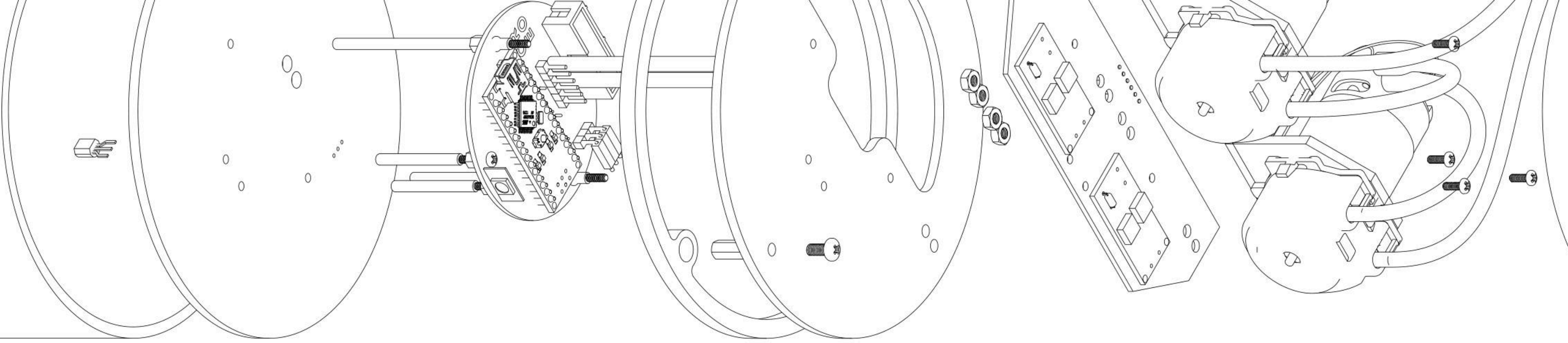
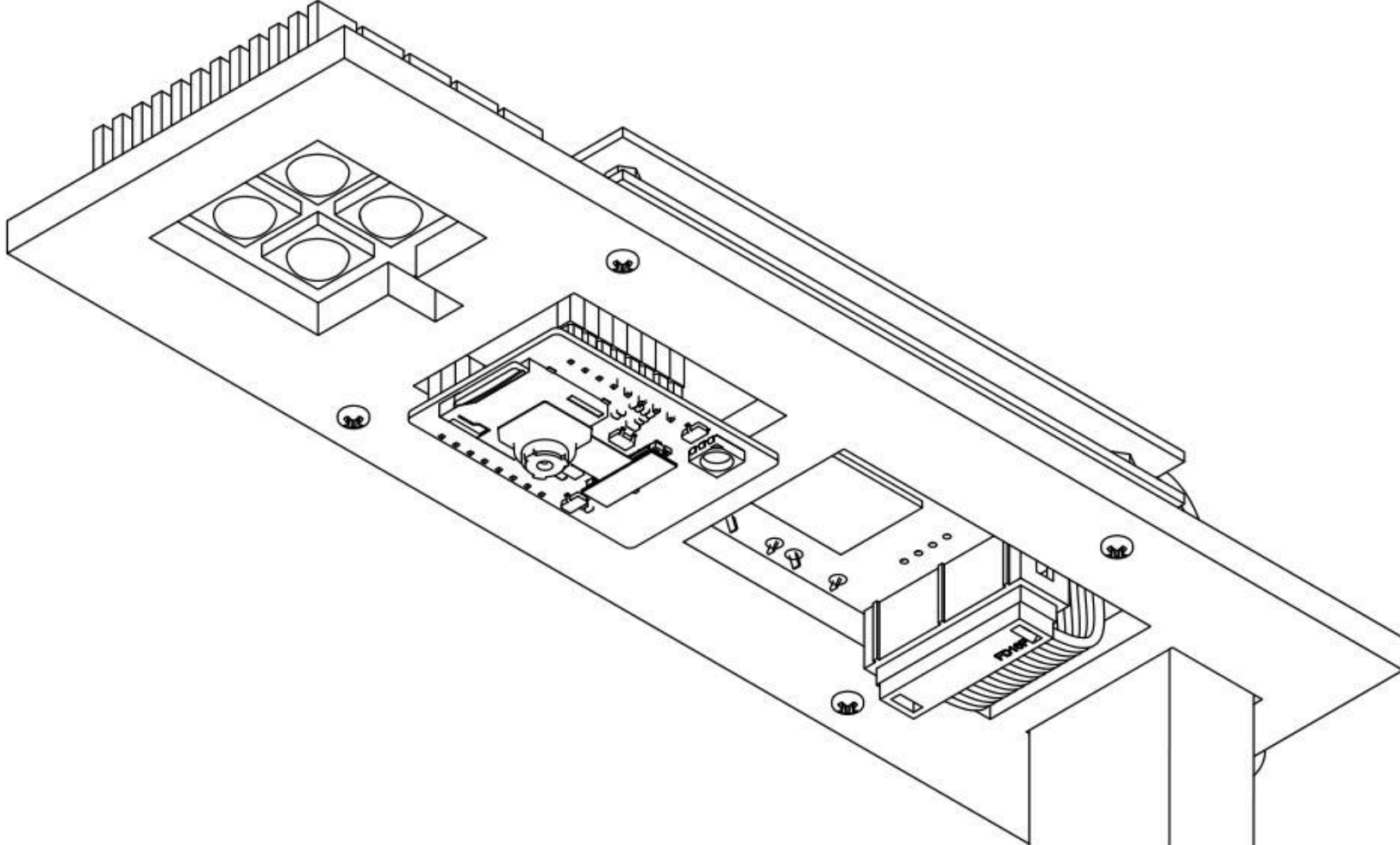




CR EO



Design Research

01

BioBulb Update

BioBulb Prototype 1

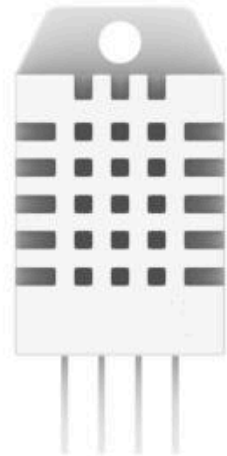
- Technical Drawings
- 3D CAD Screenshots
- Prototype
- System Components
- PCB Design
- PCB Production
- Software Demo
- User Interface Screenshots

Components

Light Sensor



Room Temperature Sensor
Room Moisture Sensor



Room Temperature Sensor
Room Moisture Sensor



Not utilized in V1.0

Soil Moisture Sensor



Pump Power Relay



Probes For The Soil Moisture Sensor



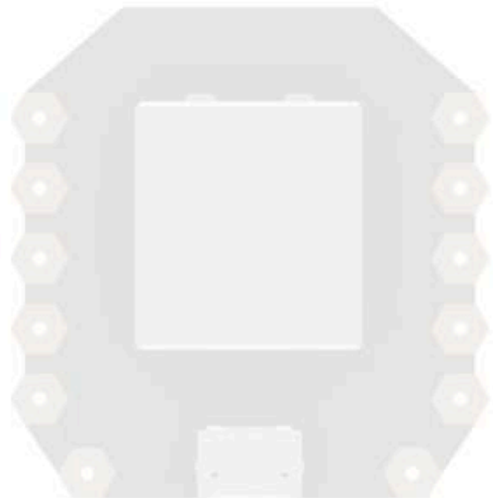
Soil Temperature Sensor



Probes For The Soil EC Sensor



Esp32
Micro Controller Unit



Not utilized in V1.0

Esp32 FireBeetle
Micro Controller Unit



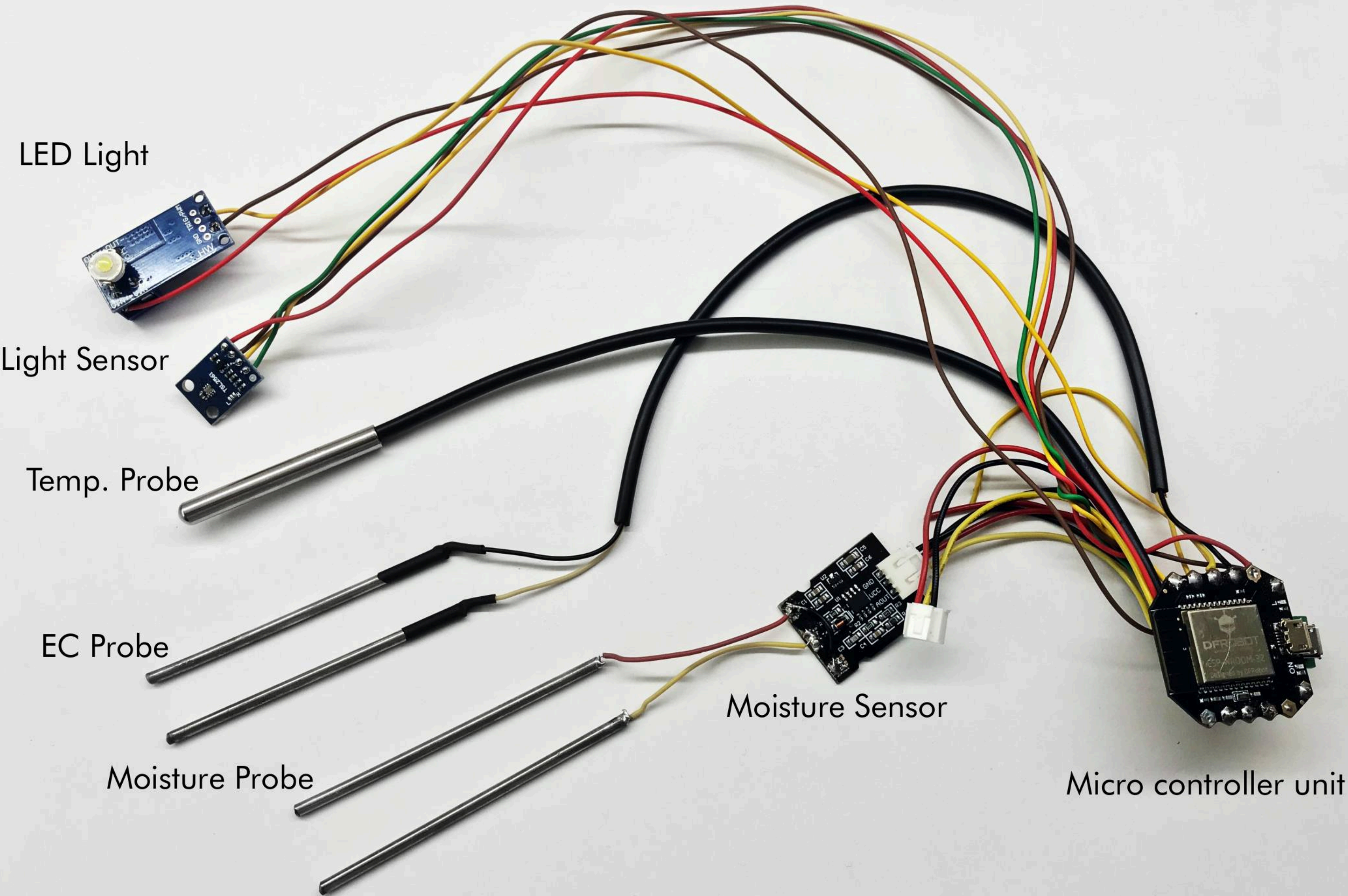
Valve



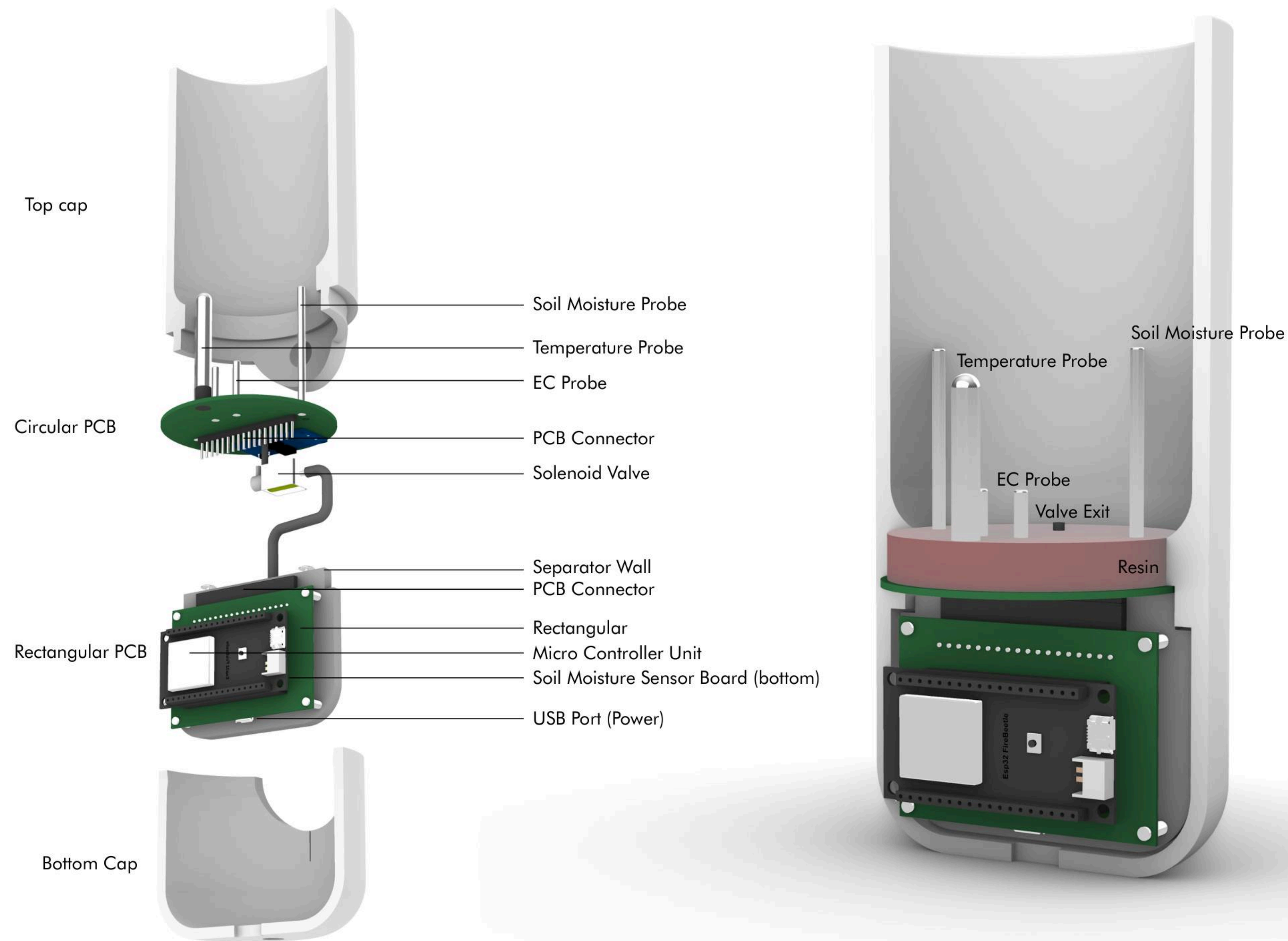
Lamp



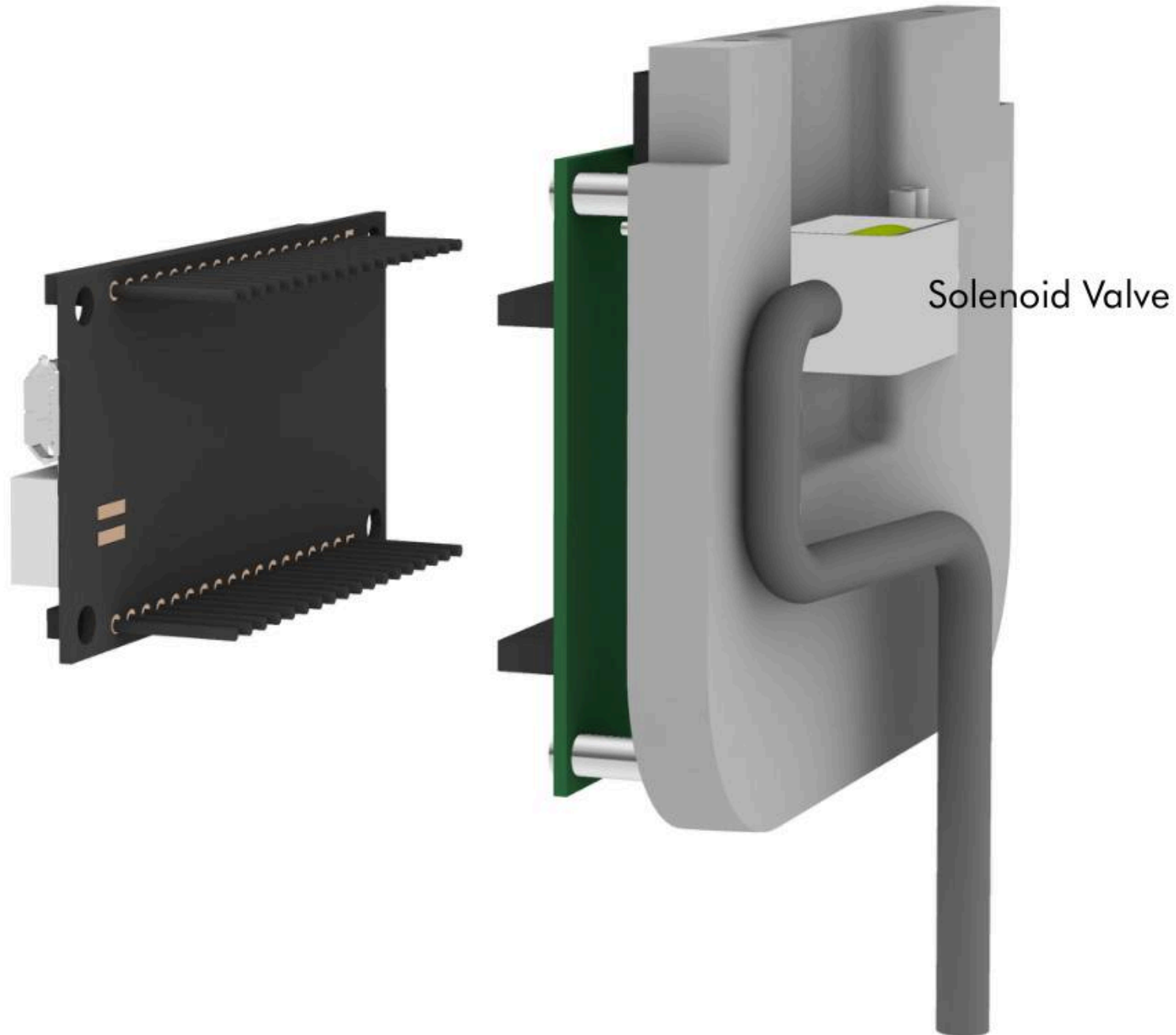
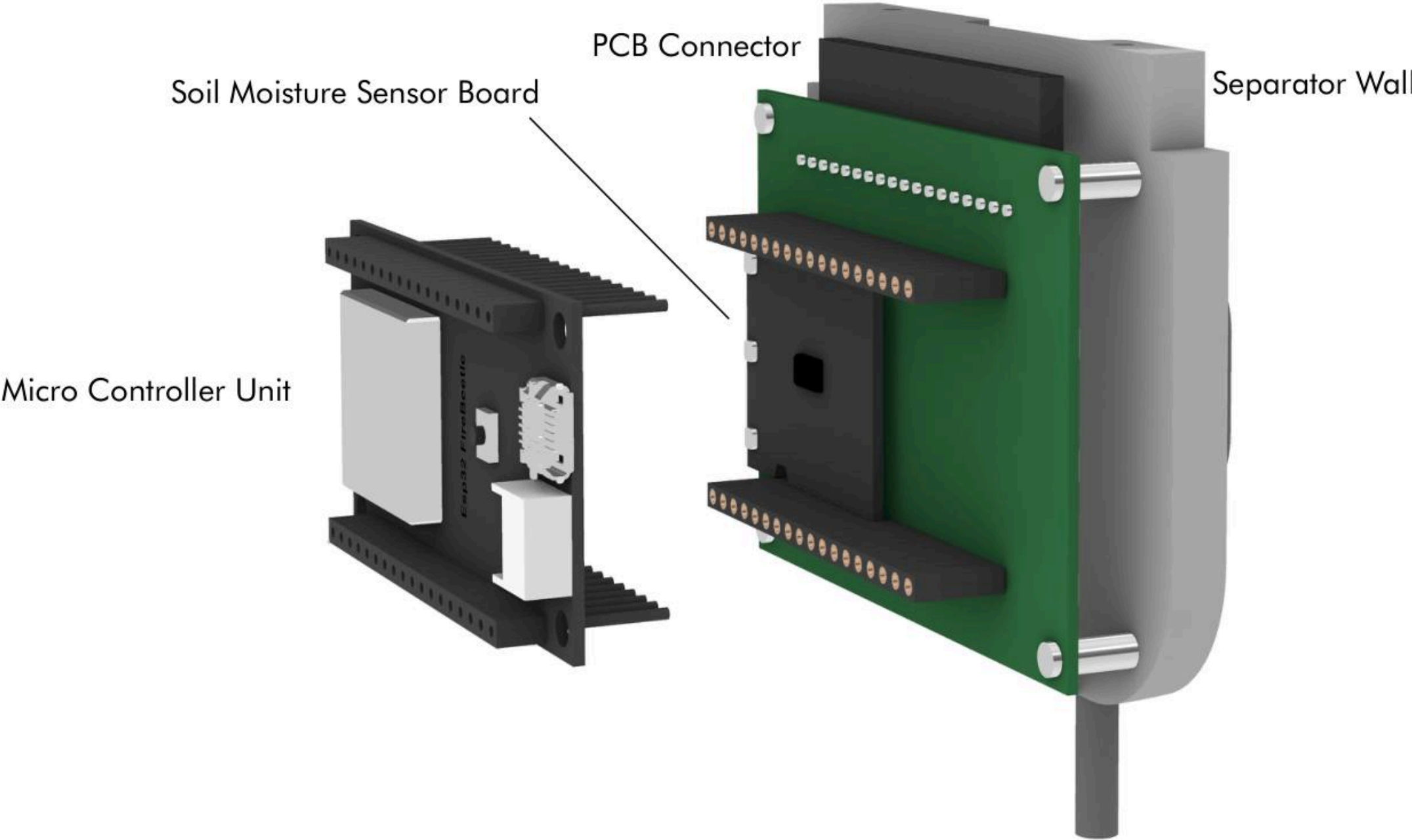
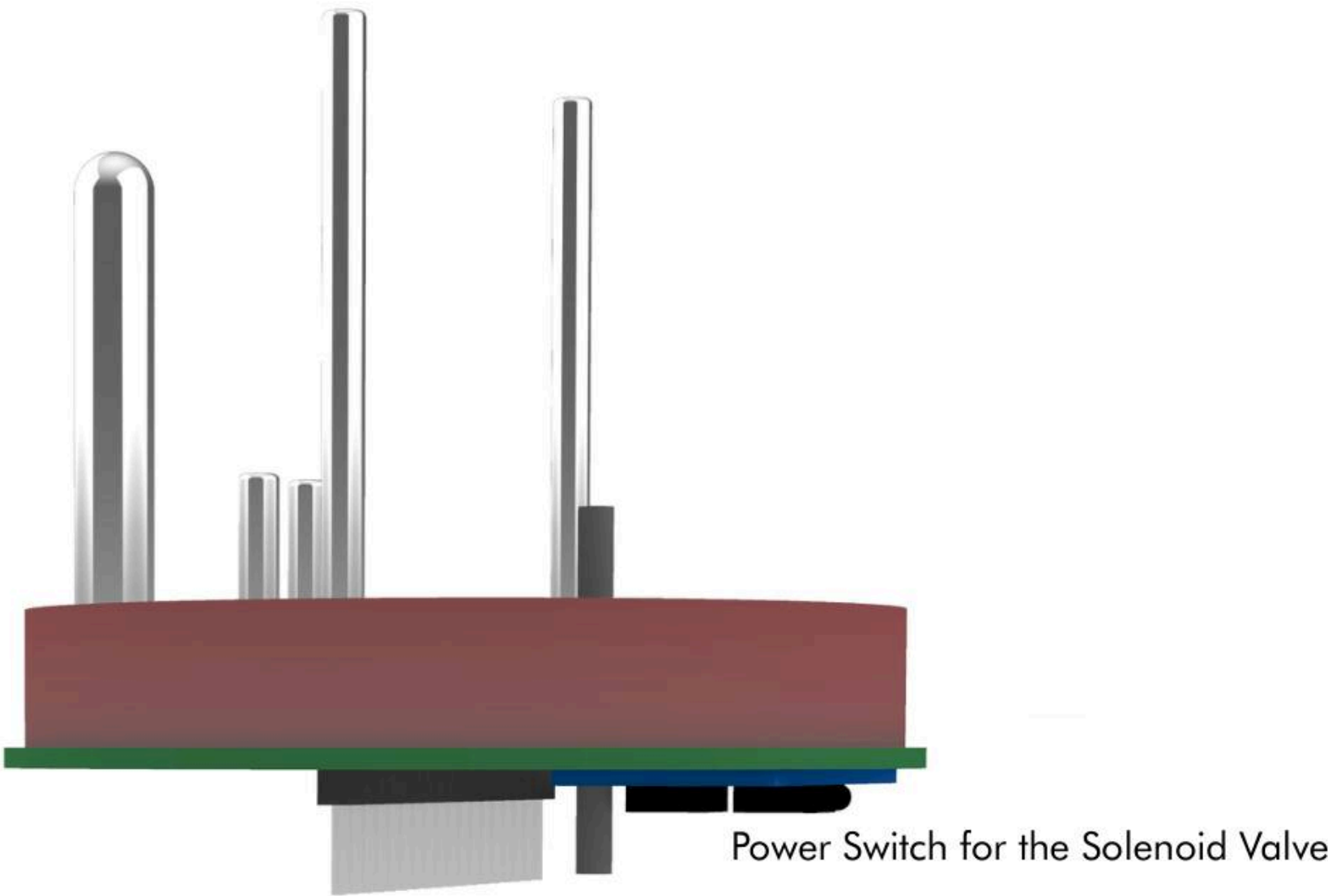
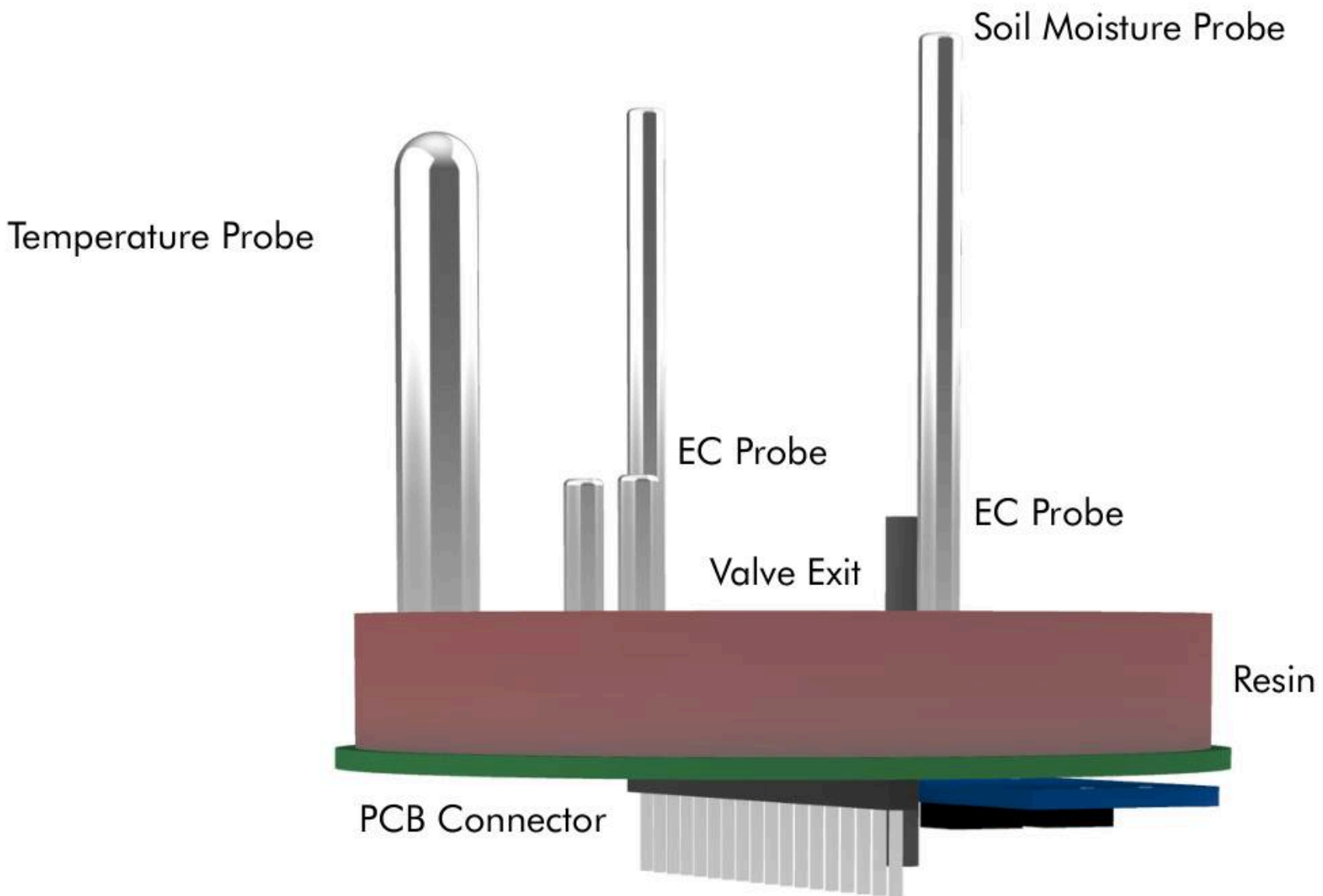
First Prototype



Assembly



Assembly



Functions

Measures EC

Measures Soil Moisture

Measures Soil Temperature

Measures Room Temperature

Measures Room Humidity

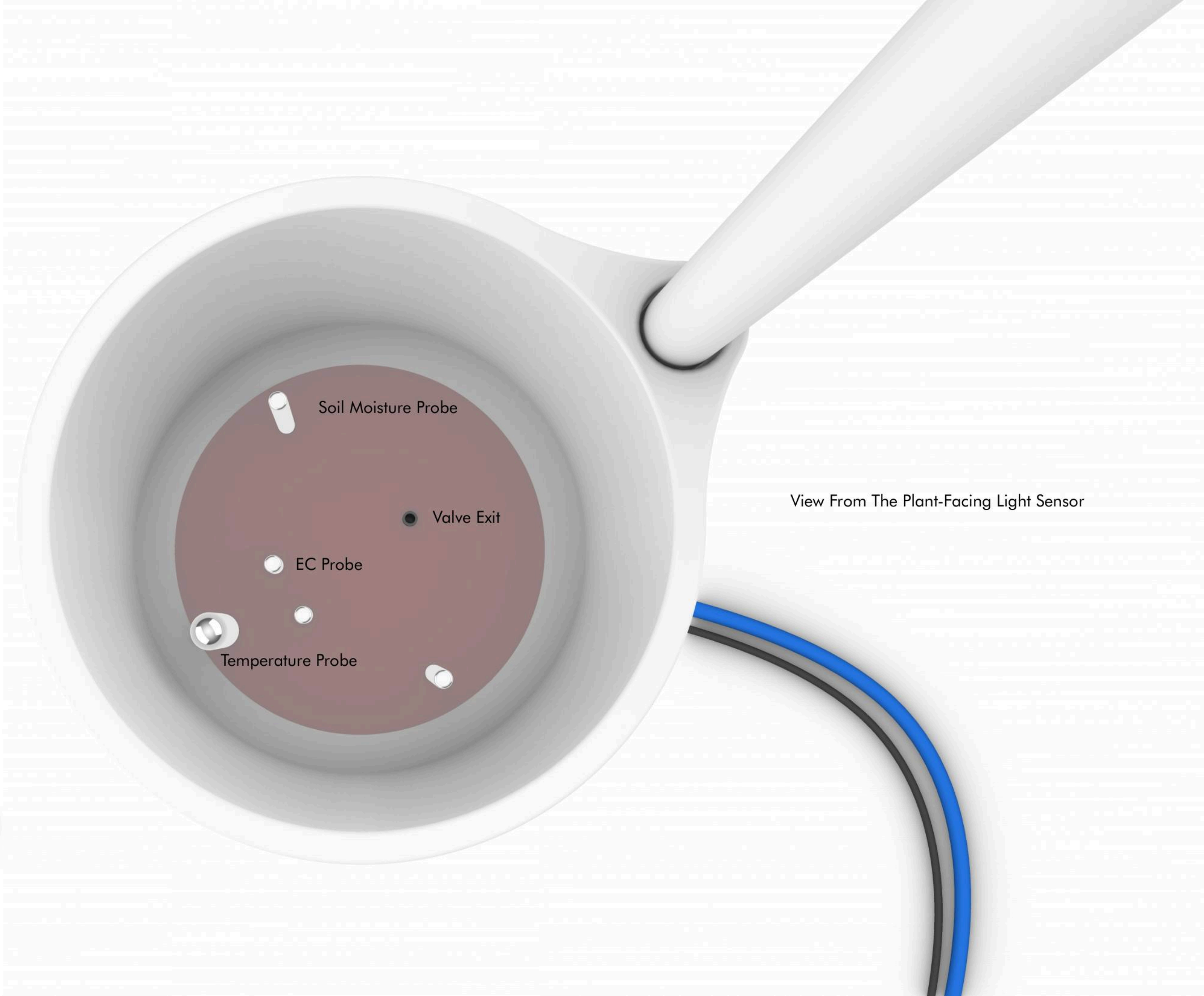
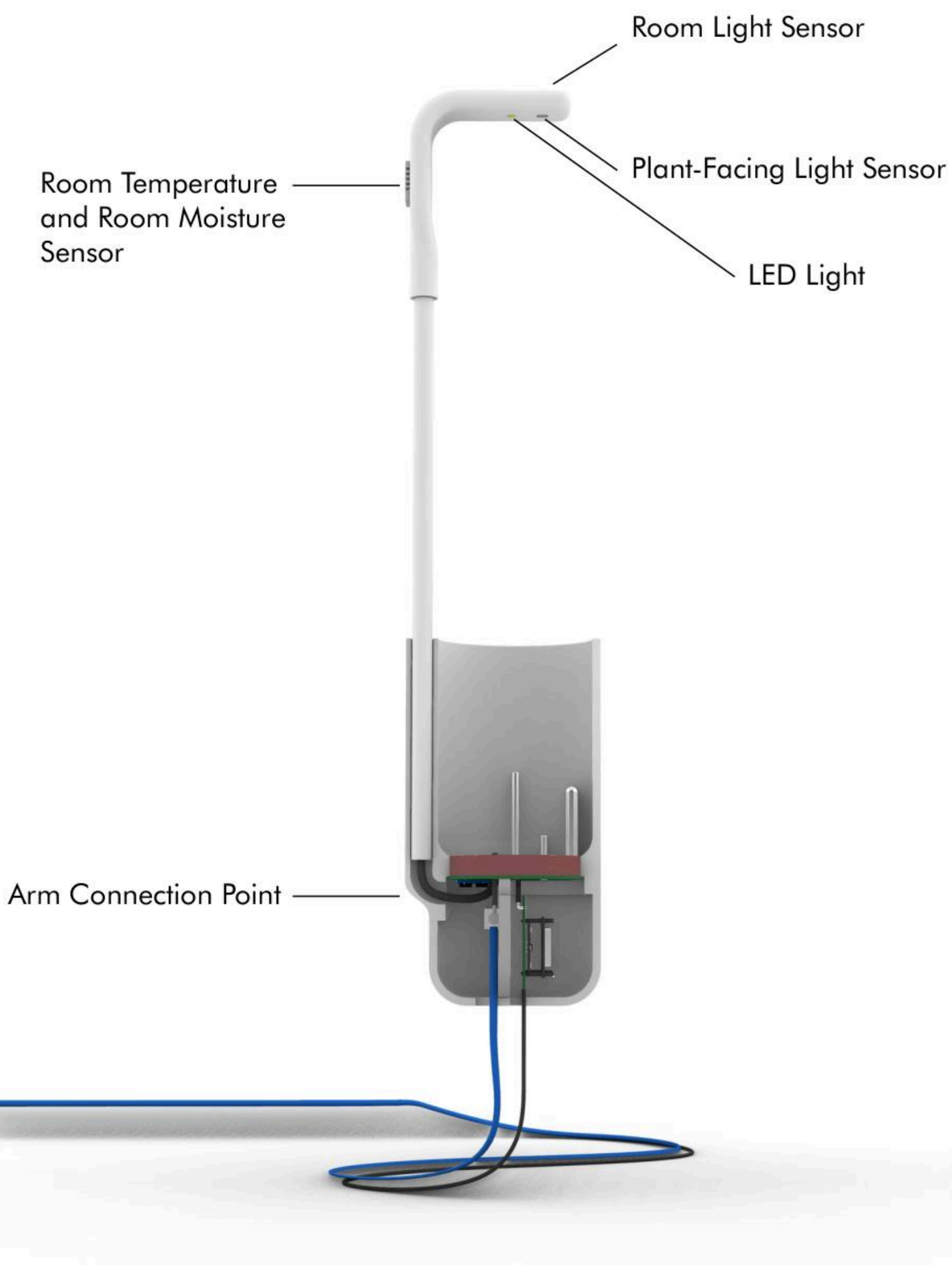
Measures Room Light Intensity

Measures Plant Surface Light Intensity

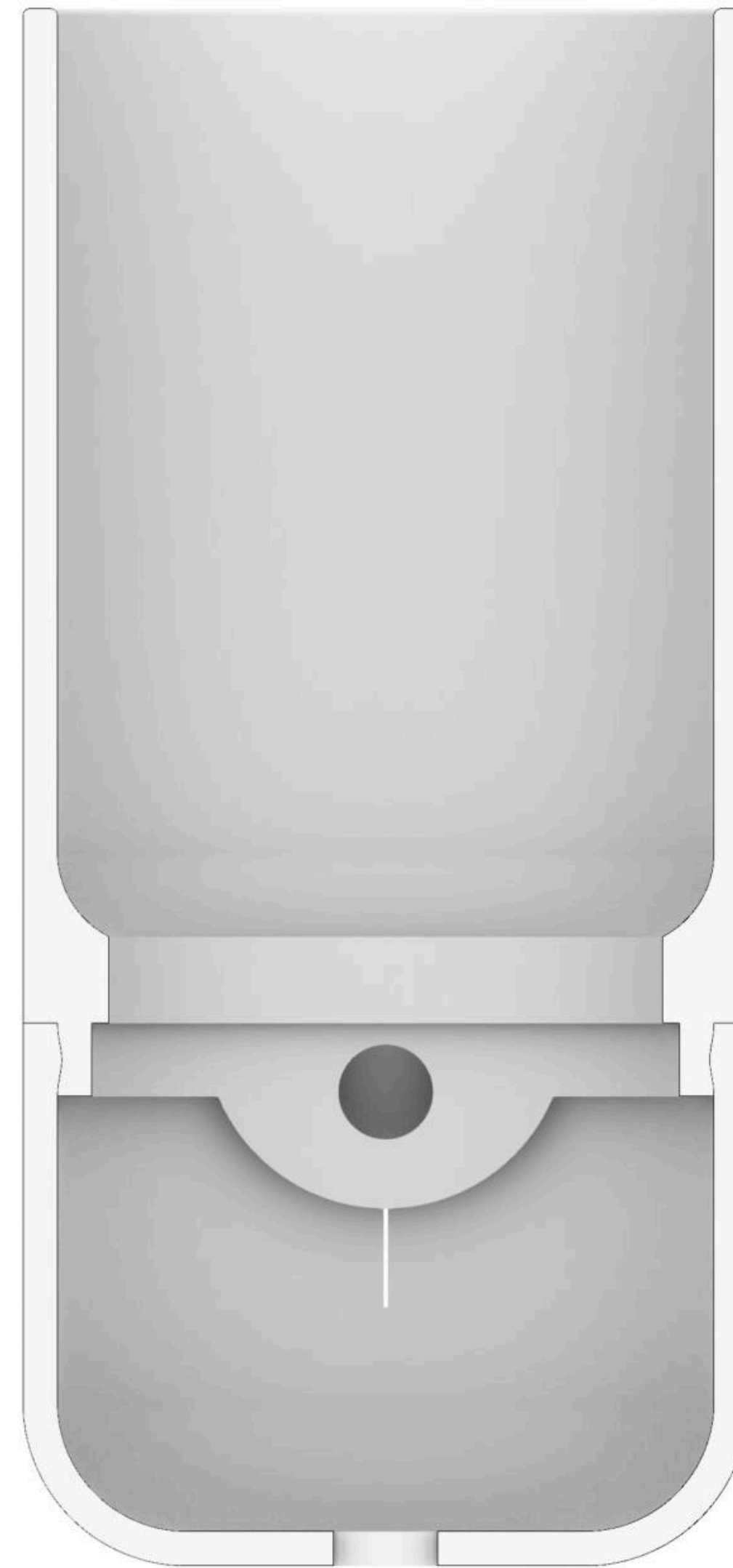
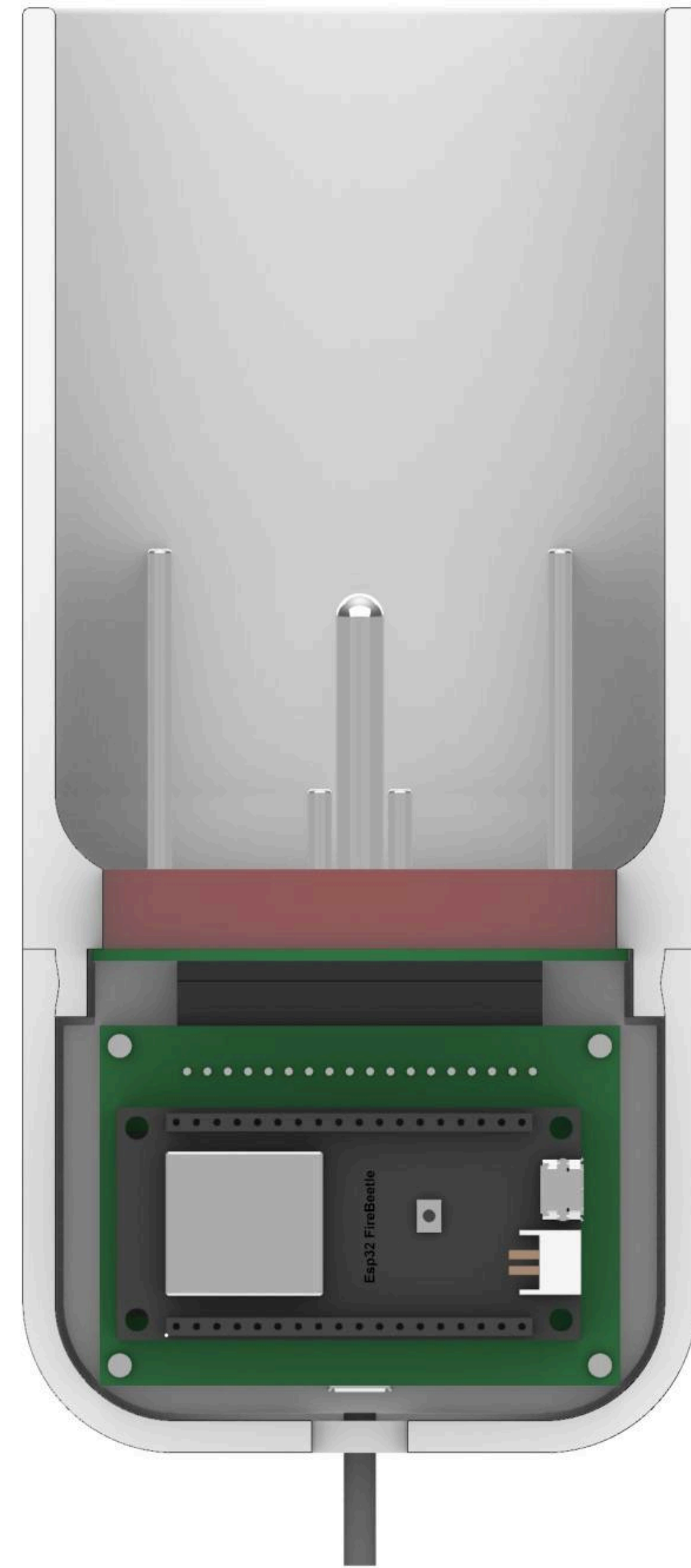
Activates Valve

