REFLEJO PEATONAL

BY RAFAEL LOZANO-HEMMER

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GENERAL IMPORTANT INFORMATION

This short section must be read for proper operation.

REFLEJO PEATONAL (2022)

BY RAFAEL LOZANO-HEMMER

Technique

Computer, Custom Software, AXIS surveillance cameras, SACO LED V-Sticks, SACO V-Brains, SACO Processors.

Description

Reflejo Peatonal is a permanent installation consisting of two sections: the first consists of an array of LED battens covering most of the facade of the Puerta Polanco building, located in Mexico City. The second array is a LED-chandelier located in the street-level soffit. A couple of surveillance cameras feed custom-made software that takes this input and extracts human silhouettes in real-time, that are in turn fed to the LED arrays.

Operation

Please refer to Appendix I - Installation for detailed system information and wiring diagram.

1. To turn the piece **ON**, press the power button on the computer for one second, then release it. Important note: *please do not push the button again as this will shut down the piece*. Wait at least two minutes before pressing it again, as the computer might need this long to reboot. After ten minutes (or less), you should see the different applications running on the left hand dock visible on the screen.

2. To turn the piece **OFF**, press the power button on the side of the small box, or the computer button.

3. Wait up to 5 minutes until everything has finished their shutdown routine.

General Artwork Behaviours

The program has a “Live” and a “Screensaver” mode - “Live” mode takes input from the cameras and feeds the extracted silhouettes to the array in real-time.

The time it takes to enter “Screensaver” mode, where the piece displays previously recorded subjects, is determined in the chandelier GUI. See Chandelier Display application, Chandelier Settings for more information.

Maintenance

Standard office cleaning should be performed routinely on the computer case, keyboard and SACO processing hardware. It is very important, however, to be extra careful when dusting off the computer and hardware, as this could potentially disturb our connections.

We recommend cleaning the piece at least every two months.

Placement Instructions

The LED array should cover the facade, it is driven by custom software that acquires silhouettes from the surveillance camera, and a separate application performs the same function to drive the V-Stick array being used in the Chandelier.

The LED-chandelier is located in the street-level soffit and surveillance cameras are mounted to record observers.

DETAILED TECHNICAL INFORMATION

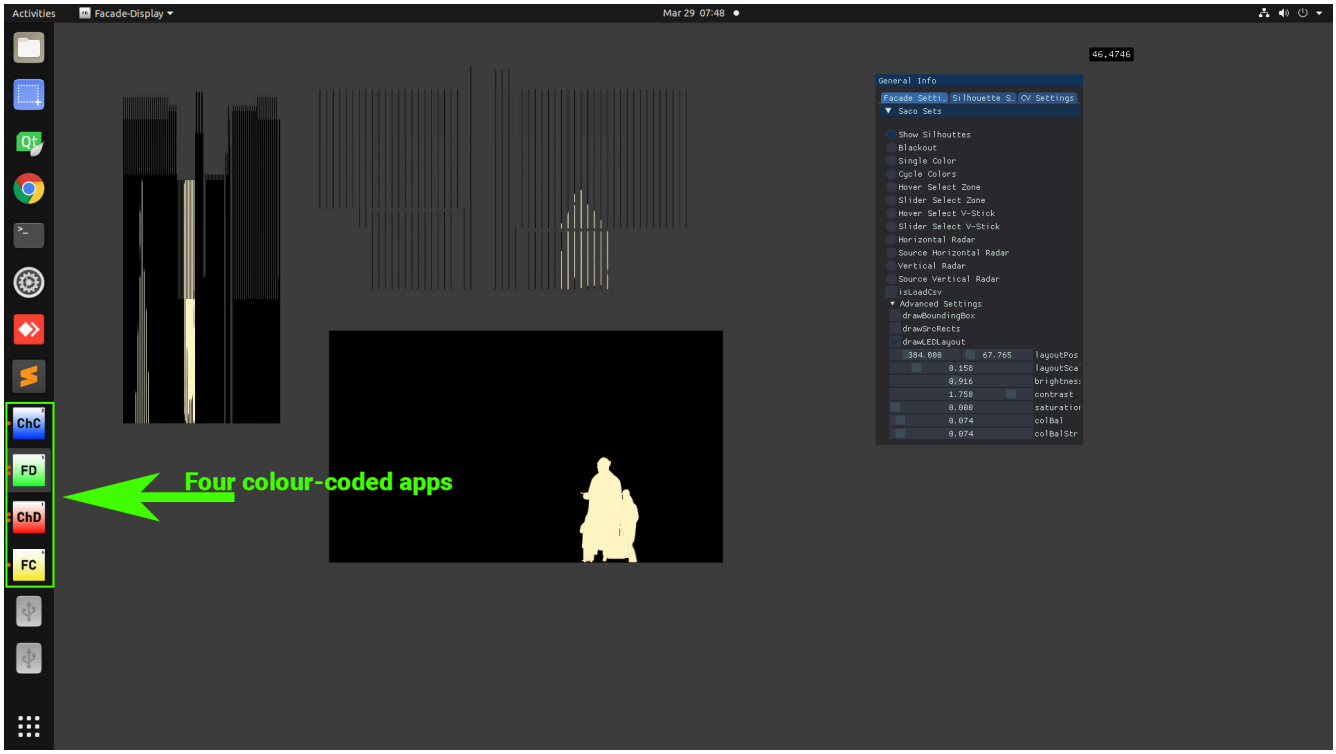
Normal Software Operation

The computer is set to restart on a daily basis at 5:30 am. When the software starts up, it goes through a setup script that loads the necessary applications.

