

CALL ON WATER

BY RAFAEL LOZANO-HEMMER



TABLE OF CONTENTS

GENERAL IMPORTANT INFORMATION

| | |
|----------------------------------|---|
| Technique | 5 |
| Description | 5 |
| Operation | 5 |
| Maintenance | 6 |
| Placement Instructions | 6 |

DETAILED TECHNICAL INFORMATION

| | |
|---|----|
| Software | 8 |
| Hardware | 14 |
| Remote Access to Artwork's Computer | 16 |
| Troubleshooting Assistance | 17 |
| Support (Contact Us) | 18 |

APPENDIX I - INSTALLATION

| | |
|--|----|
| Description of Components | 20 |
| Wiring Diagrams and Connections | 21 |
| Important Notes for Installation | 25 |

APPENDIX II - TECHNICAL DATA SHEETS

| | |
|----------------------|----|
| DMX Driver | 26 |
|----------------------|----|

PACKING INSTRUCTIONS

| | |
|--------------------------------|----|
| Packing the Fountain | 28 |
|--------------------------------|----|

GENERAL IMPORTANT INFORMATION

This short section must be read for proper operation

CALL ON WATER (2016)

BY RAFAEL LOZANO-HEMMER

Technique

Ultrasonic atomizers, aluminium and stainless steel basin, custom electronics, computer, water, camera.

Description

Call on Water is a fountain that creates words in mid-air with plumes of vapour that ascend from a water basin. The vapour texts are based off of dozens of poems by Mexican writer Octavio Paz describing readable air, or the moment when the written word is spoken and becomes the atmosphere itself. The content of the poems are tangible, almost breathable, only briefly, then they disappear in turbulence. The fountain uses hundreds of computer-controlled ultrasonic atomizers, placed under the reflecting water pool, which produce the plumes of cold vapour.

Operation

Please refer to the section [Appendix I - Installation](#) for the placement of the components and the wiring diagram.

1. Connect the computer, the monitor, and the DMX to the USB interface, and connect the fountain to electrical power. The fountain uses four power cables for the atomizer's drivers and one with a timer for the filtering system. Each one of the power cables for the fountain should be connected through a power bar or a timer so that it can be switched OFF. All the other devices should be connected to a separate power bar. The timer for the pump should never be turned OFF if the fountain has water in it.

2. To turn the piece ON, power the four sections of the fountain and all the adjoining devices. Then, press the power button of the computer for one second, then release it.

3. To turn the piece OFF, press the computer's button all the way down for two seconds. Then, turn the power OFF for all the sections of the fountain and all the accompanying devices, except for the timer that will turn ON the pumping system. For conservation reasons, we do not recommend leaving the drivers of the fountain and the lights running on all the time.

4. If the software does not start up within two minutes, try turning the computer ON again. If the software still does not show up, then hold the power button all the way down for 10 seconds. Then, wait at least three seconds and press the power button all the way down for one second and you should be up and running again.

Maintenance

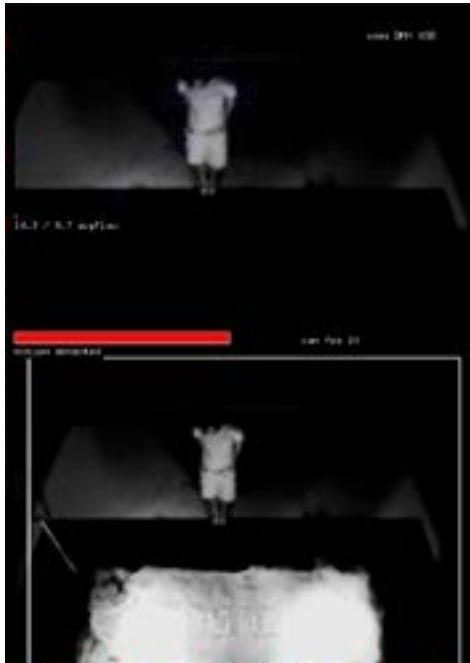
Like in a swimming pool or a spa, there is a filtration and cleaning system integrated into the piece. Every day, controlled by a timer, the filtration system will cycle the water automatically. The water will be filtered and cleaned with bromine. The filter's cartridge should be replaced after approximately 200 hours of use and the bromine tablets should be added in the system at this time as well. The clarity of the filter housing and the bromine dispenser will help you determine if more tablets are needed or if the filter is clogged.

When replacing the filter cartridge, we recommend changing all the water in the tank. To do so, please refer to the [Emptying the Tank](#) section.

To work properly, the piece needs a constant level of water in the tank. Depending on how often the fountain is activated, the temperature, and the humidity level of the room, you will need to add water directly to the tank. To make sure you have the correct amount of water, use the gauge provided or measure 2.5 cm from the top of the plates in the tank to the top of the water surface.

Placement Instructions

Because this piece uses cold water vapour, it will not cause a significant rise in humidity levels in a properly-ventilated room. Therefore, it can easily be installed indoors. This piece uses a camera both to detect the presence of the public and to limit the piece's time of function. Place the camera in a location that has a good overview of the spot where people stand in front of the piece.



To improve the clarity and legibility of the text, avoid air currents around the tank, so that the produced vapour does not blow away.

DETAILED TECHNICAL INFORMATION

Software

Keyboard Shortcuts

Press key **g** to show or hide the menu and sliders.
Press key **esc** to quit the application.

The following image shows the app and GUI elements, which are described in depth below.



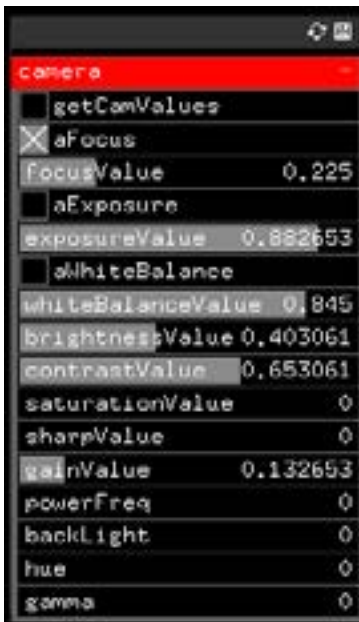
Other GUI Elements Used for Setup

Some of these GUI (Graphical User Interface) elements will only be needed when we initially setup the artwork in its location.