Activates Plant-Facing LED Light

Sensor Arm



Section

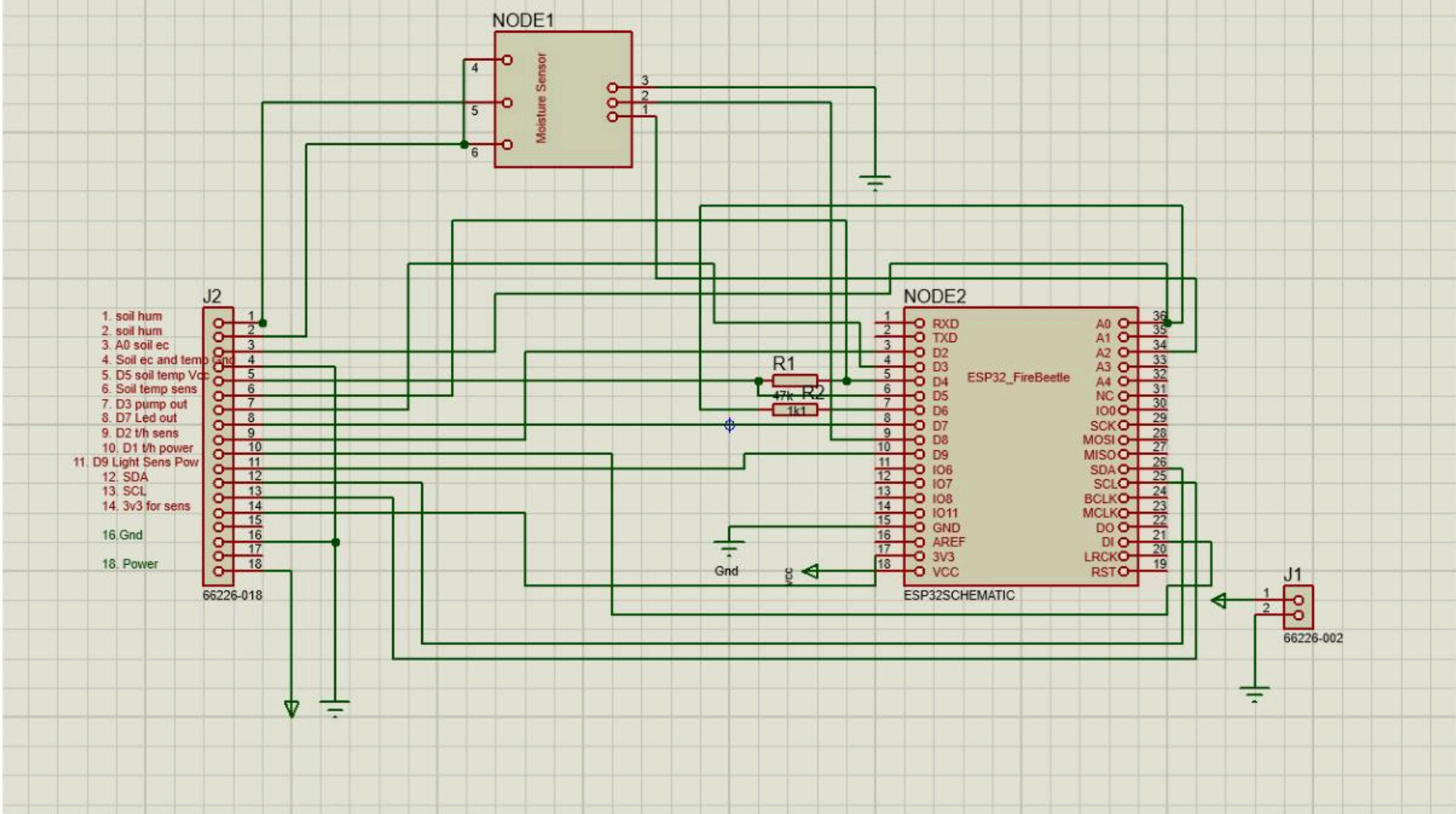


Component Connection Map

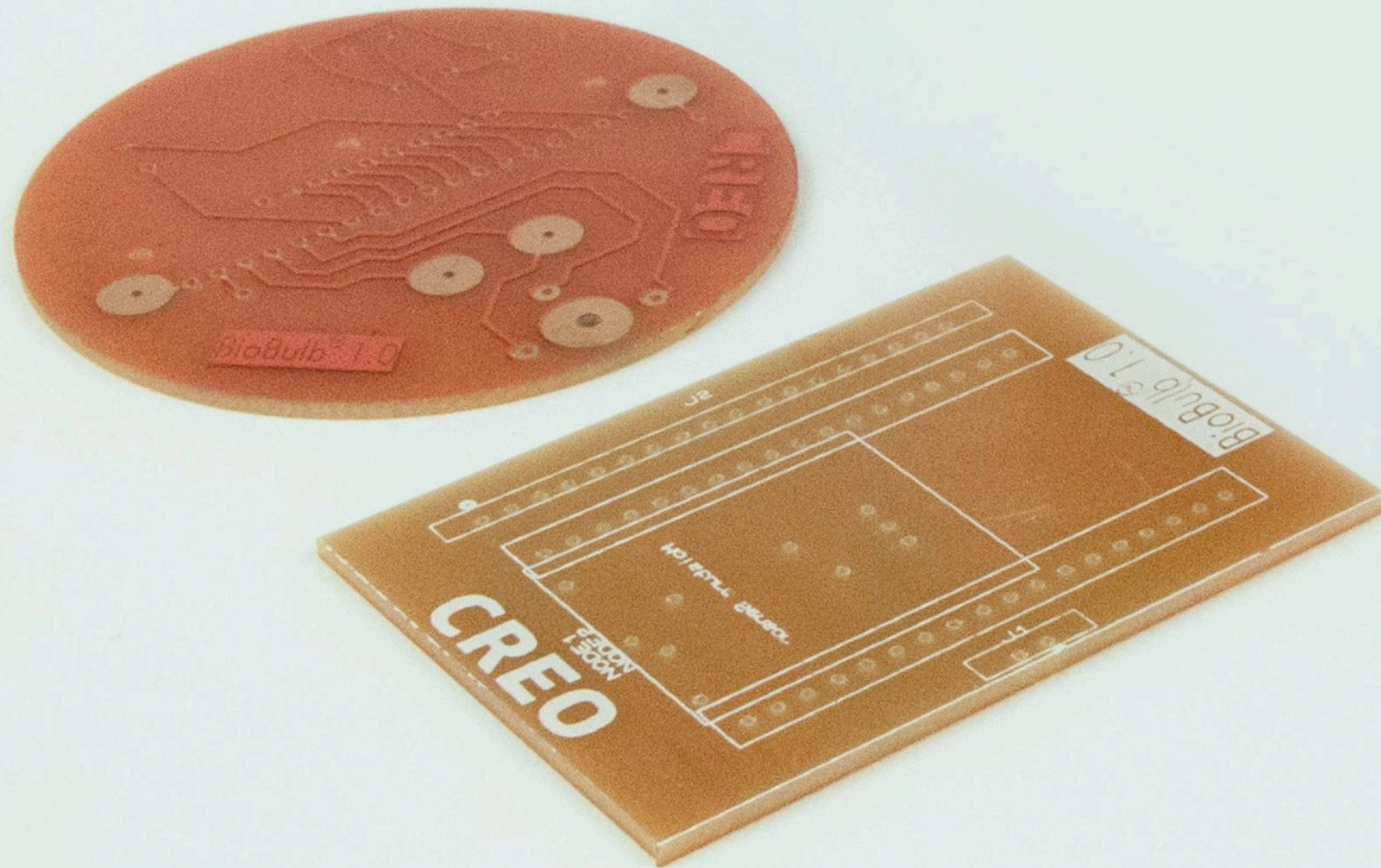
Hardware		Variables	type	Sensor Type	Output too		Power Type	Power Pin	Sensor Pin	Notes	Jumper Pin
nmcu esp32	With Sensor Board	bulp_id									
		bulp_name									
hum_sensor SOiL	Prob and board	soil_hum	float	Analog	-		Digital Pin	D8	A2	with sensor board pin out probes	1 and 2
ec_sensor	Prob	soil_ec	float	Analog	-		Digital Pin	D6	A0	with prob, A0 and D6 1K resistor	Sens 3 (A0) , 4 (Gnd)
temp sensor SOiL	sensor	soil_temp	float	Digital	-		Digital Pin	D5	D4	power D5 and Sens D4 with 4.7K Resistor	4 (Gnd), 5 (D5) power, 6 (D4) sens
light sensor	Board	air_lmn	int	Digital	-		Digital Pin	D9	SCL/SDA		12 (SDA),13 (SCL) ,11 (D9 Power)
light sensor	Board	plant_lmn	int	Digital	-		Digital Pin	D9	SCL/SDA		
temp sensor	sensor	air_temp	float	Digital	-		Digital Pin	D1	D2		9 (D2 sens), 10 (D1 Power)
hum sensor		air_hum	float	Digital	-		Digital Pin				
		Software									
mosfet driver / solenoid valf	Mosfet	pump_status	"1/0	-	mosfet	on/off	Digital Pin		D3	Drive to mosfet	7 (D3)
		pump_period	time	-		time					
		pump_duration	time			time					
mosfet driver / power led	Mosfet	lamp_status	"1/0	-	mosfet	on/off	Digital Pin		D7	Drive to mosfet	8 (D7)
		lamp_period	time			time					
		lamp_duration	time			time					

Rectangular PCB

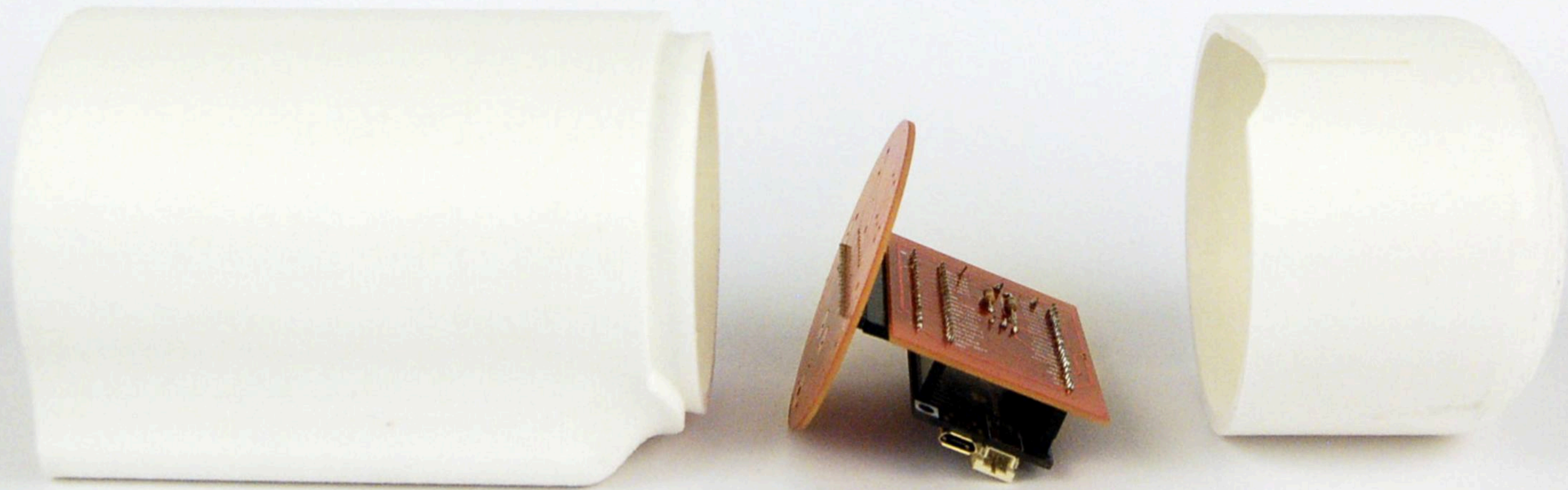
Schematic Capture



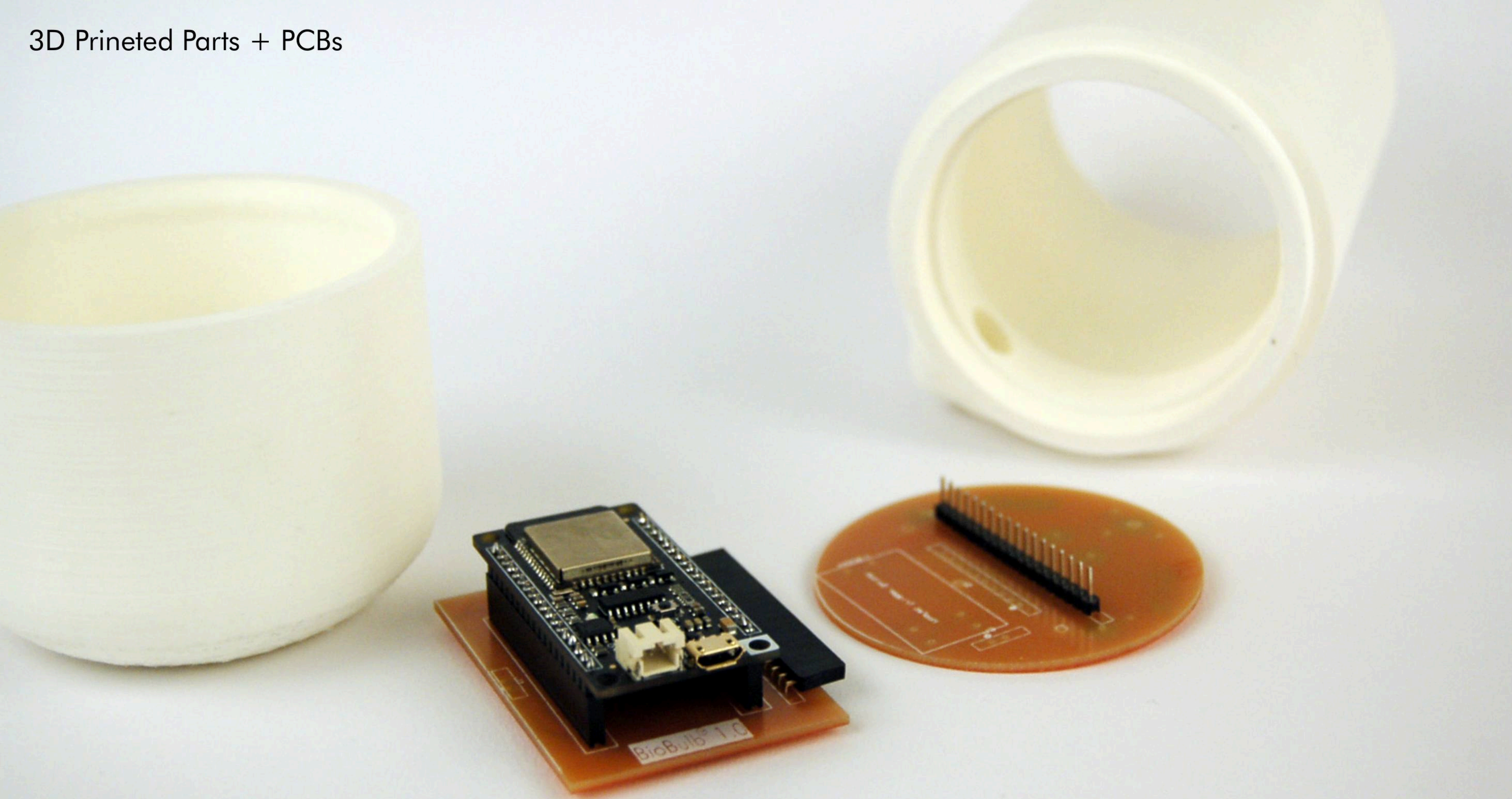
Fabricated PCBs

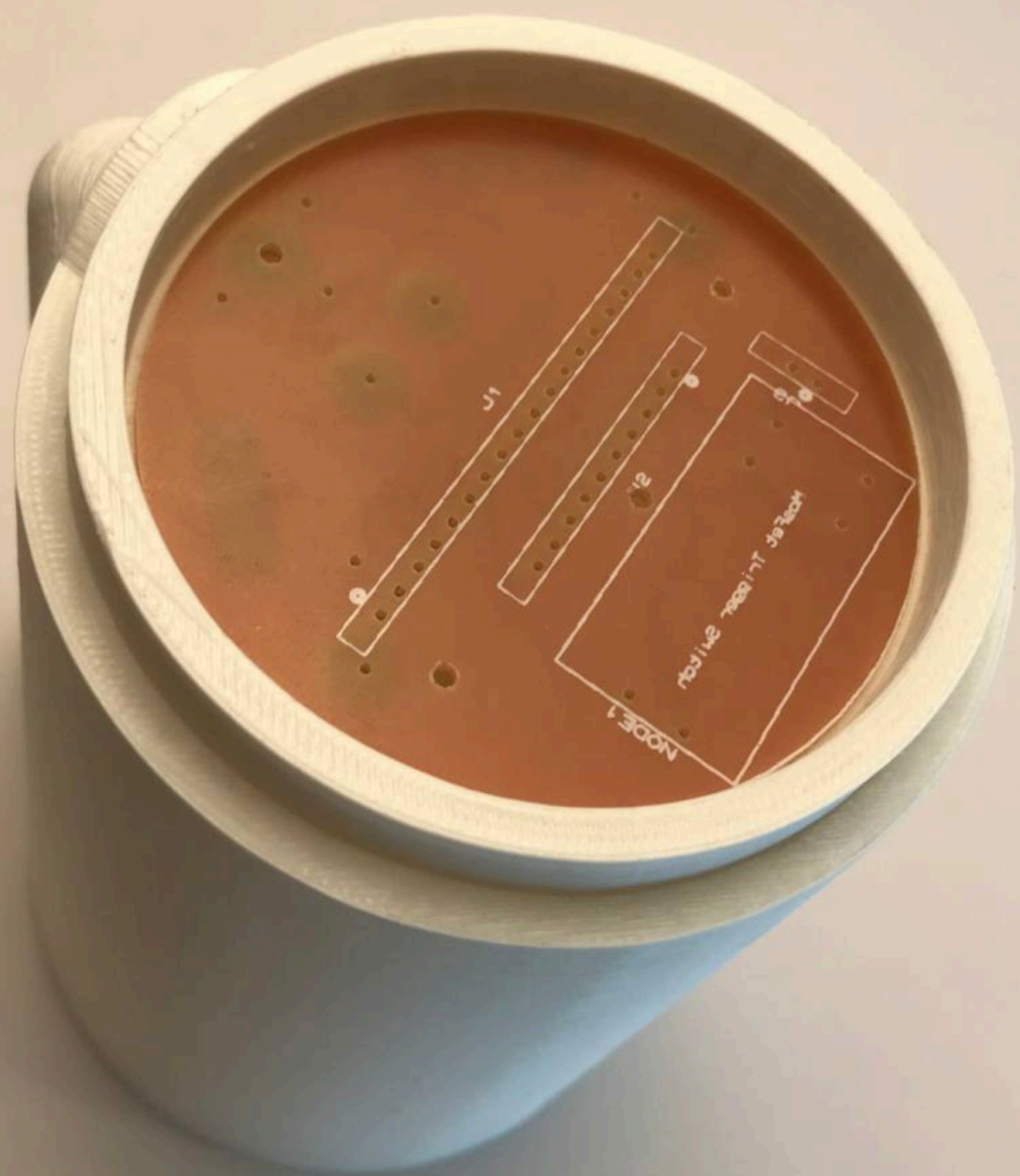


3D Printed Parts + PCBs

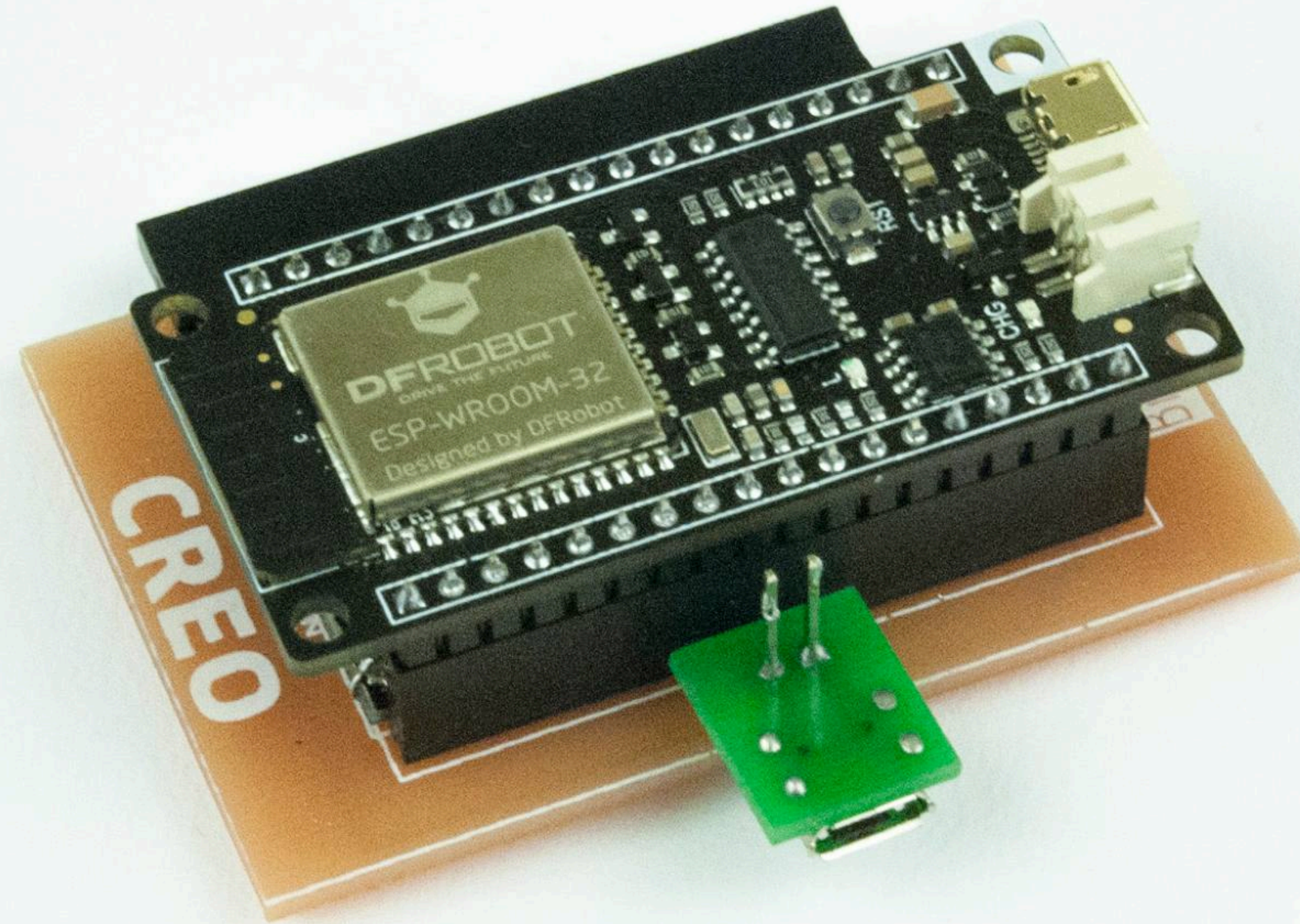


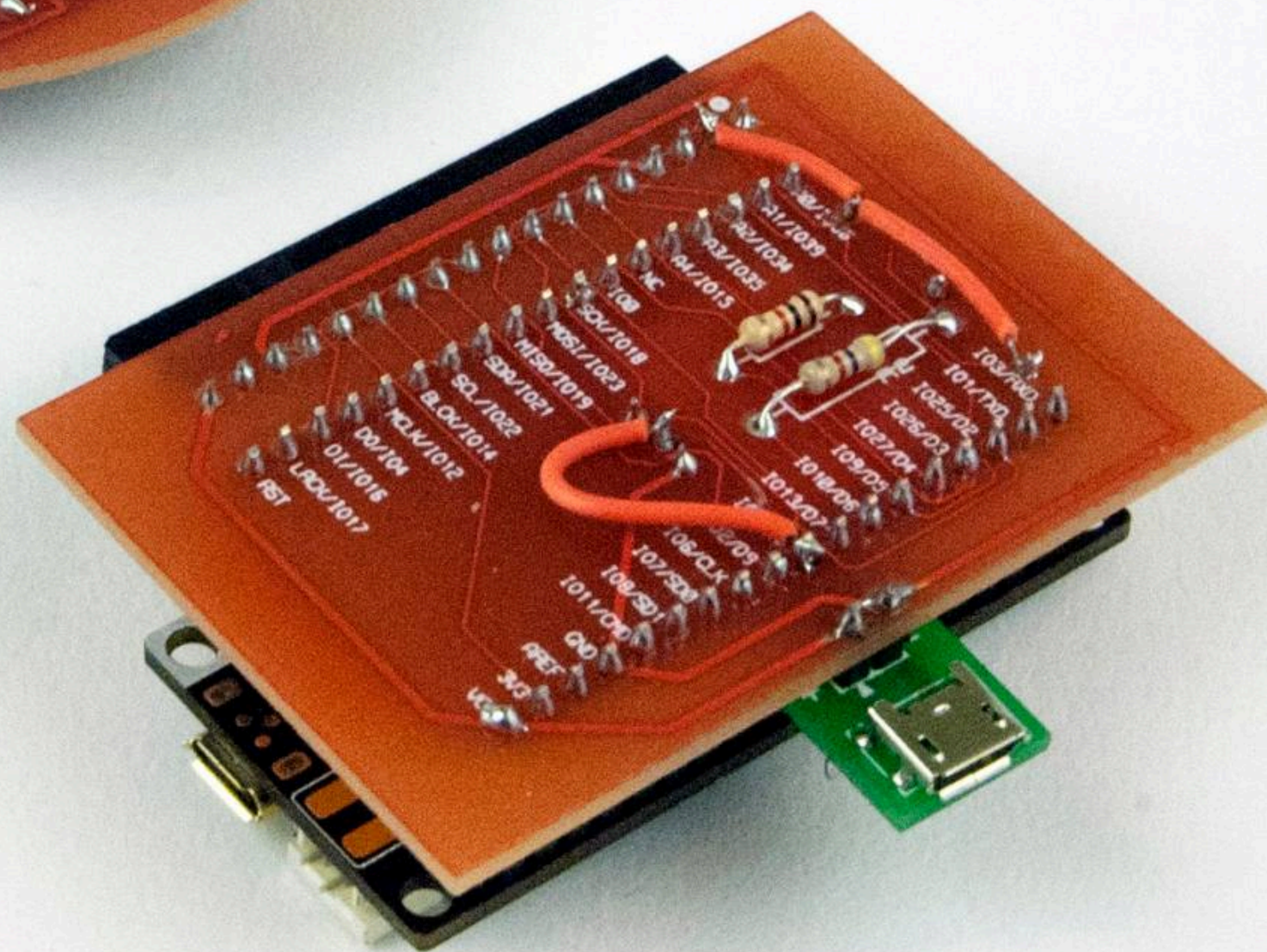
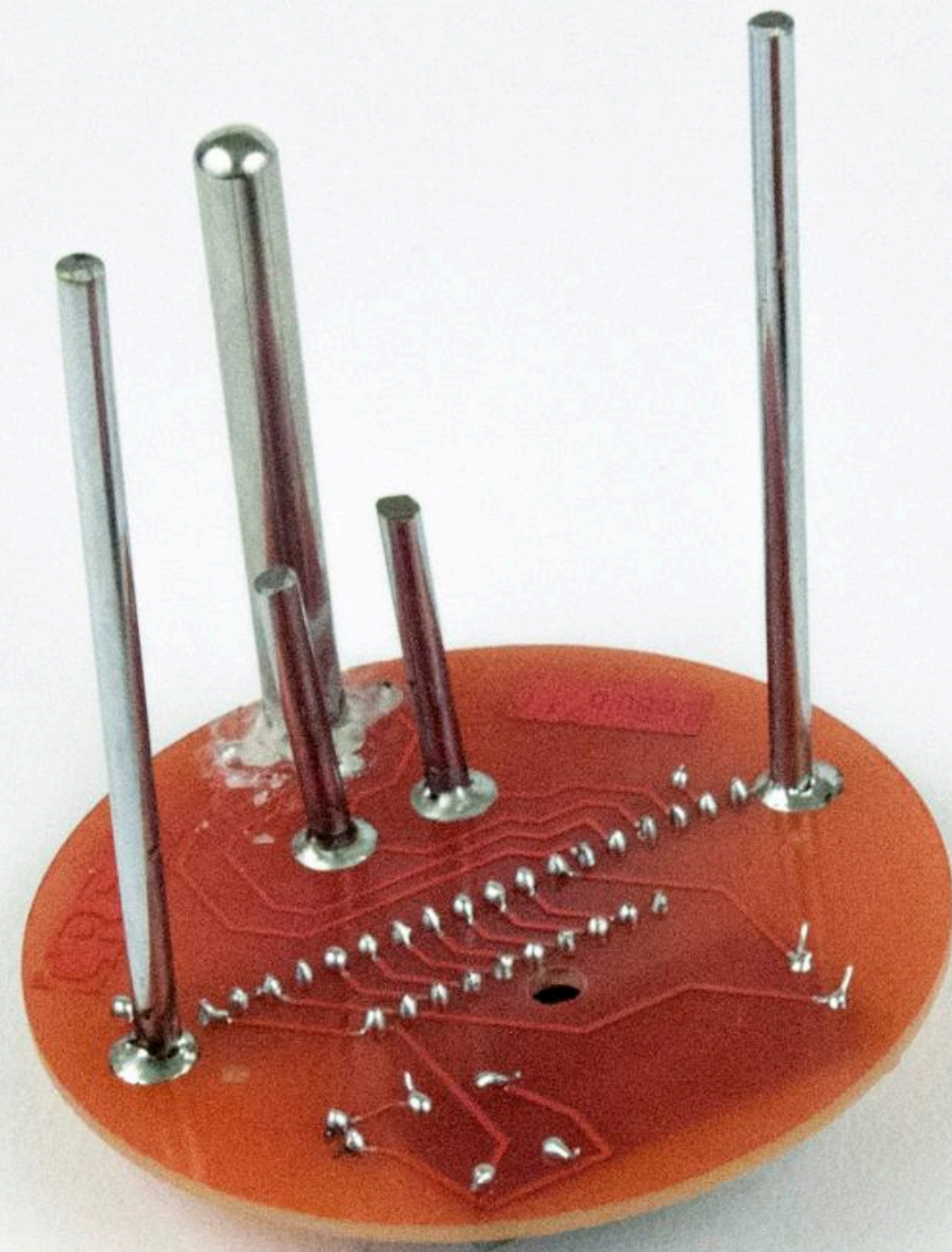
3D Printed Parts + PCBs

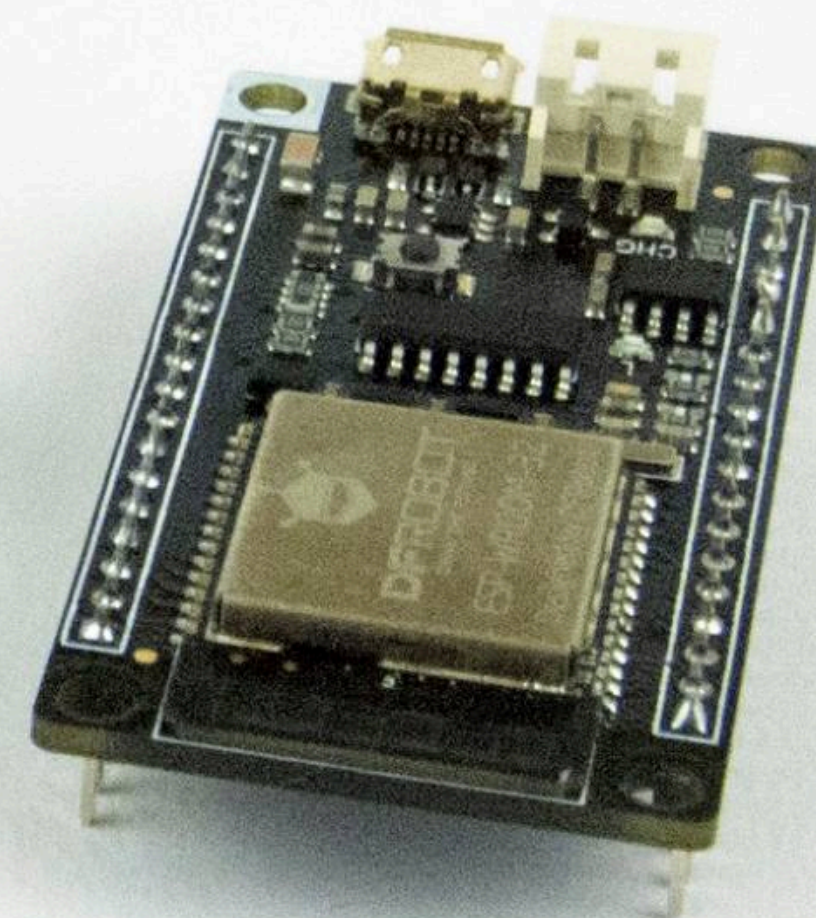
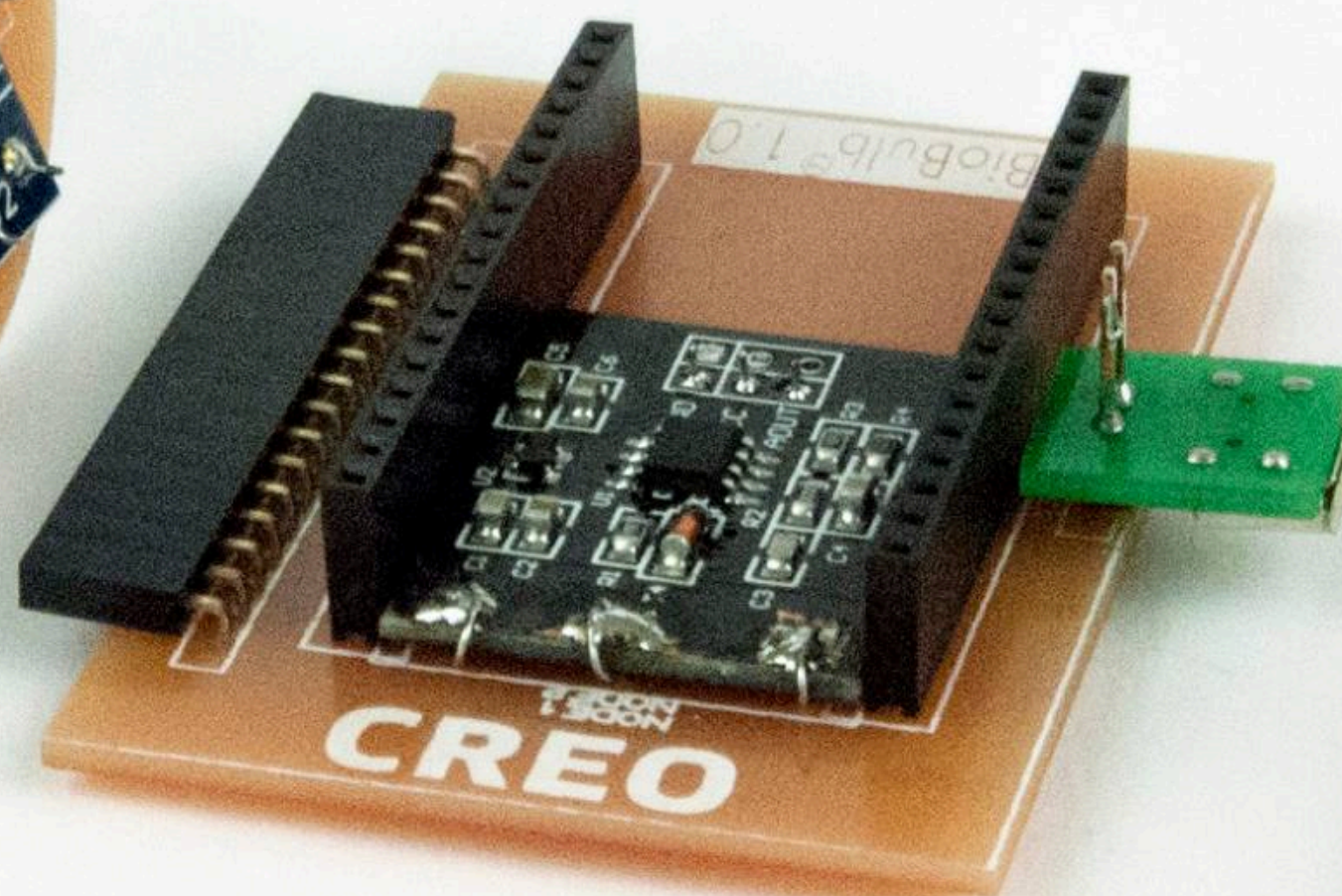
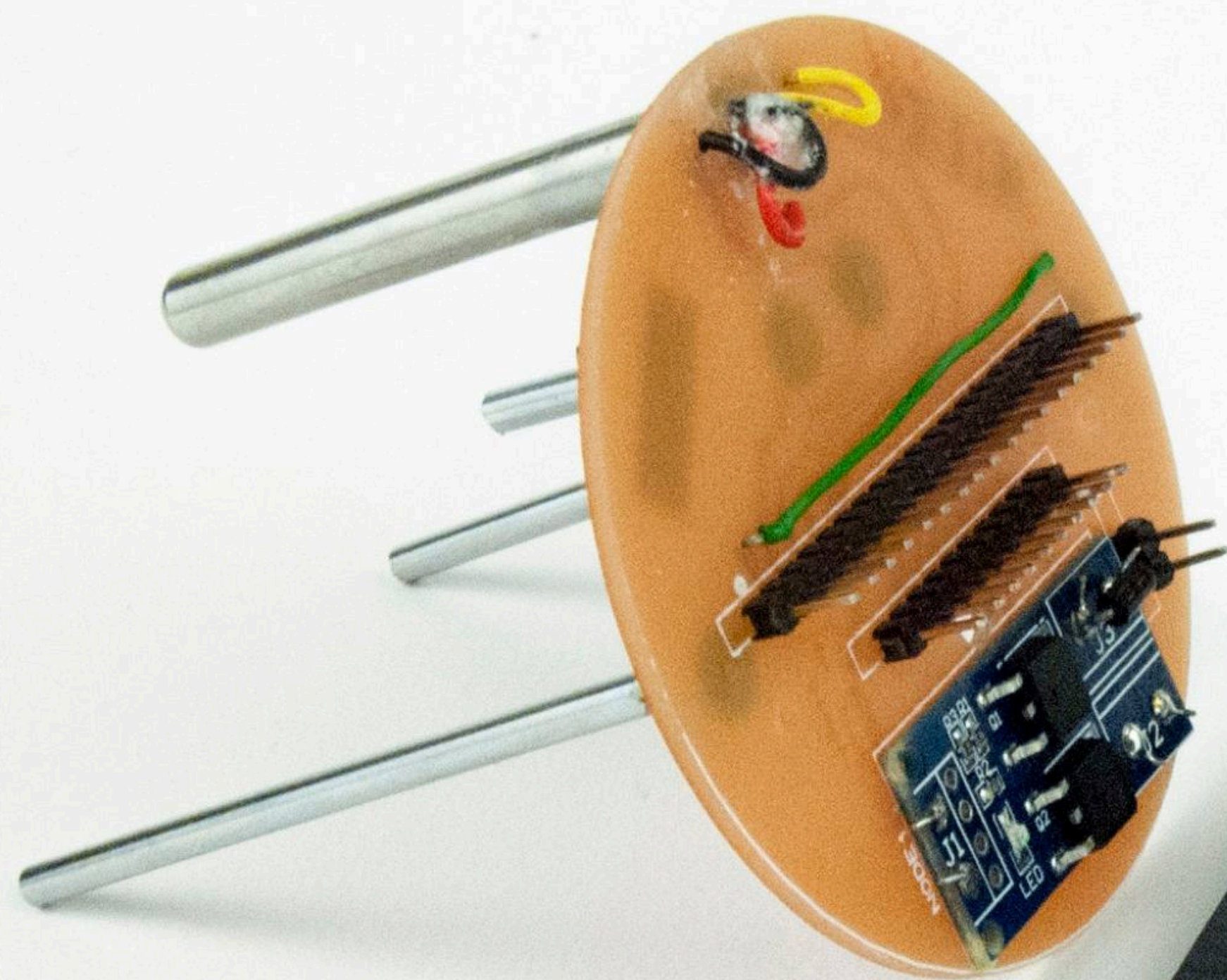


