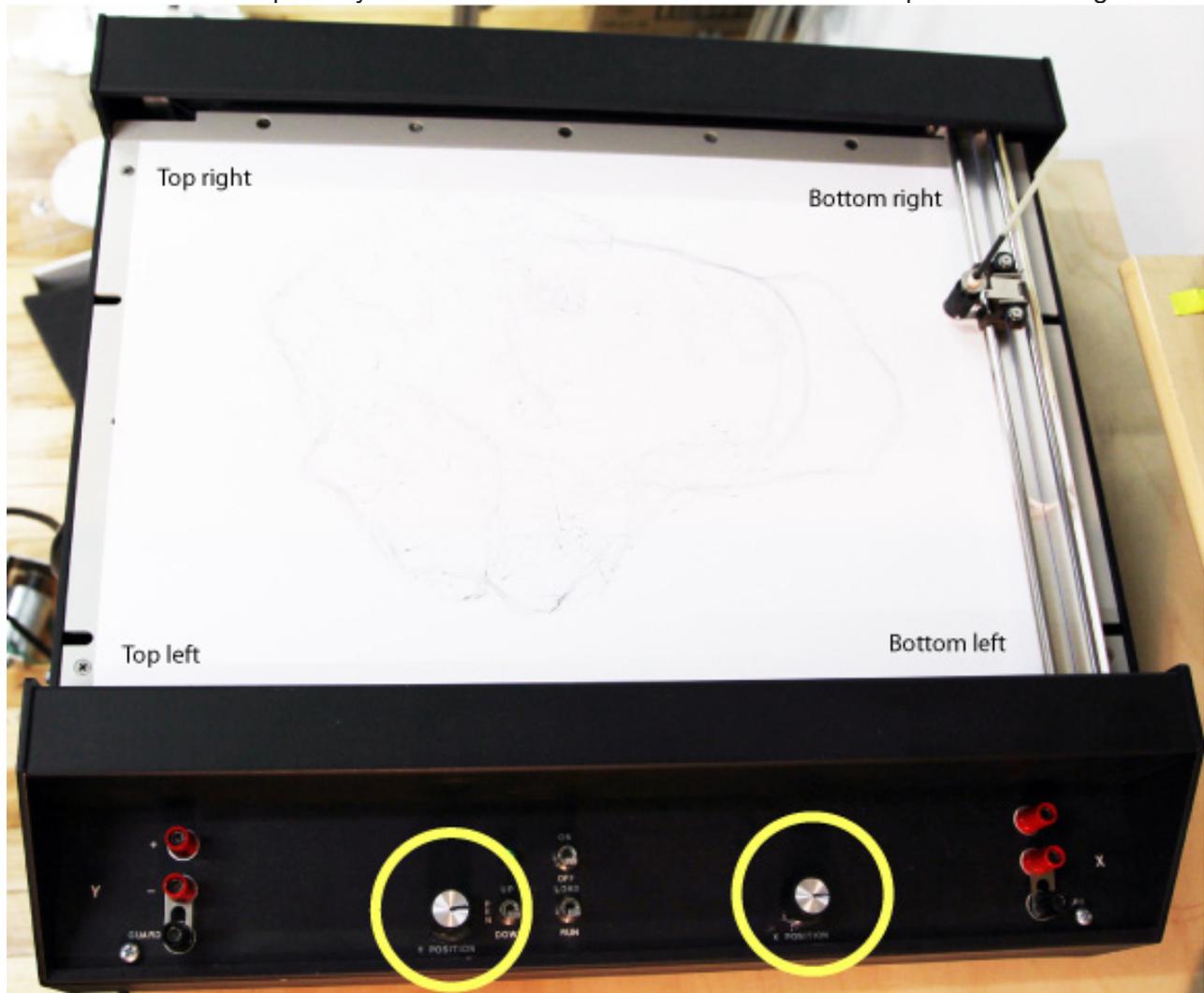
The selected step-down transformer should allow a minimum of 300 watts, as the artwork needs that in peak consumption.