The following camera GUI elements control the camera settings of the USB Logitech camera via the UVC serial protocol. Not all USB camera models allow for these settings to be applied.

All changes are directly applied onto the device (the image processing does not happen after the image is acquired.)

Camera



Don't use **getCamValues**.

aFocus: enables the auto-focus function.

focusValue: if **aFocus** is disabled, this sets the focus value.

aExposure: enables the auto-exposure function.

exposureValue: determines the manual exposure value.

aWhiteBalance: enables auto white balance.

whiteBalanceValue: enables manual white balance value.

brightnessValue: sets brightness value.

contrastValue: sets contrast value.

saturationValue: sets saturation value.

sharpValue: sets sharpness value.

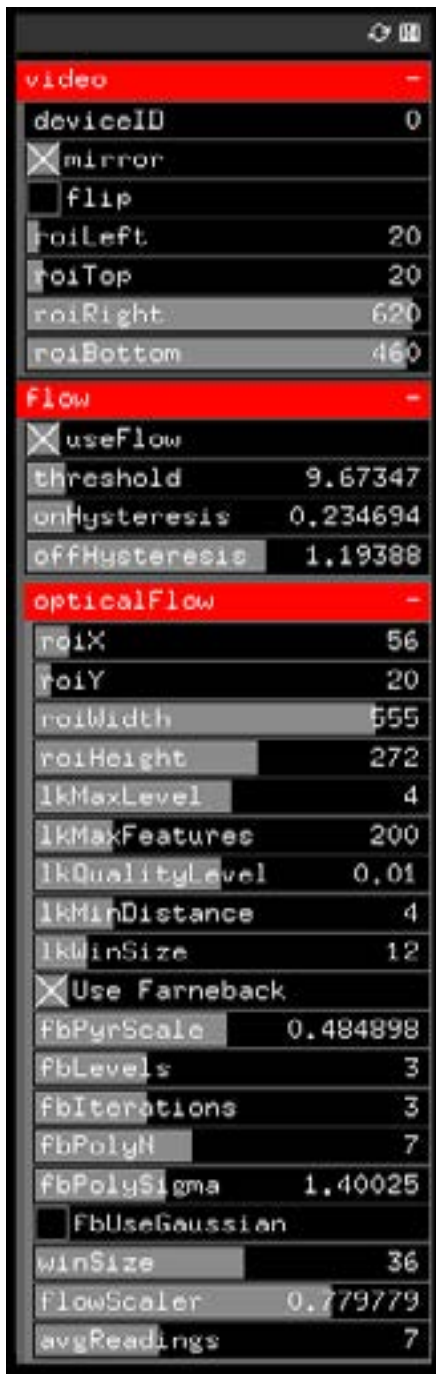
gainValue: sets gain value.

powerFreq: tries to counter light flicker due to 50 or 60 Hz power.

backLight: tries to compensate for bright back light.

hue: sets hue value.

gamma: sets gamma value.



Video

deviceID: if more than one camera is connected to the computer, establish which camera is in use here. Note that changes will only take effect after the app restarts.

mirror: mirrors the image.

flip: flips the image.

roiLeft, roiTop, roiRight, roiBottom: defines the image region used for tracking. A black frame will be drawn to block any new image information outside of this region.

Flow

Flow controls are used for motion detection.

useFlow: enables flow controls.

threshold: establishes how much motion needs to be present to generate a trigger.

onHysteresis: determines the amount of time that the detected motion needs to remain present before a trigger is generated.

offHysteresis: determines the maximum threshold of the motion before it is un-triggered.

OpticalFlow

roiX, roiY, roiWidth, roiHeight: defines the region used for optical flow analysis.

All the other sliders in this sections should not be used.

Atomizers

The following images and descriptions outline the GUIs related to the control of the atomizers.

The screenshot displays a software interface for controlling atomizers, featuring several control panels and a text display area.

Top Panel: A yellow bar at the top indicates "stage = 0".

Left Panel (CallOnWater):

- ver: 23 20180518 e3ccff1
- fps: 19
- showGui
- debug
- fontChange
- useMotionDetection
- motionDuration: 62
- drawDebug
- column: -1
- row: -1
- gridX: 96
- gridY: 500
- currentFileIndex: 5
- dmx** (highlighted in red)
- allowDMX
- channelsPerDraw: 200
- allOff
- minLevel: 0

Font Panel:

- Font** (highlighted in red)
- Fonts: -
- pickedFont: 19
- allCaps
- fontSize: 10
- fontY: 5
- centerAlign
- customWordSpacing: 1
- customLetterSpacing: 1

Text Display Area:

in stage == 0 / show text
key c to clear all DMX values
select debugDraw to draw while mouse is pressed
press n to go to next text line
press p to go to previous text line

---- F_VUELTA.TXT ----
V U E L T A
PALABRAS/ON SOMERA.
NO/LAS OINGOS,
LAS/NEGAMOS,
DUBIOS AVE/NO EXISTIAN;
NO/QUEDAMOS
CON EL RUIDO,
POETA;
JERONIMO/DE EPITAFIOS.