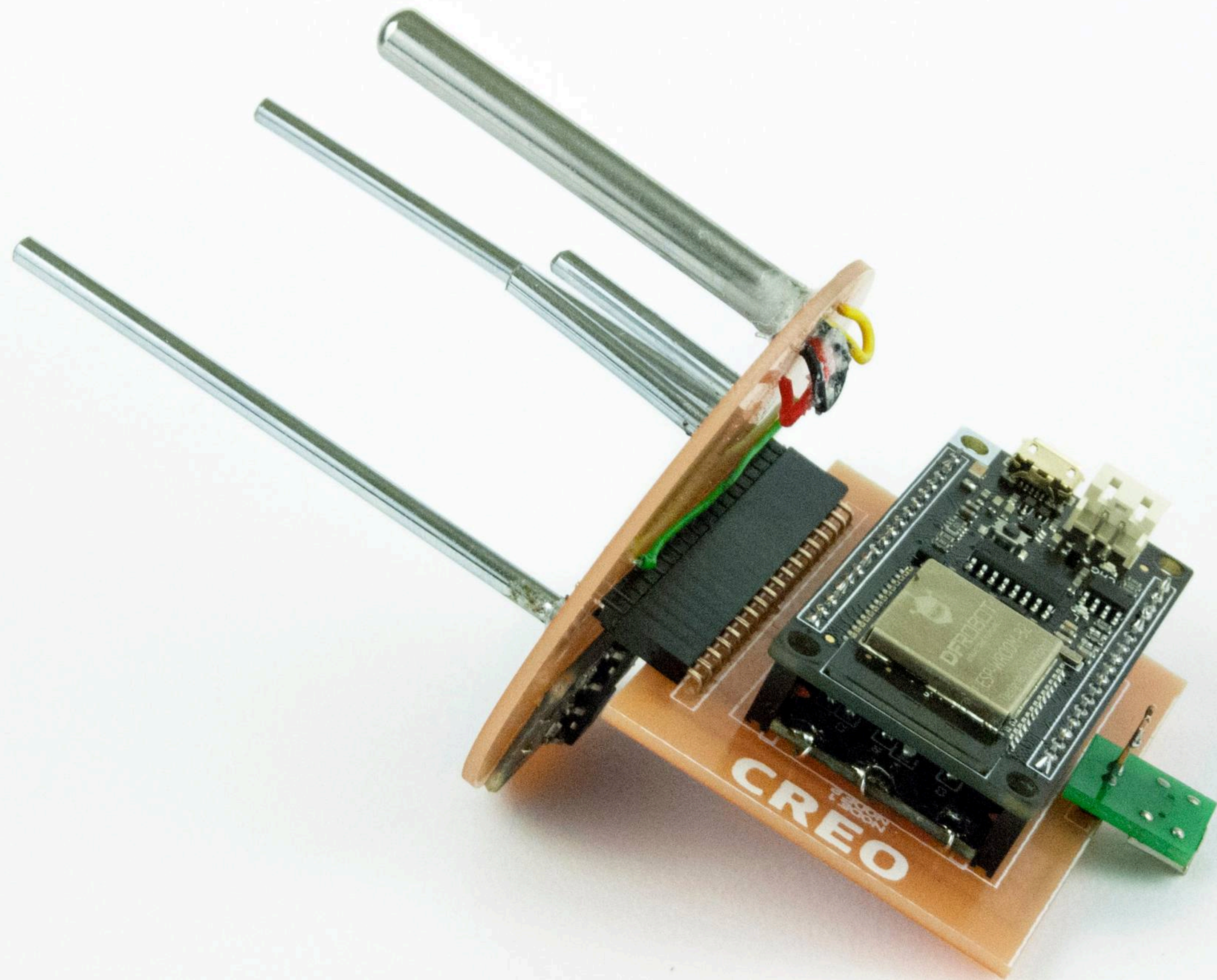


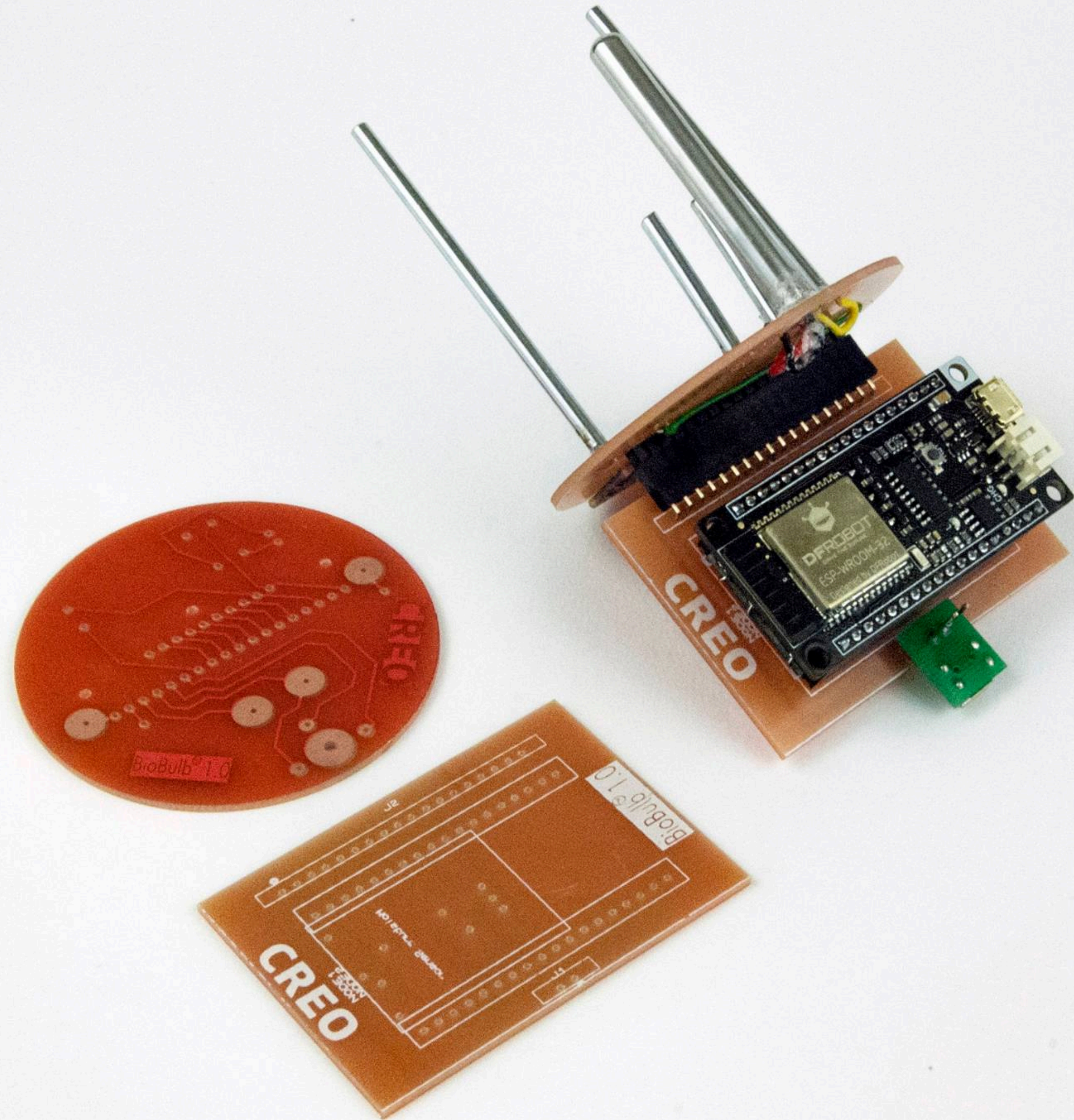
Assembled Rectangular PCB

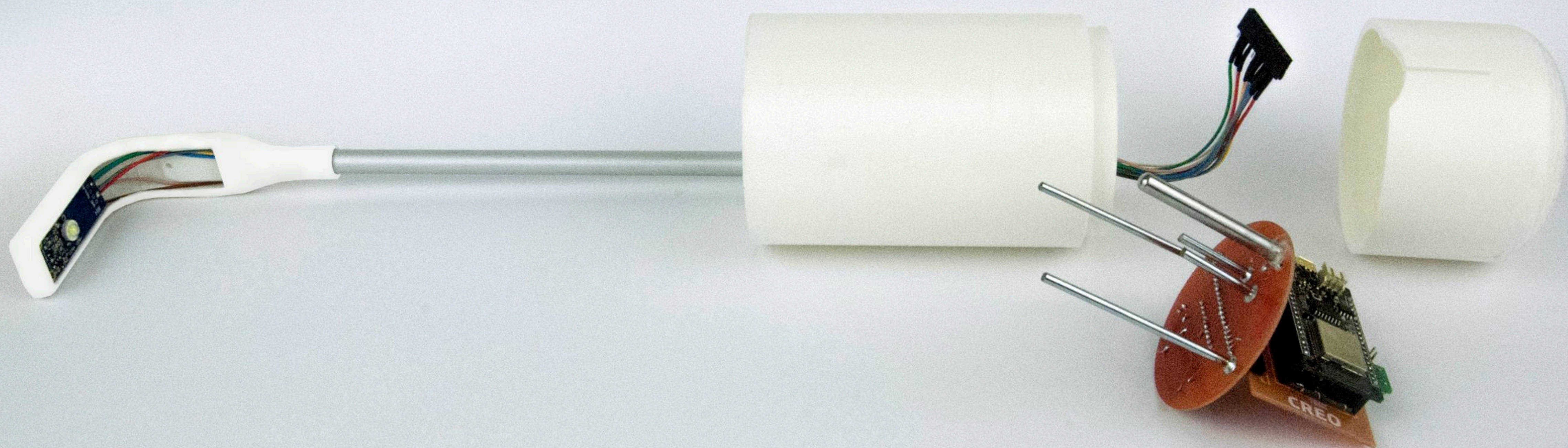


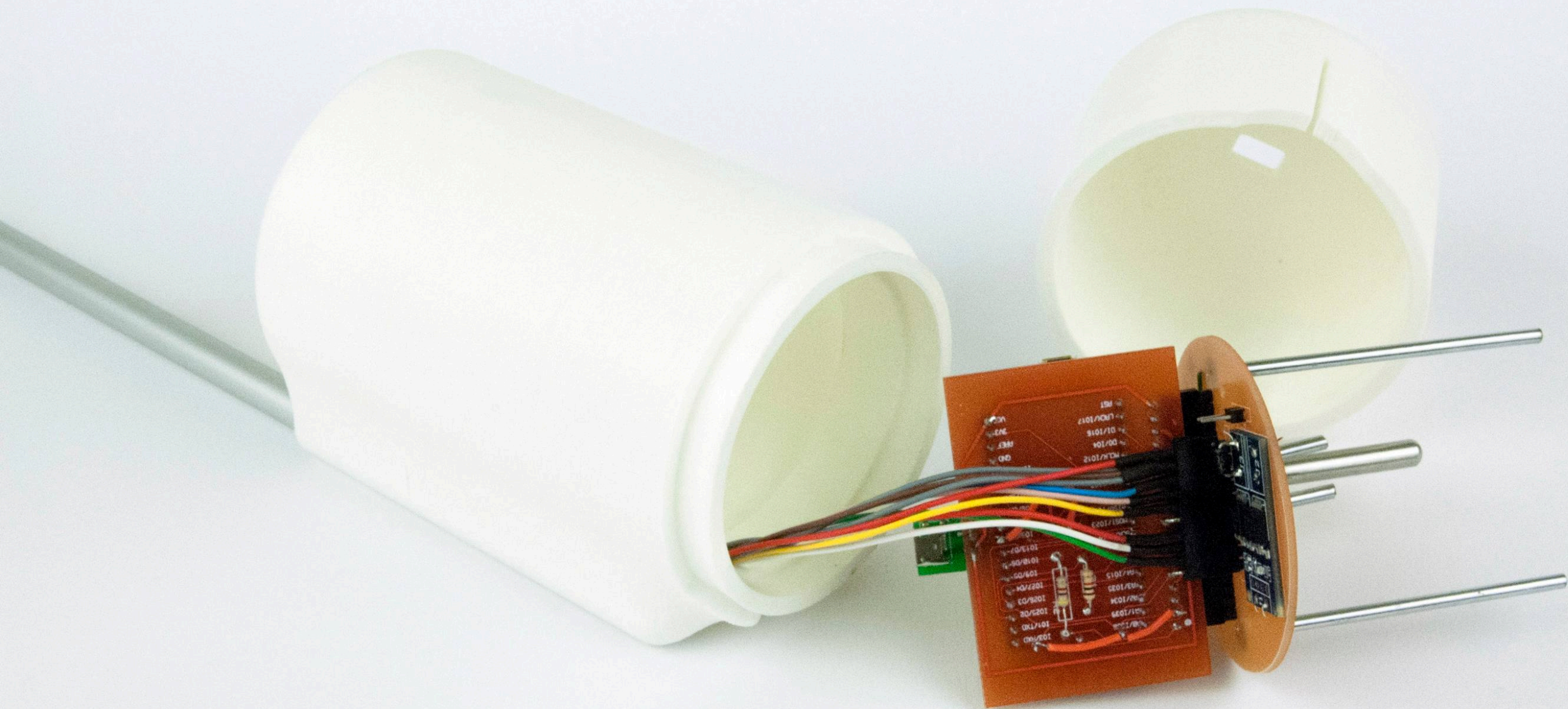








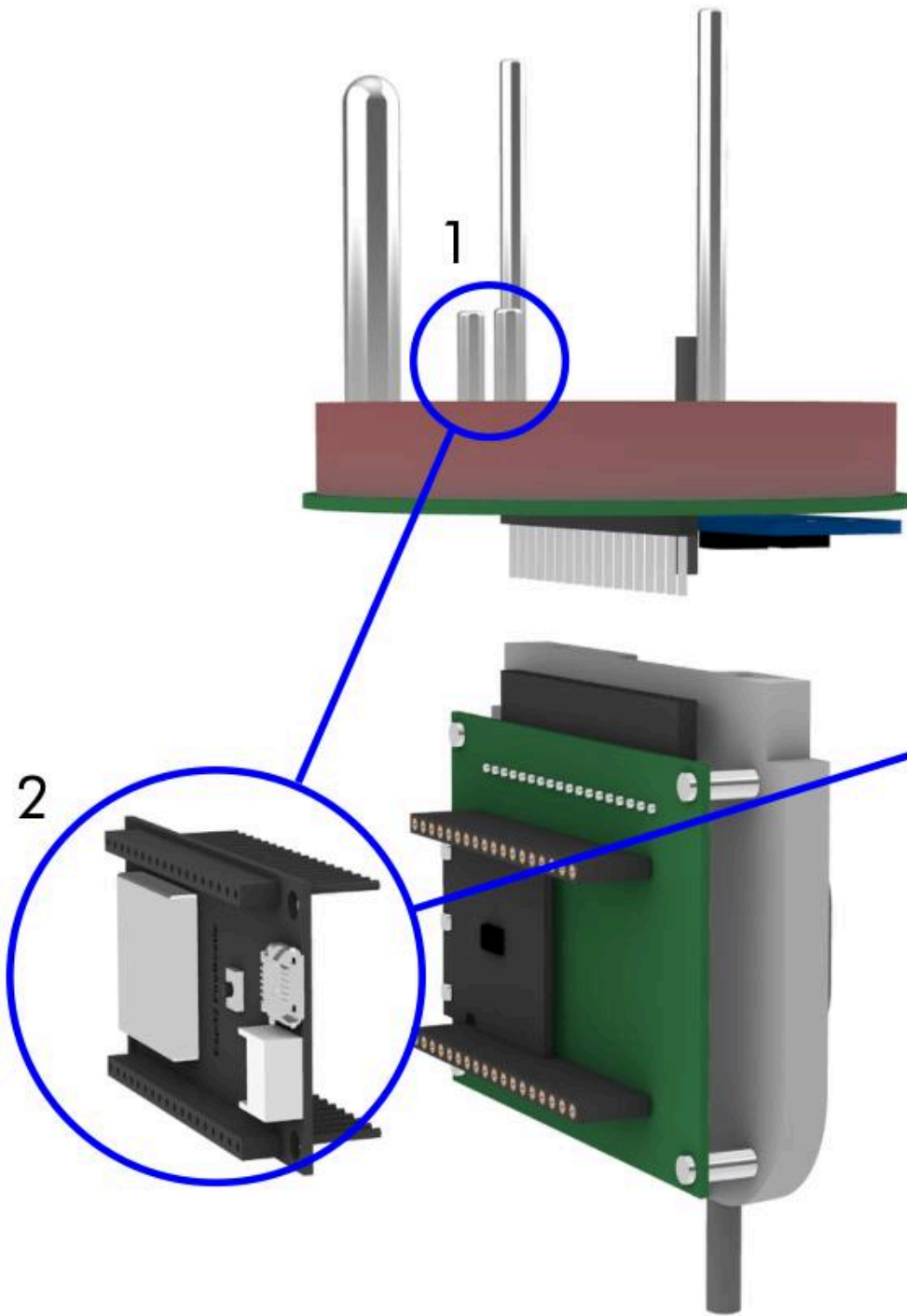






Sensor Readings

Electrical Conductivity



```
ec_calibration | Arduino 1.8.10
File Edit Sketch Tools Help

ec_calibration ec_read printdata

int i=0;
float buffer=0;

//*****
void setup()
{
  Serial.begin(115200);
  // pinMode(TempProbeN
  // digitalWrite(TempP
  //pinMode(TempProbeP
  //digitalWrite(TempP

  pinMode(ECPin, INPUT);
  pinMode(ECPower, OUTPUT);
  pinMode(ECGround, OUTPUT);
  digitalWrite(ECGround, LOW);

  delay(100); // gives

  /*** Adding Digital R
  // Console Read-Me f
  Rl=(Rl+Ra);

  Serial.println("ElChe
  Serial.println("By:
  Serial.println("Free
  Serial.println("");
  Serial.println("Make sure Probe and Temp Sensor are in Solution and solution is well mixed");
  Serial.println("");
  Serial.println("Starting Calibration: Estimated Time 60 Seconds:");

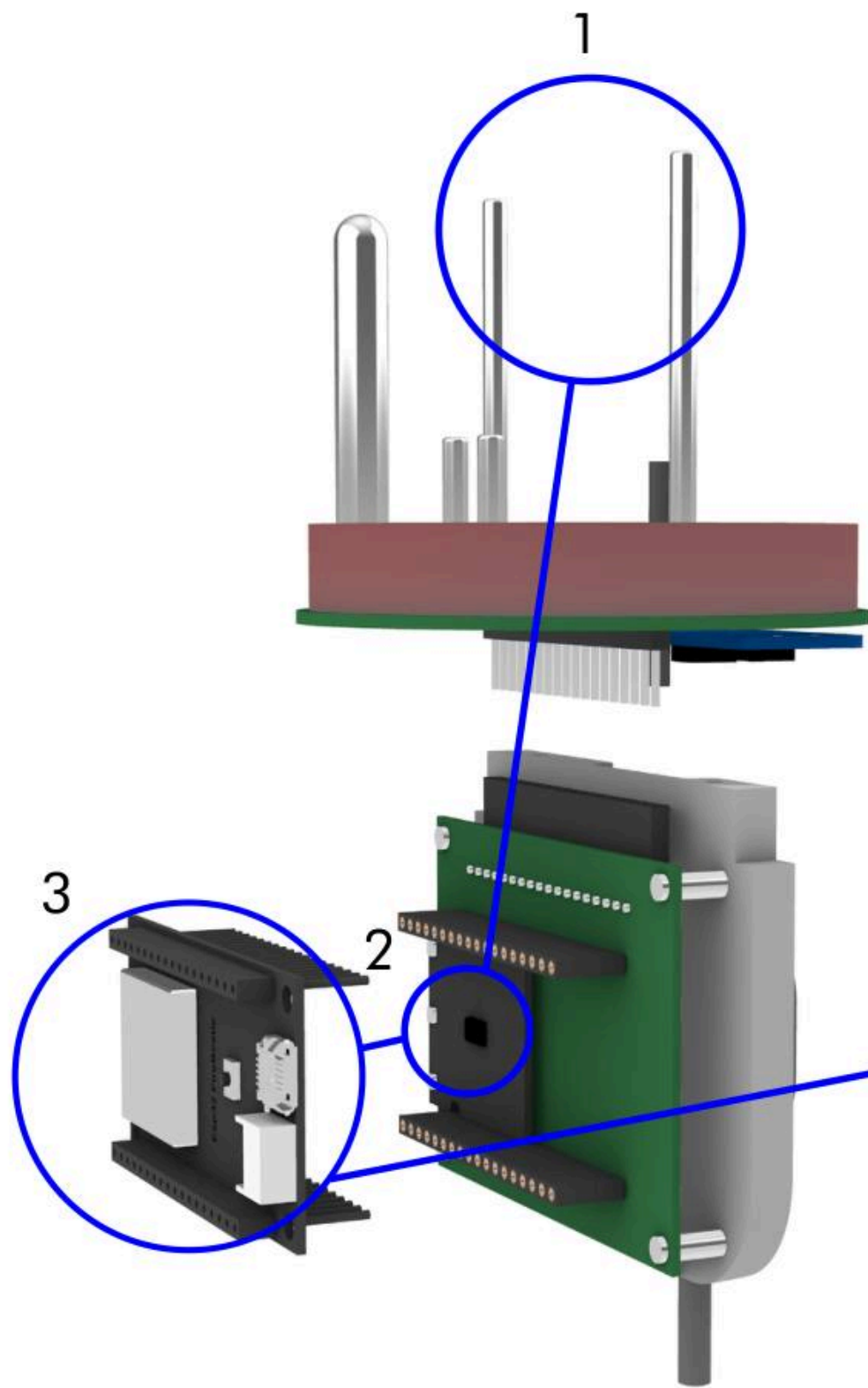
  15:45:48.213 -> 4095
  15:45:53.220 -> 1573
  15:45:58.216 -> 1593
  15:46:03.223 -> 4095
  15:46:08.230 -> 1712
  15:46:13.237 -> 4095
  15:46:18.206 -> 1649
  15:46:23.220 -> Calibration Fluid EC: 1.38 S Cell Constant K0.30Rc: 650.03 EC: 5.22 Simens 3650 ppm 23.37 °C
  15:46:24.490 -> Temperature = 23.44 Celsius, 74.19 Fahrenheit
  15:46:24.524 -> 1630
  15:46:29.491 -> 1620
  15:46:34.500 -> 1607
  15:46:39.500 -> 1584
  15:46:44.512 -> 1583
  15:46:49.514 -> 1568
  15:46:54.493 -> 1566
  15:46:59.500 -> 1557
  15:47:04.501 -> 1535
  15:47:09.498 -> 1535
  15:47:14.509 -> Calibration Fluid EC: 1.38 S Cell Constant K1.21Rc: 588.96 EC: 1.45 Simens 1012 ppm 23.44 °C
  15:47:15.808 -> Temperature = 23.44 Celsius, 74.19 Fahrenheit
  15:47:15.808 -> 1533
  15:47:20.799 -> 1531
  15:47:25.801 -> 1524

  Leaving...
  Hard resetting via RTS pin...

145 FireBeetle-ESP32 on COM3
```


Sensor Readings

Soil Moisture



moister_caliber | Arduino 1.8.10

File Edit Sketch Tools Help

moister_caliber

```
int R1= 1000;
int Ra=25; //Resistance of powering Pins
int humSens= 34;// esp A2 ölçüm ucu

int humPower =5;// esp D8 power ucu TYA HOME 02_10_2019
```

COM3

Send

15:48:34.299 ->	2401
15:48:35.287 ->	2399
15:48:36.277 ->	2399
15:48:37.271 ->	2399
15:48:38.268 ->	2399
15:48:39.295 ->	2397
15:48:40.288 ->	2399
15:48:41.283 ->	2399
15:48:42.277 ->	2399
15:48:43.267 ->	2399
15:48:44.292 ->	2399
15:48:45.290 ->	2399
15:48:46.282 ->	2311
15:48:47.277 ->	2287
15:48:48.272 ->	2282
15:48:49.267 ->	2285
15:48:50.292 ->	2279
15:48:51.285 ->	2274
15:48:52.280 ->	2248
15:48:53.277 ->	2235
15:48:54.268 ->	2241
15:48:55.293 ->	2233

☒ Autoscroll ☒ Show timestamp

Newline

115200 baud

Clear output

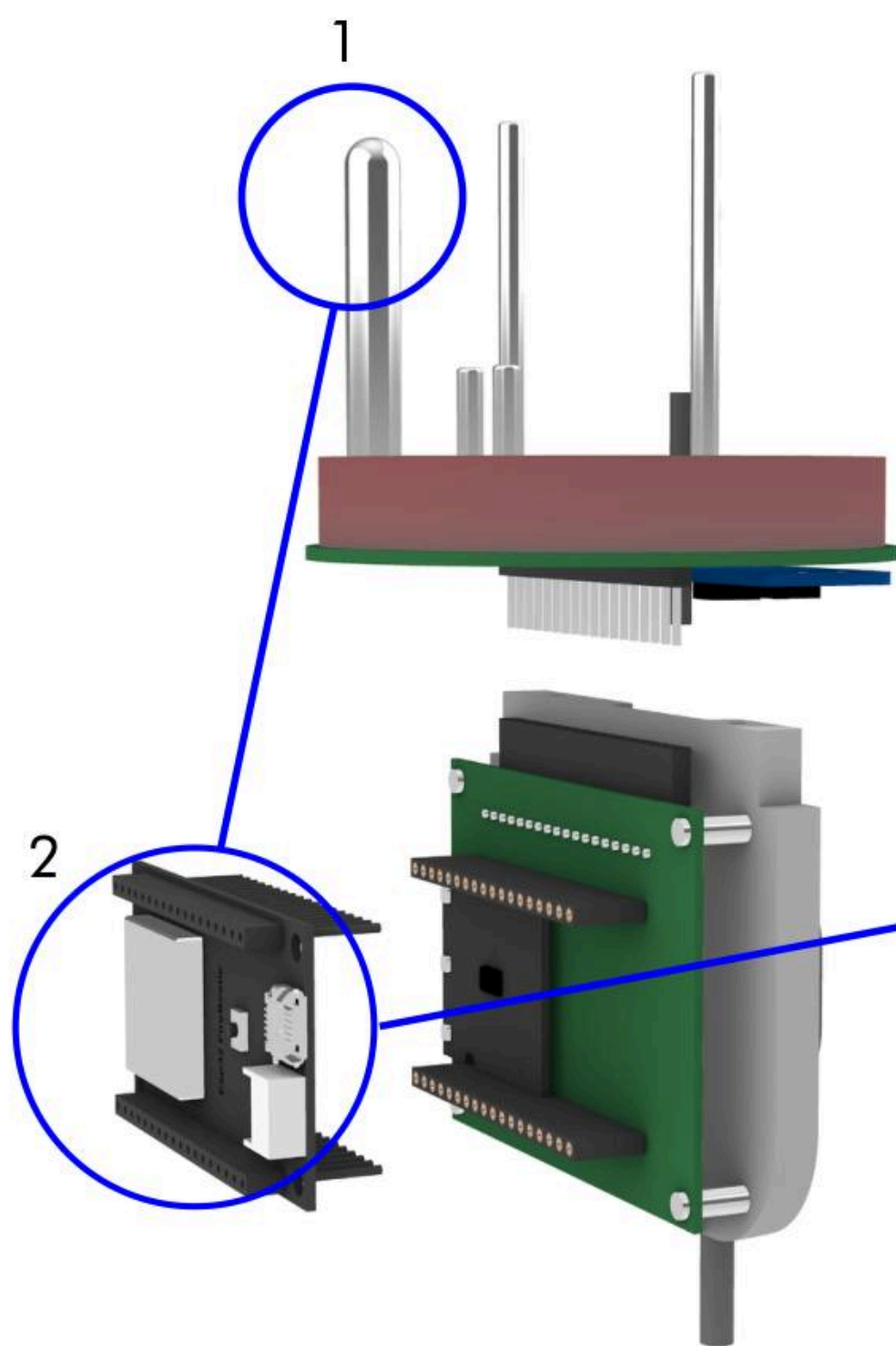
Leaving...

Hard resetting via RTS pin...

15 FireBeetle-ESP32 on COM3

Sensor Readings

Soil Temperature



ec_calibration | Arduino 1.8.10
File Edit Sketch Tools Help

ec_calibration ec_read printdata

```
int i=0;
float buffer=0;

//*****
void setup()
{
  Serial.begin(115200);
  // pinMode(TempProbeN
  // digitalWrite(TempP
  //pinMode(TempProbeP
  //digitalWrite(TempP

  pinMode(ECPin, INPUT);
  pinMode(ECPower, OUTP
  pinMode(ECGround, OUT
  digitalWrite(ECGround

  delay(100); // gives

  /** Adding Digital
  // Console Read-Me f
  Rl=(Rl+Ra);

  Serial.println("ElChe
  Serial.println("By:
  Serial.println("Free
  Serial.println("");
  Serial.println("Make sure Probe and Temp Sensor are in Solution and solution is well mixed");
  Serial.println("");
  Serial.println("Starting Calibration: Estimated Time 60 Seconds:");
}
```

COM3

15:45:48.213 -> 4095
15:45:53.220 -> 1573
15:45:58.216 -> 1593
15:46:03.223 -> 4095
15:46:08.230 -> 1712
15:46:13.237 -> 4095
15:46:18.206 -> 1649
15:46:23.220 -> Calibration Fluid EC: 1.38 S Cell Constant K0.30Rc: 650.03 EC: 5.22 Simens 3650 ppm 23.37 °C
15:46:24.490 -> Temperature = 23.44 Celsius, 74.19 Fahrenheit
15:46:24.524 -> 1630
15:46:29.491 -> 1620
15:46:34.500 -> 1607
15:46:39.500 -> 1584
15:46:44.512 -> 1583
15:46:49.514 -> 1568
15:46:54.493 -> 1566
15:46:59.500 -> 1557
15:47:04.501 -> 1535
15:47:09.498 -> 1535
15:47:14.509 -> Calibration Fluid EC: 1.38 S Cell Constant K1.21Rc: 588.96 EC: 1.45 Simens 1012 ppm 23.44 °C
15:47:15.808 -> Temperature = 23.44 Celsius, 74.19 Fahrenheit
15:47:15.808 -> 1533
15:47:20.799 -> 1531
15:47:25.801 -> 1524

☒ Autoscroll ☒ Show timestamp

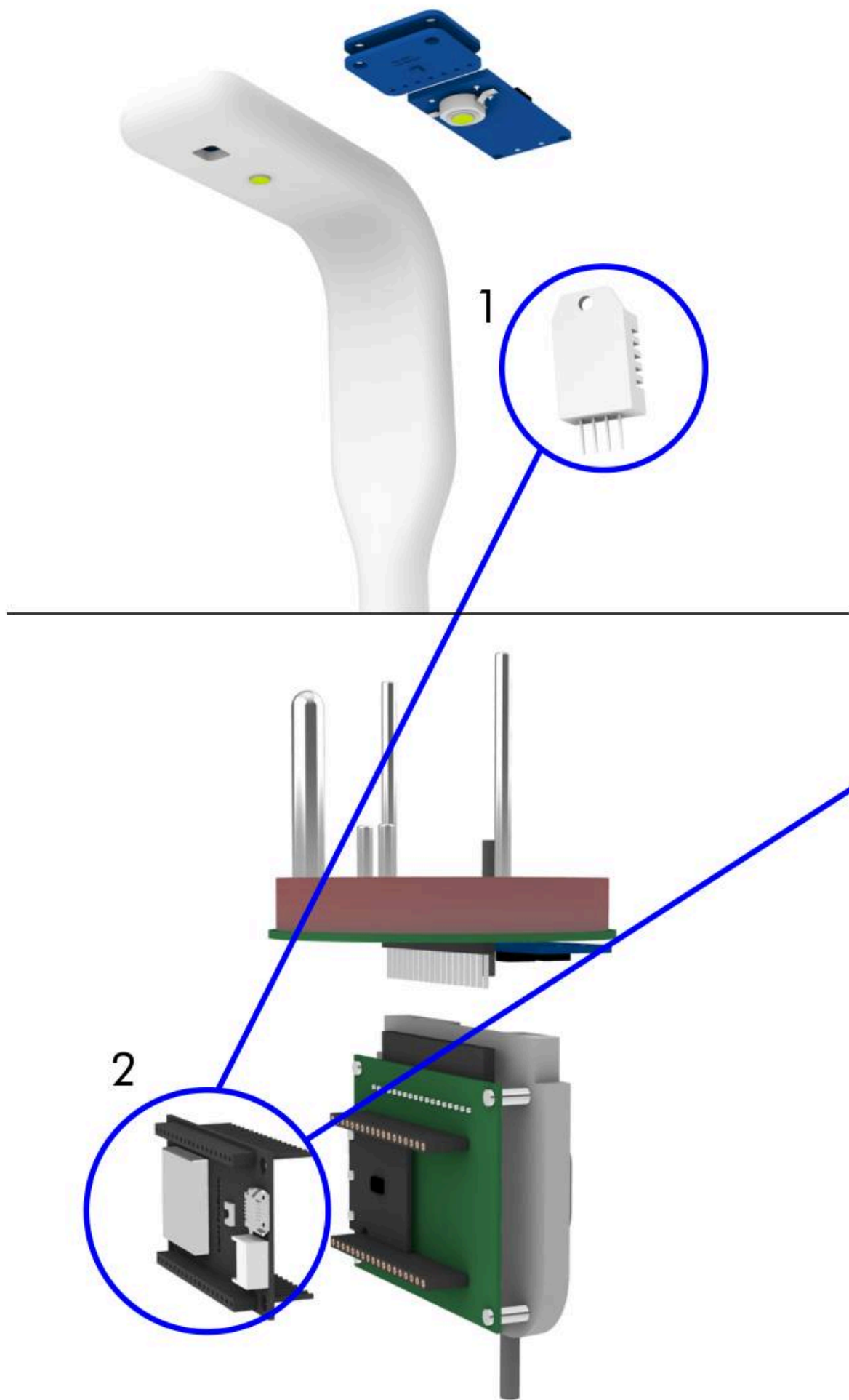
Newline 115200 baud Clear output

Leaving...
Hard resetting via RTS pin...