## APPENDIX IV - CALIBRATING THE XY PLOTTER

1. Remove the front cover of the Sensor-Pod.
2. With the software running, double tap the screen until you see the settings page. When tapping one of the buttons seen in the image under, then the drawing pen moves either to the top left (tl), top right (tr), middle (m), bottom left (bl) or bottom right (br).



To calibrate a new XY plotter you will need to turn the X and Y knobs on the plotter. See image below.



To calibrate, the easiest process is to first set the sensor pod on a stable surface, then set the piece's settings as following:

- Auto settings should be disabled;
- Trigger's level should be raised to its maximum.

Then, press the "m" button to bring the plotter to the middle point of the table. Fine tune the X and Y positions with the knobs previously identified. Once you like the position, test the leeway when pressing on the "tl", "tr", "bl" and "br" buttons. If ever you hear the plotter forcing a bit, fine-tune the position as this probably means the plotter is actually set too much on one side of its center, either to the bottom, the top, the left or the right.

Once the position of the plotter is well calibrated, secure the knob by using hot glue to ensure they can't be rotated, either willingly or if accidentally knocked.

## APPENDIX V - PEN INFORMATION

The pen in use in this piece is a Space Pen from the company Fisher. The Write Out for this Refill is approximately 15,000 feet (4 750 kilometers) depending on writing style - 3 ½ times longer than a typical ball point refill. The two colors allowed are blue and black.



Models numbers are :

- SPR1F - PR1F for the Blue Ink Fine Point Space Pen Pressurized Refill;
- SPR4F - PR4F for the Black Ink Fine Point Space Pen Pressurized Refill.

If this model of cartridge isn't retrievable anymore, the key information to know is the following:

- diameter: 3/16 inch;
- length: 3 1/2 inch.

The pen cartridge should be inserted in the metal pen holder provided with the artwork. This pen holder ensures that the cartridge isn't jamming into plotter's pen holder and then create tension within plotter's pen holder assembly. The pen holder is also adding a slight weight onto the pen cartridge, improving the quality of drawing.



# APPENDIX IV - UPDATING IPOD TOUCH

This iPod touch is “jail broken”. This allows us to add features that Apple has not yet officially endorsed. To update the Seismoscopes software you need to download a new version from Cydia. Cydia is much like the official App Store. \*\* Since this process is delicate, going thru the following steps should be done very carefully and only under the recommendation of the studio. \*\*

1. Take the front cover of the sensor-pod off, so that you have full access to the iPod. It helps to flip the iPod so that you can see the screen right side up.
2. Check your version number, then exit the Seismoscope software by pressing the Home button (the physical button on the bottom of the iPod). You will see the home screen with the Seismoscope icon in the Dock.
3. Tap the Settings icon, navigate to the Wi-Fi Networks settings, select your wireless network. You might have to enter password to gain network access.
4. Press the Home button again, which takes you to the home screen.