DMX Display:

NO/QUEDAMOS
NO/QUEDAMOS

id: 19 , name: munro_small , size: 10 , caps: 1 , yOffset: 5

Right Panel (stages):

- stages: 0
- stopProgress
- lineOn: 10
- linePause: 10
- curDuration: 0
- allowFlip
- flipOn: 0.405
- flipOff: 0.42
- idleOn: 2
- idlePause: 5
- idleAmount: 5
- nextRandom: 1



ver: 23: every time a new app version is established (through Git), a new version number is generated.

fps: displays how fast the app is running.

showGui: displays GUI.

debug:

fontChange:

useMotionDetection: uses the optical flow trigger to switch from idle mode to active mode.

motionDuration: the amount of time the app stays in active mode once a motion-trigger occurs.

drawDebug: draws vertical and horizontal lines for debugging purposes.

column: determines where a horizontal line is drawn.

row: determines where a vertical line is drawn.

gridX: determines where on the screen the word “grid” is drawn (horizontal axis).

gridY: determines where on the screen the word “grid” is drawn (vertical axis).

currentFileIndex: shows which poem file is currently being used. The app cycles through all **.txt** files in the **bin/data/texts** folder.

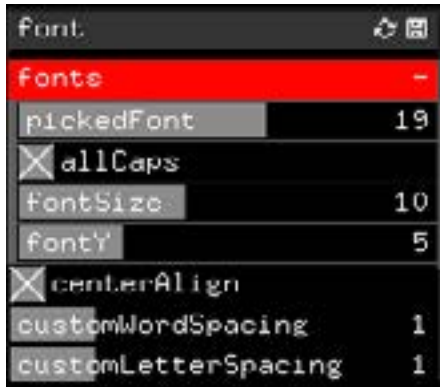
dmx

allowDMX: if unselected, no information is sent to the DMX atomizer controllers.

channelsPerUniv: two DMX universes are used, each using an equal amount of DMX addresses.

allOff: turns all atomizers off

minLevel: sometimes, we get more reliable reaction from the atomizers when the OFF state of the DMX is set to a small value other than 0.



Fonts

pickedFont: the font used to write the text. References all fonts found in **bin** → **data** → **fonts**.

allCaps: if checked, all letters will be in uppercase format.

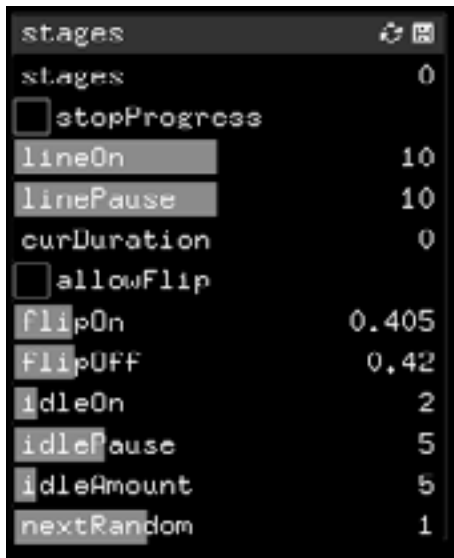
fontSize: font size.

fontY: some fonts need adjustment on their vertical start position. This value determines the adjustment.

centerAlign: aligns the text to middle of the tank.

customWordSpacing: determines the spacing between words.

customLetterSpacing: determines the spacing between letters.



Stages

stages: 0 = show text, 1 = random noise, 2 = debug lines, 3 = midi input.

stopProgress: stops from automatically switching to the next line.

lineOn: determines how long a line of text will stay visible. If needed, **bin** → **data** → **texts** contains all the files with the poems and the information on this GUI.

linePause: the pause between two lines of text.

curDuration: the duration of time for the current line.

allowFlip: if this mode is enabled, the atomizers will quickly turn ON and OFF.

flipOn: the ON time for flip-mode (in seconds.)

flipOff: the OFF time for flip-mode (in seconds.)

idleOn: if no one is present, no text is shown except for a few random atomizers. This setting determines how long all the random atomizers will be visible together.

idlePause: the pause before a next group of atomizers is randomly picked.

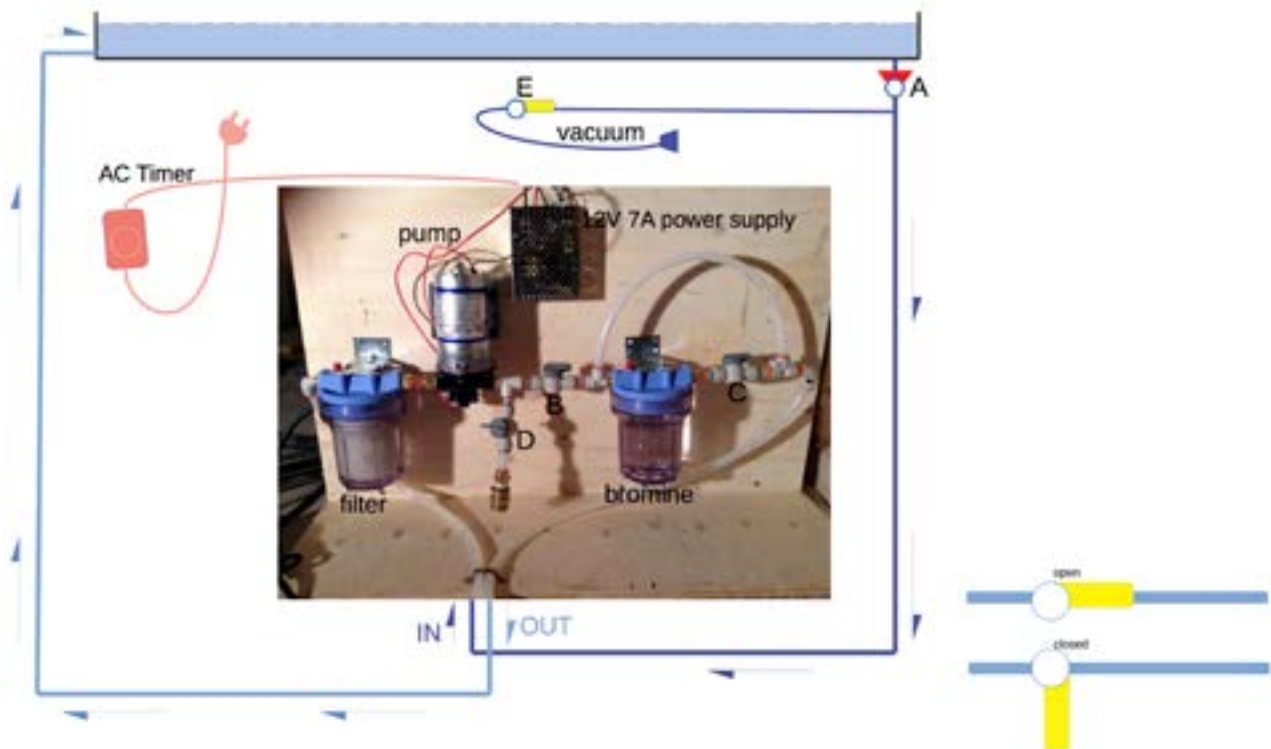
idleAmount: determines the amount of random atomizers that are picked.

nextRandom: the pause between activating the next random atomizers.