145 FireBeetle-ESP32 on COM3

Sensor Readings

Room Temp./Humidity Sensor



```
TYA_DHT22 | Arduino 1.8.10
File Edit Sketch Tools Help

TYA_DHT22
COM3

20:24:31.950 -> #####SHD401S6#####aC$DHTxx test!
#inc 20:24:38.096 -> Humidity: 24.20% Temperature: 28.30°C 82.94°F Heat index: 27.08°C 80.74°F
20:24:40.100 -> Humidity: 24.90% Temperature: 27.80°C 82.04°F Heat index: 26.75°C 80.15°F
#def 20:24:42.112 -> Humidity: 24.80% Temperature: 27.70°C 81.86°F Heat index: 26.68°C 80.03°F
#def 20:24:44.118 -> Humidity: 24.80% Temperature: 27.70°C 81.86°F Heat index: 26.68°C 80.03°F
#def 20:24:46.110 -> Humidity: 24.80% Temperature: 27.70°C 81.86°F Heat index: 26.68°C 80.03°F
20:24:48.127 -> Humidity: 24.70% Temperature: 27.70°C 81.86°F Heat index: 26.68°C 80.02°F
// F 20:24:50.123 -> Humidity: 24.70% Temperature: 27.70°C 81.86°F Heat index: 26.68°C 80.02°F
// P 20:24:52.132 -> Humidity: 24.70% Temperature: 27.70°C 81.86°F Heat index: 26.68°C 80.02°F
20:24:54.139 -> Humidity: 24.90% Temperature: 27.70°C 81.86°F Heat index: 26.68°C 80.03°F
// U 20:24:56.163 -> Humidity: 24.90% Temperature: 27.70°C 81.86°F Heat index: 26.68°C 80.03°F
// #d 20:24:58.169 -> Humidity: 24.90% Temperature: 27.70°C 81.86°F Heat index: 26.68°C 80.03°F
#def 20:25:00.154 -> Humidity: 24.90% Temperature: 27.70°C 81.86°F Heat index: 26.68°C 80.03°F
// #d 20:25:02.179 -> Humidity: 24.80% Temperature: 27.70°C 81.86°F Heat index: 26.68°C 80.03°F
20:25:04.170 -> Humidity: 24.70% Temperature: 27.70°C 81.86°F Heat index: 26.68°C 80.02°F
// C 20:25:06.177 -> Humidity: 24.70% Temperature: 27.70°C 81.86°F Heat index: 26.68°C 80.02°F
// N 20:25:08.180 -> Humidity: 24.70% Temperature: 27.80°C 82.04°F Heat index: 26.74°C 80.14°F
// t
// C
// C
// C
// I
// N
// t
// a
// as
DHT

void setup() {
  Serial.begin(115200);

  pinMode(LEDPOWER,OUTPUT);// SET LED POWER OUTPUT
  digitalWrite(LEDPOWER,LOW);// POWER LED
}

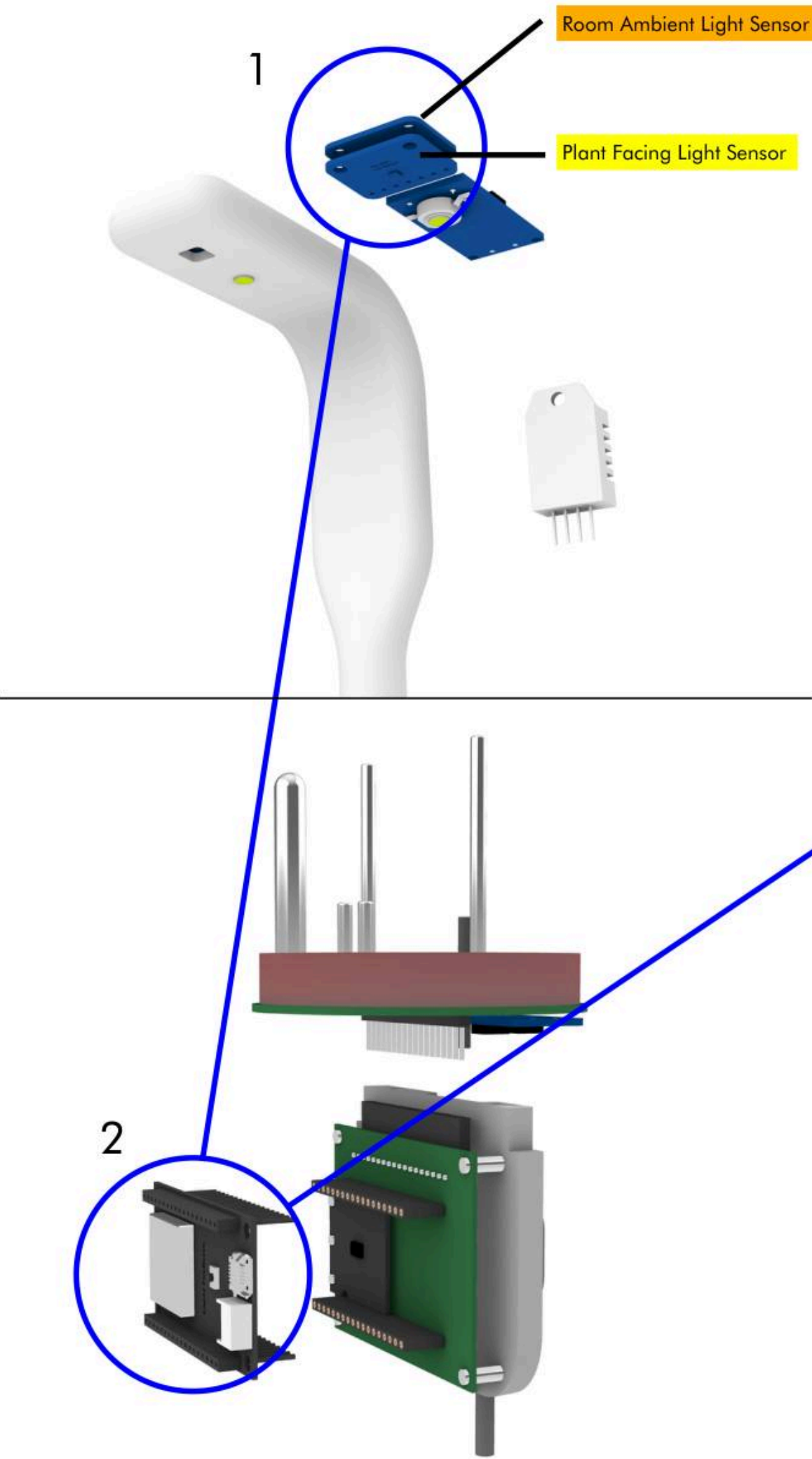
Done uploading.

Leaving...
Hard resetting via RTS pin...

FireBeetle-ESP32 on COM3
```


Sensor Readings

Light Sensors



```
two_tls2561 | Arduino 1.8.10
File Edit Sketch Tools Help

two_tls2561
COM3

void loop(void)
{
  /* Get a new sensor event */
  sensors_event_t event1;
  tsl.getEvent(&event1);

  /* Display the result on the serial port */
  if (event1.light)
  {
    Serial.print("Room Ambient Light : ");
    Serial.println(event1.light);
  }
  else
  {
    /* If event.light is zero then the sensor is not receiving any light
    and no reliable data is returned. An exception is under direct light
    from the Sun where the value may return 0 for a short time. */
    Serial.println("No light detected...");
    delay(2500);
  }

  /* Get a new sensor event */
  sensors_event_t event2;
  ts2.getEvent(&event2);

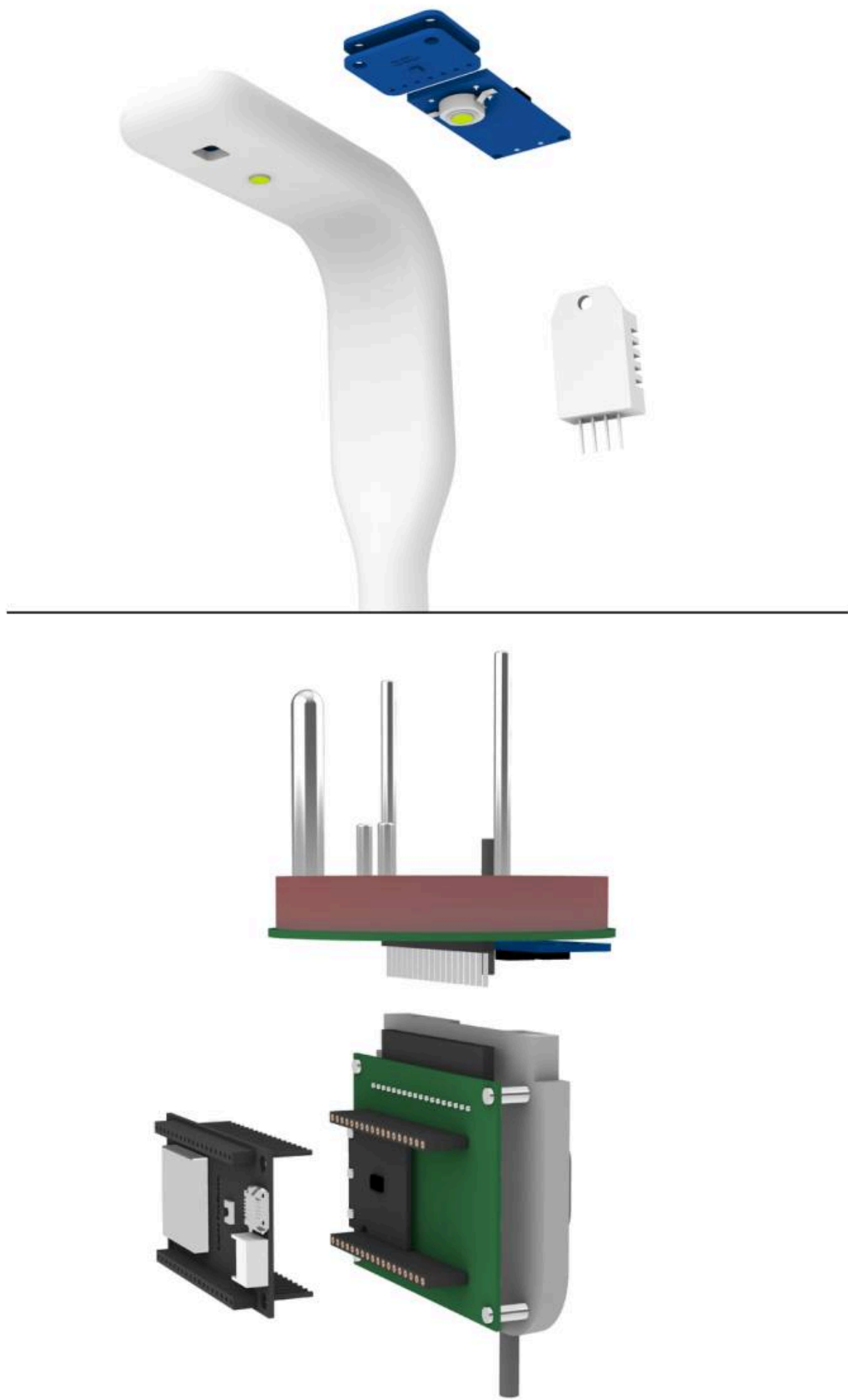
  /* Display the result on the serial port */
  if (event2.light)
  {
    Serial.print("Plant Light : ");
    Serial.println(event2.light);
  }
  else
  {
    /* If event.light is zero then the sensor is not receiving any light
    and no reliable data is returned. An exception is under direct light
    from the Sun where the value may return 0 for a short time. */
    Serial.println("No light detected...");
    delay(2500);
  }
}
```

```
21:38:21.020 -> Light Sensor Test
21:38:21.020 -> -----
21:38:21.020 -> Sensor1:    TSL2561
21:38:21.020 -> Driver Ver: 1
21:38:21.020 -> Unique ID:  12345
21:38:21.020 -> Max Value:  17000.00 lux
21:38:21.020 -> Min Value:   1.00 lux
21:38:21.020 -> Resolution:  1.00 lux
21:38:21.020 -> -----
21:38:21.533 -> Sensor2:    TSL2561
21:38:21.533 -> Driver Ver: 1
21:38:21.533 -> Unique ID:  67890
21:38:21.533 -> Max Value:  17000.00 lux
21:38:21.533 -> Min Value:   1.00 lux
21:38:21.533 -> Resolution:  1.00 lux
21:38:21.533 -> -----
21:38:22.015 -> Gain:       Auto
21:38:22.015 -> Timing:     13 ms
21:38:22.015 -> -----
21:38:22.049 ->
21:38:22.083 -> Room Ambient : 27.00 lux
21:38:24.614 -> Plant Light : 18.00 lux
21:38:27.139 -> Room Ambient : 24.00 lux
21:38:29.676 -> Plant Light : 18.00 lux
21:38:32.171 -> Room Ambient : 31.00 lux
21:38:34.681 -> Plant Light : 18.00 lux
21:38:37.225 -> Room Ambient : 928.00 lux
21:38:39.732 -> Plant Light : 18.00 lux
21:38:42.255 -> Room Ambient : 40.00 lux

Done uploading.
Leaving...
Hard resetting via RTS pin...

178 FireBeetle-ESP32 on COM3
```


Sensor Readings - All



creo_main_01 - send_html.ino | Arduino 1.8.10
File Edit Sketch Tools Help

creo_main_01 | **ambiance** | dht_sensor | ec_calibration | ec_print | ec_read | handleonconnect

```
ptr += "<h1>BioBulb 1.0 Report</h1>\n";

ptr += "<p>Room Temp: ";
ptr += Temperaturestat;
ptr += "°C</p>";

ptr += "<p>Room Humidity: ";
ptr += (int)Humiditystat;
ptr += "%</p>";

ptr += "<p>Room Ambient: ";
ptr += (int)RoomLight;
ptr += " Lux</p>";

ptr += "<p>Plant Ambient: ";
ptr += (int)PlantLight;
ptr += " Lux</p>";

ptr += "<p>Soil Ec: ";
ptr += (int)raw;
ptr += " EC Serial</p>";

ptr += "<p>Soil Temp: ";
ptr += (int)TemperatureFinish;
ptr += "°C</p>";

ptr += "<p>Soil Humidity: ";
ptr += (int)soilMoistureValue;
ptr += " Hum Serial</p>";

ptr += "</div>\n";
ptr += "</body>\n";

Hash of data verified.

Leaving...
Hard resetting via RTS pin...
```

39

COM3

Min Value: 0.00%
Resolution: 0.10%

Light Sensor Test

Sensor1: TSL2561
Driver Ver: 1
Unique ID: 12345
Max Value: 17000.00 lux
Min Value: 1.00 lux
Resolution: 1.00 lux

Sensor2: TSL2561
Driver Ver: 1
Unique ID: 67890
Max Value: 17000.00 lux
Min Value: 1.00 lux
Resolution: 1.00 lux

Gain: Auto
Timing: 13 ms

Make sure Probe and Temp Sensor are in Solution and solution is well mixed

Room Temperature: 24.80°C
Room Humidity: 29.50%
Room Ambient : 43.00 lux
Plant Light : 5.00 lux
A0 EC Value:4095.00
Rc: inf EC: 0.00 Simens 0 ppm 0.00 °C
Moister : 4095.00
Percentage: 0.00

Room Temperature: 24.80°C

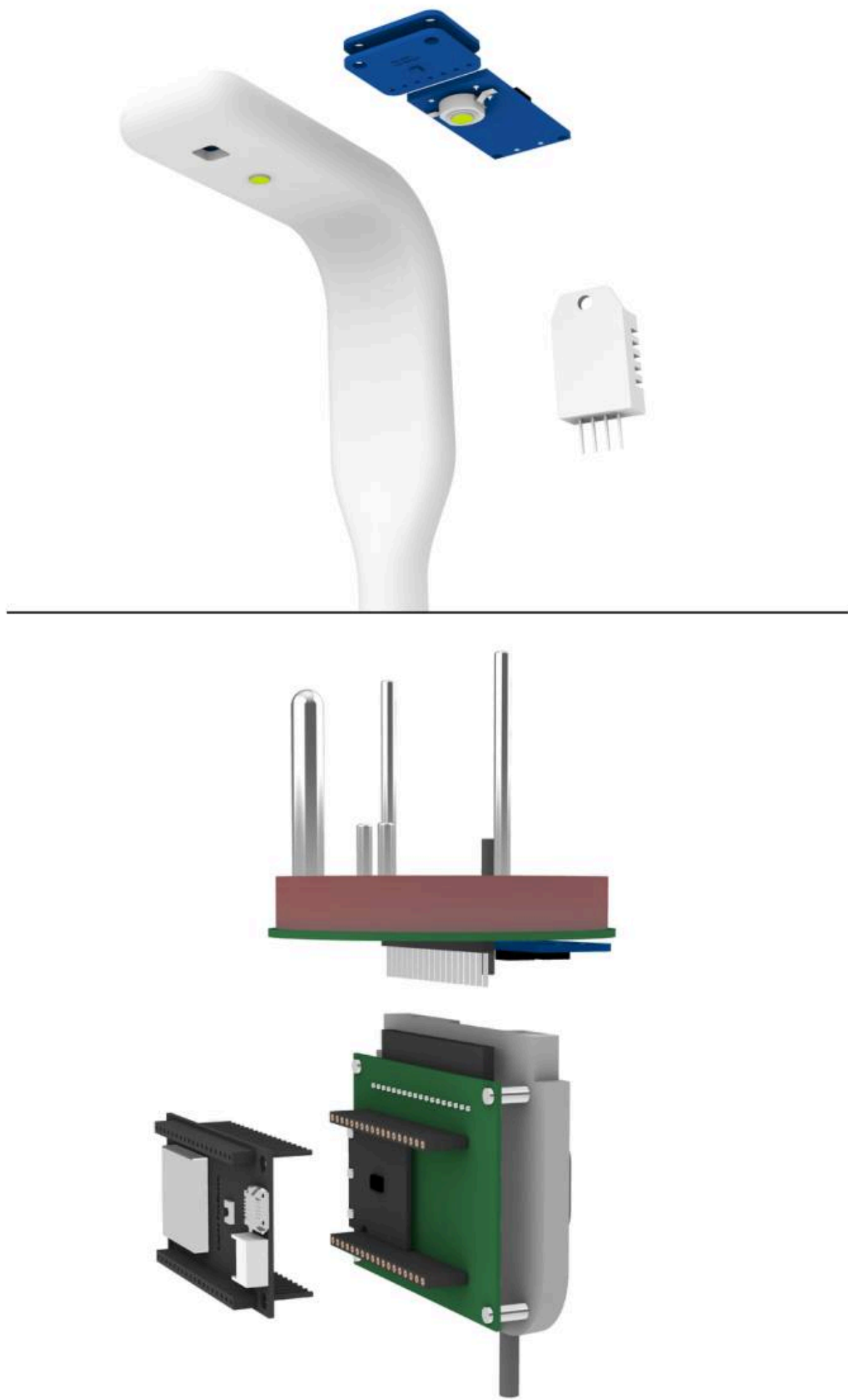
☐ Autoscroll ☐ Show timestamp

Newline 115200 baud Clear output

FireBeetle-ESP32 on COM3

Sensor Readings - All

Web Access



CREO BioBulb 1.0 Micro Control | x +

← → ↻ Güvenli değil | 192.168.1.4 ☆ ⓘ ⋮

Uygulamalar TBM Portal Ana S... M MYS Cutting Thin Strips... How to Make a Thi... Nextion Tutorial-Ba... Nextion Display wit... DHT22 with LCD 12... Wiring The HMI NE... Writing From Ardui...

BioBulb 1.0 Report

Room Temp: 24.80°C

Room Humidity: 29 %

Room Ambient: 44 Lux

Plant Ambient: 5 Lux

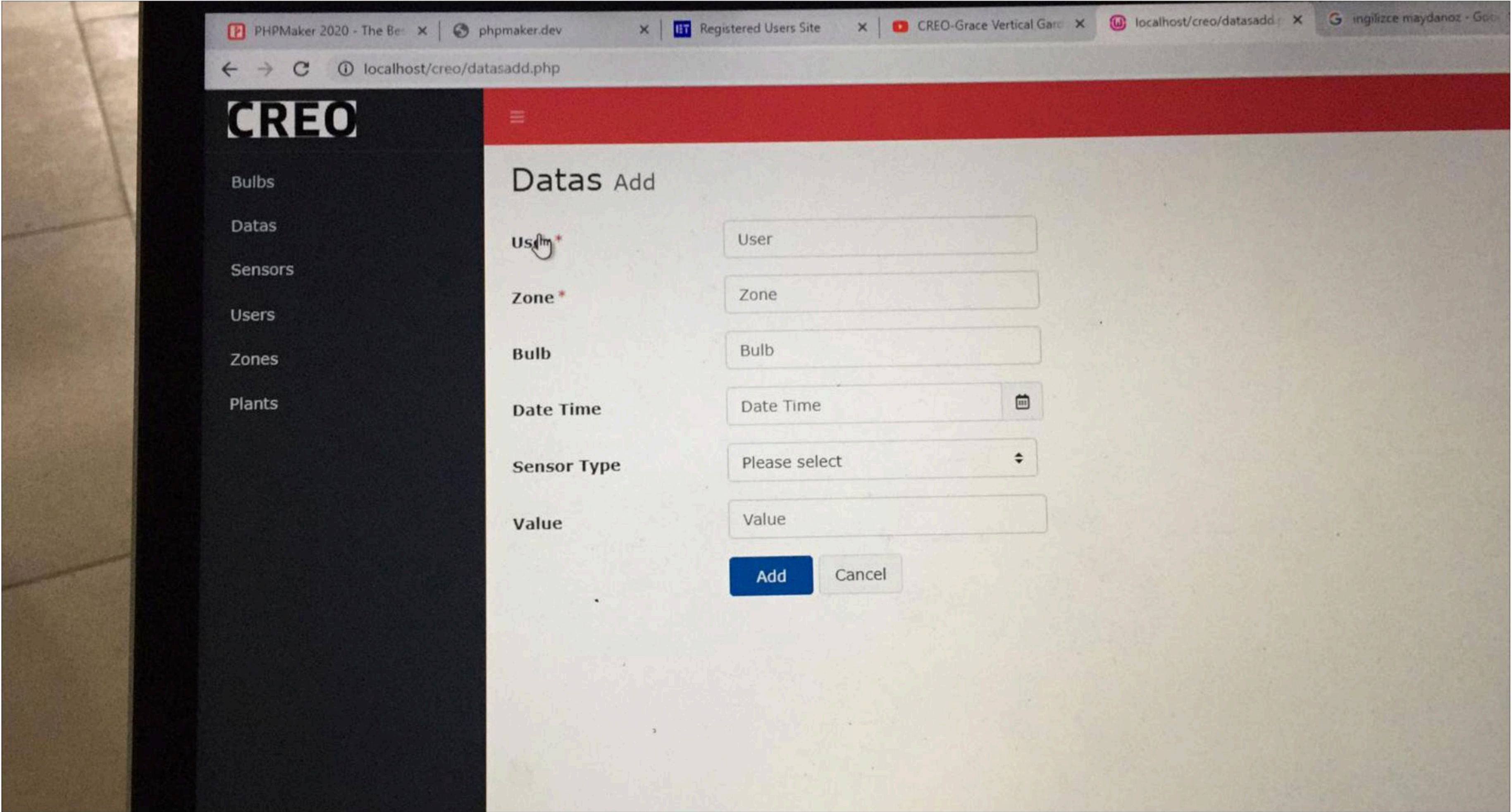
Soil Ec: 4095 EC Serial

Soil Temp: 23°C

Soil Humidity: 4095 Hum Serial

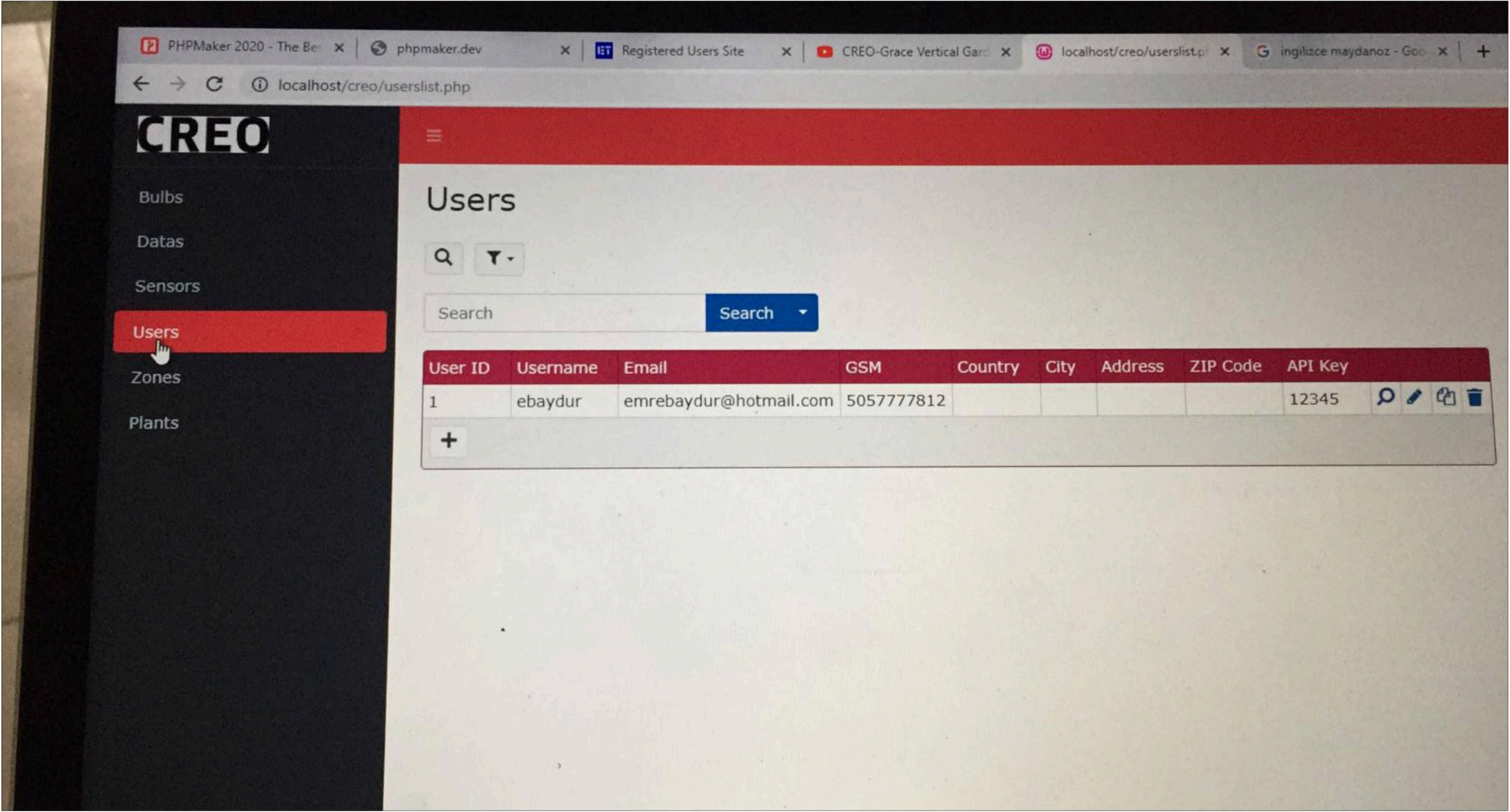
Server

User Registration



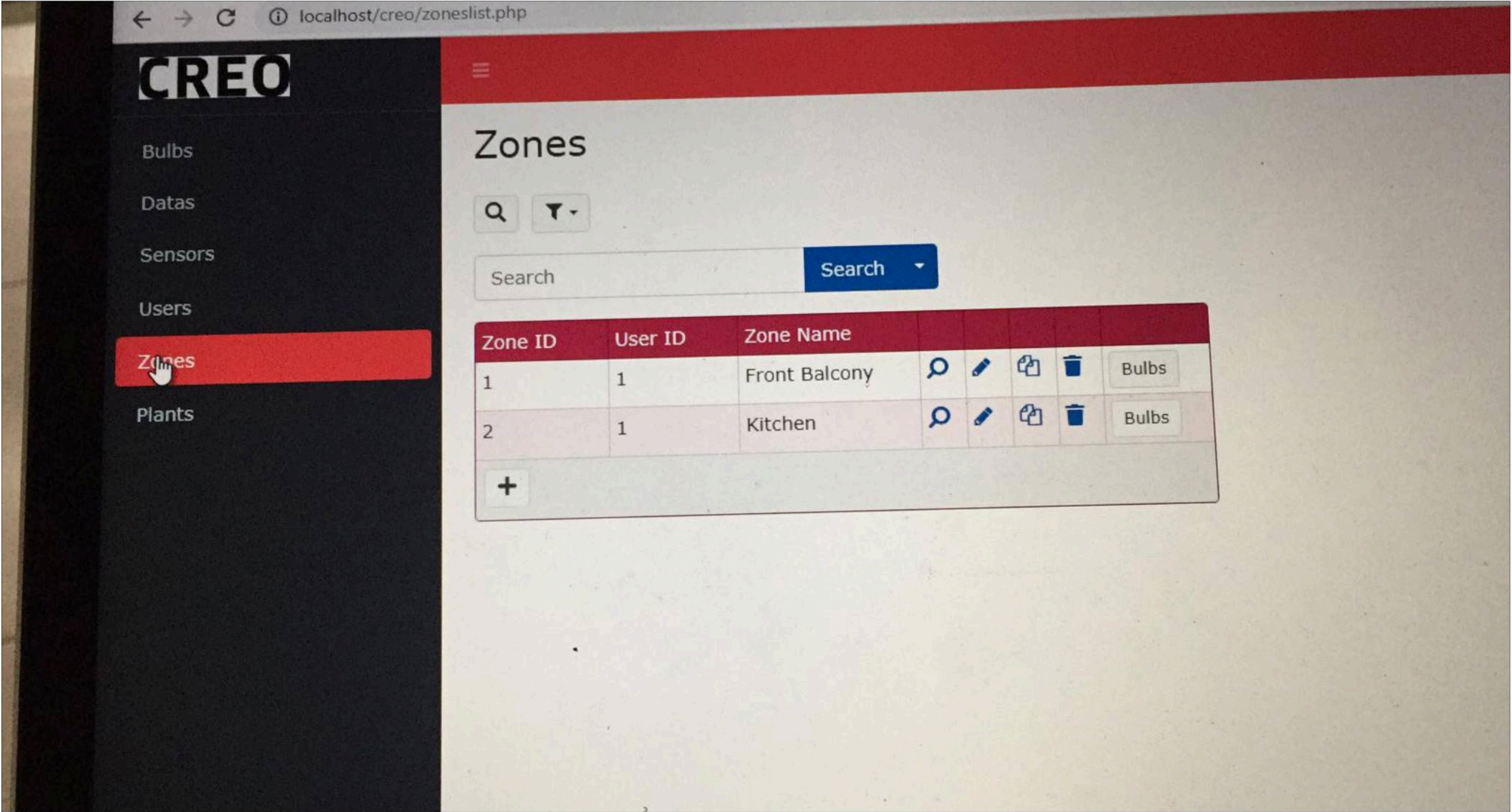
Server

User ID



Server

Zones



Server

Bulbs

CREO

Bulbs

Datas

Sensors

Users

Zones

Plants

Bulbs

Q

T

Search

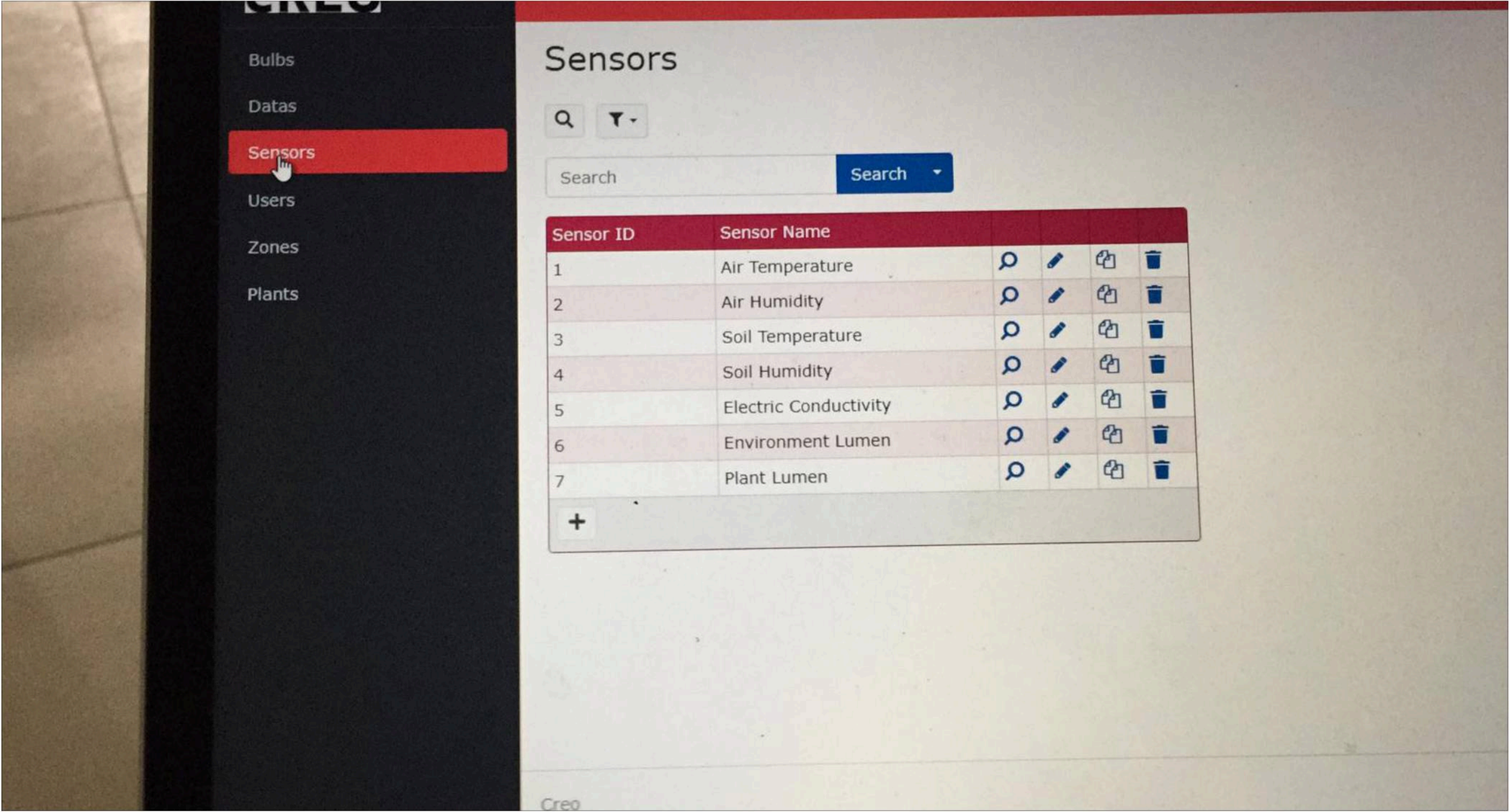
Search

Bulb ID	Zone	Bulb Name	Bulb IP	Bulb Mac Address	Plant Type					
1	Front Balcony	FB_1	111.111.11.11	12:12:12:12	Parsley					Datas
2	Kitchen	K_1	111.111.11.11	12:12:12:12	Lily					Datas