It consists of four applications:

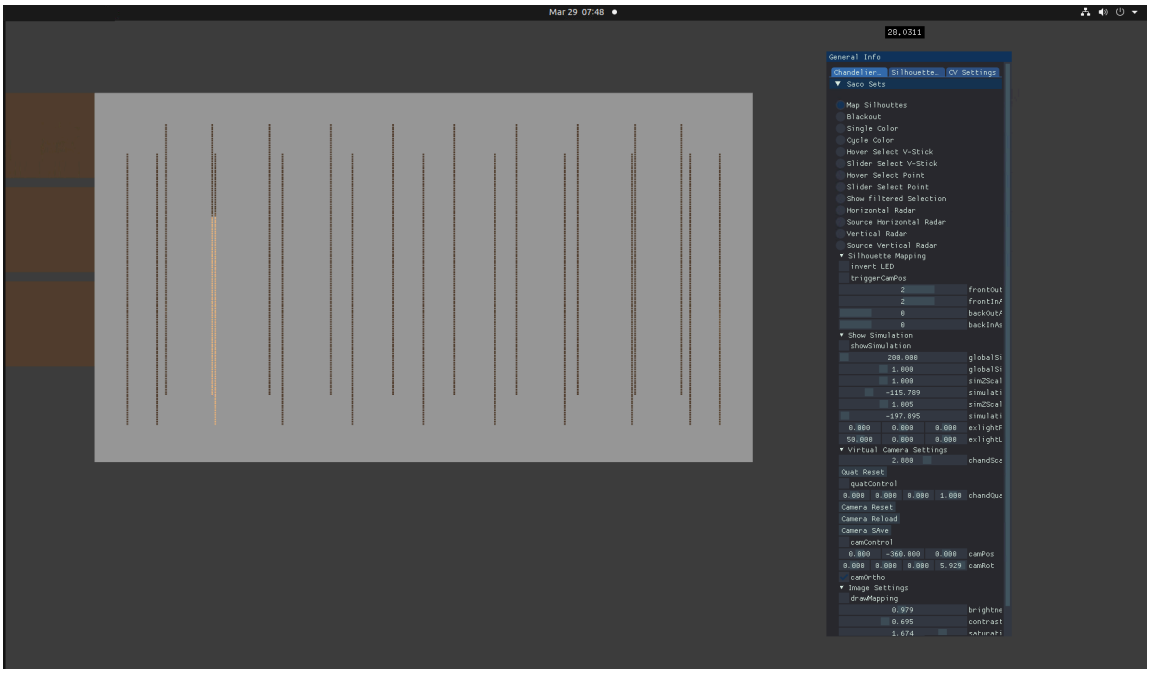
- Chandelier Display
- Chandelier Capture
- Facade Display
- Facade Capture

To make sure all applications are running, the user only has to look at the system dock, which should be visible on the left-hand side of the screen. These four icons should be visible on the dock as seen in the image below. The computer has two monitors, the lower monitor should look like the image below after a successful boot, notice the 4 distinctly coloured icons on the left, if all four are present, and the applications show moving silhouettes, it means the application environment has loaded correctly.



The software running successfully on the lower monitor.

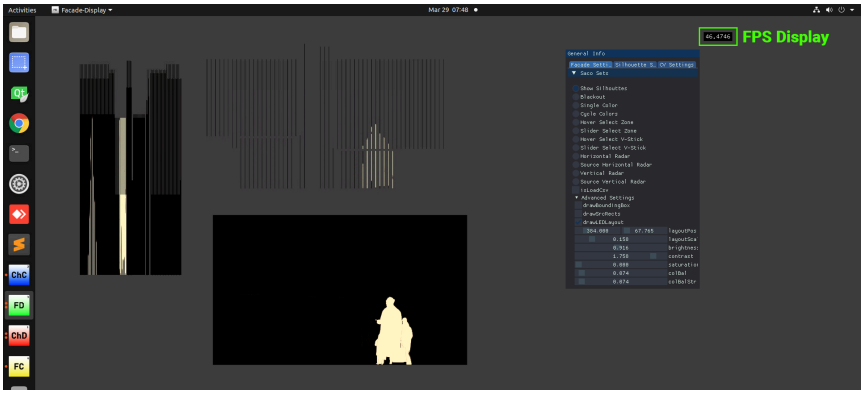
The image below is what the monitor on the top of the rack should be showing. It shows the Chandelier Display app running successfully.



Bottom monitor running the software successfully.