Hardware

Filtration and Cleaning Systems

The fountain has its own filtration and cleaning systems. Though these systems are mostly automatic, they will still need some adjustments during installation. Depending on the amount of bromine tablets in the system, you should adjust the flow of valve **C**, to have the right amount of bromine in the tank. Follow the instructions in the provided test kit to measure the bromine concentration and pH levels. We recommend that the quality of water be checked on a weekly basis.



Normal Operation

The filtration and cleaning systems should always be active anytime the tank is filled with water. The ideal cycling time should allow all the water in the tank to be filtered 10 to 15 times per day. The pump in this system cannot work continuously, so it needs a timer to alternate between 30-minute periods of operation and non-operation. We recommend a minimum of six hours for the filtration period (the pump will work only for three hours during this time.)

Changing the Filter Cartridge

The filter's cartridge should be changed after 200 hours of operation. To do so, remove the left side of the fountain's frame and close valve **A**, located under the left side of the tank. Then, unplug the power

cord to the pump's power supply, close valve **B**, and depress the red pressure-relief button on top of the filter housing. Once the pressure is relieved from the system, twist off the bottom of the housing. Replace the new cartridge, and repeat these steps backwards to re-assemble the system as it was from the beginning. **Be careful not to over-tighten the filter housing and make sure the cap standpipe slips into the cartridge.**

Adding Bromine Tablets

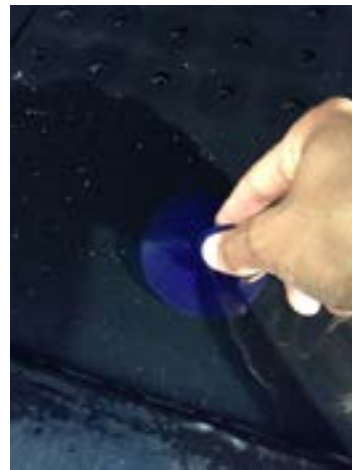
Remove the left side of the fountain's frame and close valve **A**, located under the left side of the tank. Then, unplug the power cord to the pump's power supply, close valve **B**, and depress the red pressure-relief button on top of the bromine housing. Once the pressure is relieved from the system, twist off the bottom of the housing. Add 1 to 5 bromine tablets. Repeat these steps backwards to re-assemble the system as it was from the beginning. **Be careful not to over-tighten the bromine housing.**

Emptying the Tank

Remove the left side of the fountain's frame and close valve **A**, located under the structure of the tank. Close valve **B**, then attach a garden hose to the brass hose fitting and open valve **D**. Turn on the pump to start draining the water from the fountain. Repeat these steps backwards to put the system back as it was from the beginning. You can now add fresh water.

Cleaning Remaining Particles in the Tank

While the filter removes most of the dirt in the water, some particles may remain. There is a water vacuum integrated into the cleaning and filtrations system to clean out these particles. Remove the left side of the fountain's frame and close valve **A**, located under the left side of the tank. Pull the transparent hose under the tank off and place the blue suction cup in the water (as shown below). Make sure the cup is placed underneath the water's surface far enough so that it does not fall off. Open valve **E**. Turn on the pump to start sucking out the particles.



Remote Access to Artwork's Computer

The computer running this artwork has a software installed called LogMeIn 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 needed.

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 the monitor should display the piece shortly. If not, check if the monitor is well powered and that the source (input) is set to the corresponding hardware port.

The piece doesn't react when someone passes in front of it.

Make sure that the camera is recognized by the computer and the software. The image should be displayed on the piece's application. If not, quit the software, unplug the camera, and restart the program. Also, verify that the DMX USB interface is recognized by the computer. If the software is running, you should see a green blinking LED light.

Some atomizers are always ON or OFF.

Cycle the power around the section where the problem atomizers are located by unplugging and re-plugging the main power cable corresponding to that section. This often happens when one driver does not receive the DMX signal, so most of the time the faulty atomizers are aligned in the same row.

The vapour plumes are too high or too low and the text is not readable.

There is too little or too much water in the basin. Adjust the level with the provided measuring gauge or measure 2.5 cm from the top of the plates covering the atomizers to the top of the water's surface (ideally, precisely in the middle of the fountain.)

The vapour text should look like the image below.