+

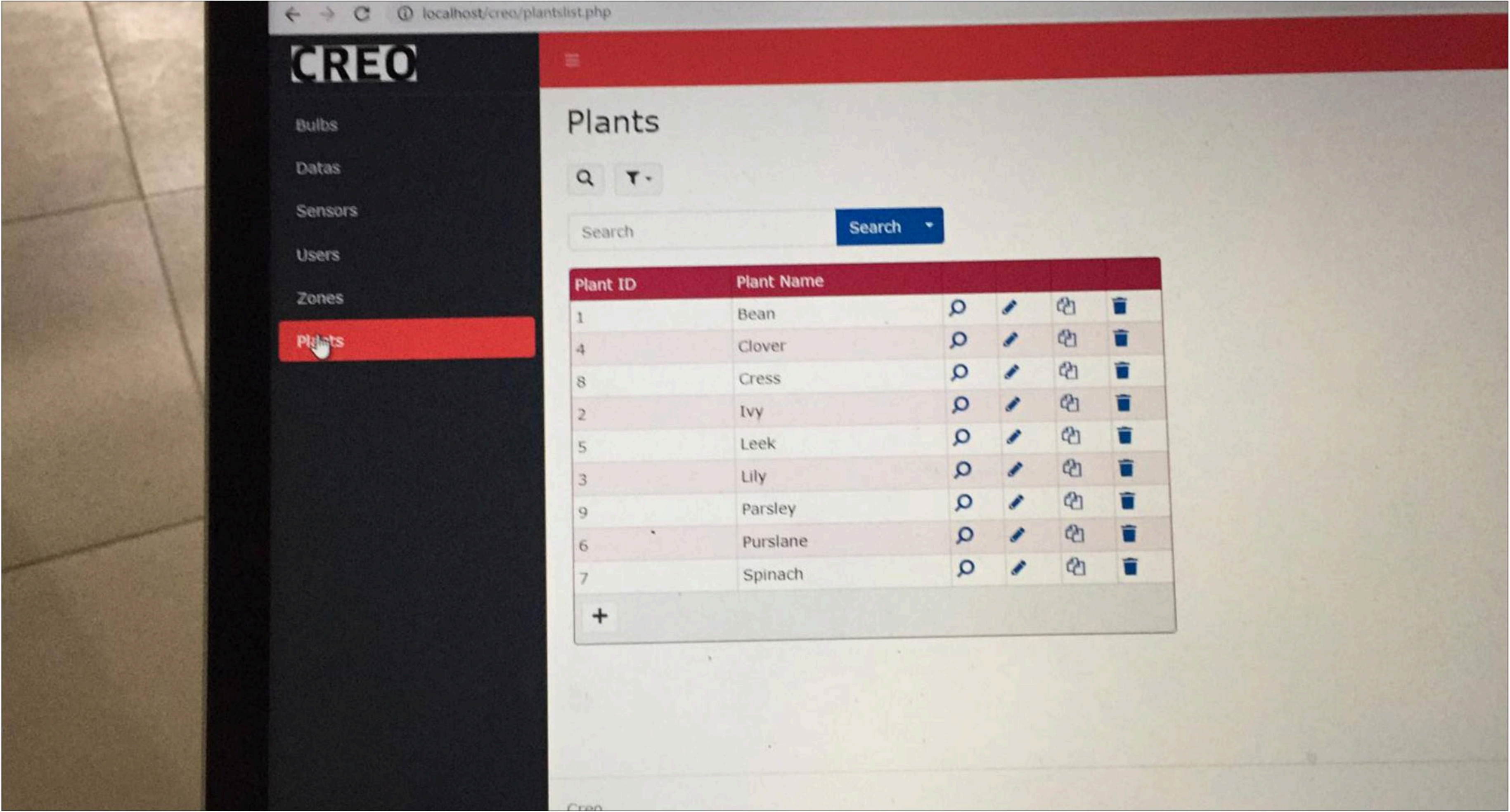
Server

Sensors



Server

Plant Types





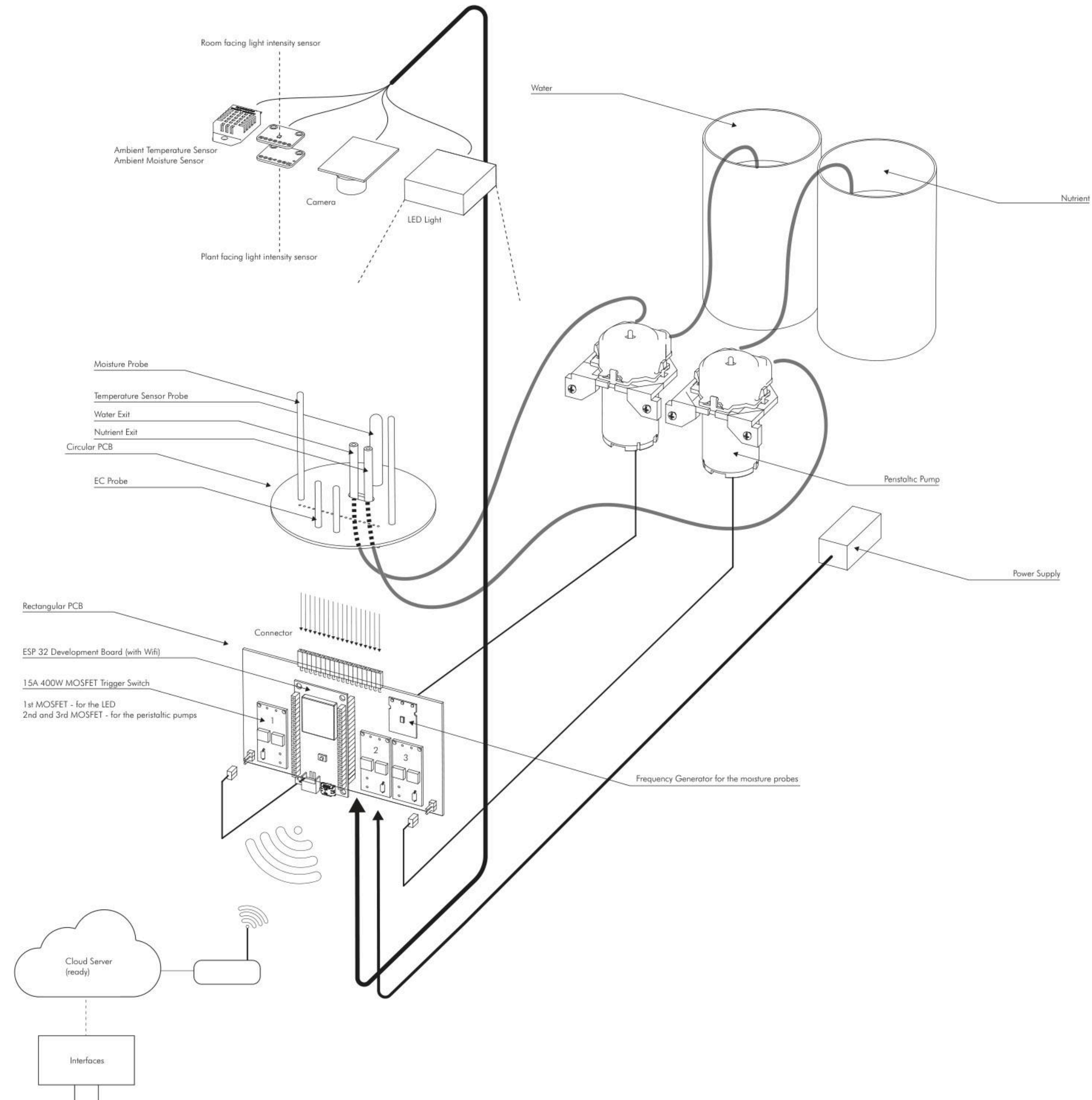
Design Research

02

BioBulb Update

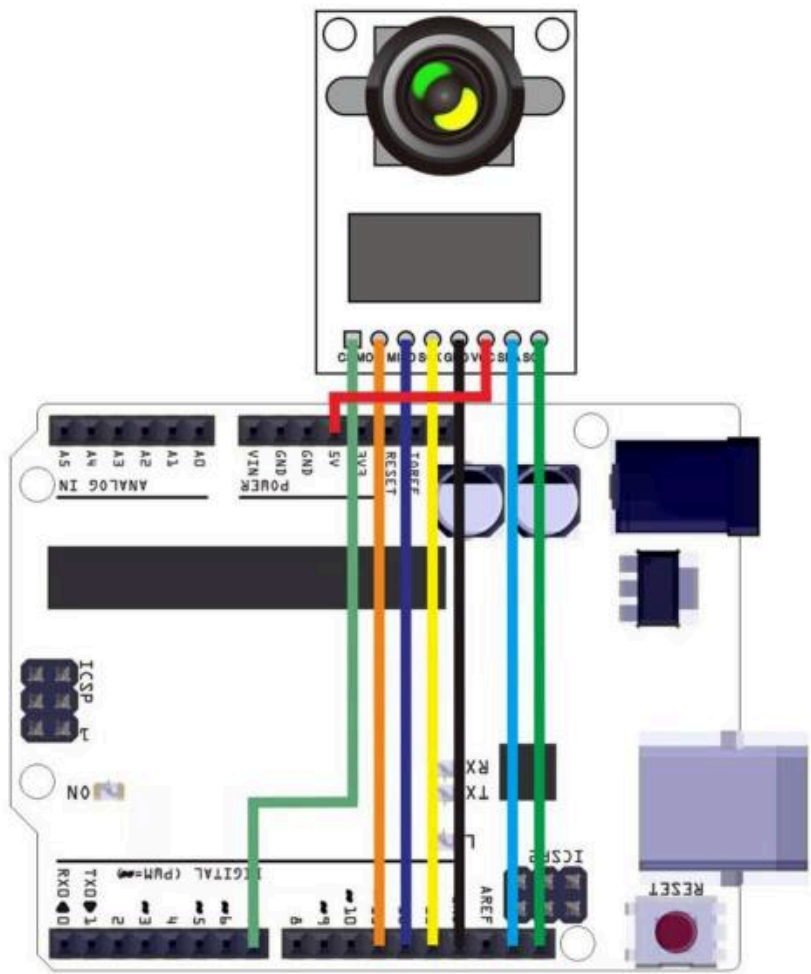
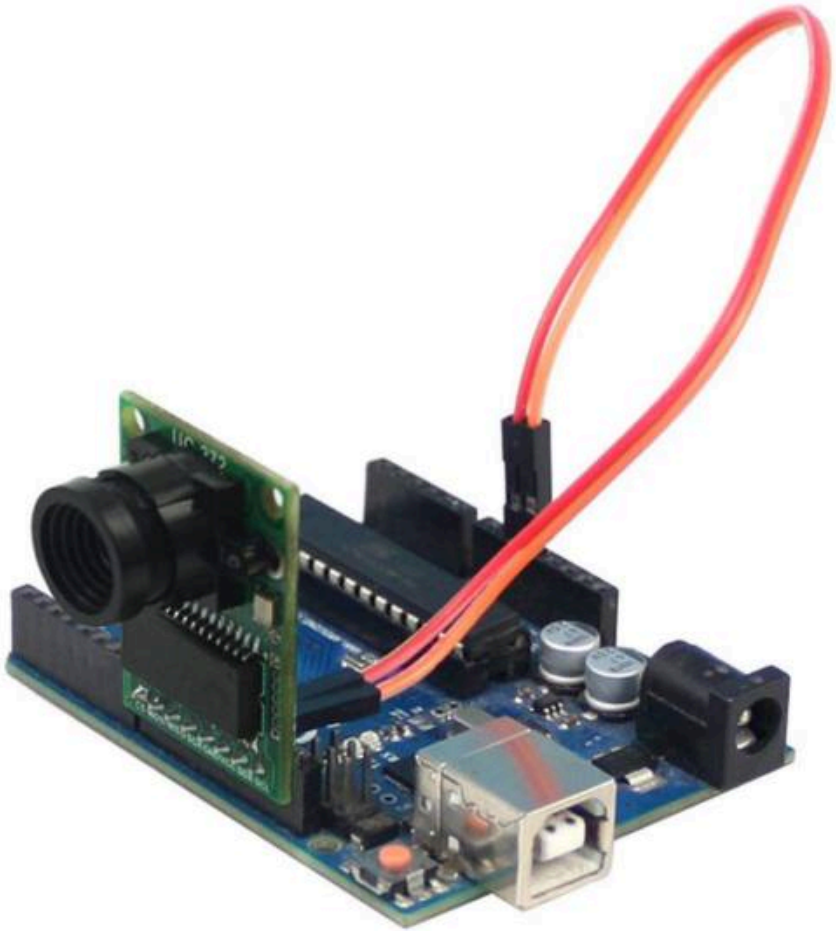
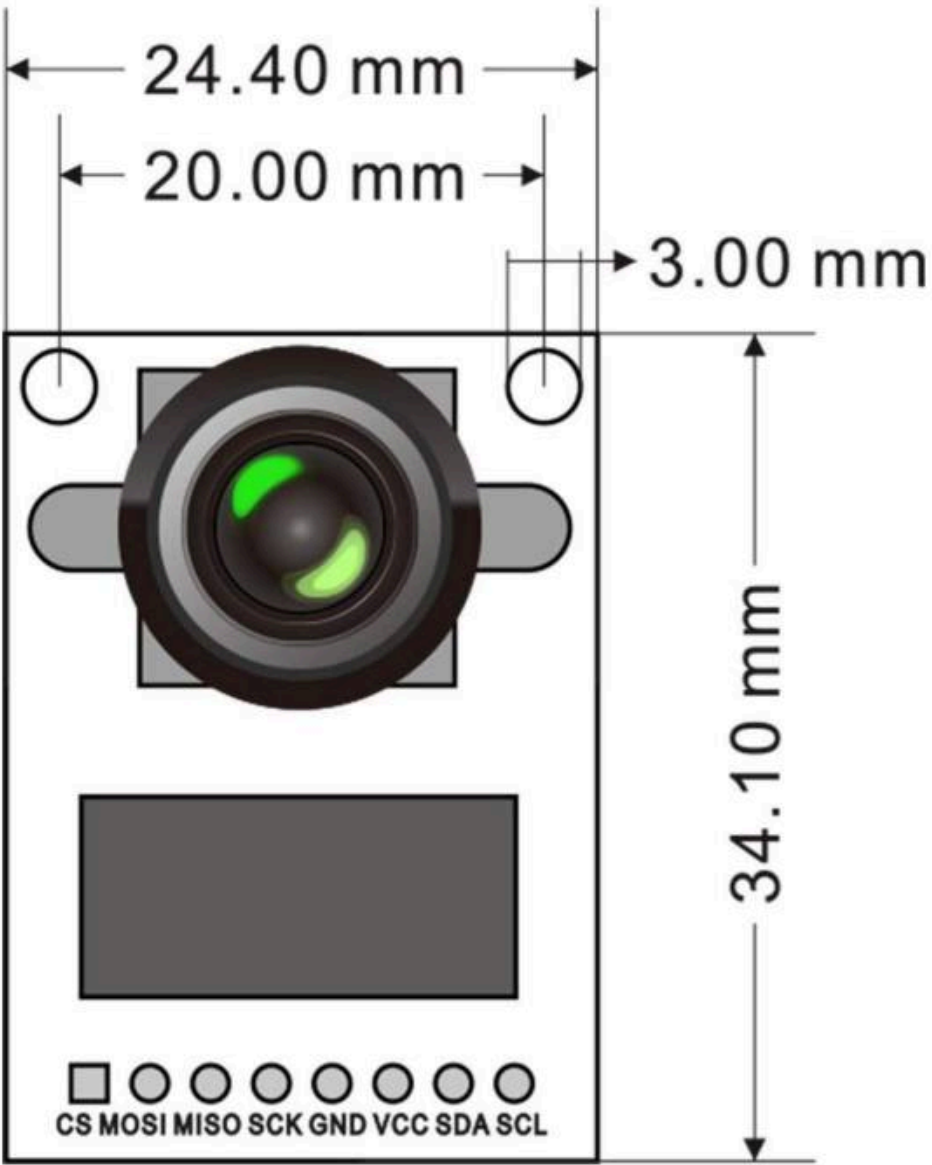
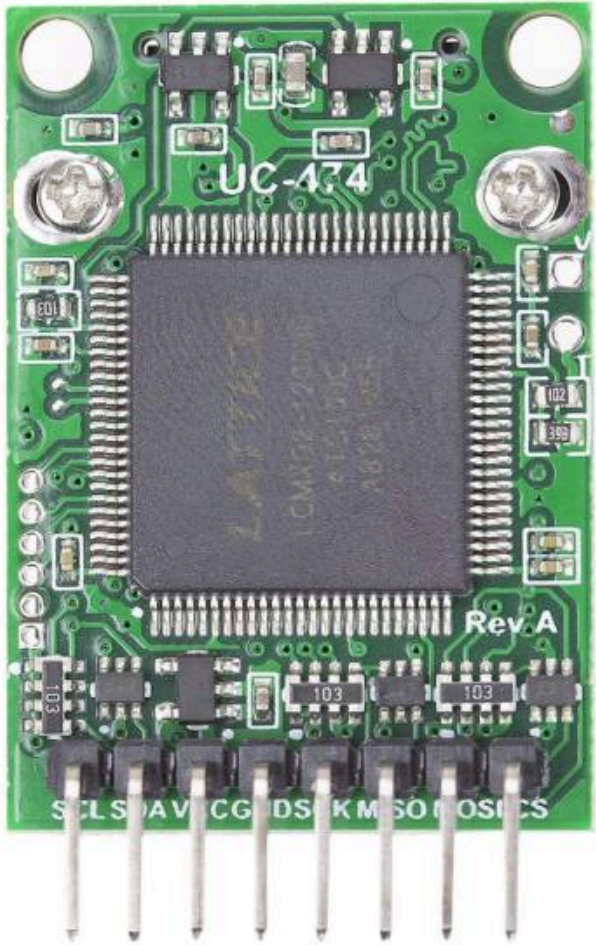
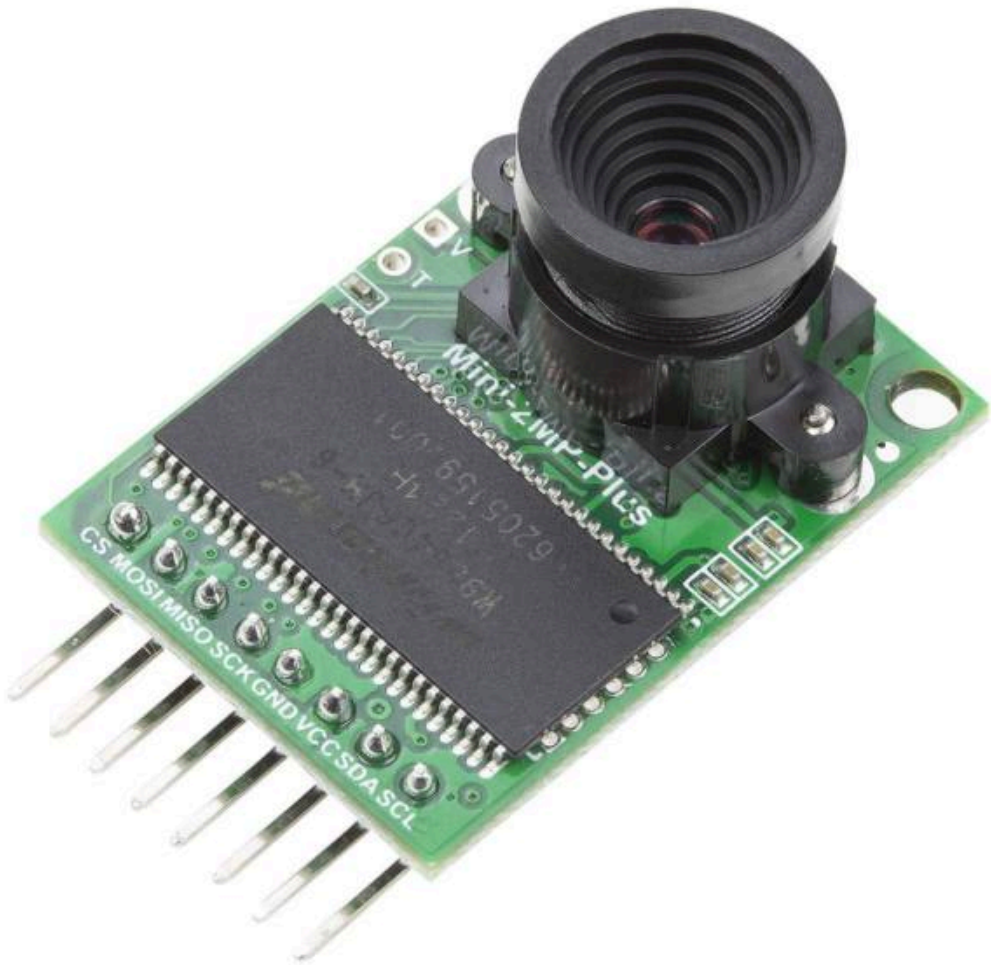
BioBulb Prototype 2

- Technical Drawings
- 3D CAD Screenshots
- Prototype
- System Components
- Assembly Sequences



Camera Option

Arducam Mini Module Camera Shield with OV2640 2 Megapixels Lens for Arduino UNO Mega2560 Board



Camera and Other Sensors

Arm

Cylindrical Cup

Water

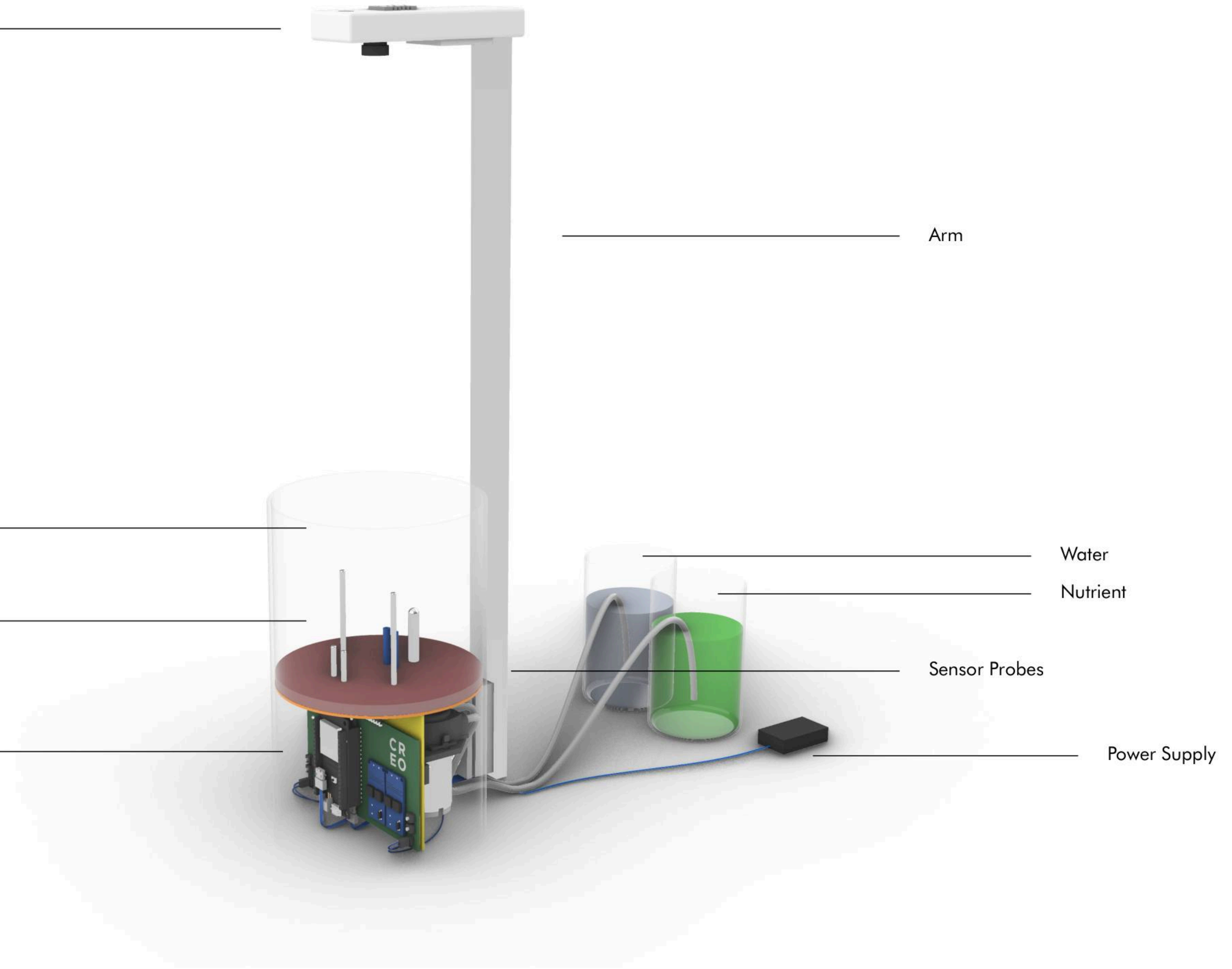
Nutrient

Sensor Probes

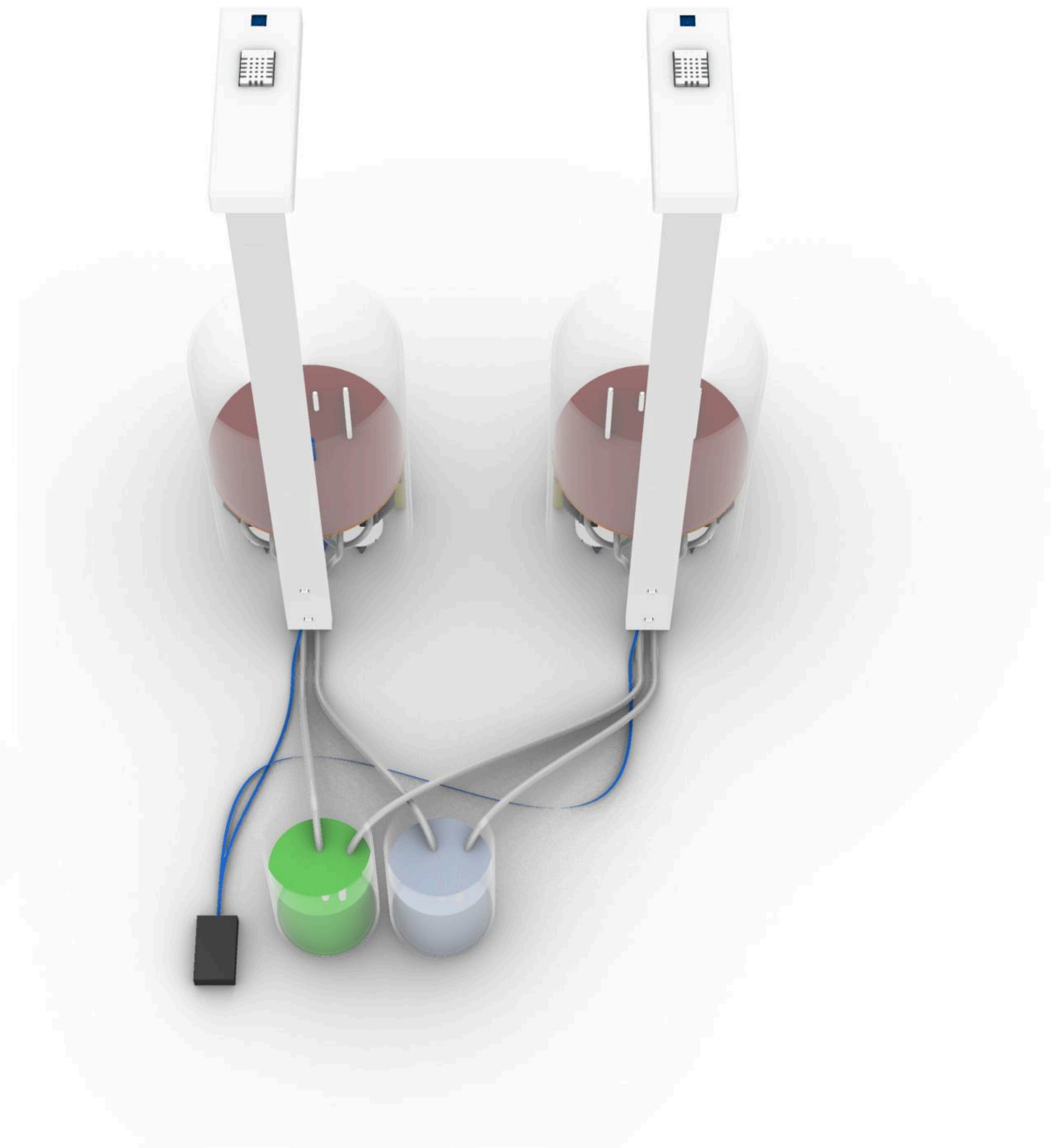
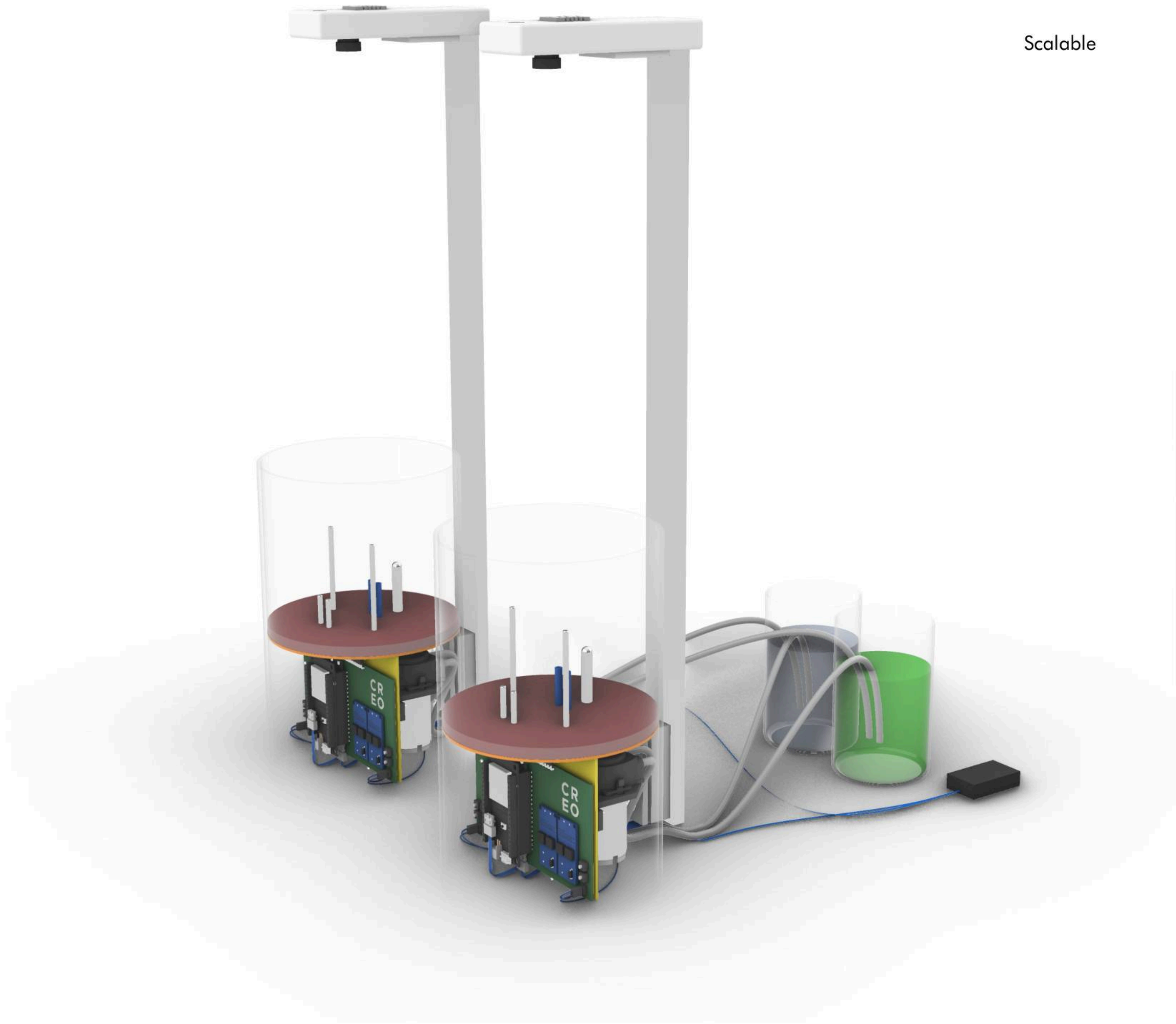
Sensor Probes

Control

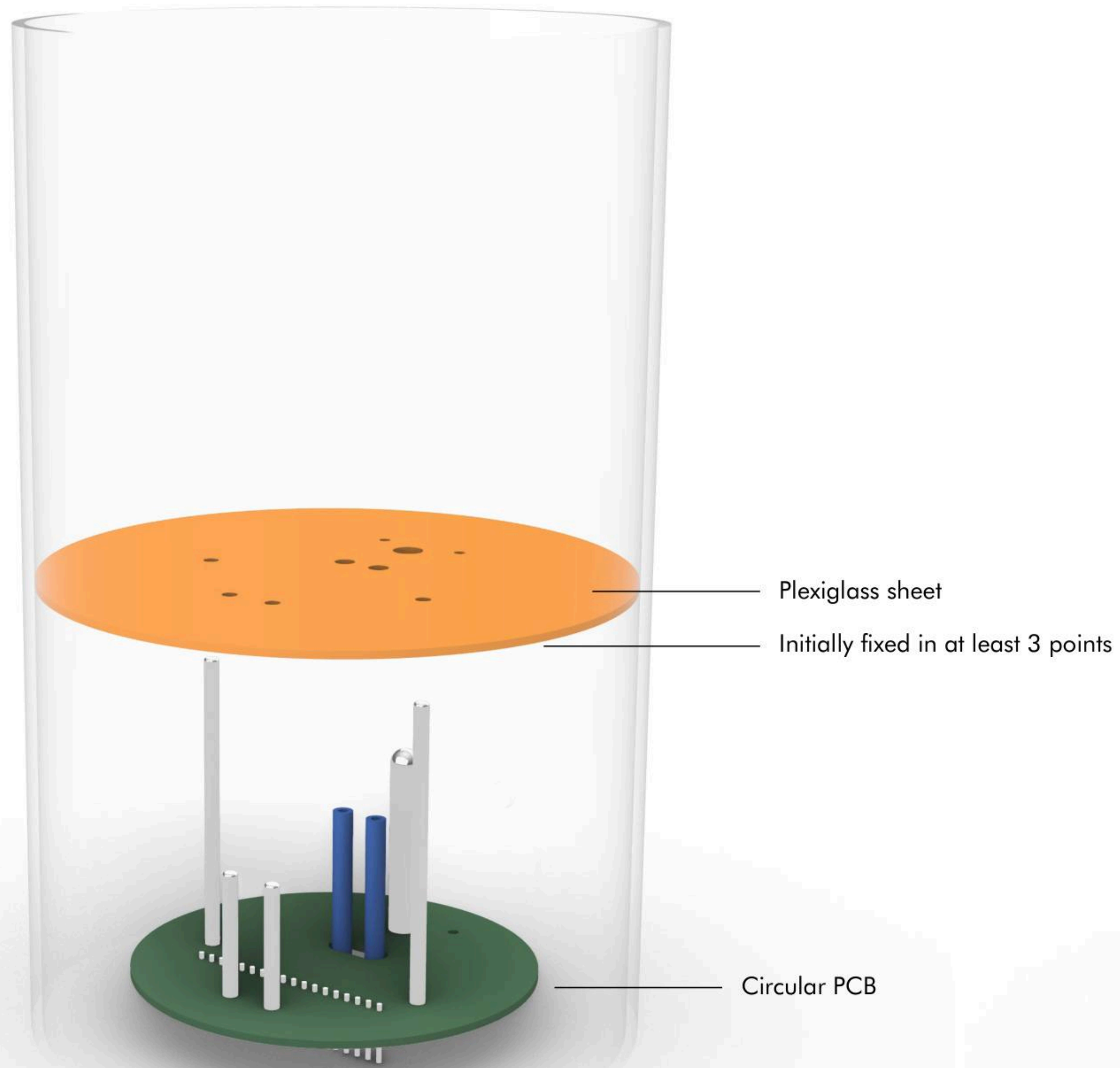
Power Supply



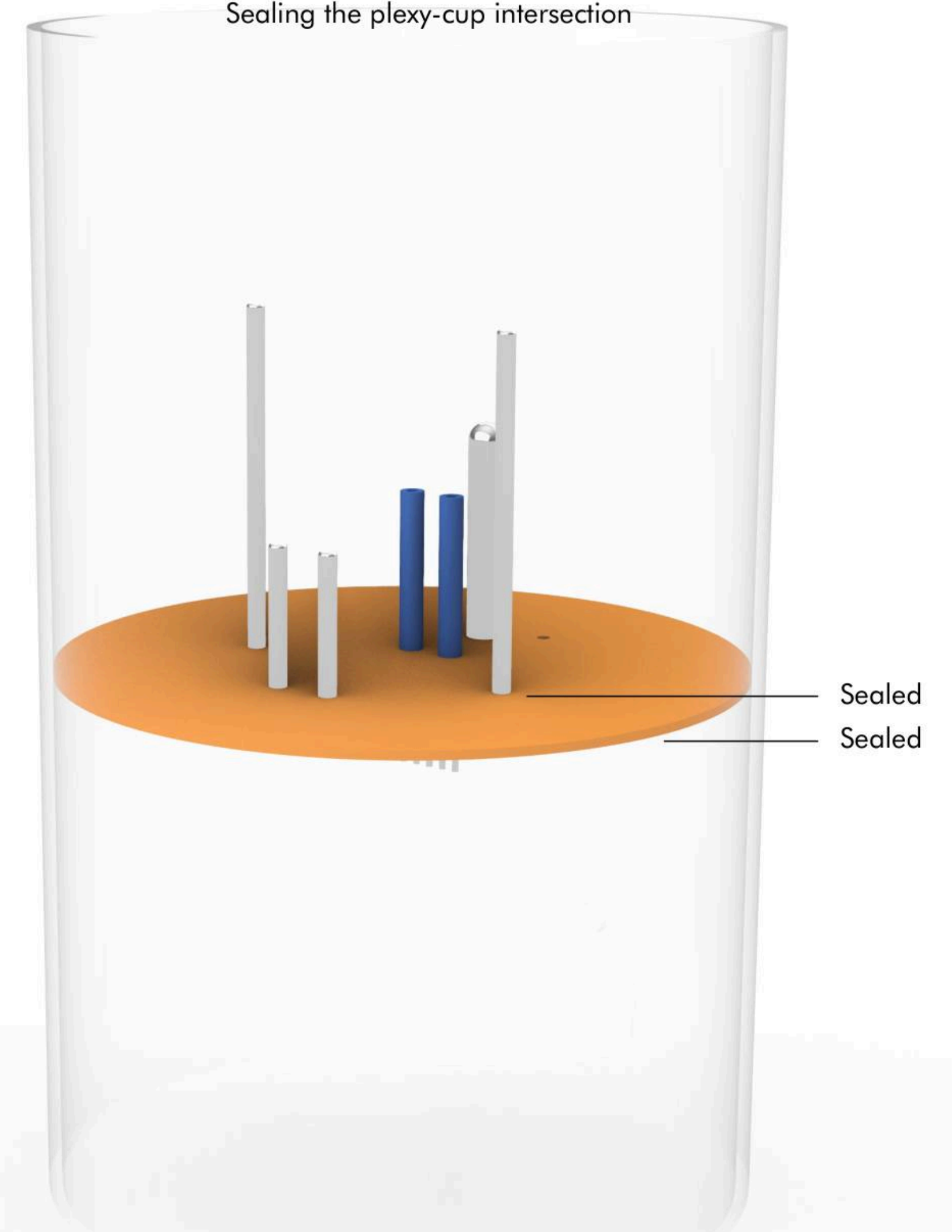
Scalable



Fixing the plexiglass sheet



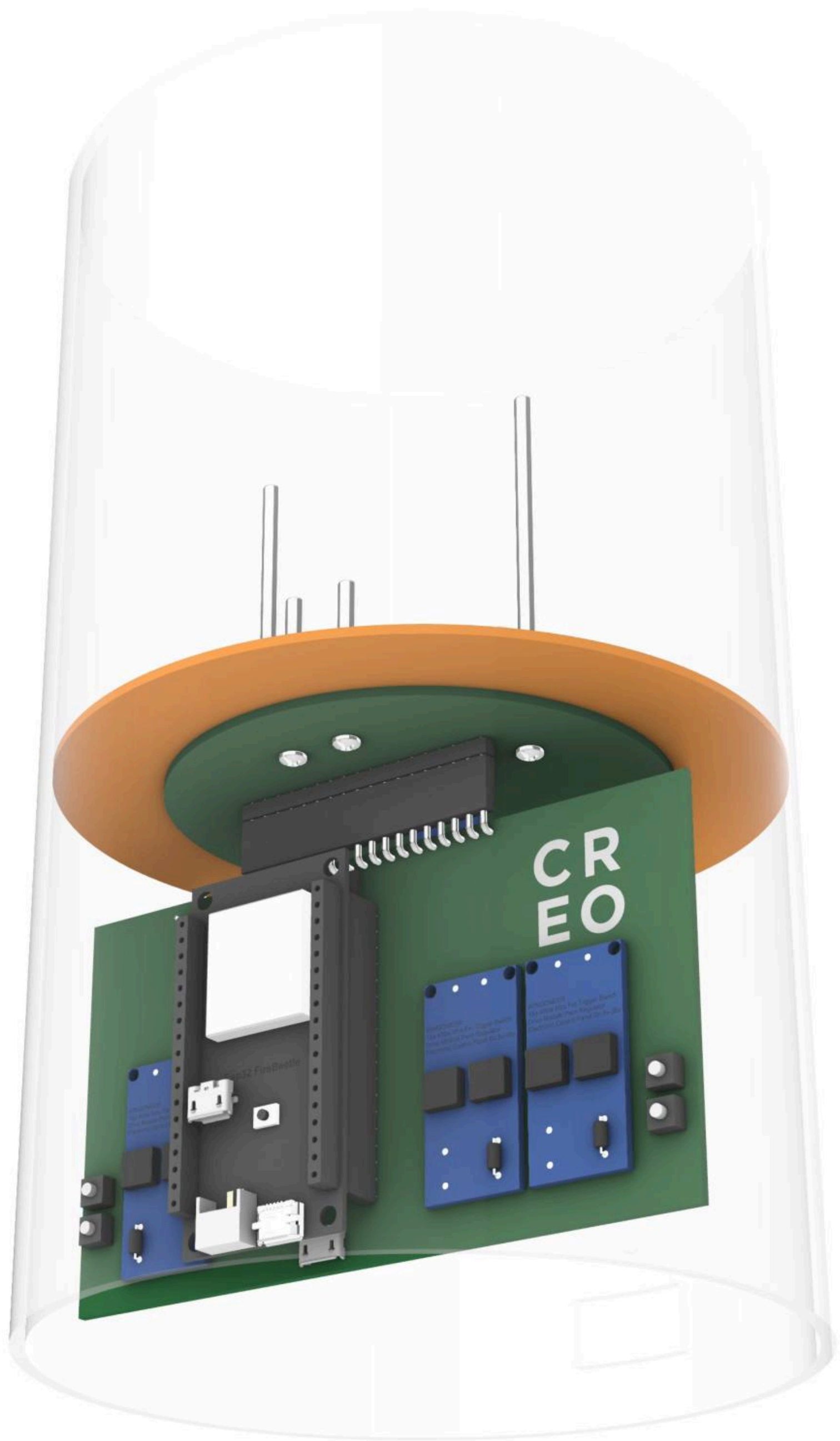
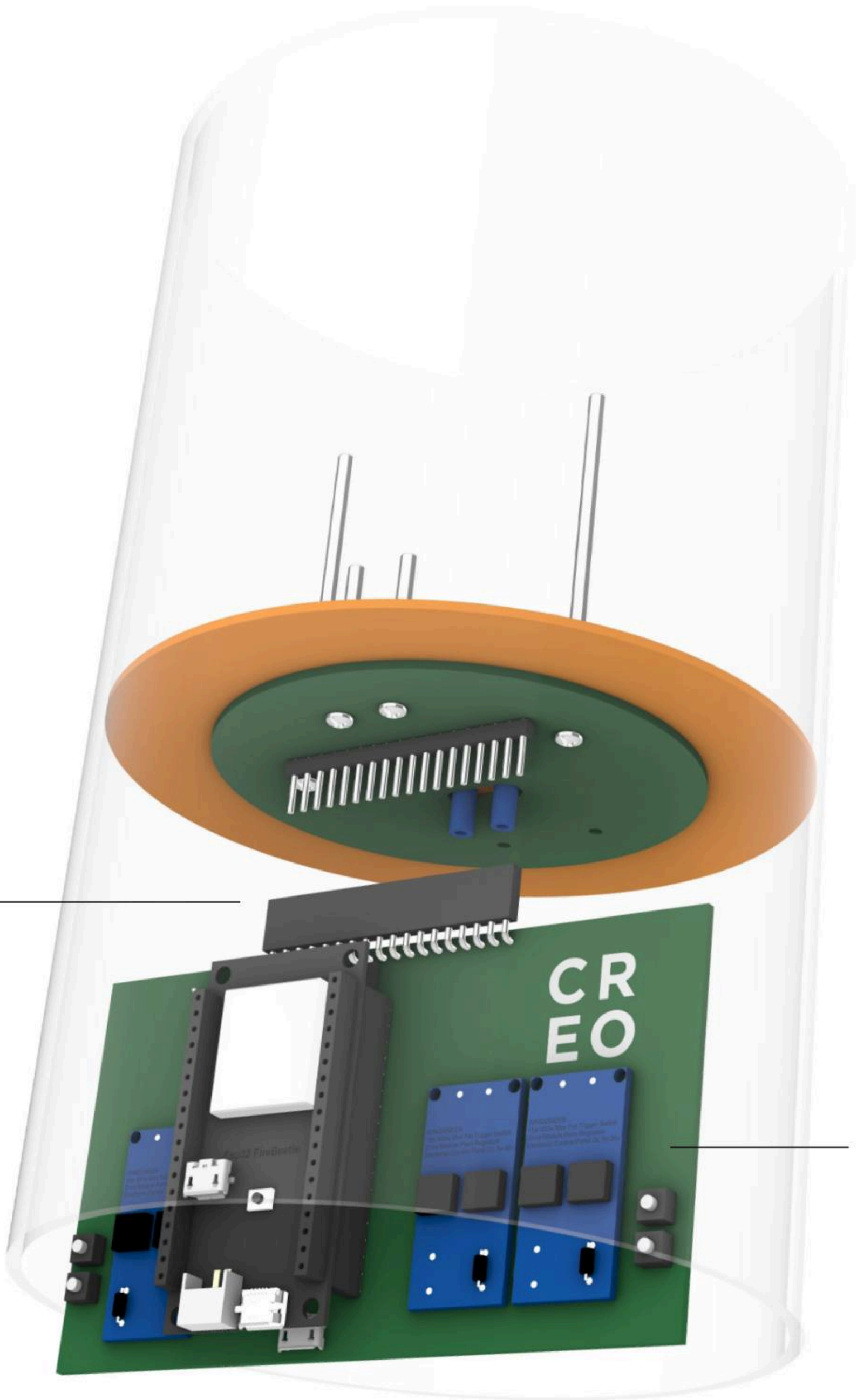
Adding the Circular PCB
Sealing the probe gaps
Sealing the plexy-cup intersection



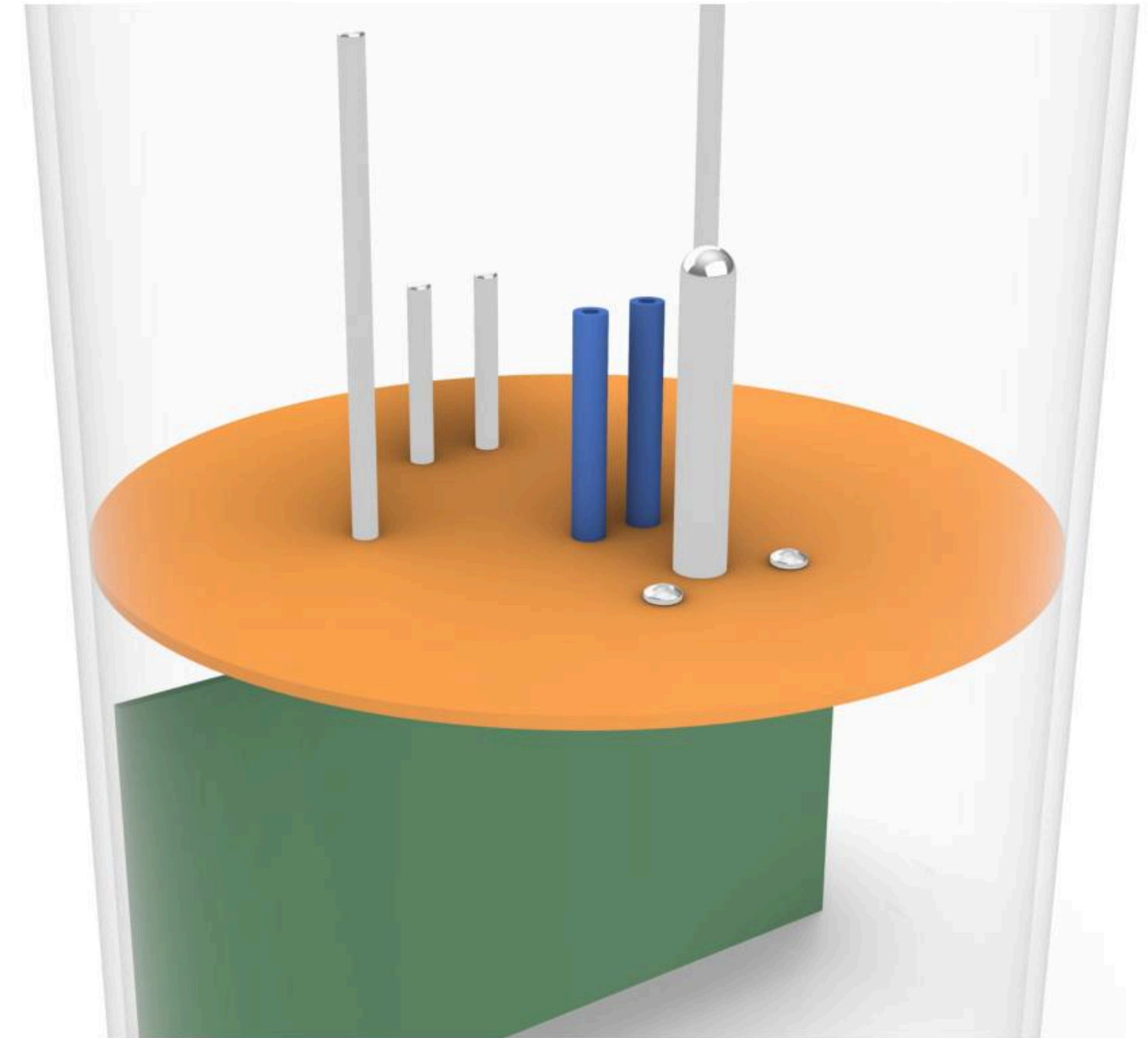
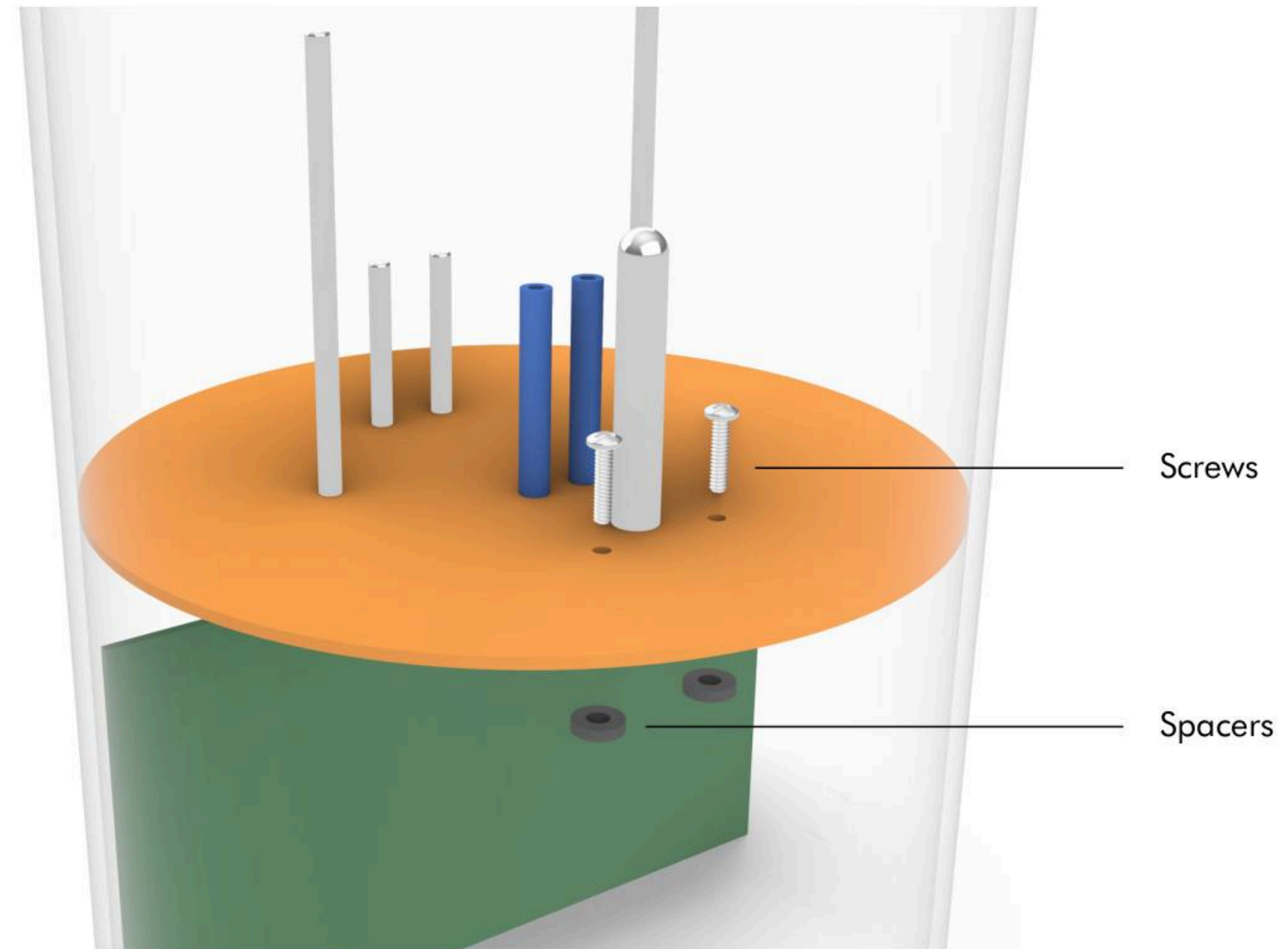
Connecting the Rectangular PCB