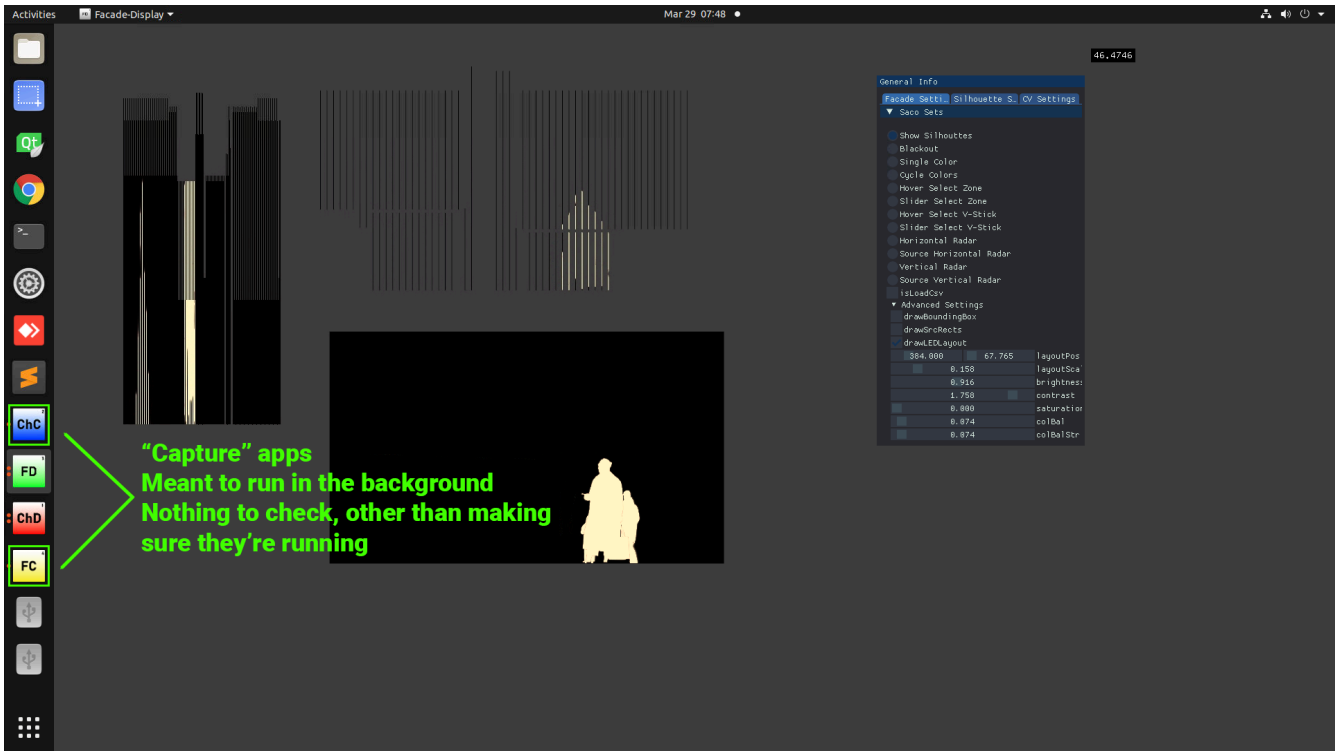
NOTE: It is important to give the computer enough time to load all four applications after a system reboot or power cycle.

The machine-learning applications can take a while to start up and while initialising users may experience a frozen window The start-up process is completed successfully if the user is able to see the Chandelier Display (ChD) application on the top monitor and the Facade Display (FD) application on the lower monitor in the physical rack. Both applications feature an FPS display, this number should stay consistently over 25, otherwise it may be necessary to run a profile assessment of the computer, to be performed by maintenance staff only. The image below shows the FPS display highlighted as a reference.



FPS display highlighted.

Though not visible to the user, in the background there are other two apps running: “Chandelier Capture (ChC)” and “Facade Capture (FC)”. These are for the internal working of the piece and not meant for anything other than as an application bridge. These two applications are not meant to be tweaked or assessed in any way, and only Antimodular staff should modify them if necessary. It is very important to note, however, if the icons for these applications are showing in the dock, it means they are open and running. Use the image below as reference.



Capture apps reference screenshot.

Manual Software Operations

This piece uses two applications.

- Facade Display: Used to control the LED array on the facade
- Chandelier Display : This is the piece's main software. It automatically starts once the computer is powered via **delayOpen**.

Both apps were developed with **OpenFrameworks 10.0**. The normal operation of each piece of software is detailed below.

Pressing key **G** will toggle the visibility of the GUI, pressing key **S** will save stored GUI settings and pressing **L** will load them.

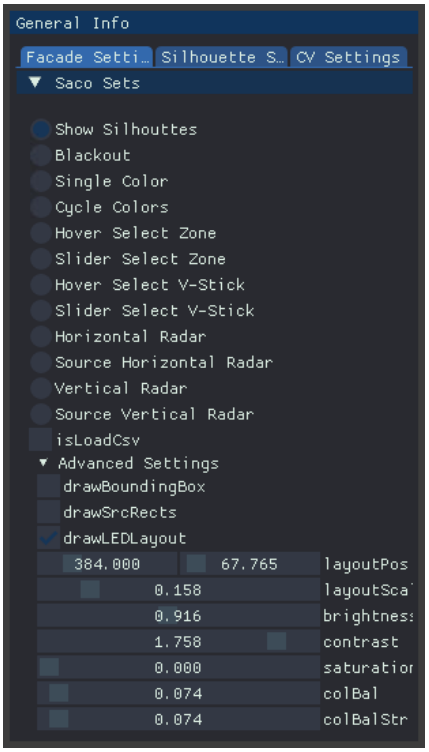
Both Display applications (Facade & Chandelier) feature a GUI that allows the user to tweak, assess and control the v-Stick arrays as needed. The following is a thorough explanation of what the different GUI items do, and what is their intended use.