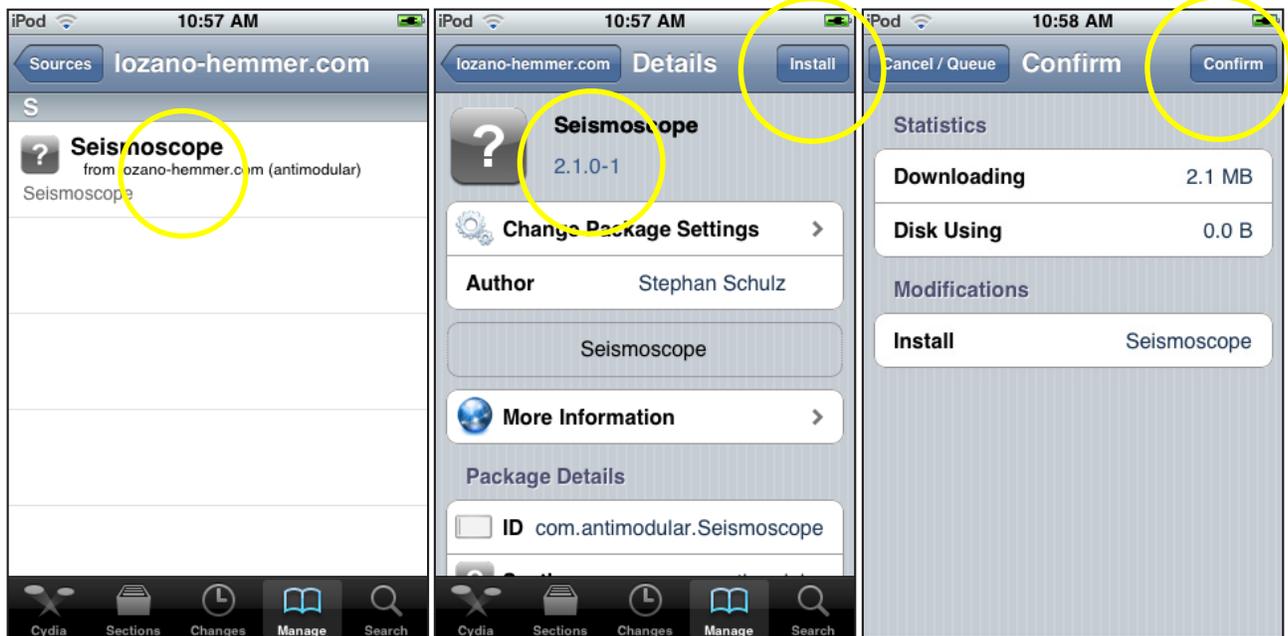
- Tap the Cydia icon. It will take a while to load. Tap cancel if it wants to update things. Tap the Manage icon at the bottom of the screen. Tap the big Source button in the middle of the screen.



- Tap the Edit button at the top right of the screen.
- Tap the Add button at the top left of the screen.
- A pop up window will ask you to enter the following URL: <http://www.lozano-hemmer.com/software/seismoscope> (the ??? stand for version #).
- Tap the “Add Source” button.
- Tap the “Done” button at the top right of the screen.
- Tap the “lozano-hemmer.com” row in the section “Entered by User”.



12. Tap the "Seismoscope" row.
13. Compare your current version number with the one displayed in this screen. Ignore the number after the minus sign 2.0.0 - 1. Tap the install button if the two version number are different.
14. Tap the confirm button. The screen will switch to a black screen with white writing.