Connector

Rectangular PCB



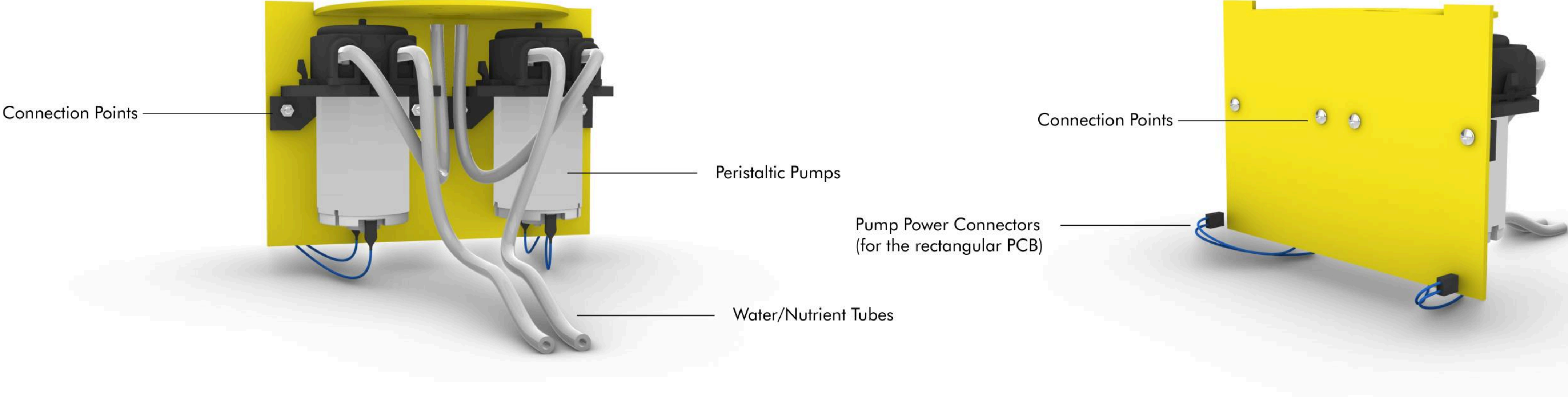
Adding the Screws for the Mid-Section



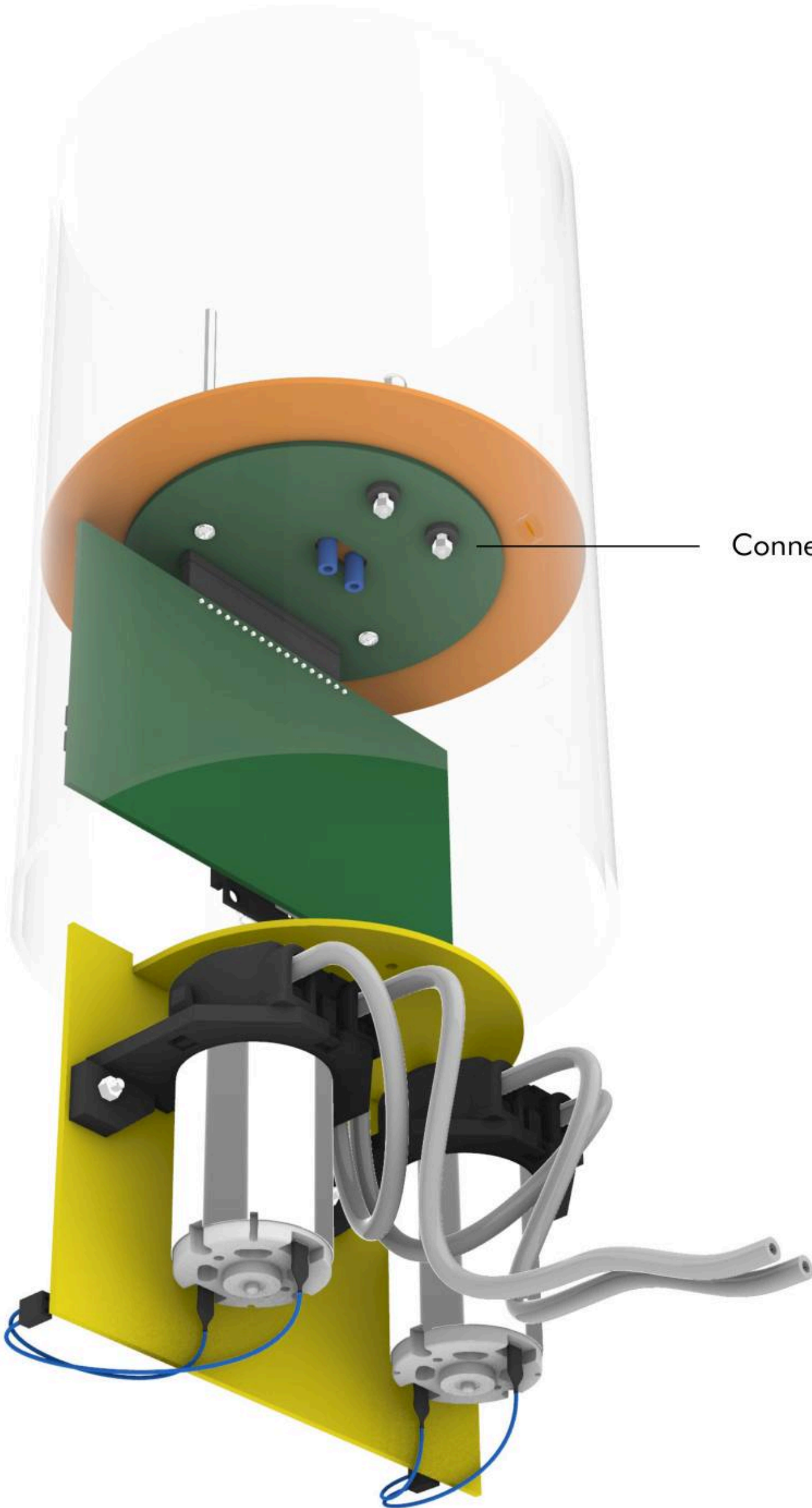
Assembling the Mid-Section



Attaching the peristaltic pumps to the Mid-Section

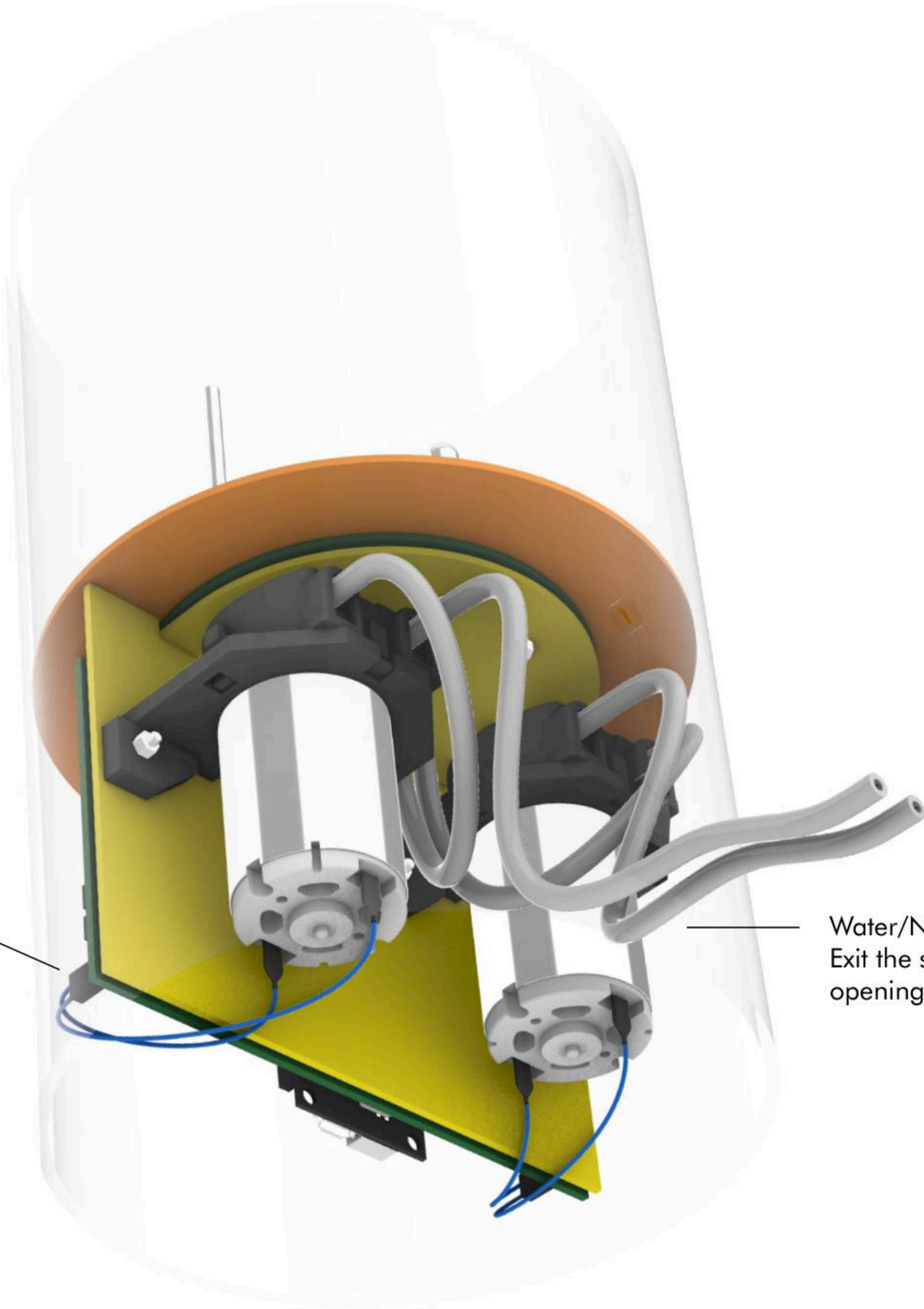


Connecting the Mid-Section to the system



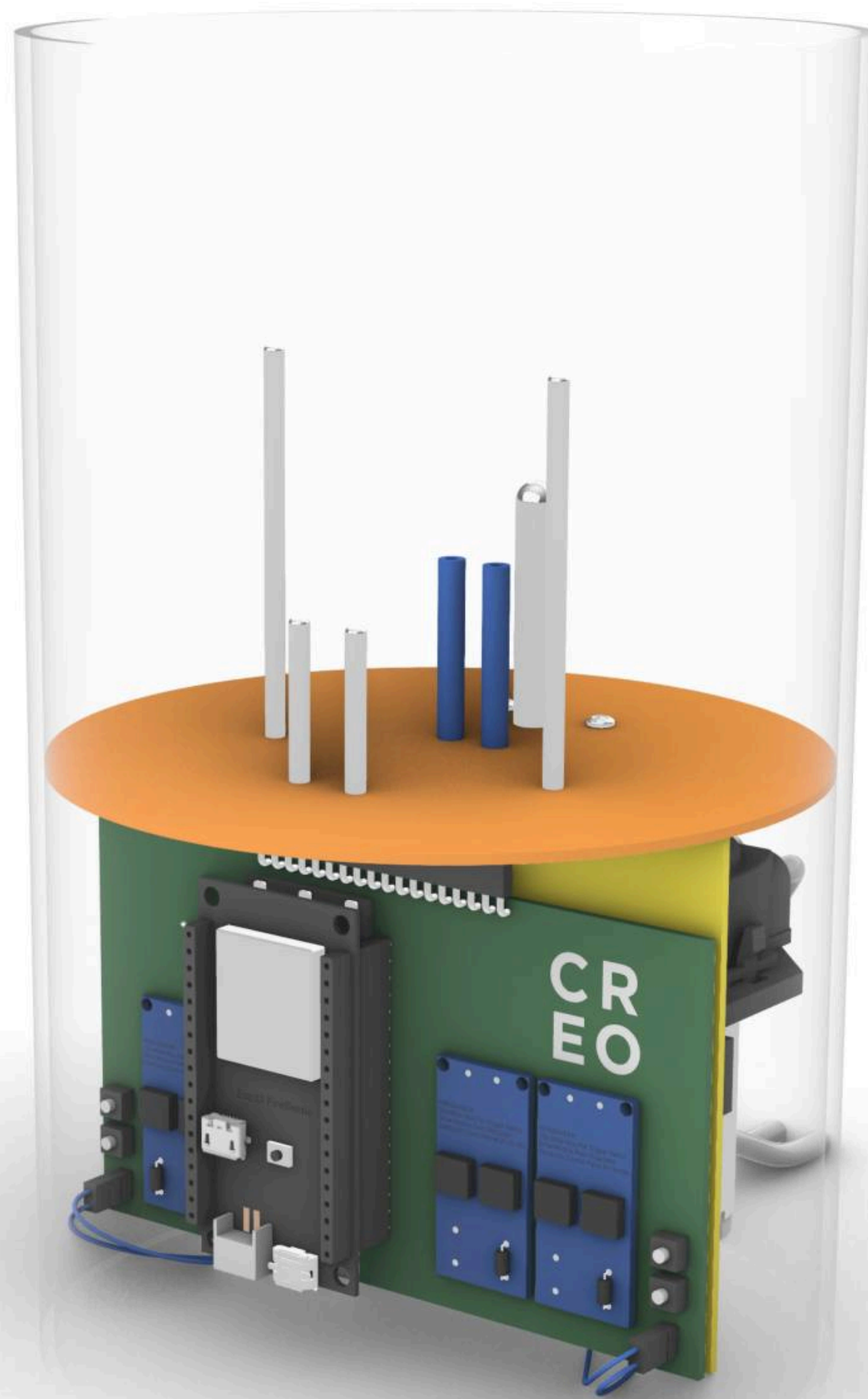
Connection Points

Pump Power Connectors
(for the rectangular PCB)



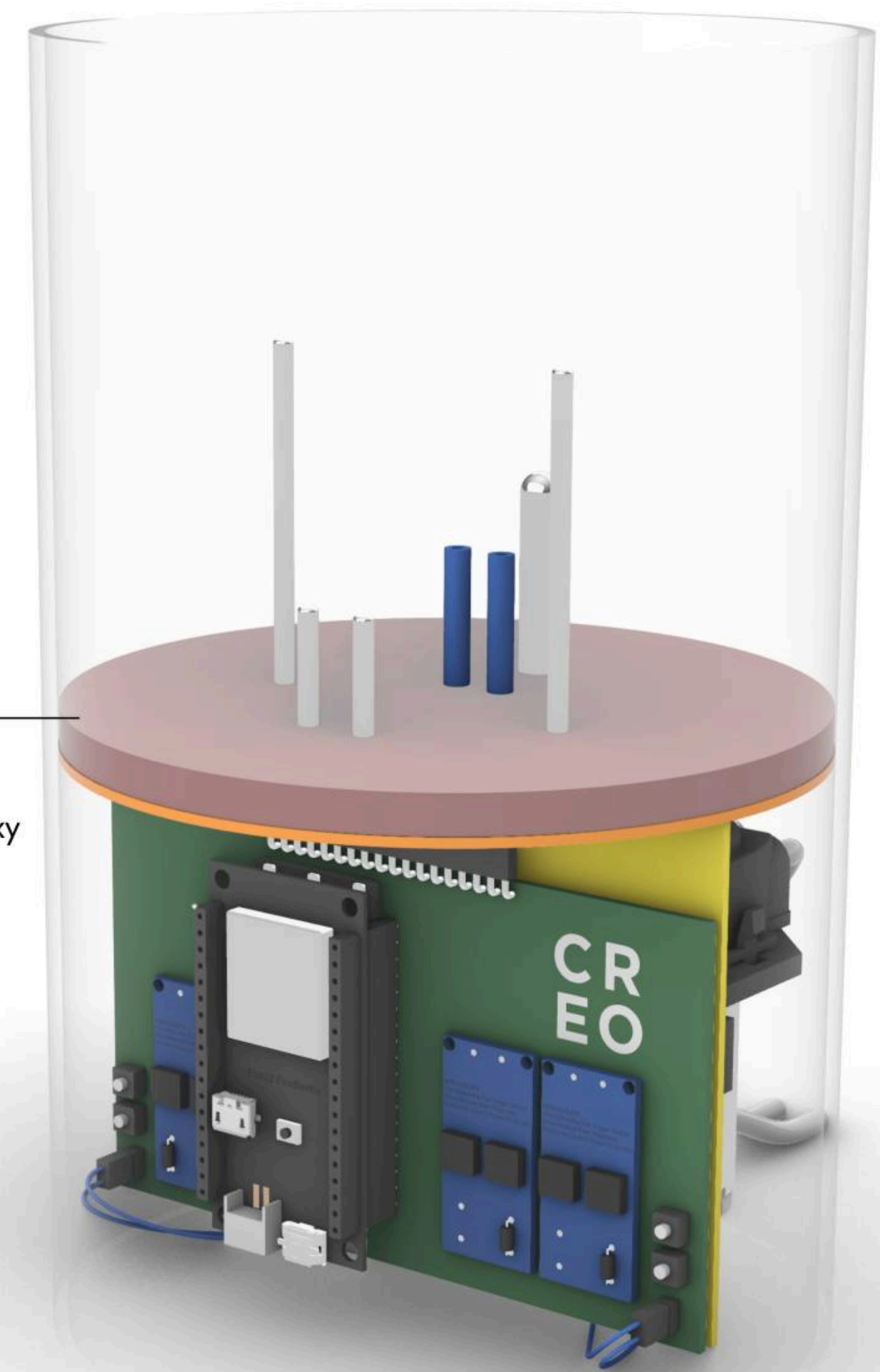
Water/Nutrient Tubes
Exit the system rectangular
opening

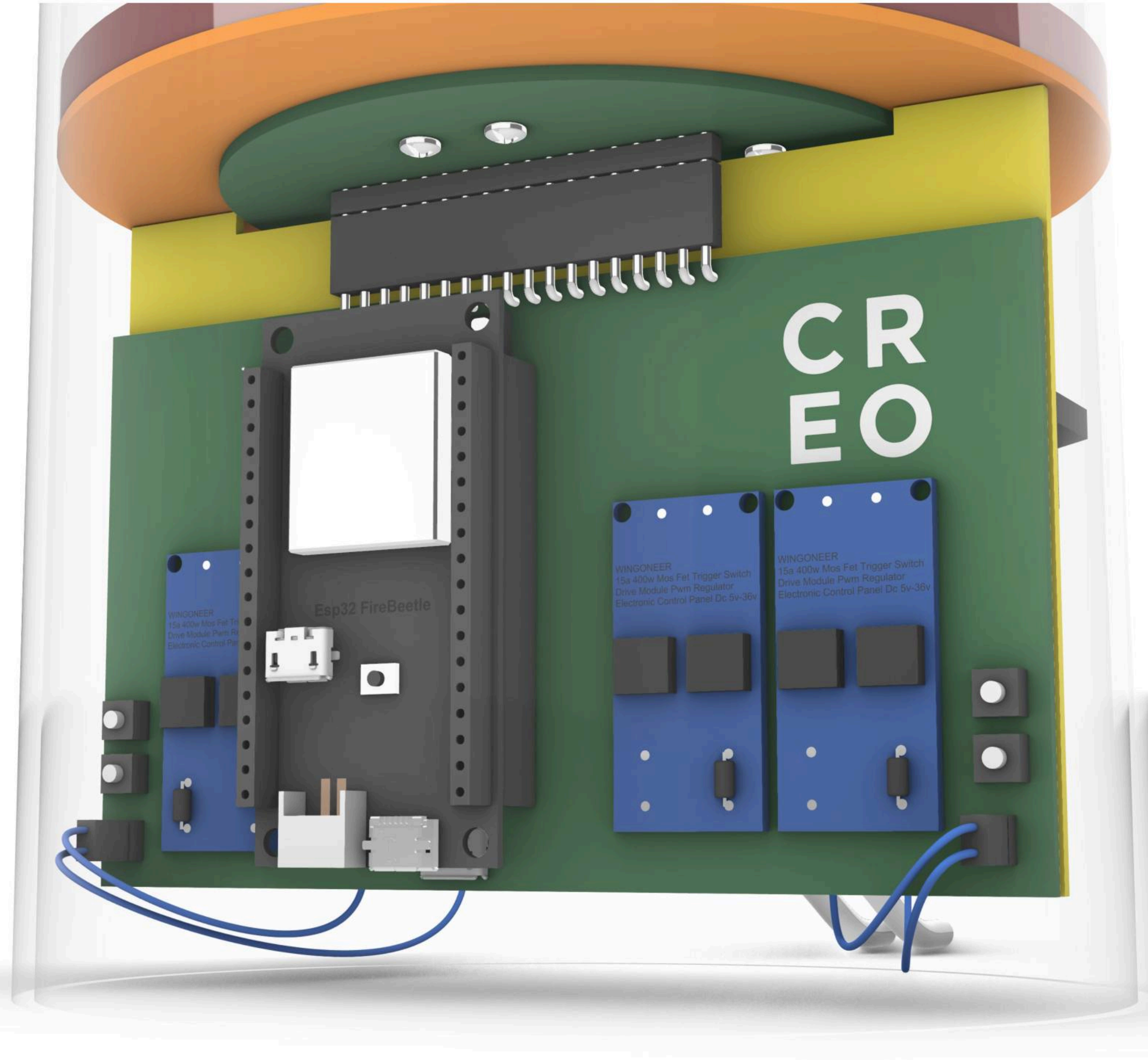
Adding Resin



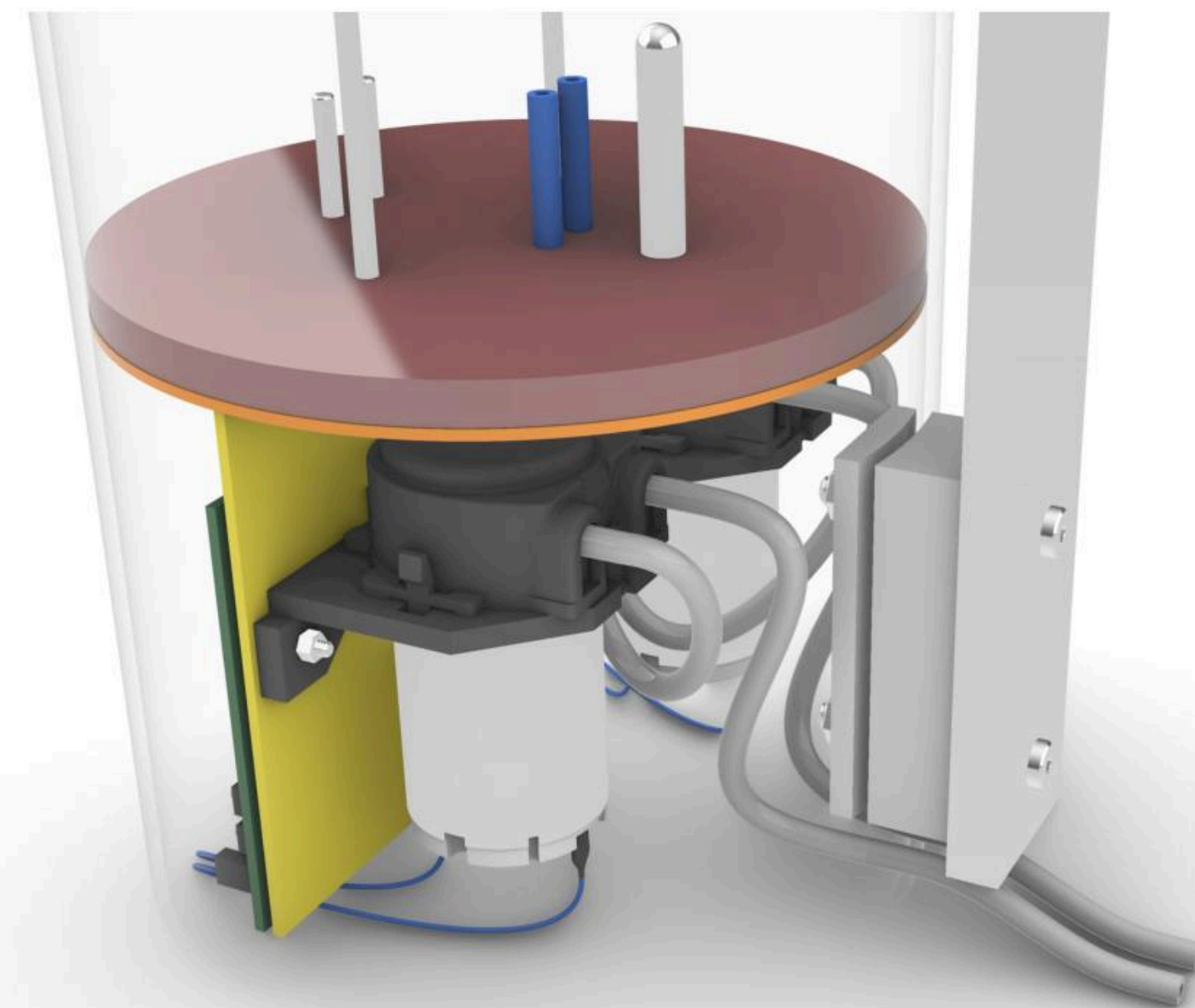
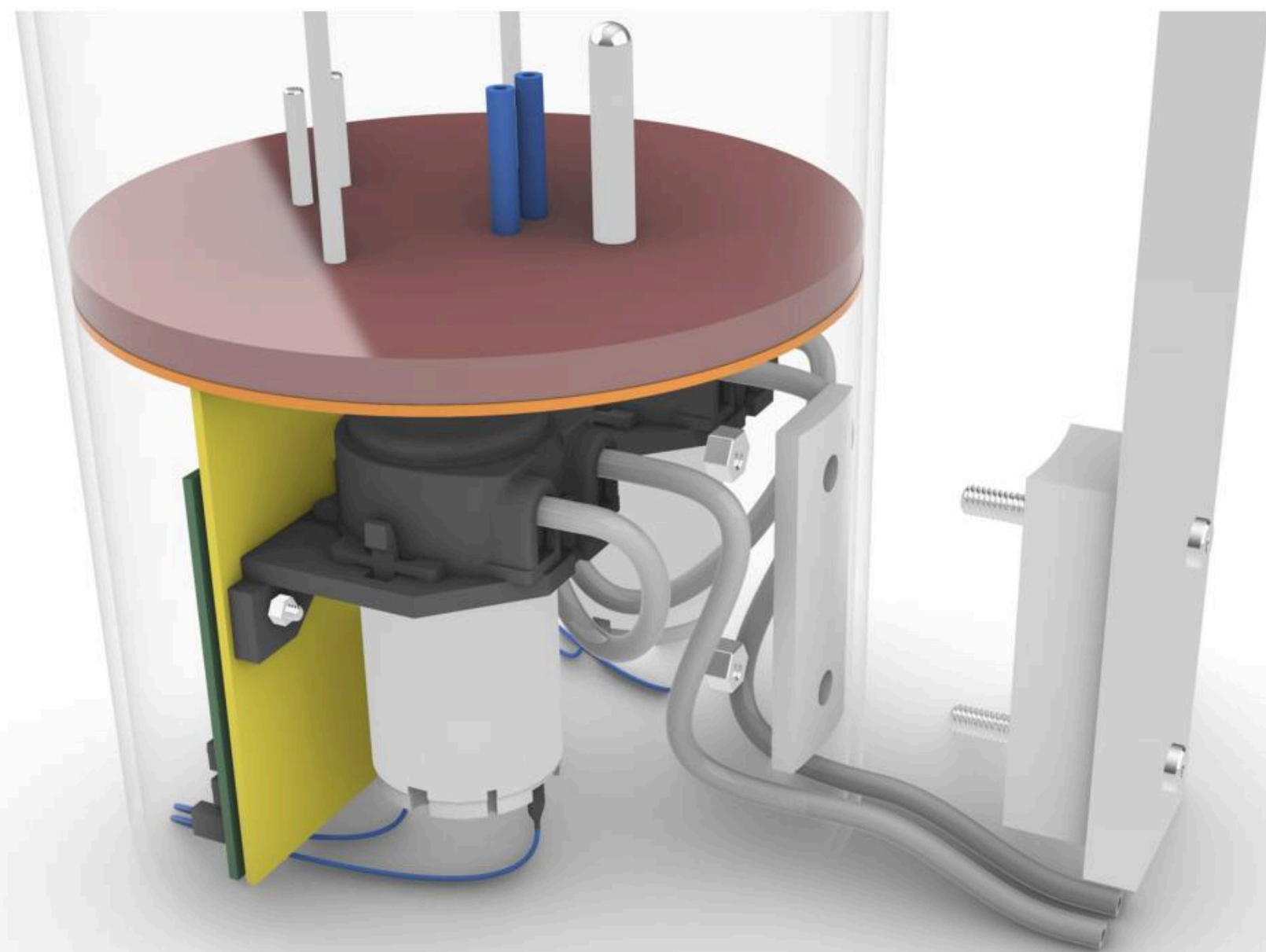
Functions:
1 Structurally fixing the probes to the circular plexy
2 Sealing

Resin

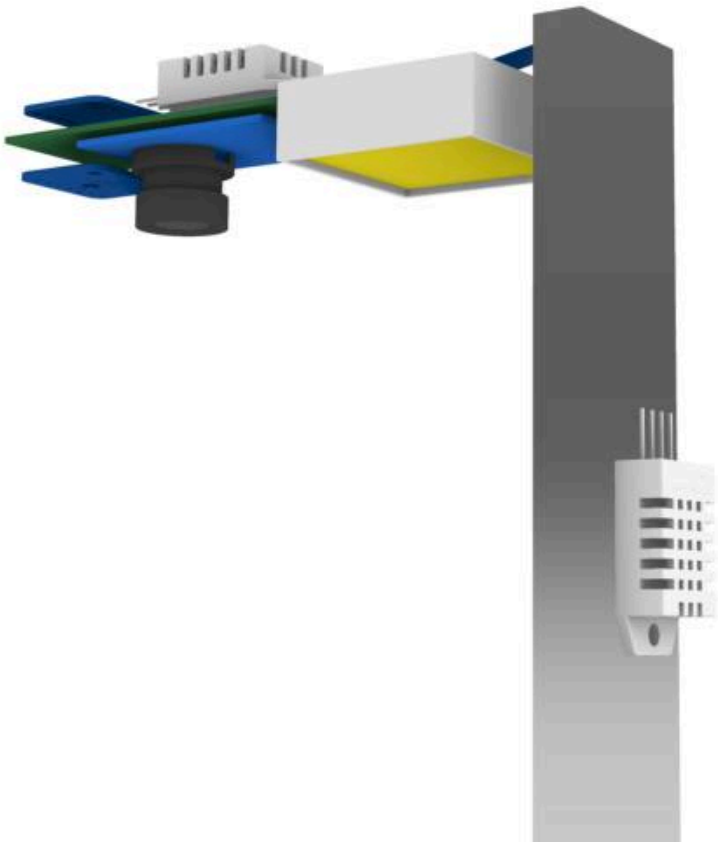
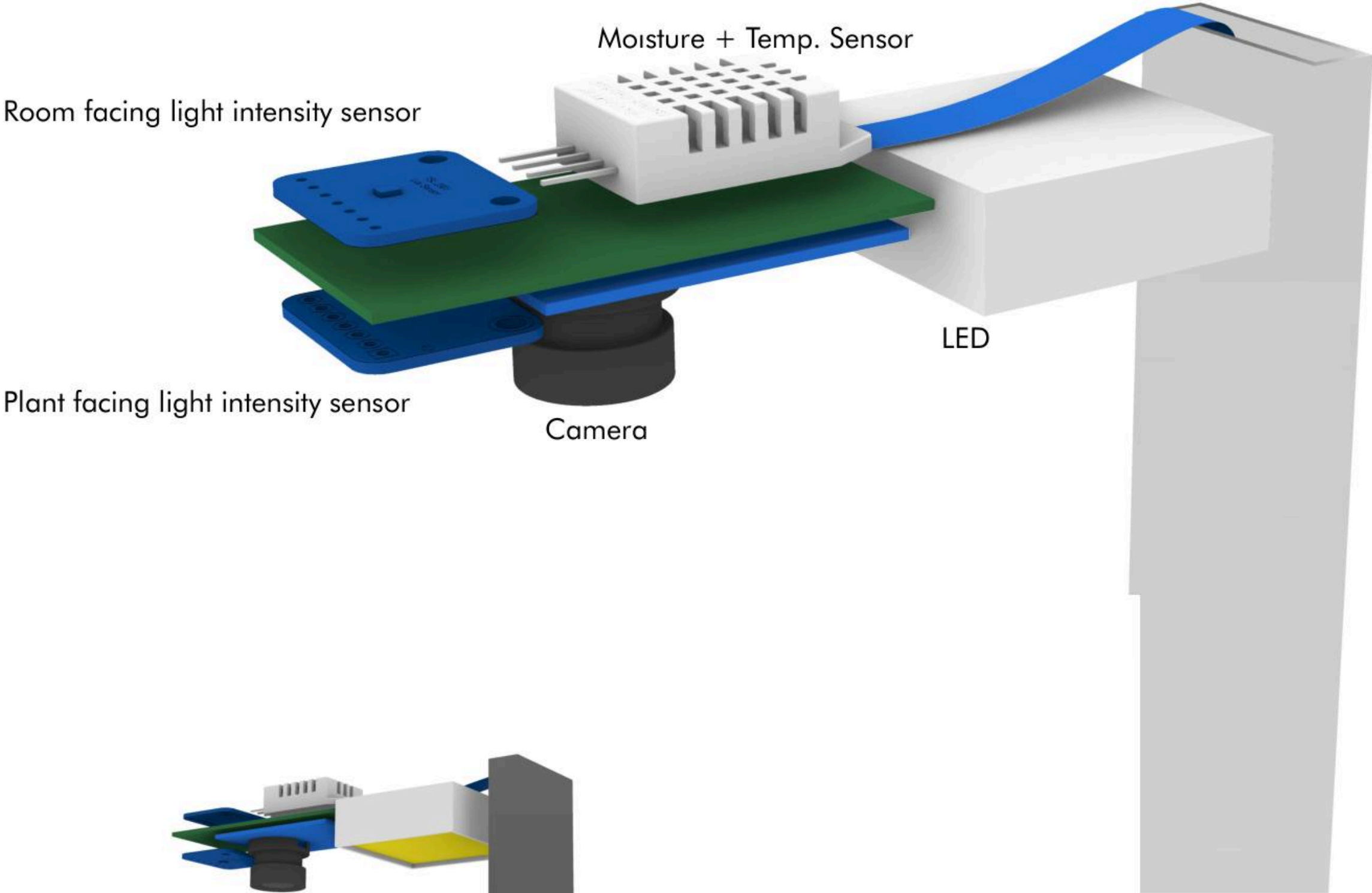




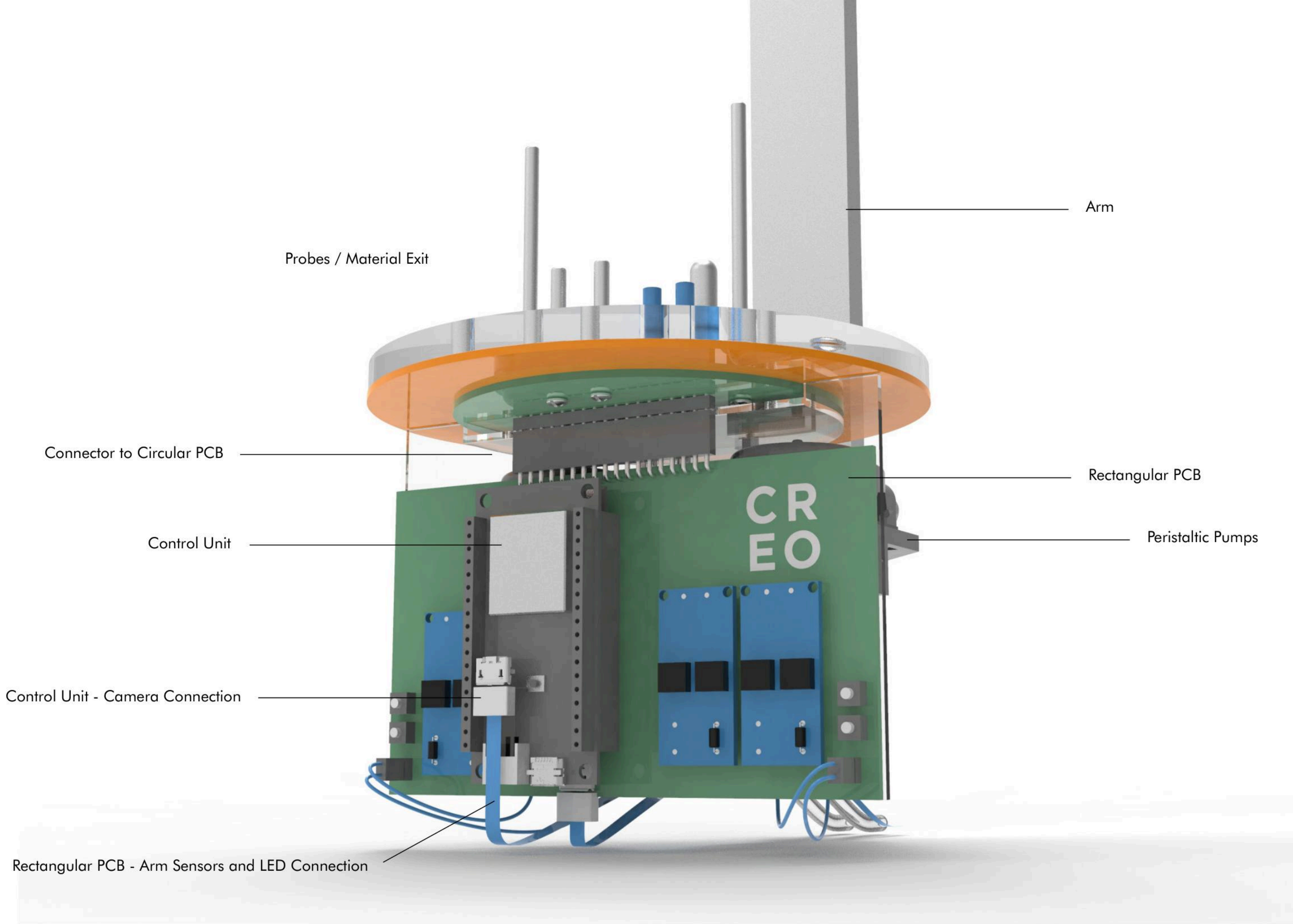
Fixing the Arm



Arm



Alternative Moisture + Temp. sensor placement





Design Research

03

BioBulb Update

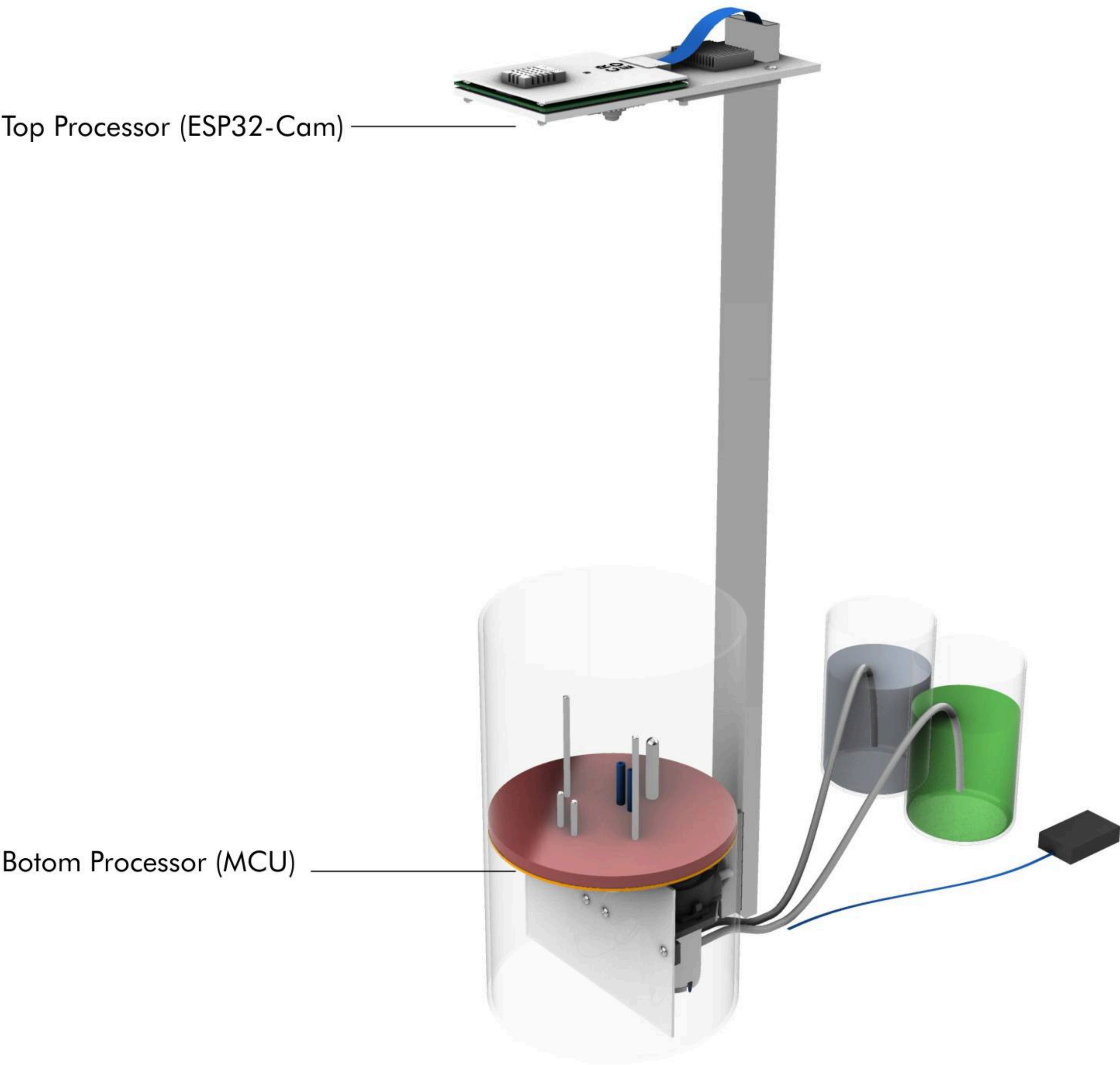
BioBulb Prototype 2.1

- Technical Drawings
- 3D CAD Screenshots
- Software Demo
- System Components
- ESP Camera Image Samples

Changes:

- Work is divided between the top processor and bottom processor.
- Top processor is the master, bottom processor is the slave.
- Bottom processor is smaller, cheaper, and has lower processing capacity.
- Bottom rectangular PCB is no longer needed.