Facade Display

The following sections cover all the available tabs of the GUI for the Facade Display app and their settings.

Facade Settings

Some of these GUI elements are only needed when troubleshooting the LED array and should only be used in exceptional circumstances. The following table shows the Facade Settings tab of the GUI.

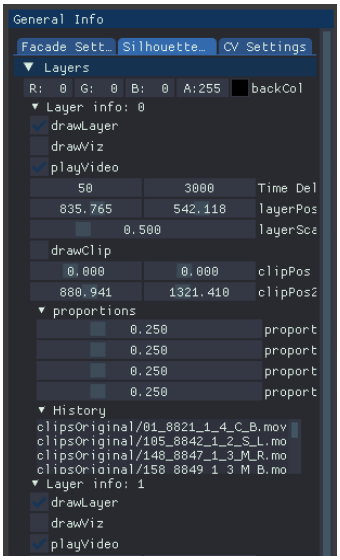


Setting	Description
Show Silhouettes	Default mode, software plays back live and recorded silhouettes.
Blackout	Sets output to all black.
Single Color	Sets output to a single color.
Cycle Colors	Cycles the array through all colors.

Setting	Description
Hover Select Zone	When active, the user can hover over the preview window and directly select a zone of v-Sticks.
Slider Select Zone	Same as Hover Select Zone, but applies to Sliders.
Hover Select V-Stick	Allows for individual selection of V-Sticks by hovering over the preview window.
Slider Select V-Stick	Allows for individual selection of V-Sticks using the sliders.
Horizontal Radar	Displays a horizontal test pattern that flows along the LED array.
Source Horizontal Radar	Displays a horizontal test pattern that flows along the framebuffer.
Vertical Radar	Displays a vertical test pattern that flows along the LED array.
Source Vertical Radar	Displays a vertical test pattern that flows along the framebuffer.
isLoadCSV	Do not use.
Advanced Settings	Do not use.

Silhouette Settings

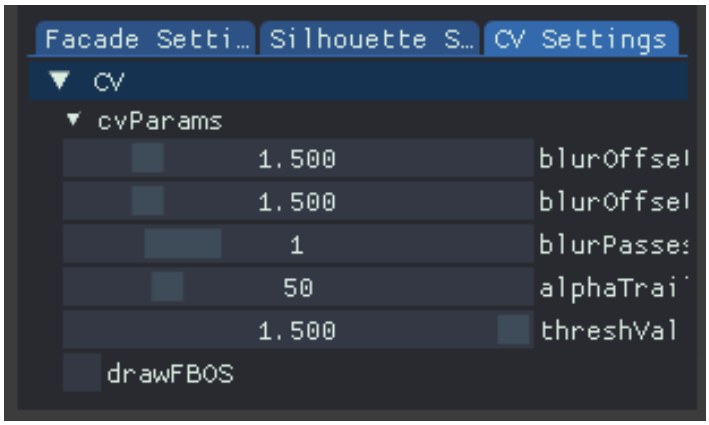
The application can play up to three layers simultaneously. Each layer has individual controls that allow the tweaking of specific values. The controls are as follows.



Setting	Description
drawLayer	Toggles layer visibility.
drawViz	Toggles region or interest visibility.
playVideo	Toggles video playback.
TimeDel	Sets a range to wait before playing the next video, the software will randomly choose a wait time within this range.
layerPos	Sets custom layer position.
layerScale	Sets custom layer scale.
drawClip	Toggles clip drawing visibility.
clipPos	Sets the origin for clip playback.
clipPos2	Sets bounding box limits for clip playback.
Proportions	Sets custom proportion values for current layer, do not adjust.
History	Displays playback history for current layer

CV Settings

The CV settings tab is meant to control the Computer Vision algorithm that creates a filter effect on top of the extracted silhouette.