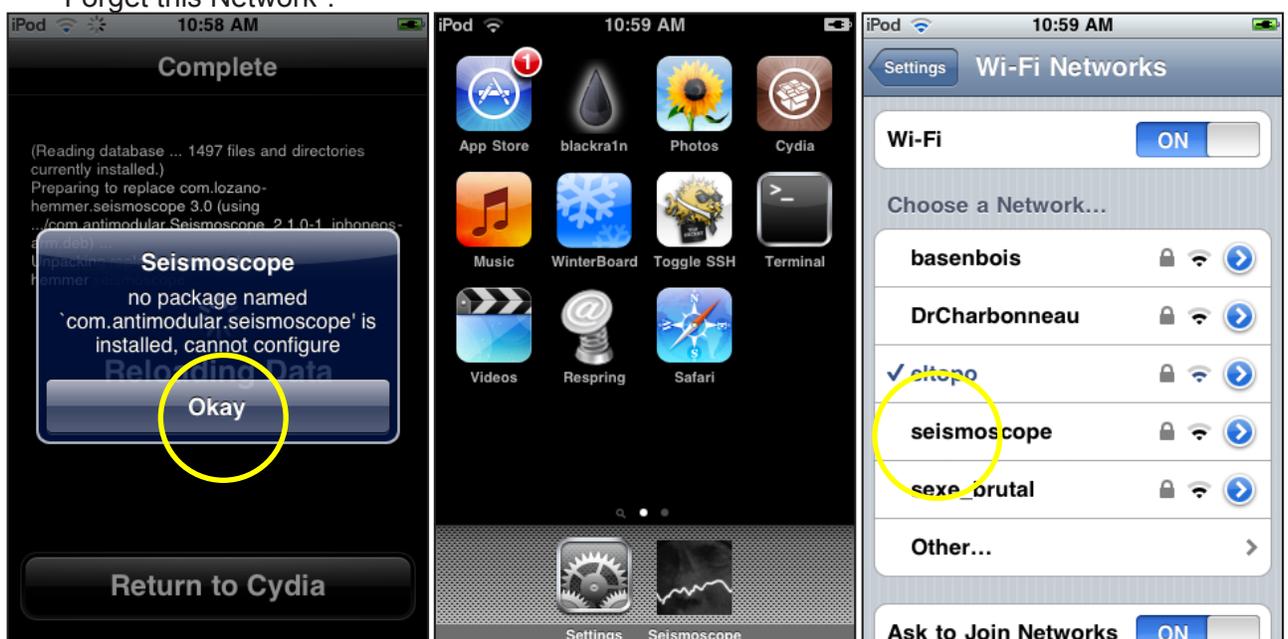


15. While on the black screen you might be prompted with a couple of error message. Tap Okay. It might take a while before the pop up message disappears.

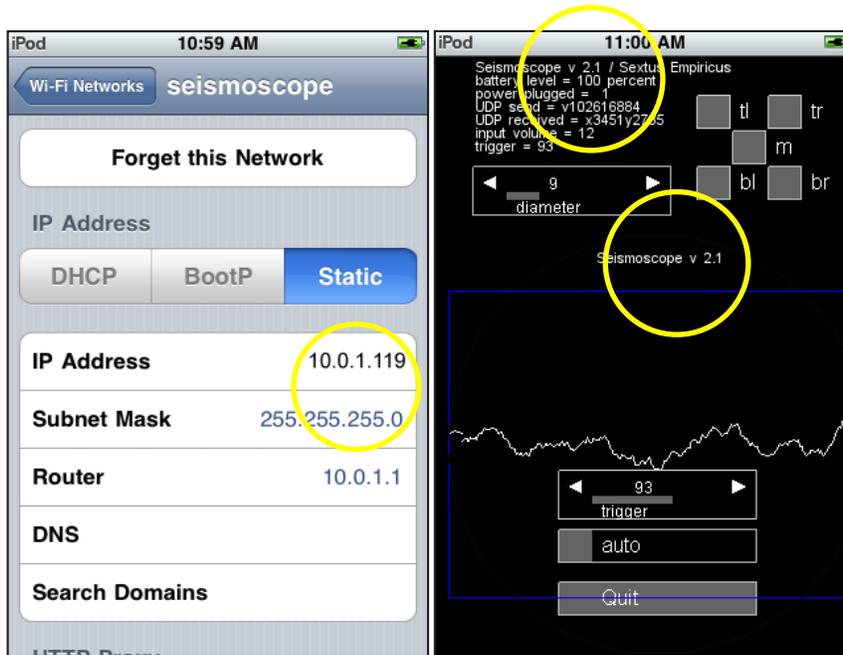
16. Press the Home button to get back to the home screen.

17. Tap the Settings icon in the Dock.

18. Navigate to the Wi-Fi Network settings and tap the name of your current network. On the top tap "Forget this Network".



19. Tap “Wi-Fi Networks” on the top left. This will take you back to the list of available networks.
20. Tap the “seismoscope” network. Make sure the Seismoscope table has power, since the table serves the network.
21. You might be prompted for a password which is: hemmer1234567.
22. Tap on the arrow towards the right of the word “seismoscope”.
23. Tap the “Static” button.
24. Double check the IP Address (10.0.1.119), Subnet Mask (255.255.255.0) and Router (10.0.1.1).



25. Once connected, press the Home button.
26. Tap the Seismoscope icon in the Dock. Check the version number that is now displayed in the Seismoscope software.

# APPENDIX VII - INSTALLATION SHOTS