Troubleshooting Assistance

Prior to contacting 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, we 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;
- 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

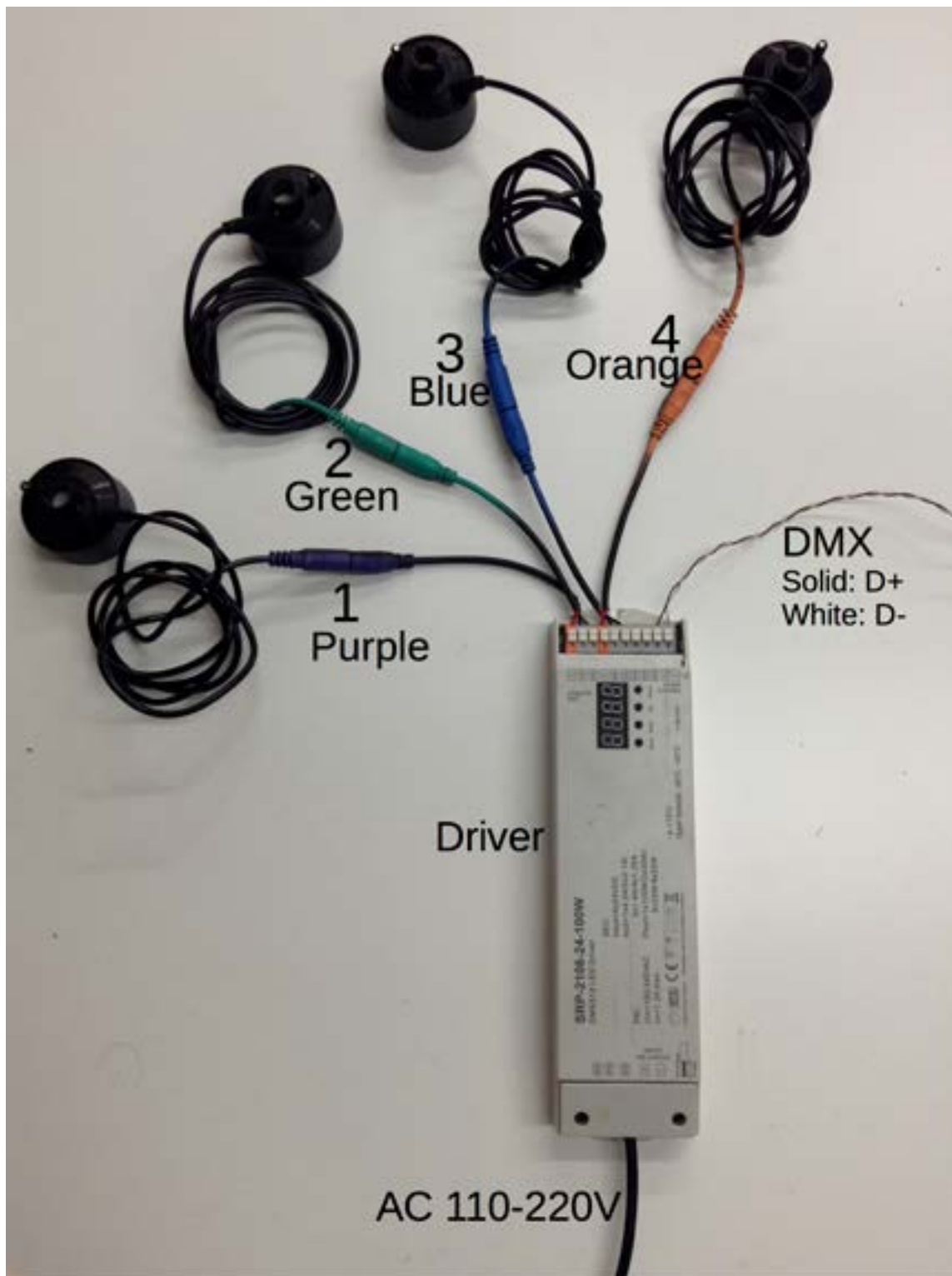
APPENDIX I - INSTALLATION

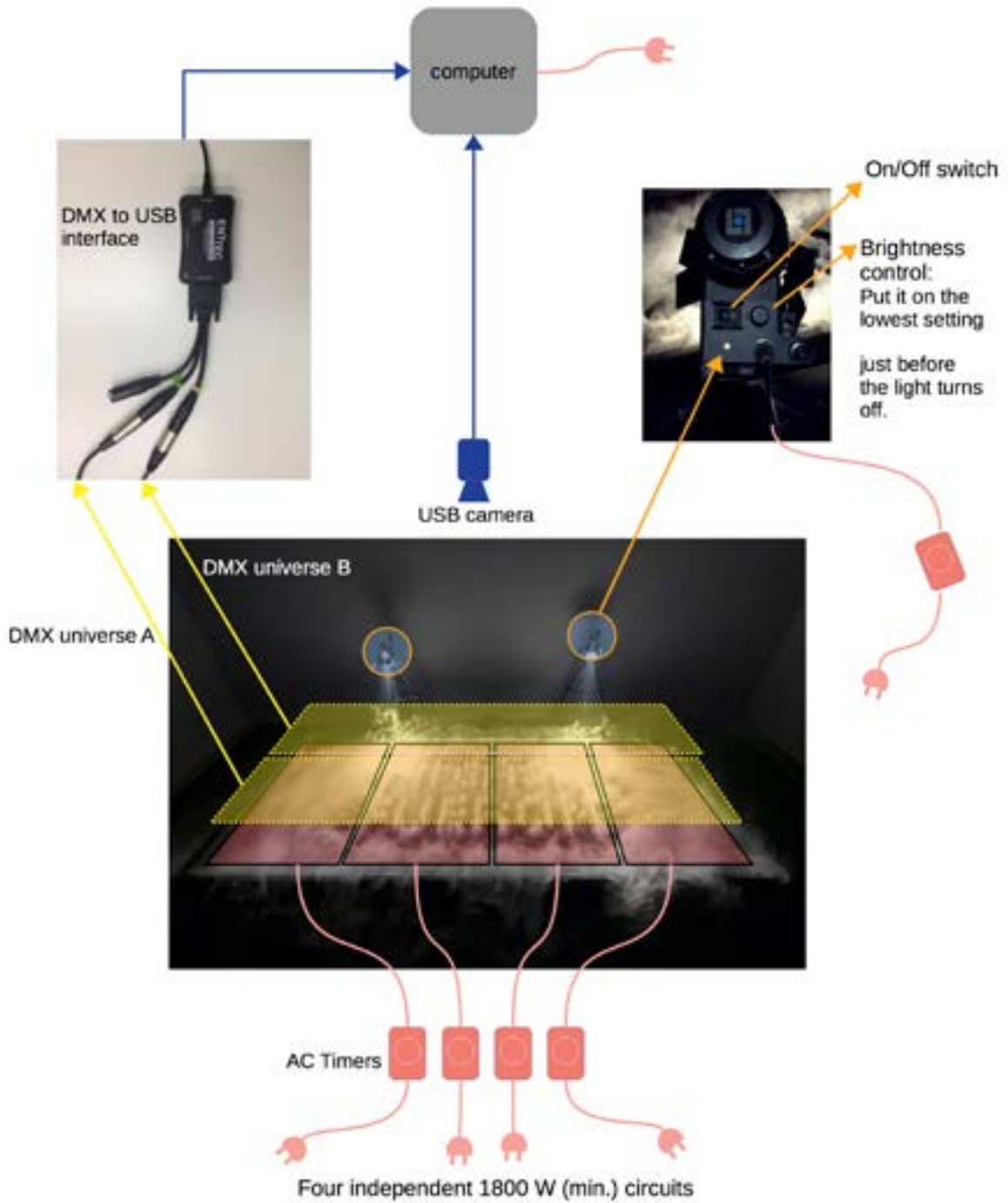
Description of Components

| Component | Description |
|----------------------------------|--|
| Mac Computer and Screen | Runs and displays the piece's custom software. |
| USB Camera | The camera detects the presence of people in front of the piece. |
| Ultrasonic Atomizers | Embedded in the fountain m theAtomizers create the vapour plumes. |