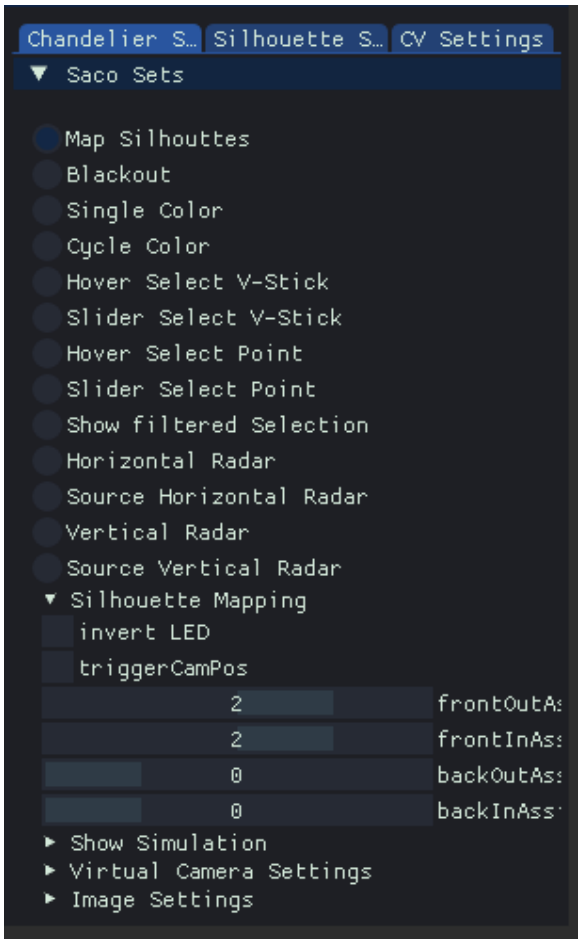


Setting	Description
drawLayer	Controls the amount of blurring occurring for the inside of the silhouette mask.
blurOffset2	Controls the amount of blurring occurring for the outside of the silhouette mask.
blurPasses	Blur iterations until processing is done.
alphaTrails	Generates a trail pattern based on the alpha value, the bigger the value, the longer the trail.
threshVal	Sets a threshold value for mask generation.
drawFBOS	Toggles FrameBufferObjects visibility.

Chandelier Display

The following sections cover all the available tabs of the GUI for the Facade Display app and their settings.

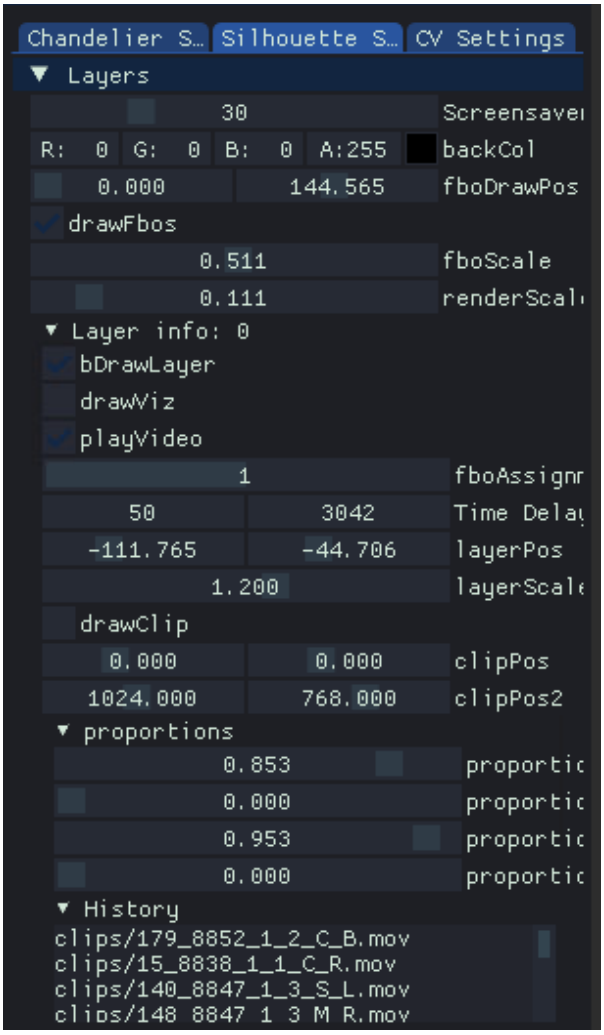
Chandelier Settings



Setting	Description
Map Silhouettes	default mode, software plays back live and recorded silhouettes
Blackout	Sets output to all black.
Single Color	Sets output to a single color
Cycle Colors	Cycles the array through all colors

Setting	Description
Hover Select V-Stick	Allows for individual selection of V-Sticks by hovering over the preview window.
Slider Select V-Stick	Allows for individual selection of V-Sticks using the sliders
Hover Select Point	When active, the user can hover over the preview window and directly select a point.
Slider Select Point	Same as Hover Select Point, but using sliders.
Show filtered Selection	Show current selection.
Horizontal Radar	Displays a horizontal test pattern that flows along the LED array.
Source Horizontal Radar	Displays a horizontal test pattern that flows along the framebuffer.
Vertical Radar	Displays a vertical test pattern that flows along the LED array.
Source Vertical Radar	Displays a vertical test pattern that flows along the framebuffer.
	Invert output, mapping black to white and vice versa.
invertLED	Do not use
triggerCamPos	Do not use
showSimulation	Do not use
Virtual Camera Settings	Do not use
Image Settings	Do not use

Silhouette Settings

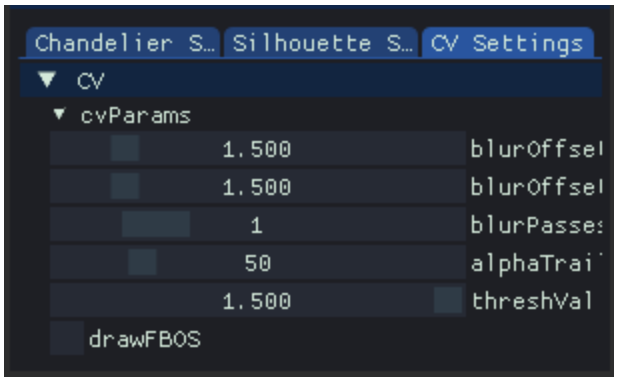


Setting	Description
Screensaver	Time in minutes to enter screensaver mode, if no new silhouettes are detected.
backCol	Sets background color
drawFbos	Toggles framebuffer(s) visibility.
fboScale	Controls framebuffer draw size.
renderScale	Allows for down-rezing fbo size.