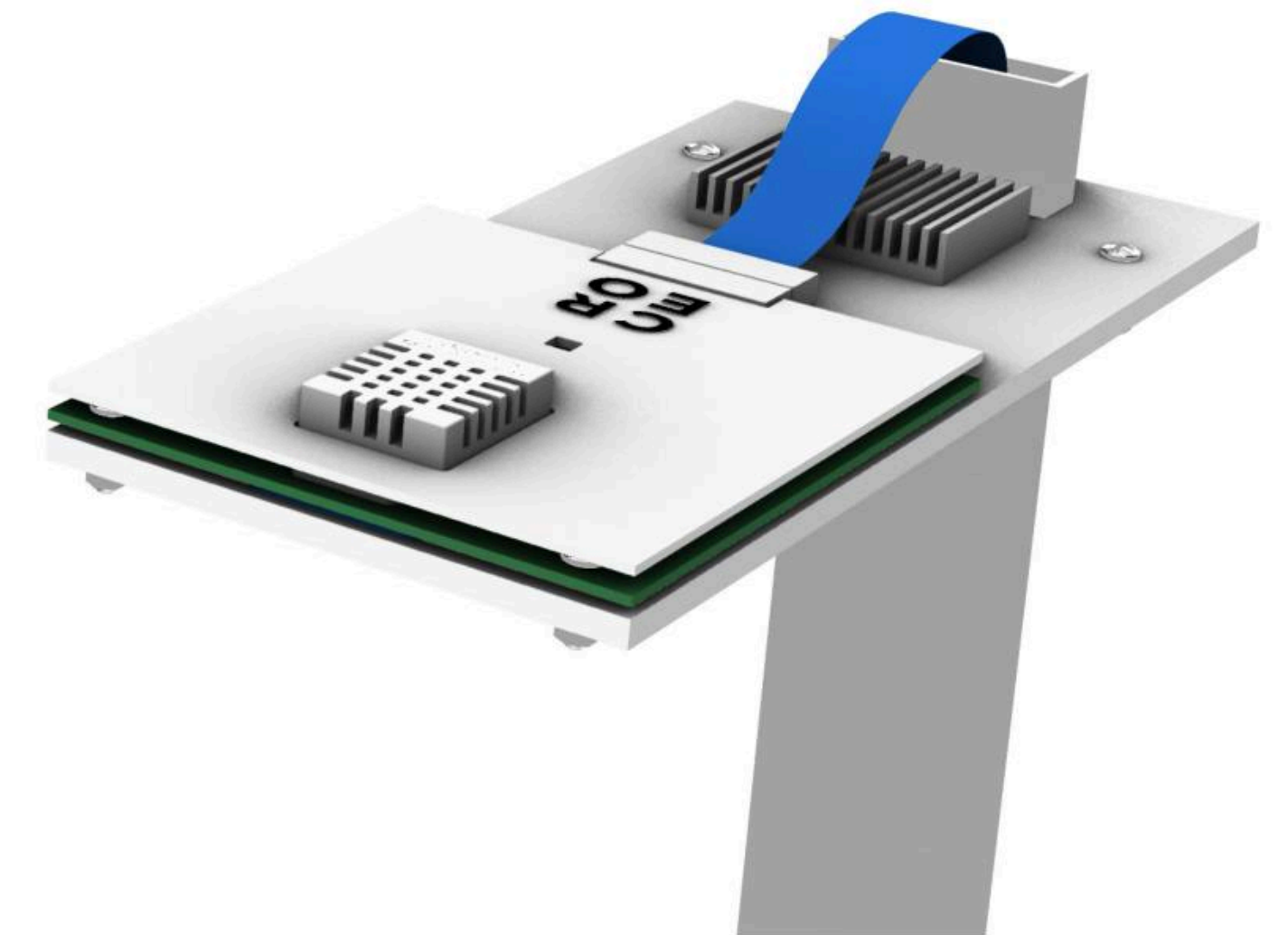
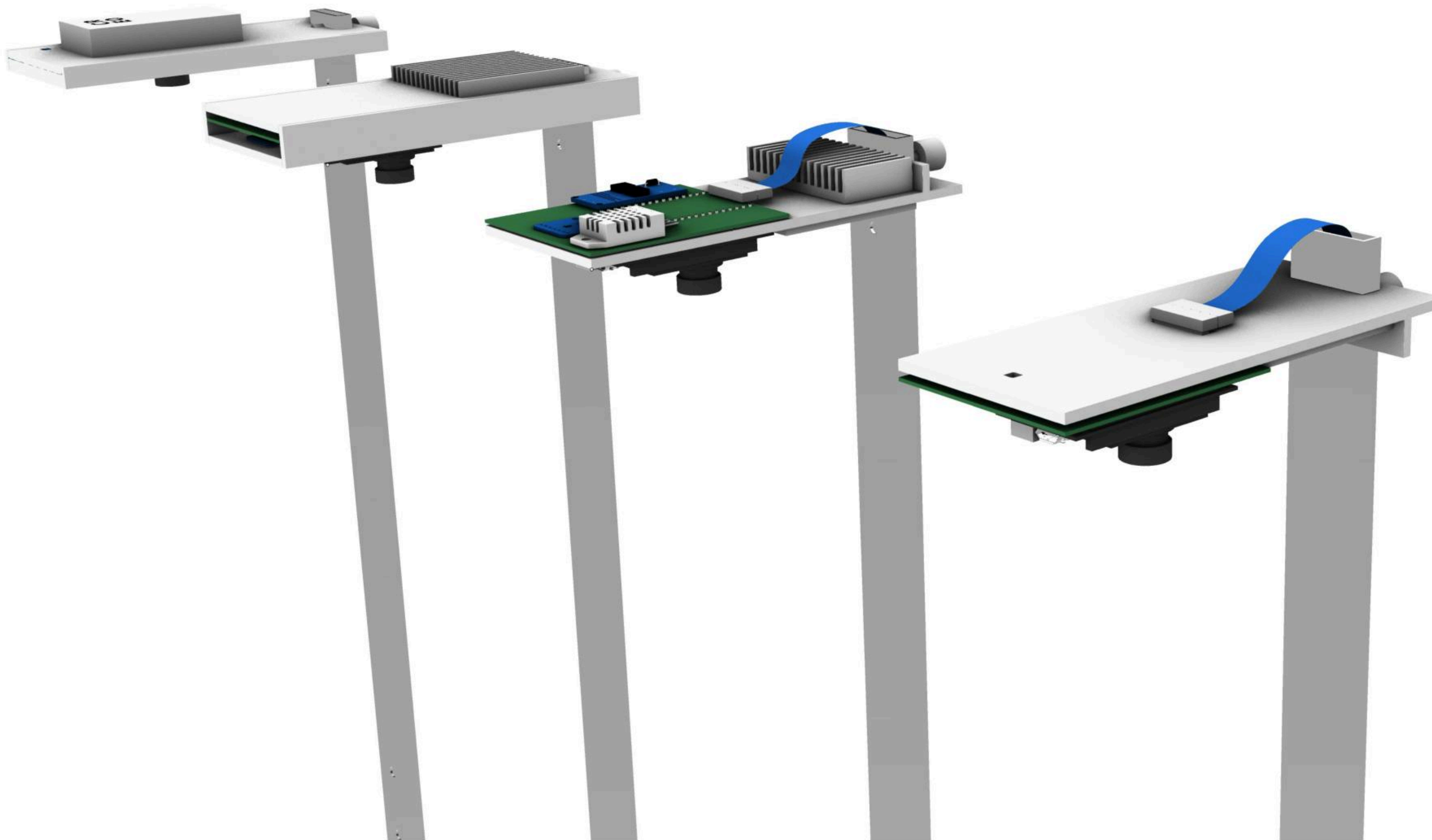
	MCU	ESP32-Cam
1 Read Soil Temp	✓	
2 Read Soil Mositure	✓	
3 Read Soil EC	✓	
4 Read Ambient Light	✓	
5 Read Plant Light	✓	
6 Read Room Temp/Hum	✓	
7 Control Water Pump		✓
8 Control Nutrient Pump		✓
9 Control Plant Lamp		✓
10 Take Picture		✓
11 Connect Internet		✓
12 Read Config		✓
13 Update Config		✓
14 Post Data		✓

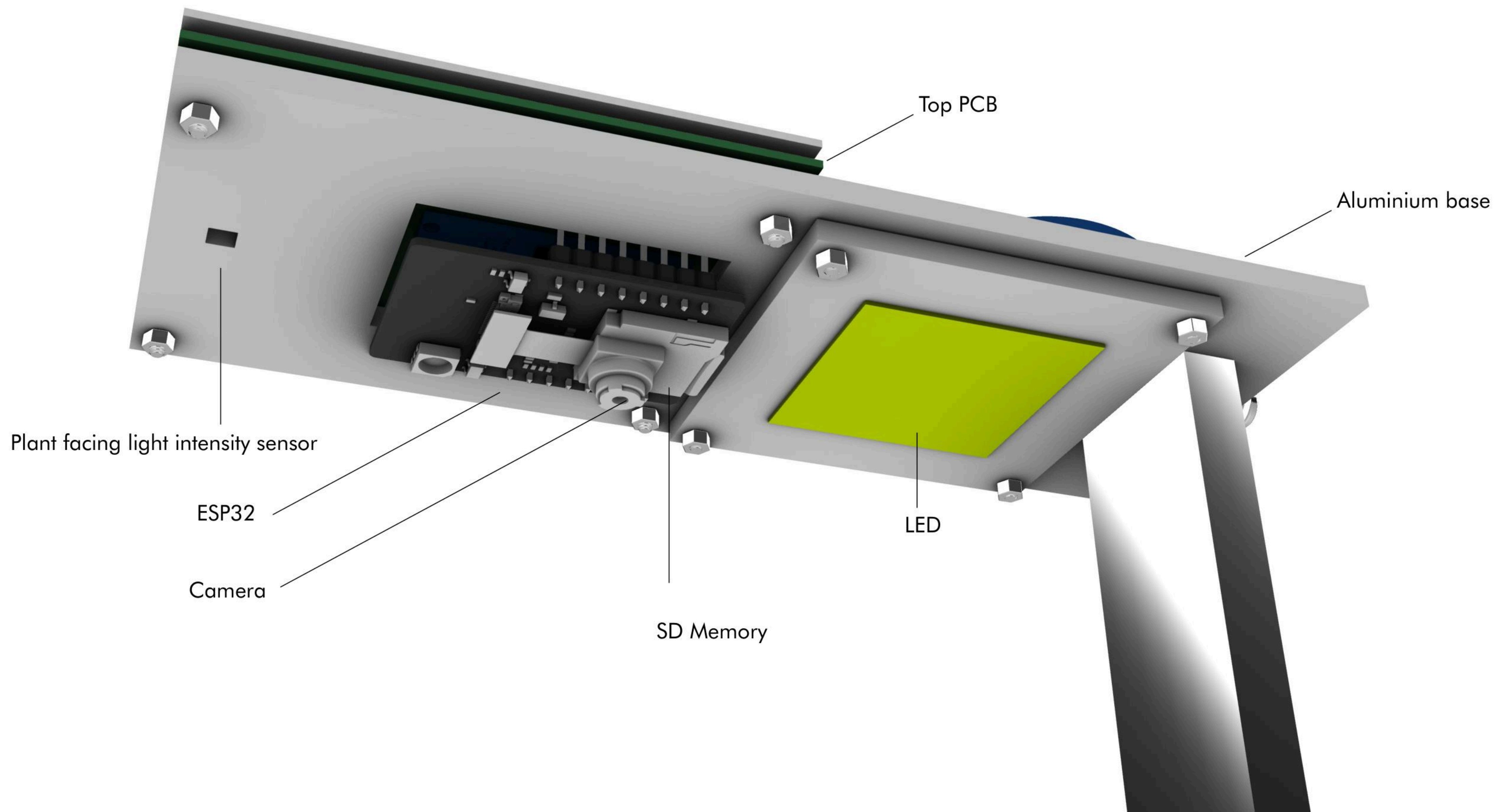


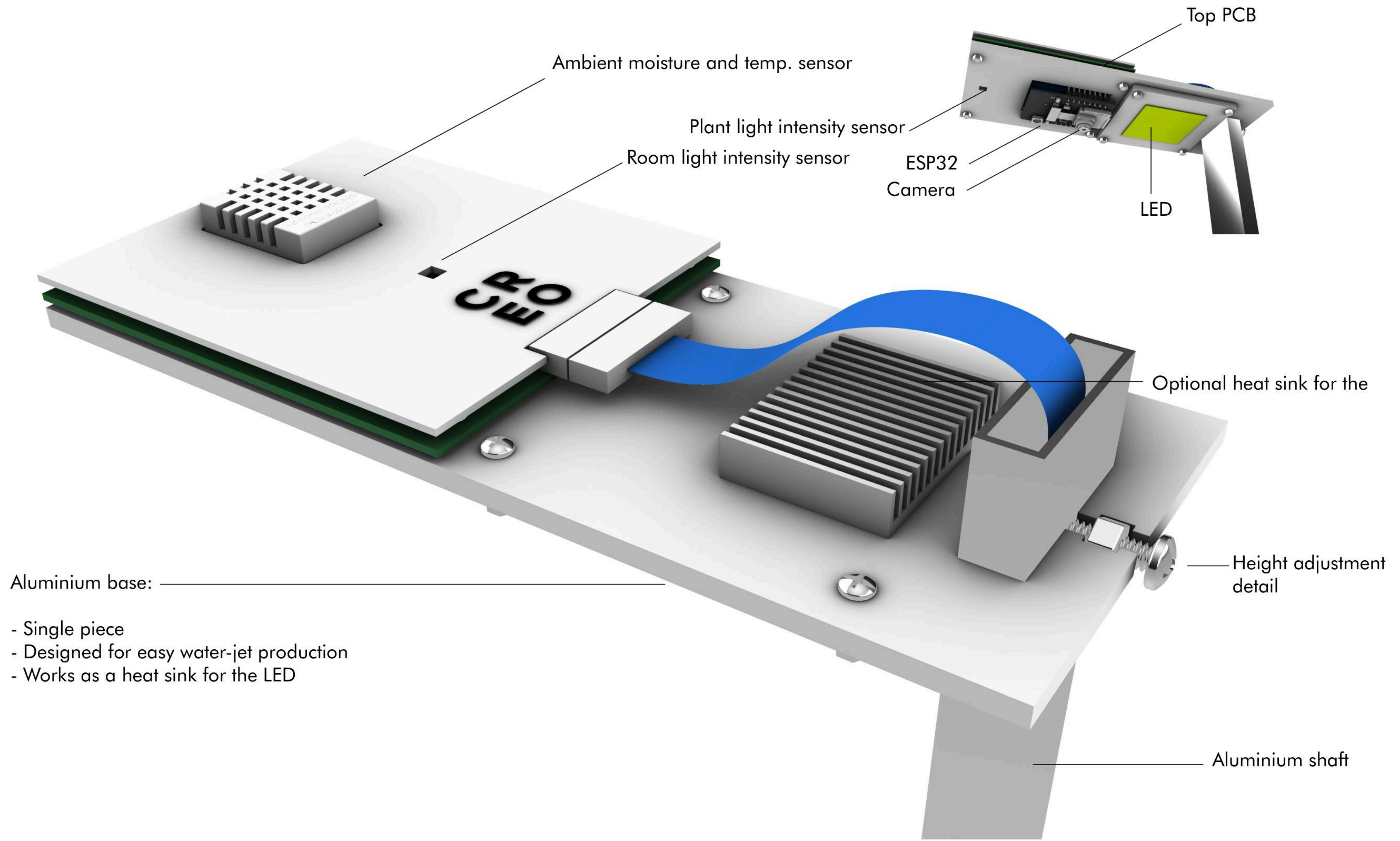
Top part design optimization

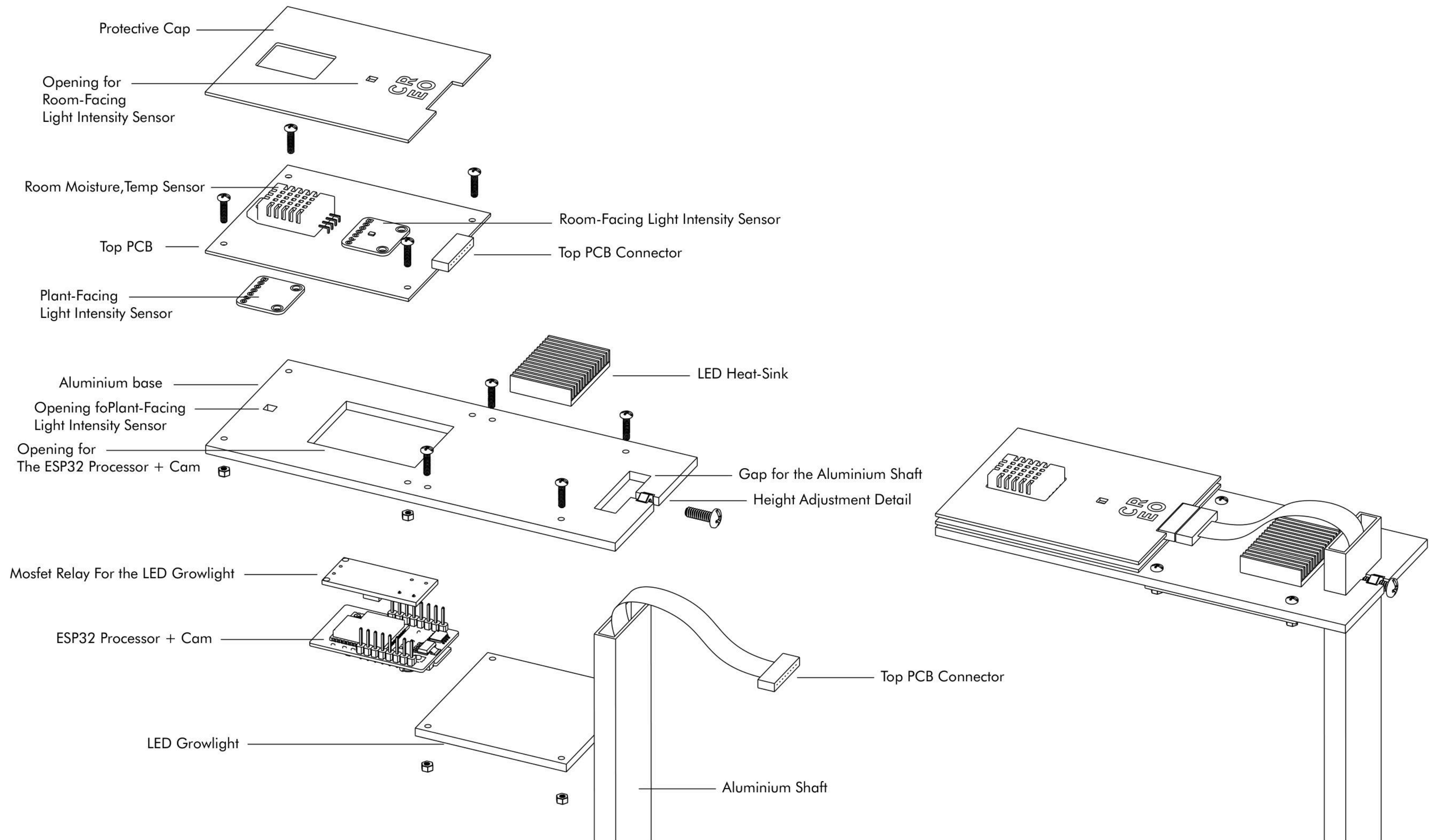
Important Design Points:

- Adjustable height
- Good thermal design
- Compact form factor
- PCB Layout

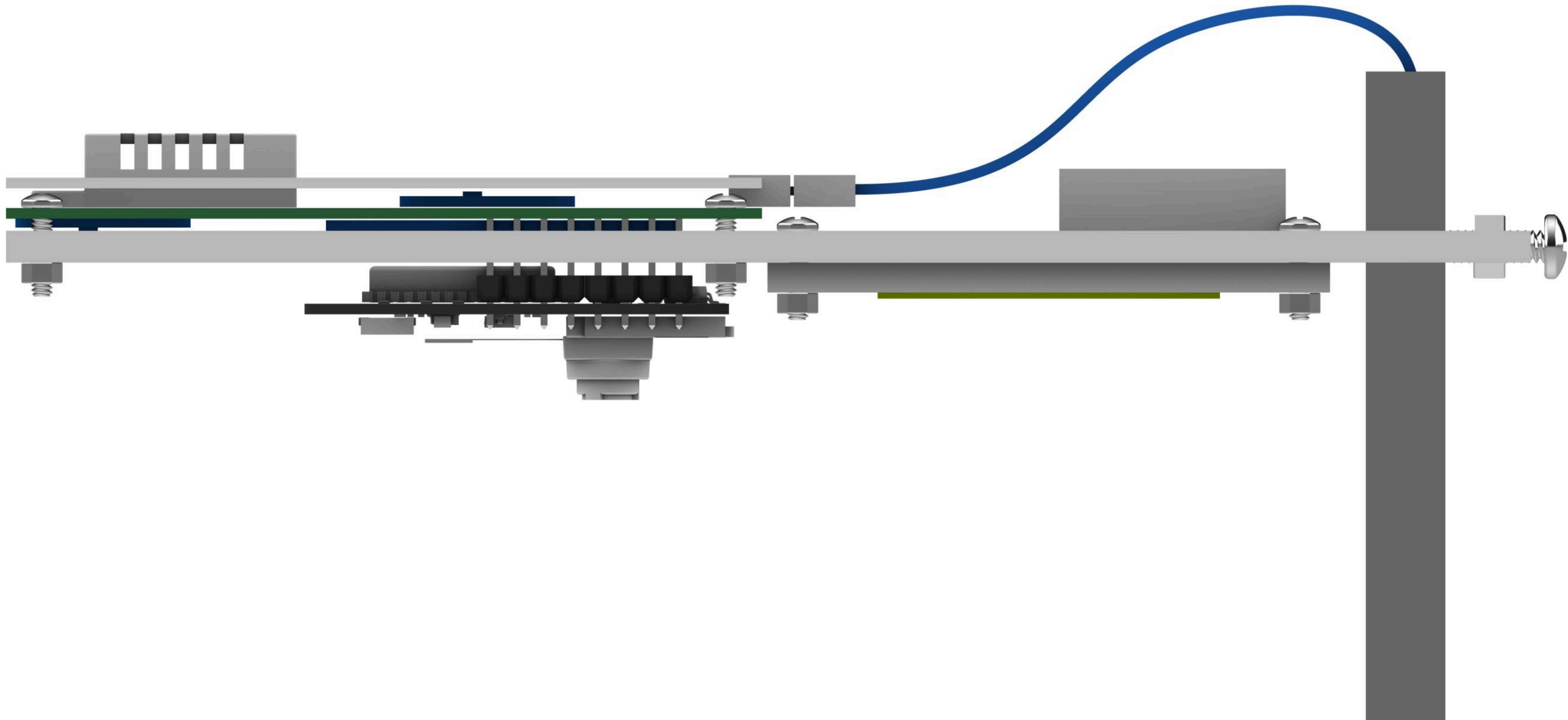




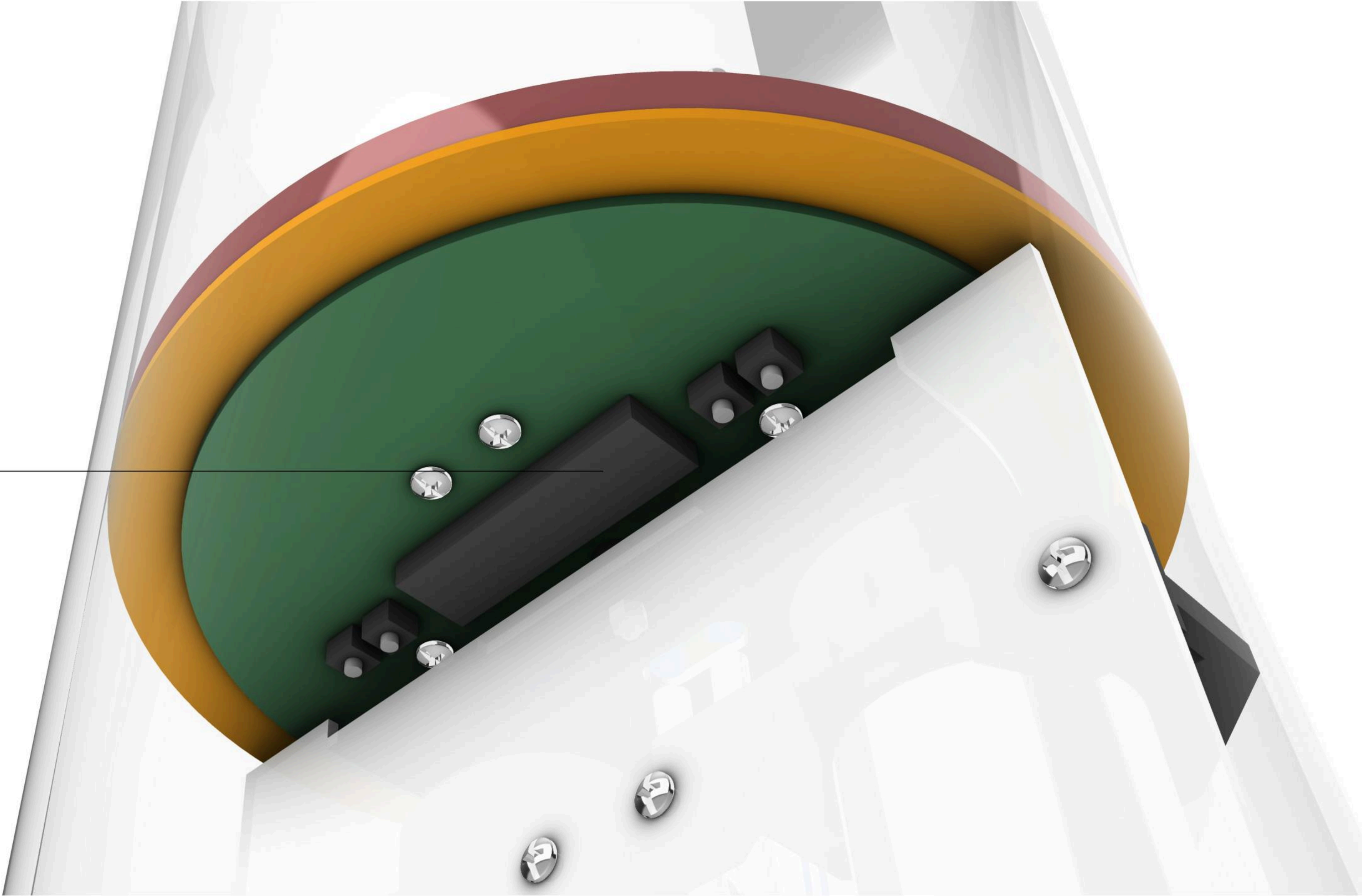


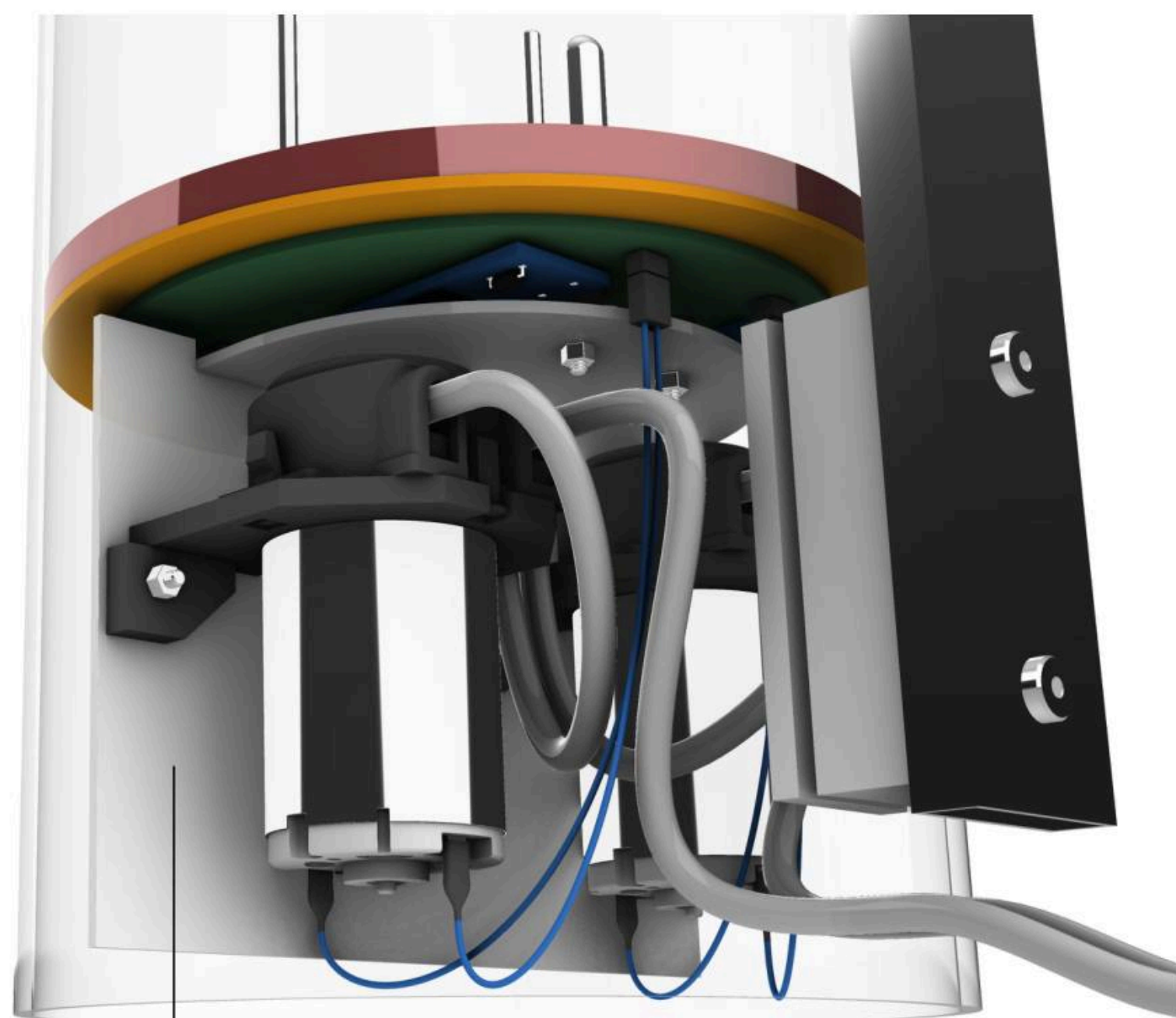


Section

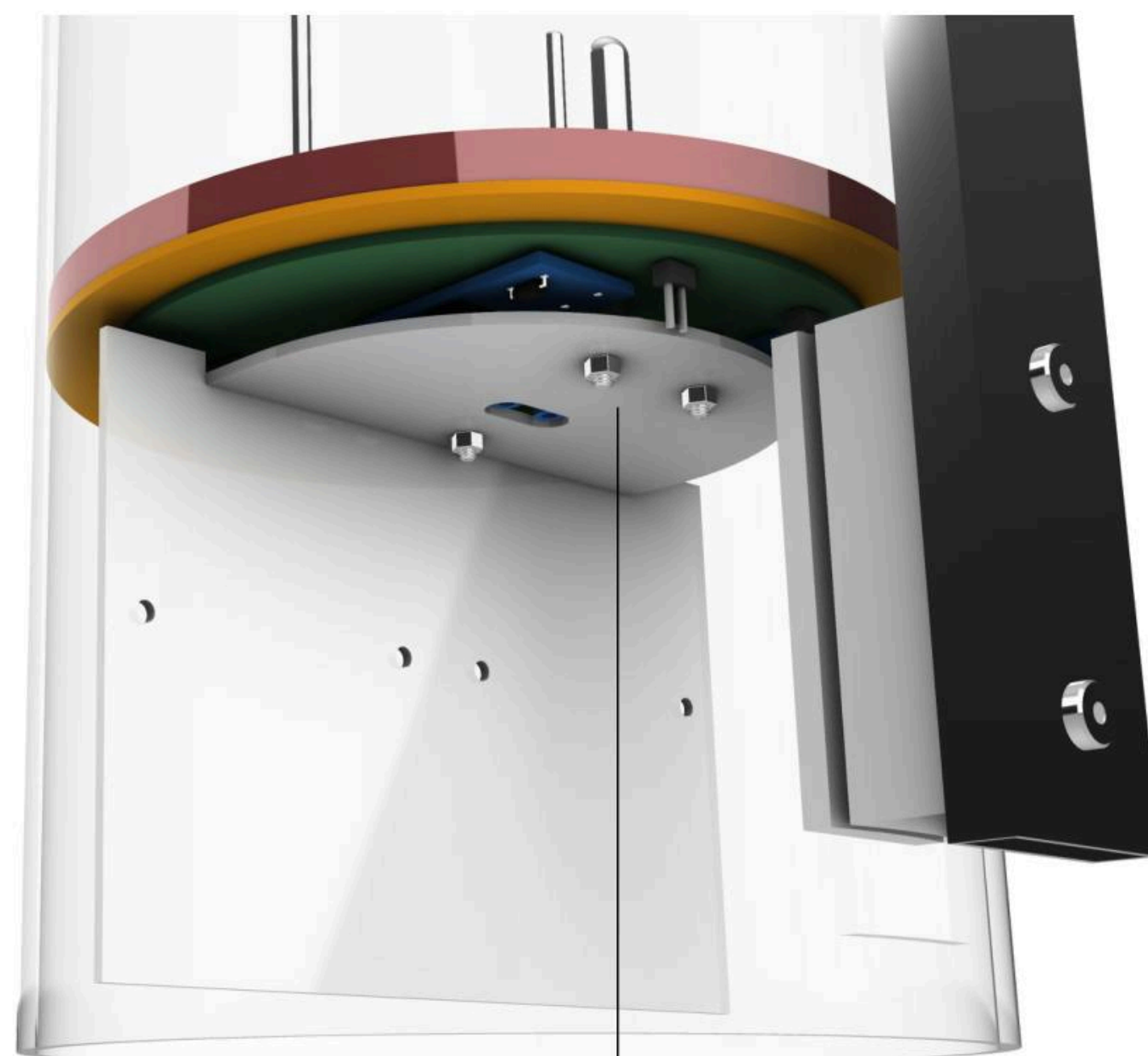


Botom Processor (MCU)

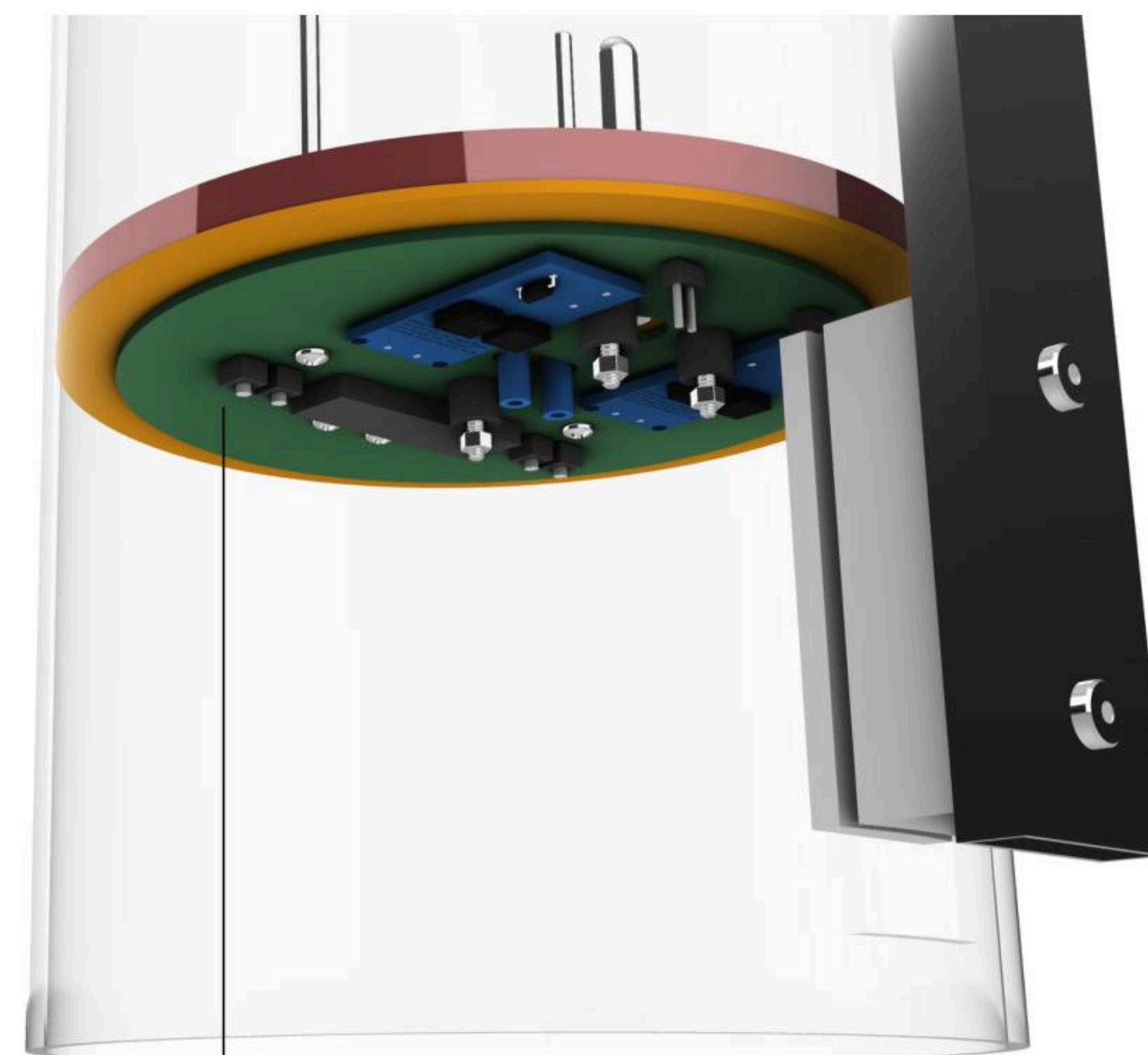




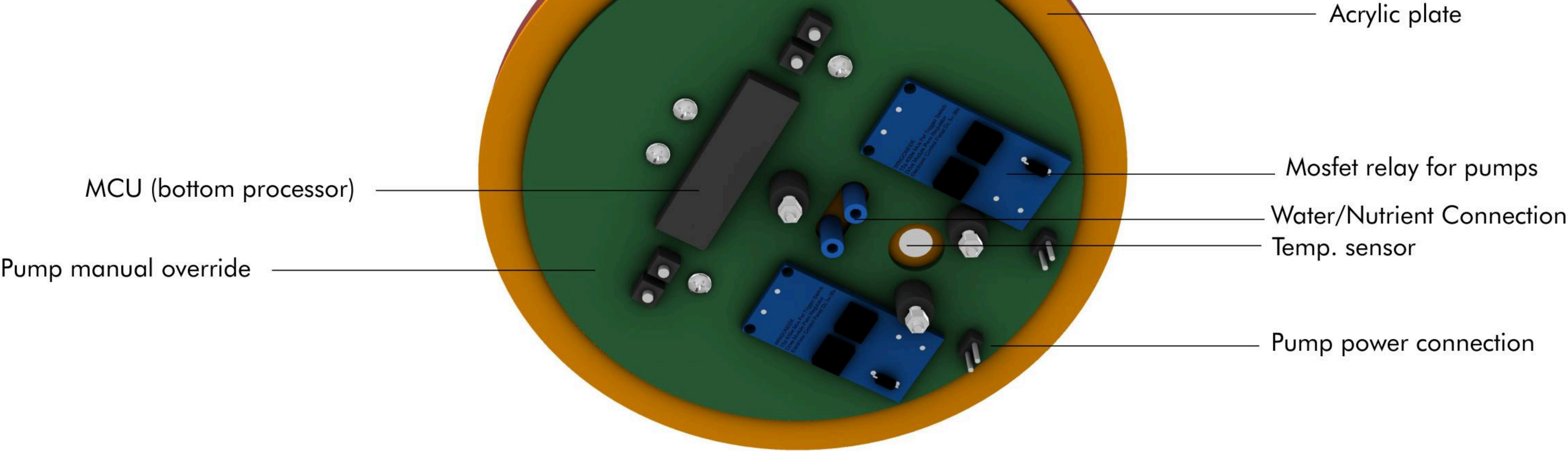
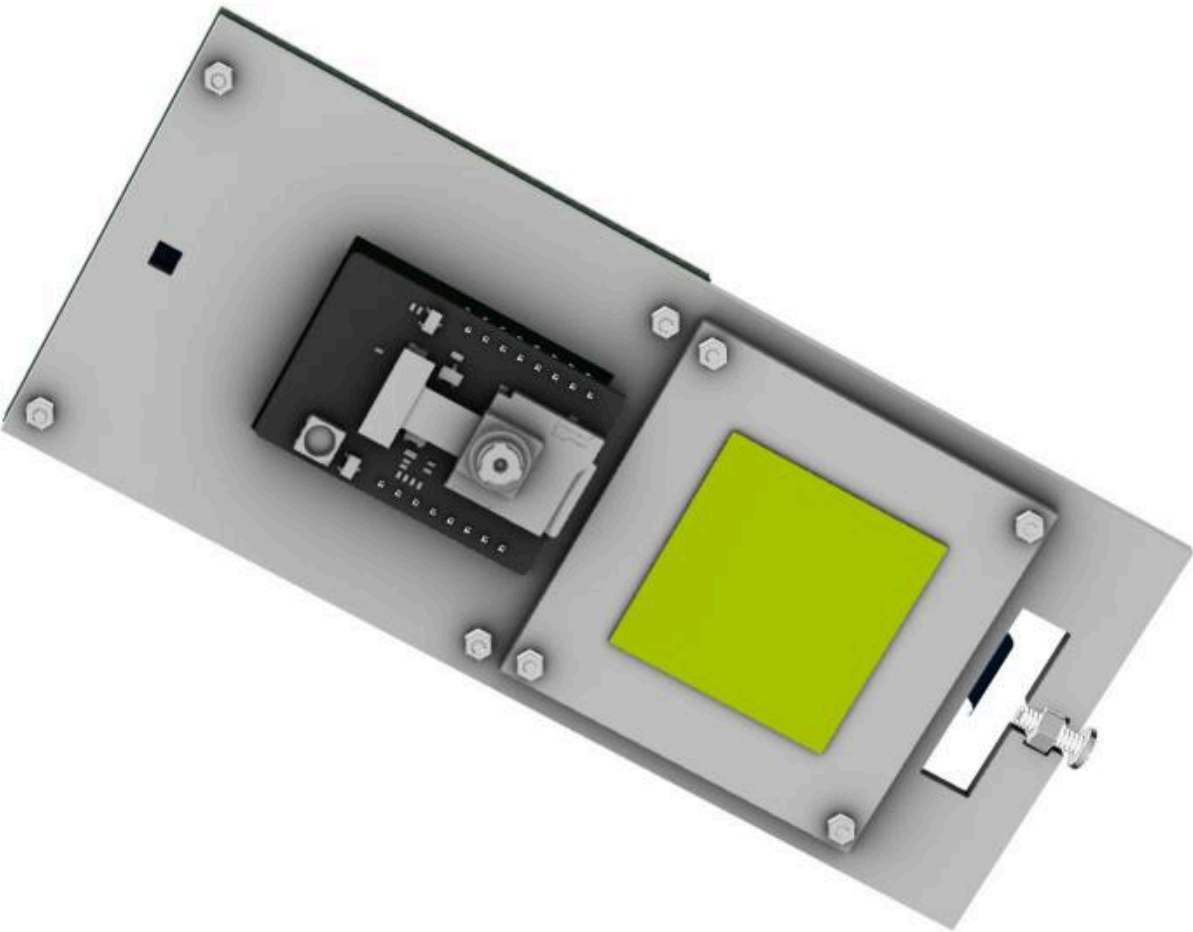
Structure for the pumps



3 Point Connection



Circular PCB



ESP32-CAM

Cam Type: OV2640

(The camera will be changed to OV7725)



Output Resolution (adjusted for the screen size)

320x240



400x296



640x480



800x600



1600x1200





camera_Time-lapse_to_Server_post

}

camera_config_t config;

config.ledc_channel = LEDC_CHANNEL_0;

config.ledc_timer = LEDC_TIMER_0;

config.pin_d0 = Y2_GPIO_NUM;

config.pin_d1 = Y3_GPIO_NUM;

config.pin_d2 = Y4_GPIO_NUM;

config.pin_d3 = Y5_GPIO_NUM;

config.pin_d4 = Y6_GPIO_NUM;

config.pin_d5 = Y7_GPIO_NUM;

config.pin_d6 = Y8_GPIO_NUM;

config.pin_d7 = Y9_GPIO_NUM;

config.pin_xclk = XCLK_GPIO_NUM;

config.pin_pclk = PCLK_GPIO_NUM;

config.pin_vsync = VSYNC_GPIO_NUM;

config.pin_href = HREF_GPIO_NUM;

config.pin_sscb_sda = SIOD_GPIO_NUM;

config.pin_sscb_scl = SIOC_GPIO_NUM;

config.pin_pwdn = PWDN_GPIO_NUM;

config.pin_reset = RESET_GPIO_NUM;

config.xclk_freq_hz = 20000000;

config.pixel_format = PIXFORMAT_YUV422_16;

//init with high specs to pre-allocate

if (psramFound()) {

config.frame_size = FRAMESIZE_1600;

Writing at 0x00008000... (100 %)

Wrote 3072 bytes (119 compressed)

Hash of data verified.