| DMX LED drivers | Controls each atomizer according to signals from the computer. Divers are wired within the fountain. |
| Custom Aluminium and Steel Basin | Water basin to hold the electronics and the atomizers. |
| DMX USB Interface | Interface used to communicate with the atomizer's drivers. |
| Keyboard | While not required for normal use of the artwork, the keyboard allows you to calibrate the system from your actual location. |

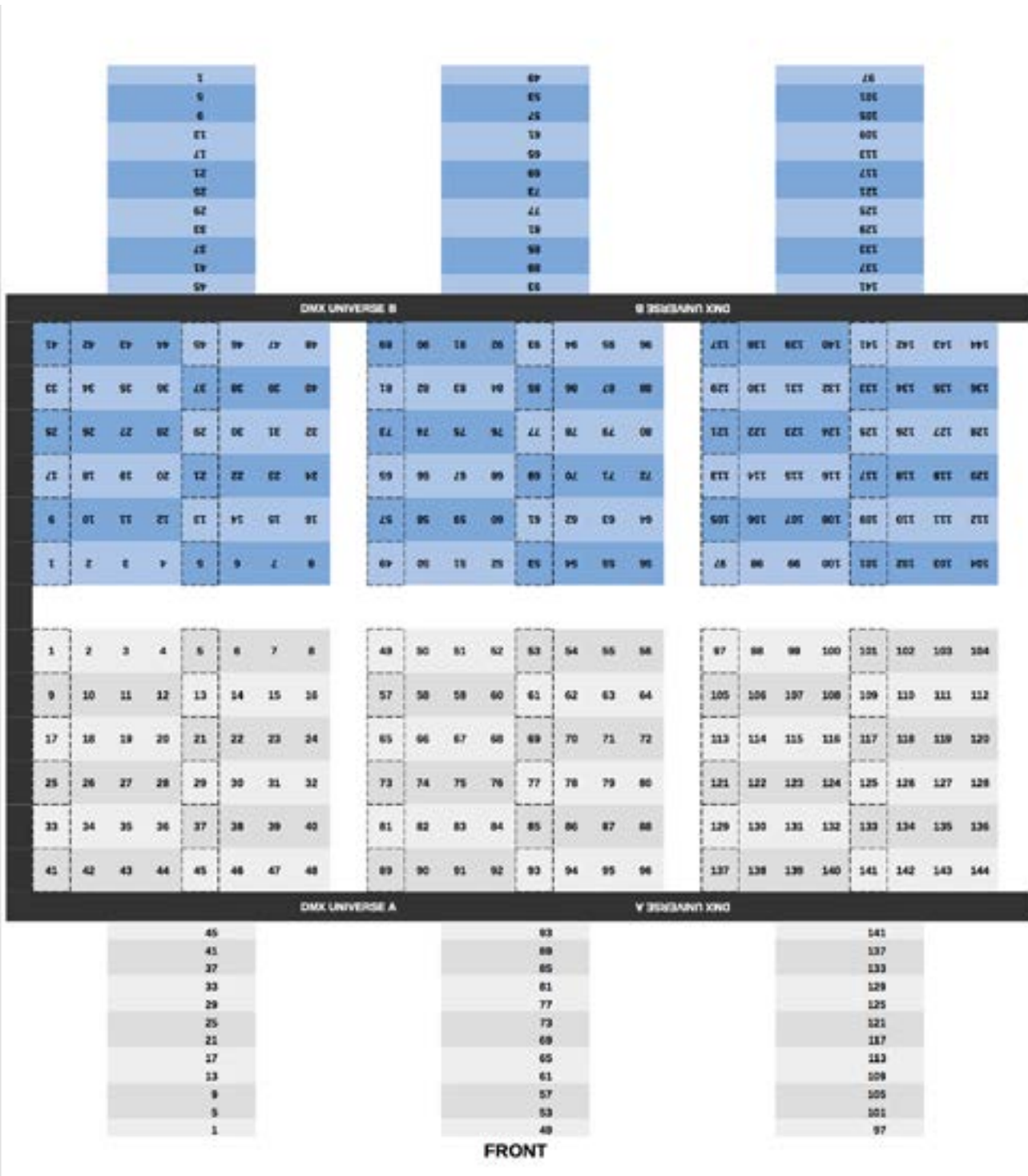
Wiring Diagrams and Connections

Consult the following images outlining the wiring connections.