Setting	Description
bdrawLayer	Toggles layer visibility.
drawViz	Toggles visualisation visibility.
playVideo	Toggles video playback.
fboAssignment	Controls which framebuffer to use.
TimeDel	Sets a range to wait before playing the next video, the software will randomly choose a wait time within this range.
layerPos	Sets custom layer position.
layerScale	Sets custom layer scale.
drawClip	Toggles clip drawing visibility.
clipPos	Sets the origin for clip playback.
clipPos2	Sets bounding box limits for clip playback,
Proportions	Sets custom proportion values for the current layer, do not use.
History	Displays playback history for the current layer.

CV Settings

The CV settings tab is meant to control the Computer Vision algorithm that creates a filter effect on top of the extracted silhouette.



Setting	Description
blurOffset1	Controls the amount of blurring occurring for the inside of the silhouette mask.
blurOffset2	Controls the amount of blurring occurring for the outside of the silhouette mask
blurPasses	Blur iterations until processing is done
alphaTrails	Generates a trail pattern based on the alpha value, the bigger the value, the longer the trail.
threshVal	Sets a threshold value for mask generation
drawFBOS	Toggles FrameBufferObjects visibility

Remote Access to Artwork's Computer

There is a software installed on the computer running this artwork that allows the studio to connect remotely to the artwork. This feature is helpful when you require assistance from the studio, as we can remotely connect to it, do a quick inspection, and do a debugging session of your components, if needed. In order to enable this feature, the computer has to be connected to the internet at all times. Depending on the computer's operating system (Windows 7/8/10, OSX), the procedure to set the computer online will vary. Please look online for tutorials, if necessary.

Preliminary Troubleshooting Steps

After pressing the power button, nothing seems to happen.

Do you hear any sound coming from the computer? If so, the computer is running and soon you should see Ubuntu starting up, and then the applications relevant to the piece being started. Make sure the physical connections on the computer are correct, specially the four display cables, they have been labelled to match port and display cable.

The applications start, and are visible on the left-hand dock, but nothing moves.

In the unlikely event of the applications not loading correctly, doing a power cycle should be enough to get the computer into running state again. Press and hold the computer's power button until it has turned off, then press the power button again to turn the computer back on.

The computer and applications are running but nothing happens on the facade.

Make sure you have a solid cable connection going from the display port on the back of the computer and the SACO processor. Make sure the SACO Nano processor is correctly plugged to a power source, and it is correctly connected to the SACO expansion box necessary for the facade. Make sure the v-Brains and v-Sticks relevant to the facade are on and in working condition. The "Facade Display (FD)" application has several debug and test modes that allow for visual assessment of the LED array itself.

The computer and applications are running but nothing happens on the chandelier.

Make sure you have a solid cable connection going from the display port on the back of the computer and the SACO processor. Make sure the SACO Pico processor is correctly plugged to a power source, and it is correctly connected to the SACO expansion box necessary for the facade. Make sure the v-Brains and v-Sticks relevant to the facade are on and in working condition. The "Chandelier Display (ChD)" application has several debug and test modes that allow for visual assessment of the LED array itself.

The keyboard and trackpad are unresponsive.

Try replacing the batteries on the keyboard with a fresh pair. The keyboard/trackpad combo requires 2x AA batteries. If after replacing the batteries it still doesn't work, try power cycling the computer and connecting the RF dongle using a different USB port.

Troubleshooting Assistance

Prior to contacting the Antimodular Studio with a problem about your artwork, please ensure that you went through the preliminary troubleshooting steps outlined in the previous section.

The troubleshooting process will vary depending on the problem. In order to make the process easier, it is recommended that you collect and send the following 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.

Support (Contact Us)

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

Antimodular Research
4462 rue Saint-Denis
Montréal, Québec, Canada
H2J 2L1
Tel 1-514-597-0917
info@antimodular.com
www.antimodular.com

APPENDIX I - INSTALLATION

Description of Components

This artwork requires the following components:

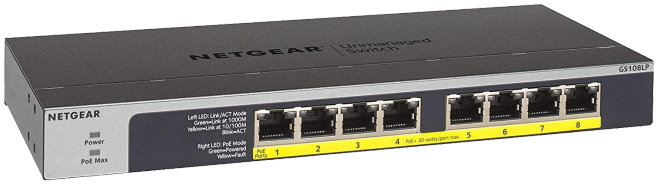
Component	Description
Computer	Dual-boot configuration, designed to run primarily in Ubuntu, has a Windows partition to be able to run dedicated SACO software. Features an nVidia Quadro P4000 GPU, with four DisplayPort outputs
Axis P3255-LVE Camera	The piece uses two of these cameras, one to acquire data for the facade, a second one for the Chandelier
SACO v-Stick	LED array that is physically mounted on the facade and chandelier
SACO v-Brain 1600	Receives signal from SACO Nano Processor and sends it to individual v-Stick
SACO Nano Processor	Receives HDMI signal from computer DisplayPort output 3, and sends the processed signal to v-Brains that control the Facade
SACO Pico Processor	Receives HDMI signal from computer DisplayPort output 4, and sends the processed signal to v-Brains that control the Chandelier
8-port PoE Ethernet Switch	Used to provide networking for the piece.
Computer Monitors	The configuration physically available on-site features two 15-inch computer monitors, connected to ports 1 and 2 on the DisplayPort outputs on the GPU. The top monitor on the rack is a secondary monitor. The lower monitor on the rack is the primary monitor.
Video Cables	Connect the two computers to their respective monitors.
Ethernet Cables	Provide power to and transmit data from the cameras to the computer.

Images of components, for consultation:

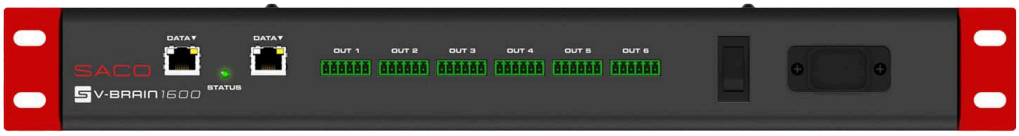
Computer, Custom-Built, featuring Quadro P4000 GPU, Dual-Boot (Ubuntu & Win 10)

On-Site Computer Monitors

Axis P3255-LVE Surveillance Camera (2 installed on-site)



8-Port Un-Managed PoE Switch



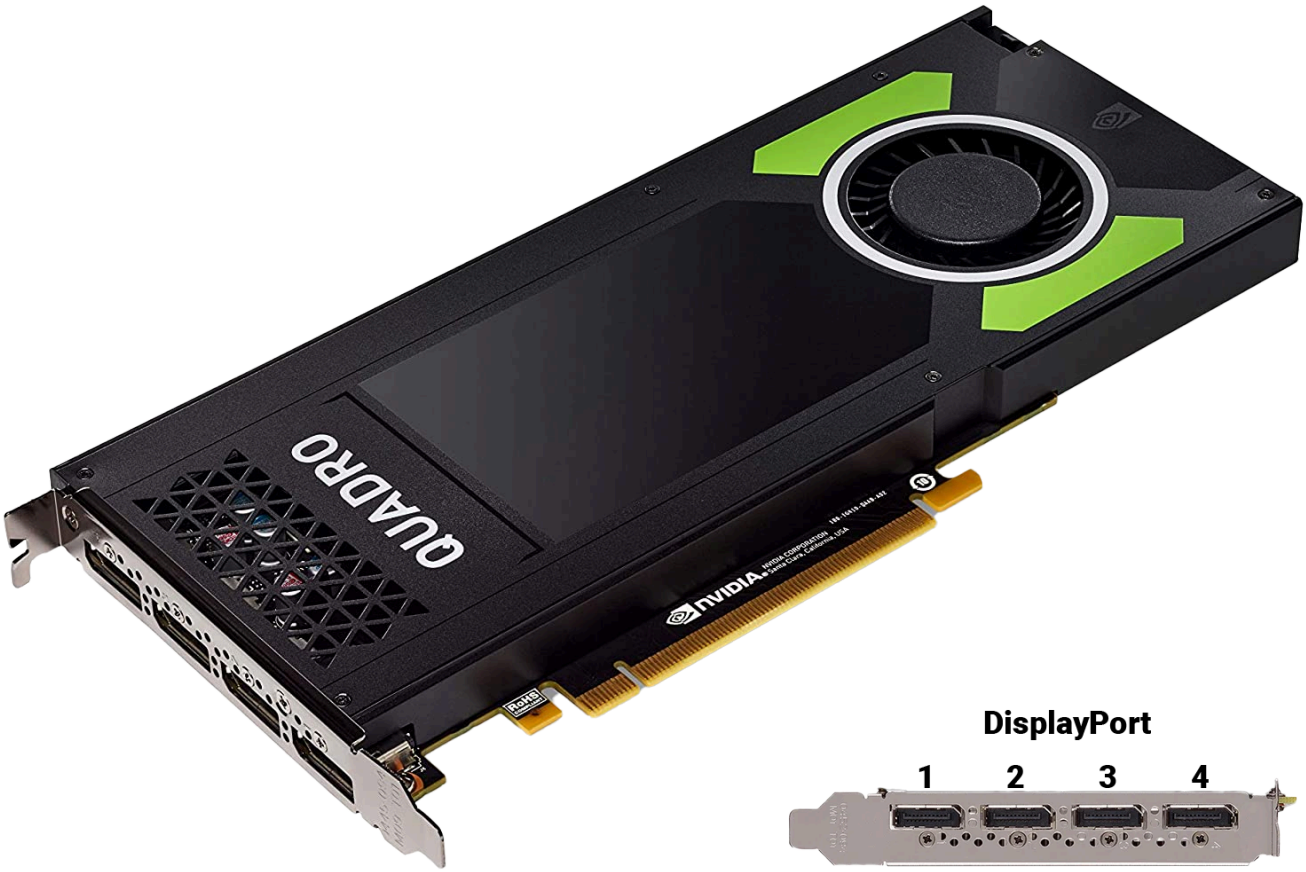
SACO v-Brain1600 (40 installed on-site)