DMX Driver Wiring Plan



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| DMX UNIVERSE B | | | | B (SIGNAL) XWD | | | | | | | | | | | | | | | |
|----------------|-----|-----|-----|----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 187 | 189 | 187 | 188 | 190 | 191 | 190 | 191 | 240 | 239 | 238 | 237 | 240 | 239 | 238 | 237 | 240 | 239 | 238 | 237 |
| 177 | 184 | 178 | 180 | 184 | 188 | 183 | 181 | 232 | 228 | 227 | 228 | 232 | 231 | 230 | 229 | 232 | 231 | 230 | 229 |
| 189 | 176 | 170 | 172 | 174 | 179 | 174 | 173 | 212 | 200 | 219 | 218 | 204 | 223 | 223 | 222 | 205 | 206 | 207 | 208 |
| 181 | 168 | 163 | 164 | 168 | 167 | 168 | 167 | 208 | 212 | 212 | 212 | 216 | 212 | 212 | 212 | 216 | 212 | 212 | 212 |
| 183 | 160 | 155 | 156 | 158 | 159 | 158 | 157 | 201 | 202 | 203 | 204 | 208 | 207 | 206 | 205 | 242 | 241 | 240 | 239 |
| 145 | 152 | 146 | 148 | 149 | 151 | 150 | 149 | 191 | 196 | 195 | 194 | 200 | 198 | 198 | 197 | 244 | 243 | 242 | 241 |
| 145 | 148 | 147 | 148 | 149 | 150 | 151 | 152 | 193 | 194 | 195 | 196 | 197 | 198 | 199 | 200 | 241 | 242 | 243 | 244 |
| 153 | 154 | 155 | 156 | 157 | 158 | 159 | 160 | 201 | 202 | 203 | 204 | 205 | 206 | 207 | 208 | 248 | 250 | 251 | 252 |
| 181 | 182 | 183 | 184 | 185 | 186 | 187 | 188 | 209 | 210 | 211 | 212 | 213 | 214 | 215 | 216 | 257 | 258 | 259 | 260 |
| 189 | 170 | 171 | 172 | 173 | 174 | 175 | 176 | 217 | 218 | 219 | 220 | 221 | 222 | 223 | 224 | 265 | 266 | 267 | 268 |
| 177 | 178 | 179 | 180 | 181 | 182 | 183 | 184 | 225 | 226 | 227 | 228 | 229 | 230 | 231 | 232 | 273 | 274 | 275 | 276 |
| 185 | 186 | 187 | 188 | 189 | 190 | 191 | 192 | 233 | 234 | 235 | 236 | 237 | 238 | 239 | 240 | 281 | 282 | 283 | 284 |
| DMX UNIVERSE A | | | | A (SIGNAL) XWD | | | | | | | | | | | | | | | |

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FRONT

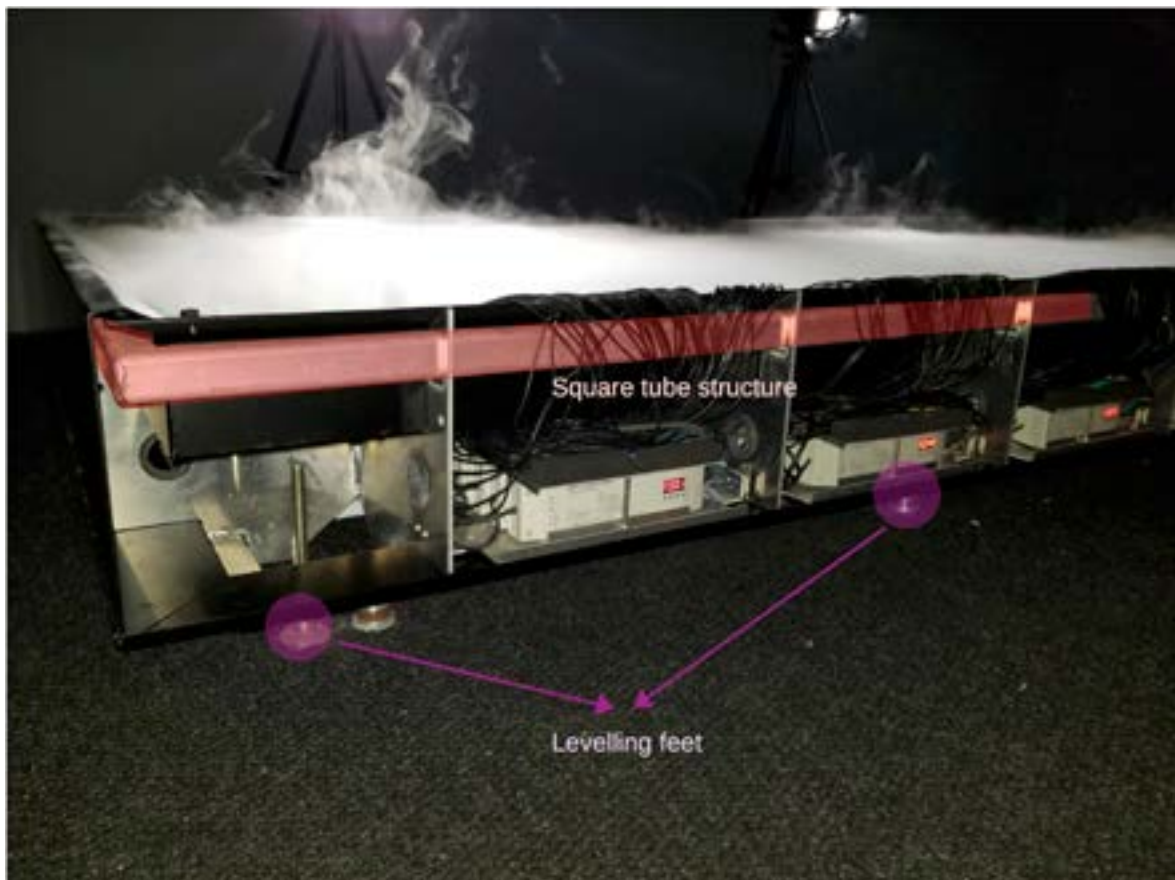
Important Notes for Installation

Caution: The fountain is very heavy! You will need at least 8 people to move it. It is very important that any manoeuvring or lifting the fountain be performed in a coordinated fashion, so that nobody gets hurt from the heavy lifting.

To lift the fountain, remove all the frames around the fountain. Grab the fountain from its structure and lift evenly, and at once.

Once the fountain is in place, use the leveling feet located under the fountain to make the structure level. This is important because it will ensure that the same amount of water is dispersed evenly over the entire array of atomizers.

The following image indicates the location of the levelling feet and square tube structure, used for lifting.



APPENDIX II - TECHNICAL DATA SHEETS

DMX Driver

100W DMX512 & RDM LED Driver (constant voltage)

Important: Read All Instructions Prior to Installation

Function Introduction

Product Data

| | |
|-------------|--|
| DC Voltage | 24V DC |
| Output | Max. Current: 4.16A max. Rated Power: max. 100W |
| Input | Voltage Range: 100-240V AC Frequency: 50/60Hz Power Factor (Typ.): > 0.9 Efficiency (Typ.): 90% @ 230VAC Input Current: 0.5A @ 230VAC |
| Protection | Short Circuit: Yes Over Current: Yes Over Temperature: Yes Working Temp.: -20°C - +45°C |
| Environment | Max. Case Temp.: 85°C Working Humidity: 10% - 95% RH non-condensing Storage Temp. & Humidity: -40°C - +80°C, 10% - 95% RH |
| Safety&EMC | Safety Standards: EN61347-1, EN61347-2-13 Withstand Voltage: IP-COP: 3.75kVAC EMC Emission: EN55015, EN61000-3-2, EN61000-3-3 EMC Immunity: EN61547, EN61000-4-2, 3, 4, 5, 6, 8, 11, surge immunity Line-Line 1kV |

Others: MTBF: 193,6K hrs min. @ 230VAC at full load and 25°C ambient temperature. Dimension: 244*64*32mm (L*W*H).

- Built-in DMX512 interface, support RDM bi-directional communication.
- 100-240VAC wide input voltage.
- 4 DMX512 Addresses, 4 Channels Output, DMX channel quantity from 5CH-4CH settable.
- To control single color, dual color, RGB/RGBW LED lighting.
- PWM output resolution ratio 8Bit, 16Bit settable.
- Output PWM frequency from 500HZ - 20K HZ settable.
- Output dimming curve gamma value from 0.1 - 9.9 settable.
- Compatible with universal DMX512 consoles.
- Class II power supply, full isolated plastic case.
- High power factor and efficiency.
- Galvanic isolation.
- IP20 rating, suitable for indoor LED lighting applications.

Safety & Warnings

- DO NOT install with power applied to device.
- DO NOT expose the device to moisture.

Wiring diagram

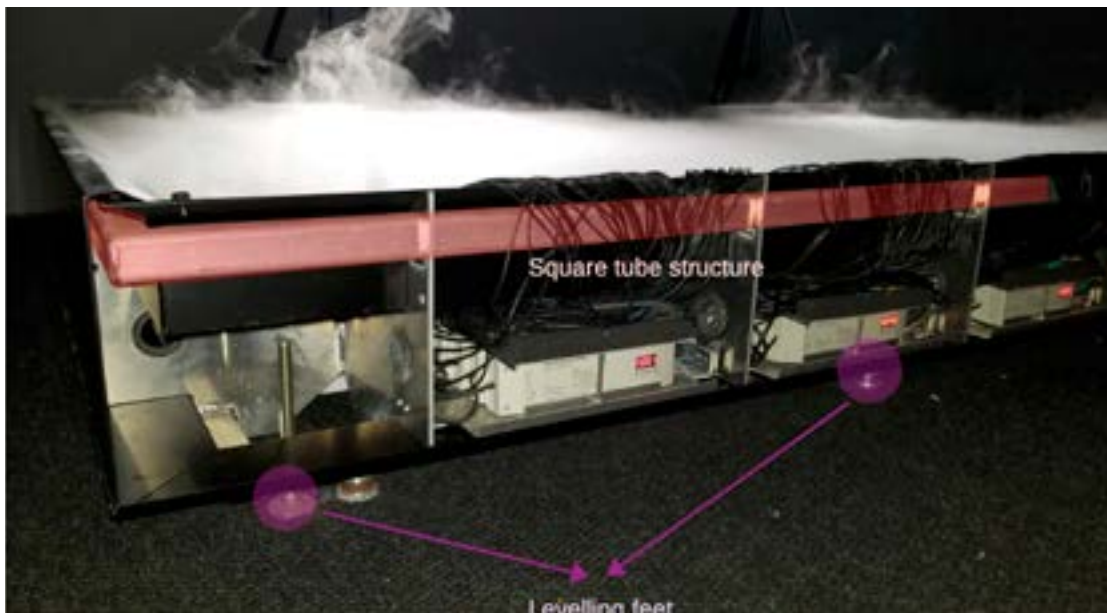
PACKING INSTRUCTIONS

Packing the Fountain

Caution: The fountain is very heavy! You will need at least 8 people to move it. It is very important that any manoeuvring or lifting the fountain be performed in a coordinated fashion, so that nobody gets hurt from the heavy lifting. .

Make sure the fountain is resting on its levelling feet and not on top of the rollers. Take all the metal frames off of the fountain. Hold the fountain from its frame (1.5-inch square aluminium tube), just under the black basin borders. With eight people, lift it carefully and simultaneously, and put it in the crate. Once the fountain is in the crate, slide the frames back on top of the fountain.

The following image indicates the location of the levelling feet and square tube structure, used for lifting.



Now, insert small pieces of foam in between the crate and the corners of the fountain, as shown in the following photos.



Next, wrap each of the top plates individually and place them over the atomizers. Last, place the big pieces of foam on the top of everything. Consult the images below.