Nano Processor - Front

Nano Processor - Back

Pico Processor - Front

Pico Processor - Back



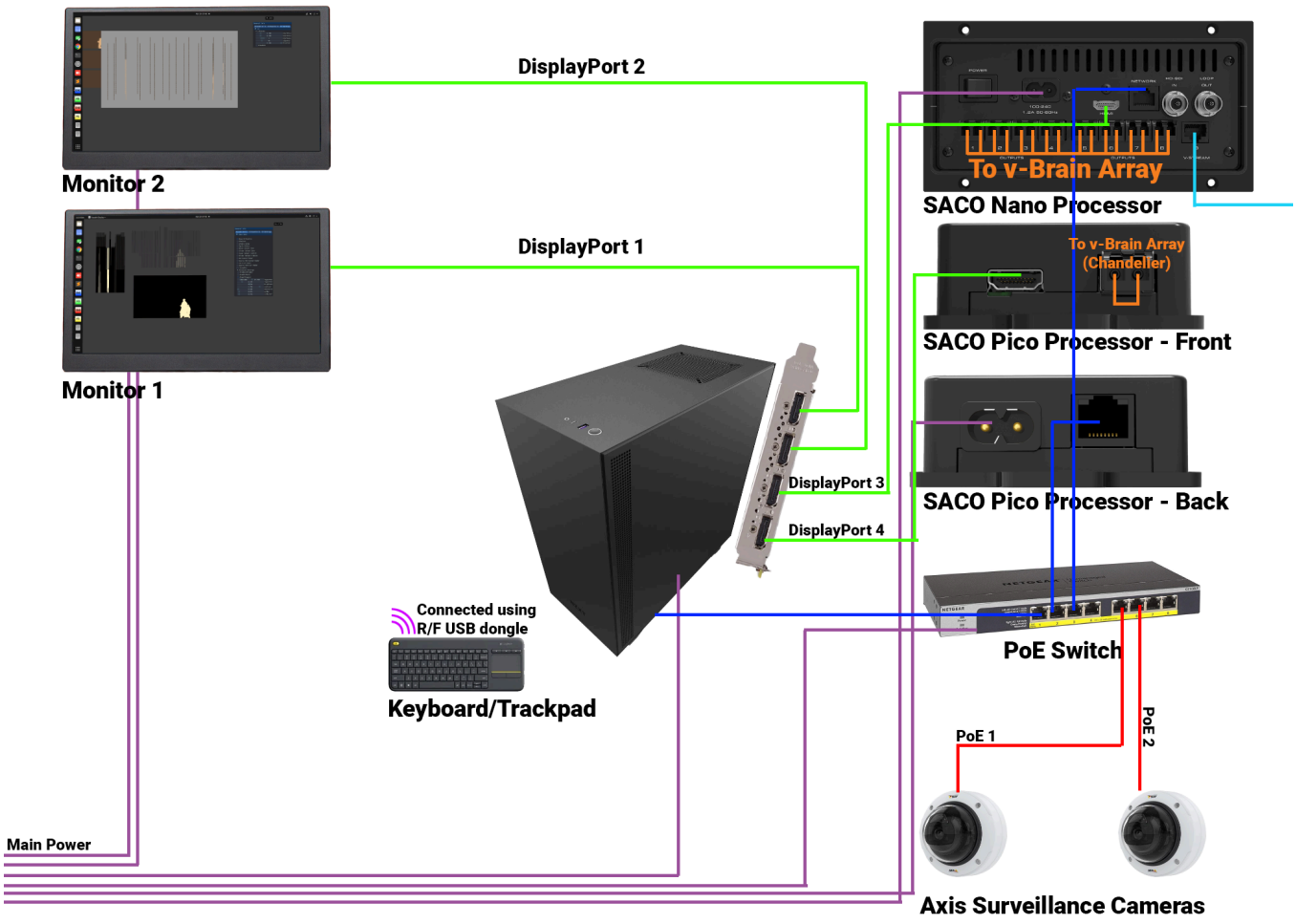
nVidia Quadro P4000 w/ DisplayPort layout

SACO v-Stick, Gray, 500mm

Logitech wireless RF keyboard

Wiring Diagrams and Connections

In order for the piece to run properly, the computer should be connected according to the following diagrams. The red lines from the PoE switch represent powered lines, blue represent unpowered lines.



General setup of all the equipment

APPENDIX II - TECHNICAL DATA SHEETS

Axis Camera

Axis camera used to provide data to the apps.

Specification	Details
Manufacturer	Axis
Model Number	AXIS P3255-LVE
Max Frame Rate	50/60
Resolution	1920x1080
Power	Power over Ethernet (PoE) IEEE 802.3at Type 2 Class 4 Typical 7.8 W, max 14.6 W
IR Light	OptimizedIR with power-efficient, long-life 850 nm IR LEDs Range of reach 40 m (130 ft) or more depending on the scene