Leaving...

Hard resetting via RTS pin...

rst:0x1 (POWERON_RESET),boot:0x13 (SPI_FAST_FLASH_BOOT)

configsip: 0, SPIWP:0xee

clk_drv:0x00,q_drv:0x00,d_drv:0x00,cs0_drv:0x00,hd_drv:0x00,wp_drv:0x00

mode:DIO, clock div:1

load:0x3fff0018,len:4

load:0x3fff001c,len:1216

ho 0 tail 12 room 4

load:0x40078000,len:9720

ho 0 tail 12 room 4

load:0x40080400,len:6352

entry 0x400806b8

Connecting to: ASUS

.Internet connected

Connecting to www.immekanik.com:80...

Sending picture to Server...

POST http://www.immekanik.com/Creo_data/fileadd.php HTTP/1.1

Host: www.immekanik.com

User-Agent: ESP32

Accept: */*

Content-Type: multipart/form-data; boundary=dgbfhfh

Content-Length: 218858

--dgbfhfh

Content-Disposition: form-data; name="fileup"; filename="CAM.jpg"

Content-Type: image/jpeg

--dgbfhfh--

Picture Send

☒ Autoscroll ☐ Show timestamp

Newline

115200 baud

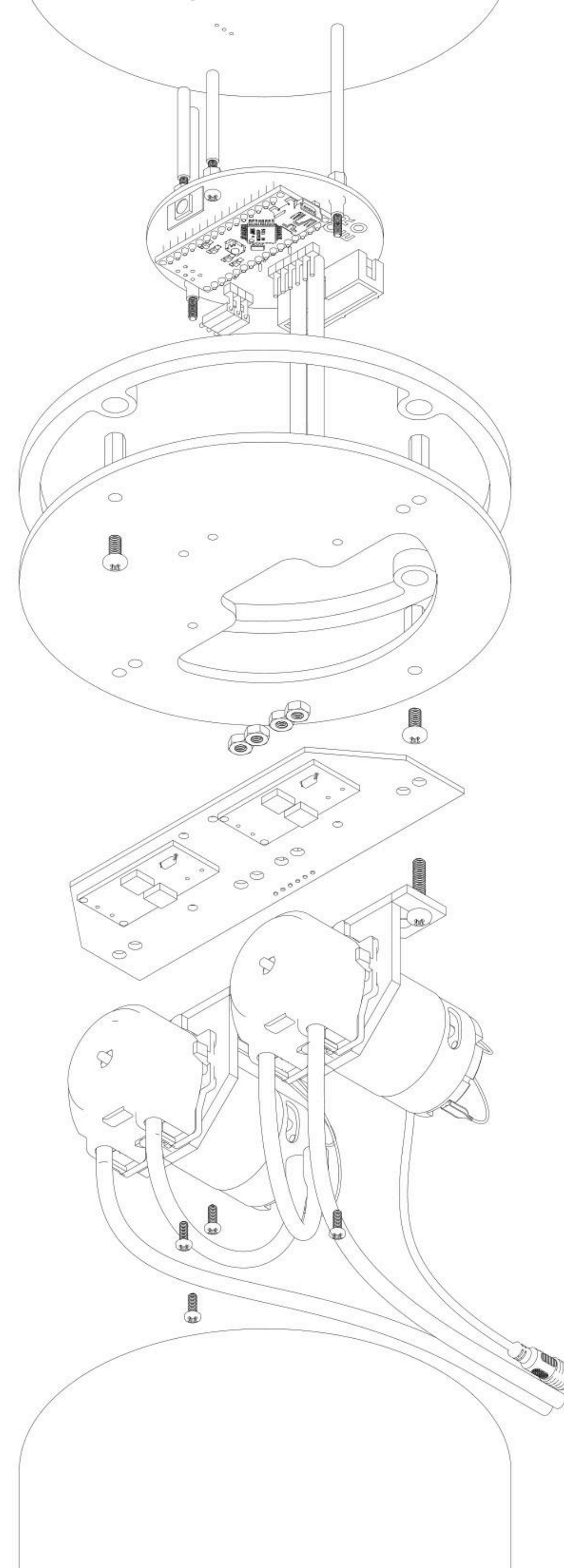
Clear output

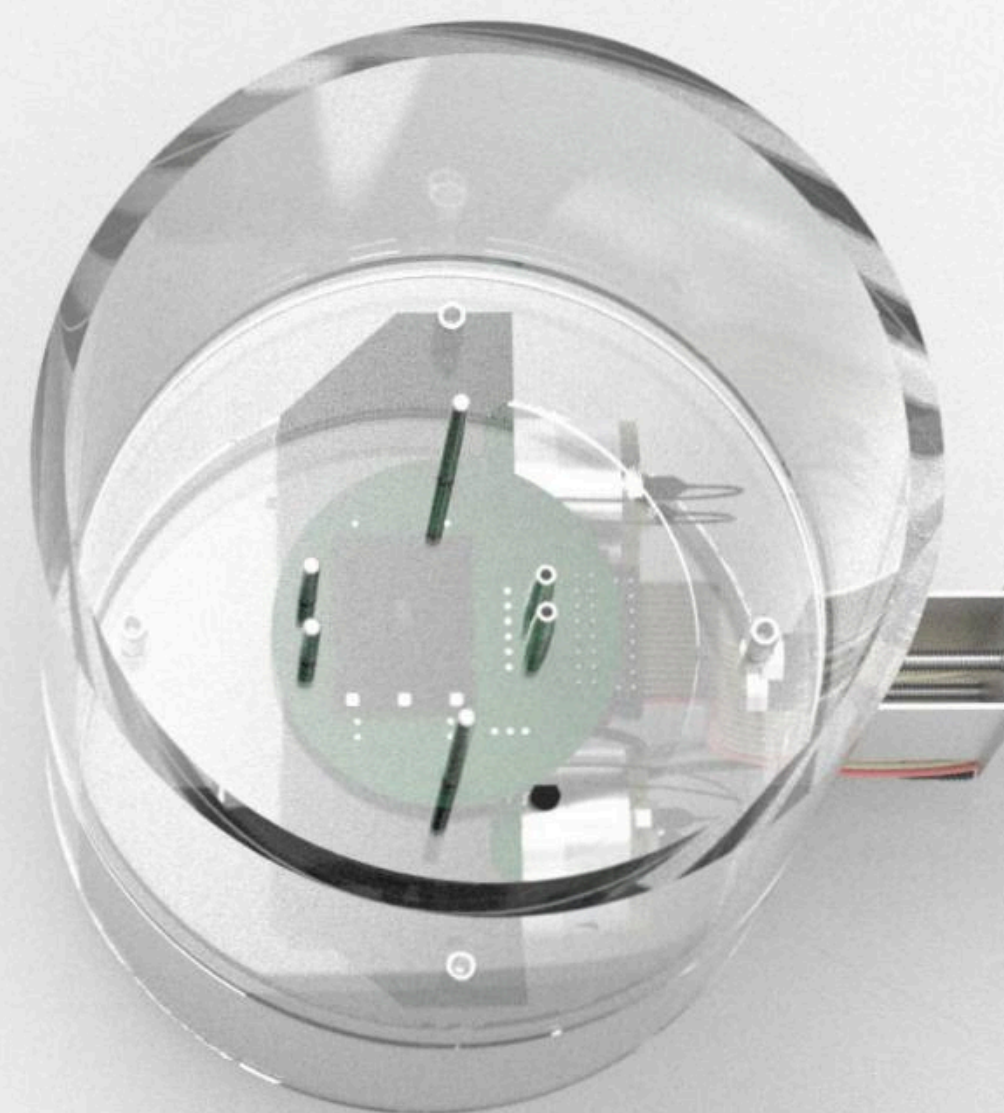
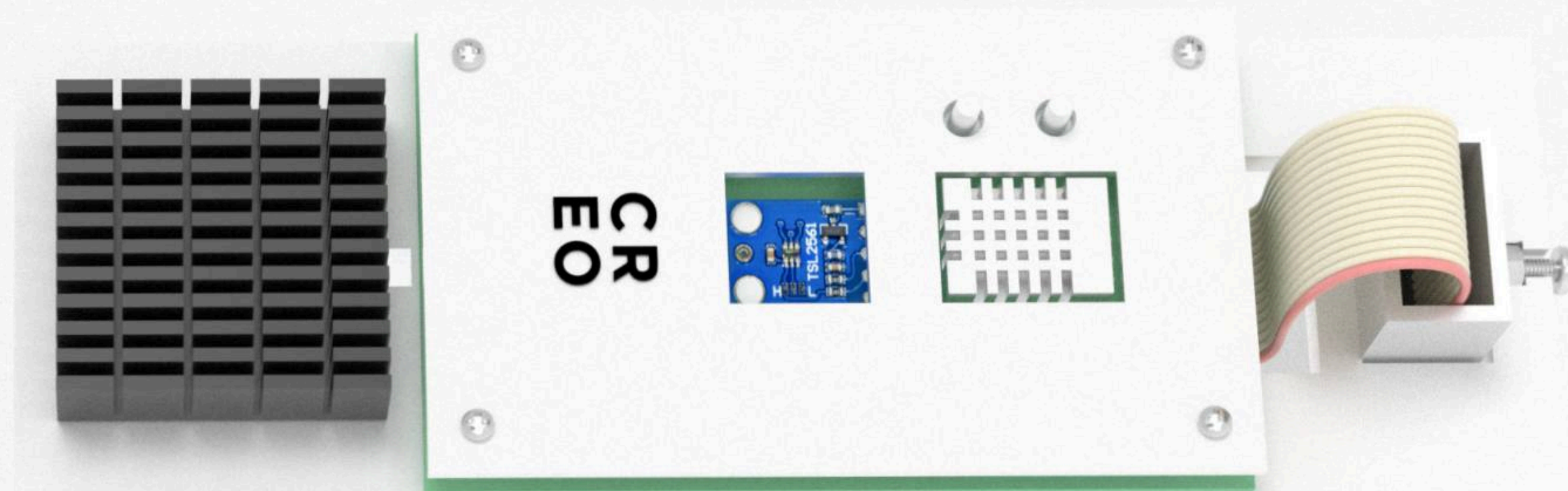
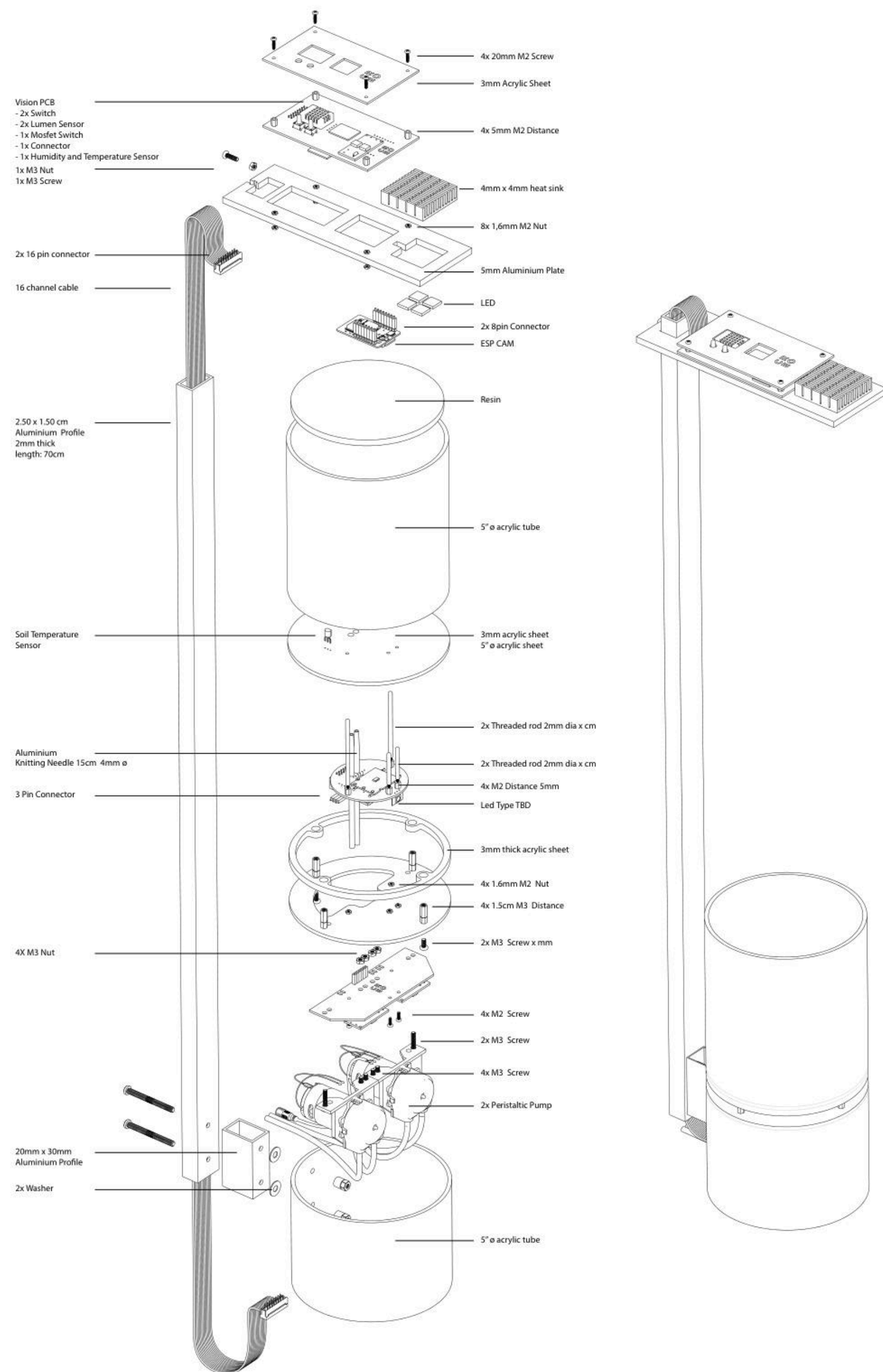
04

BioBulb Update

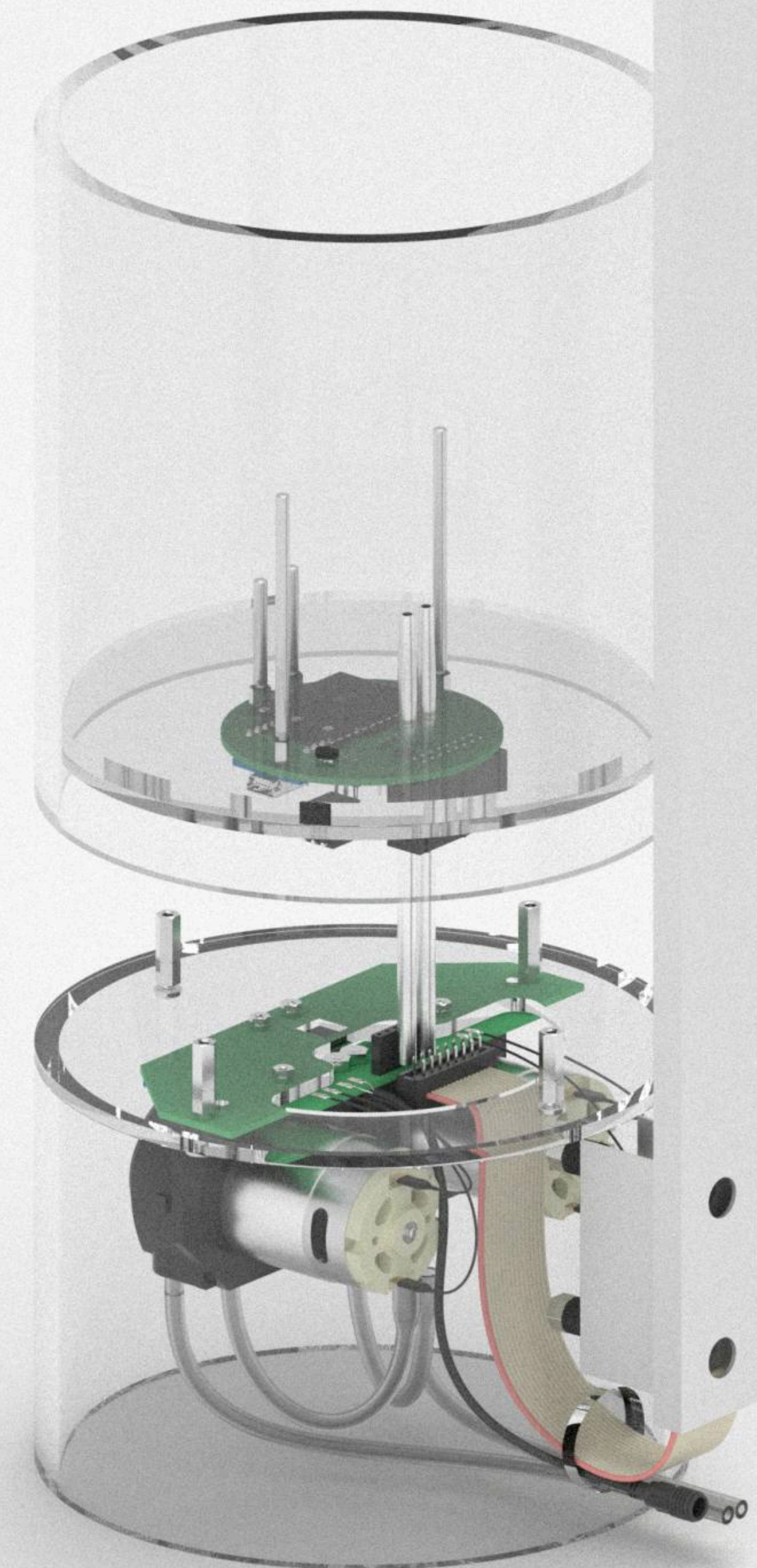
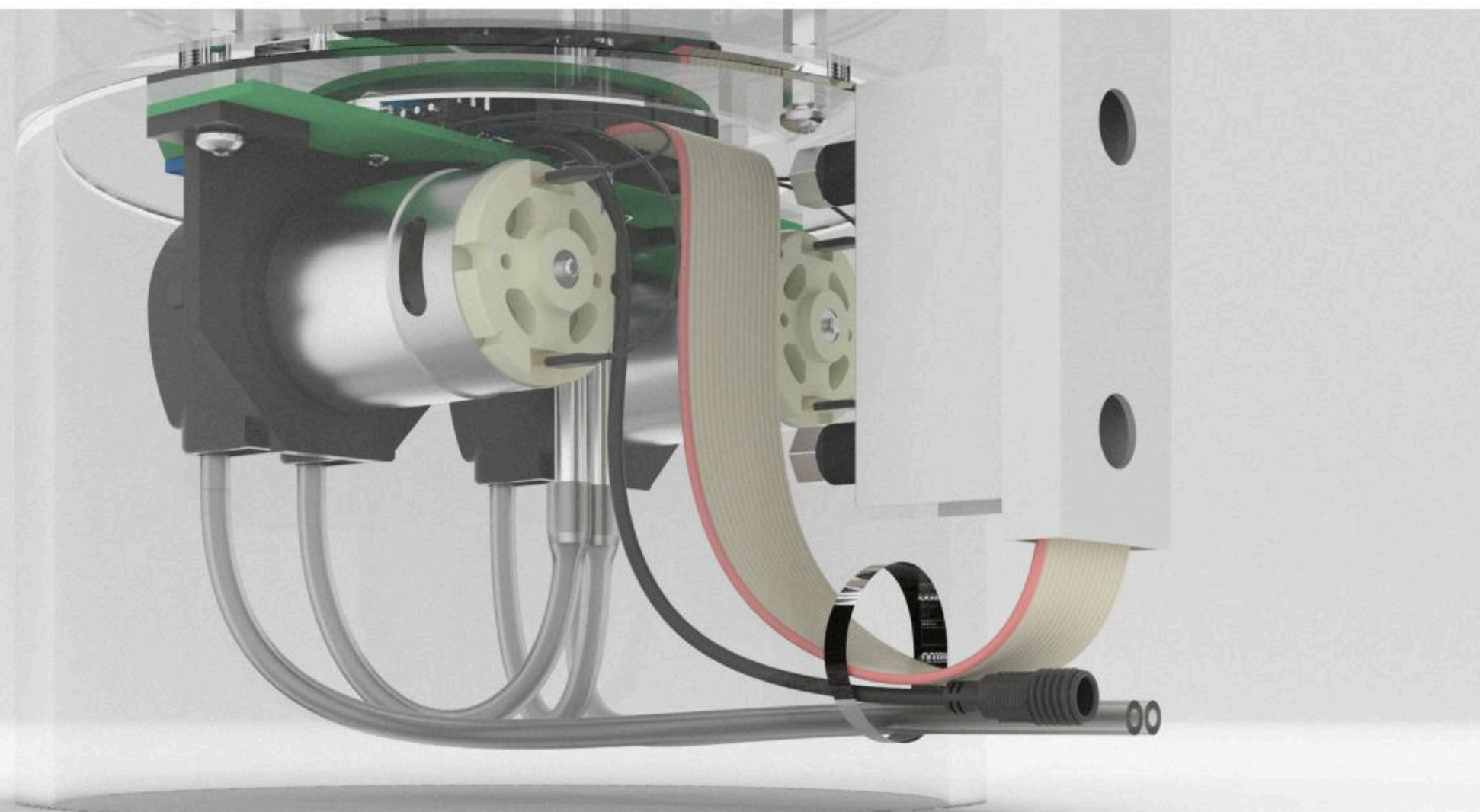
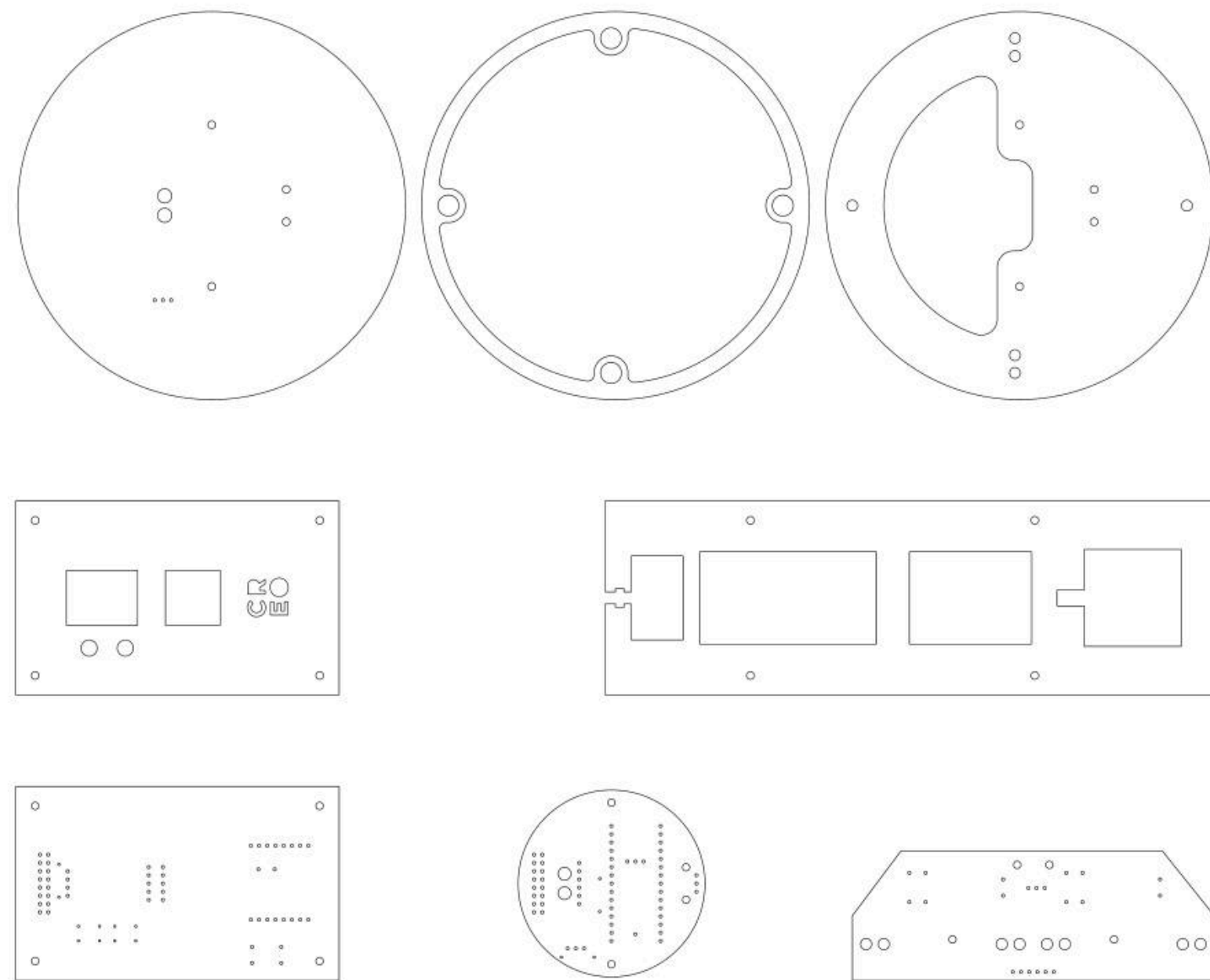
"DARWIN" Prototype

- Technical Drawings
- Renderings
- Prototype
- User Interface Screenshots
- Flowchart

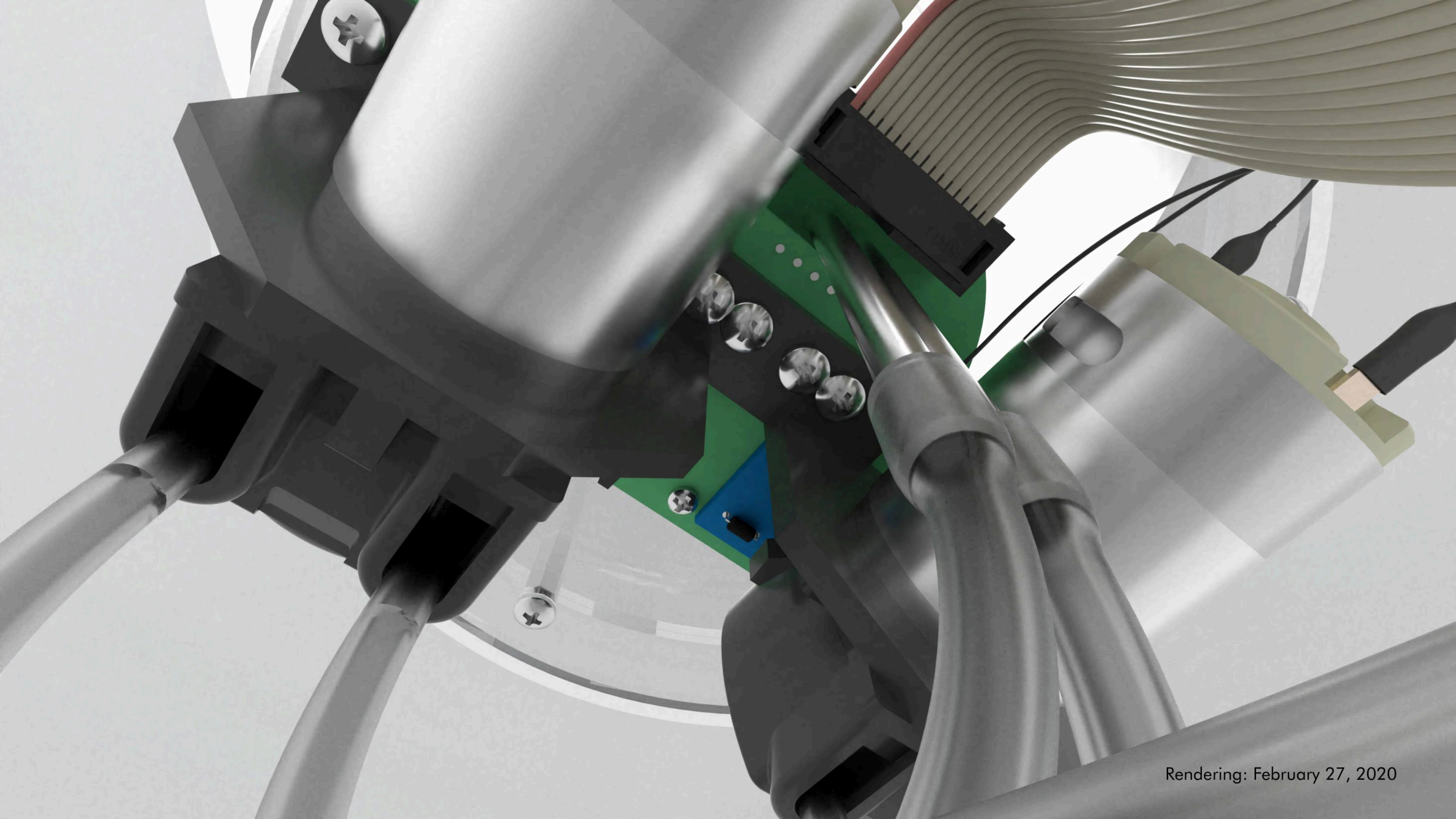




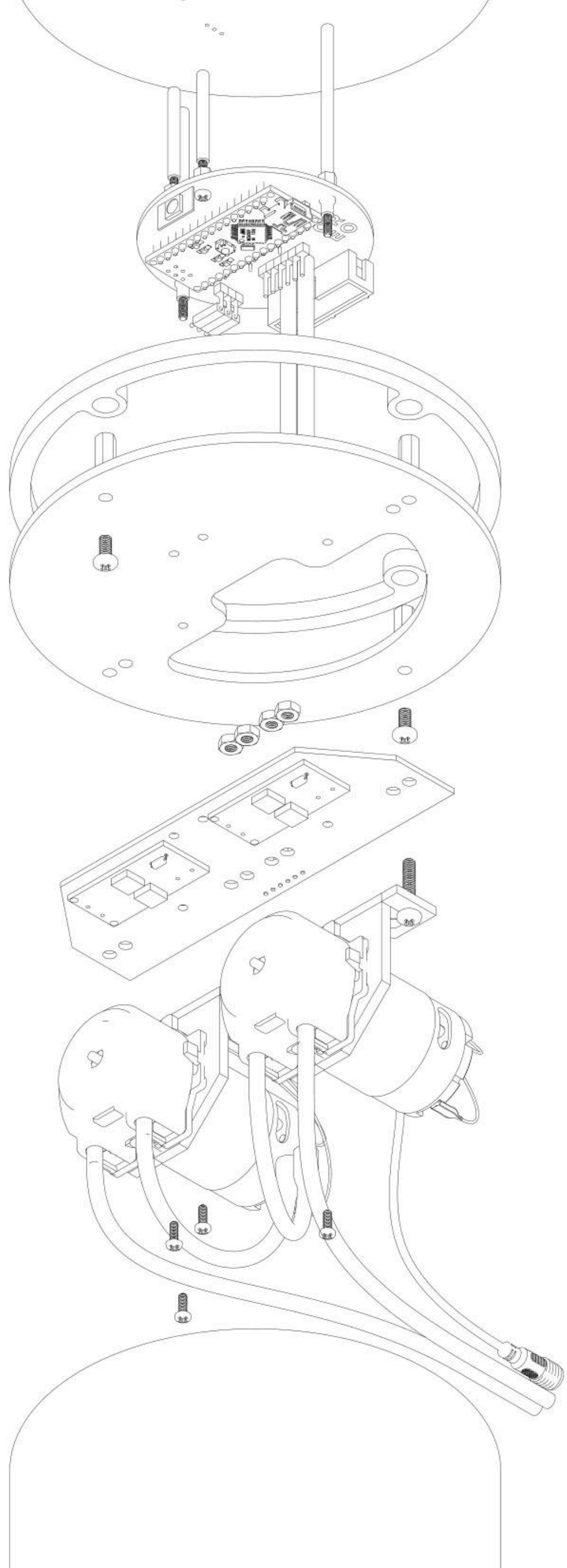
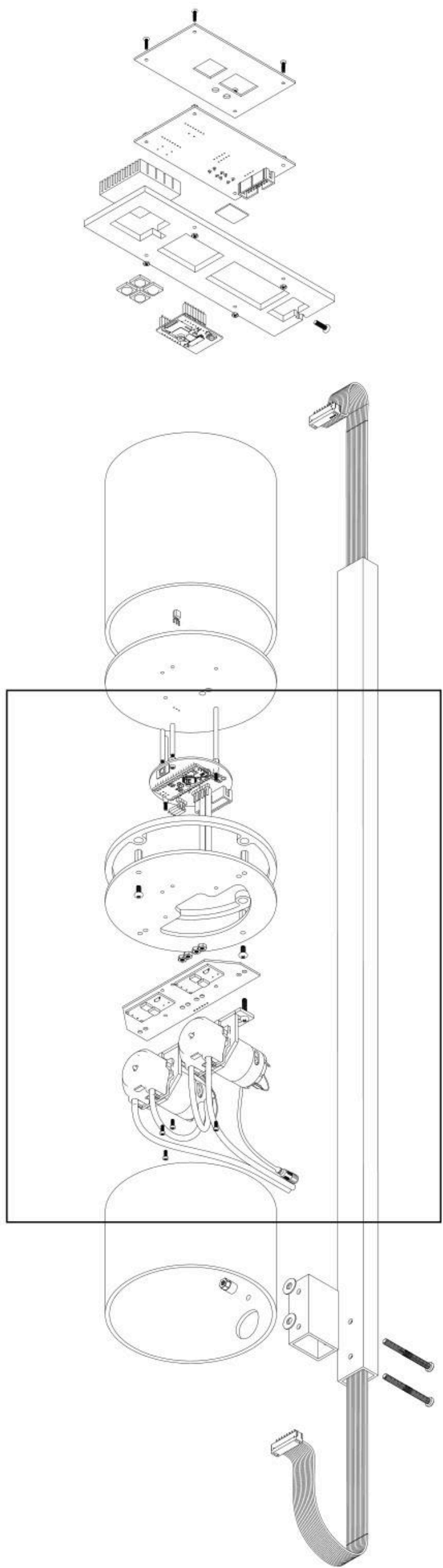
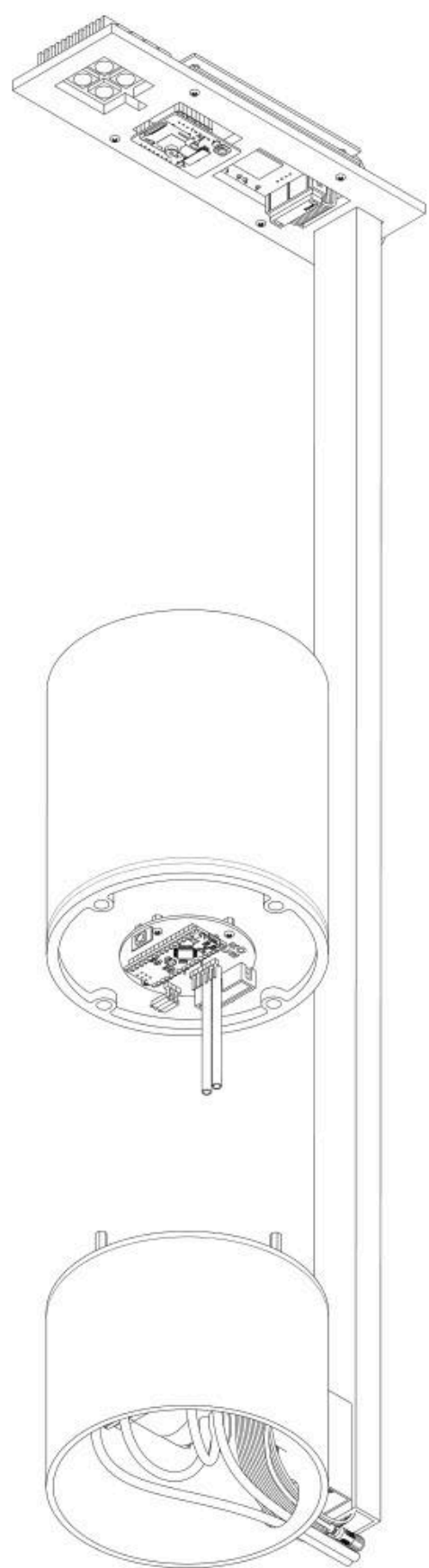
Rendering: February 27, 2020

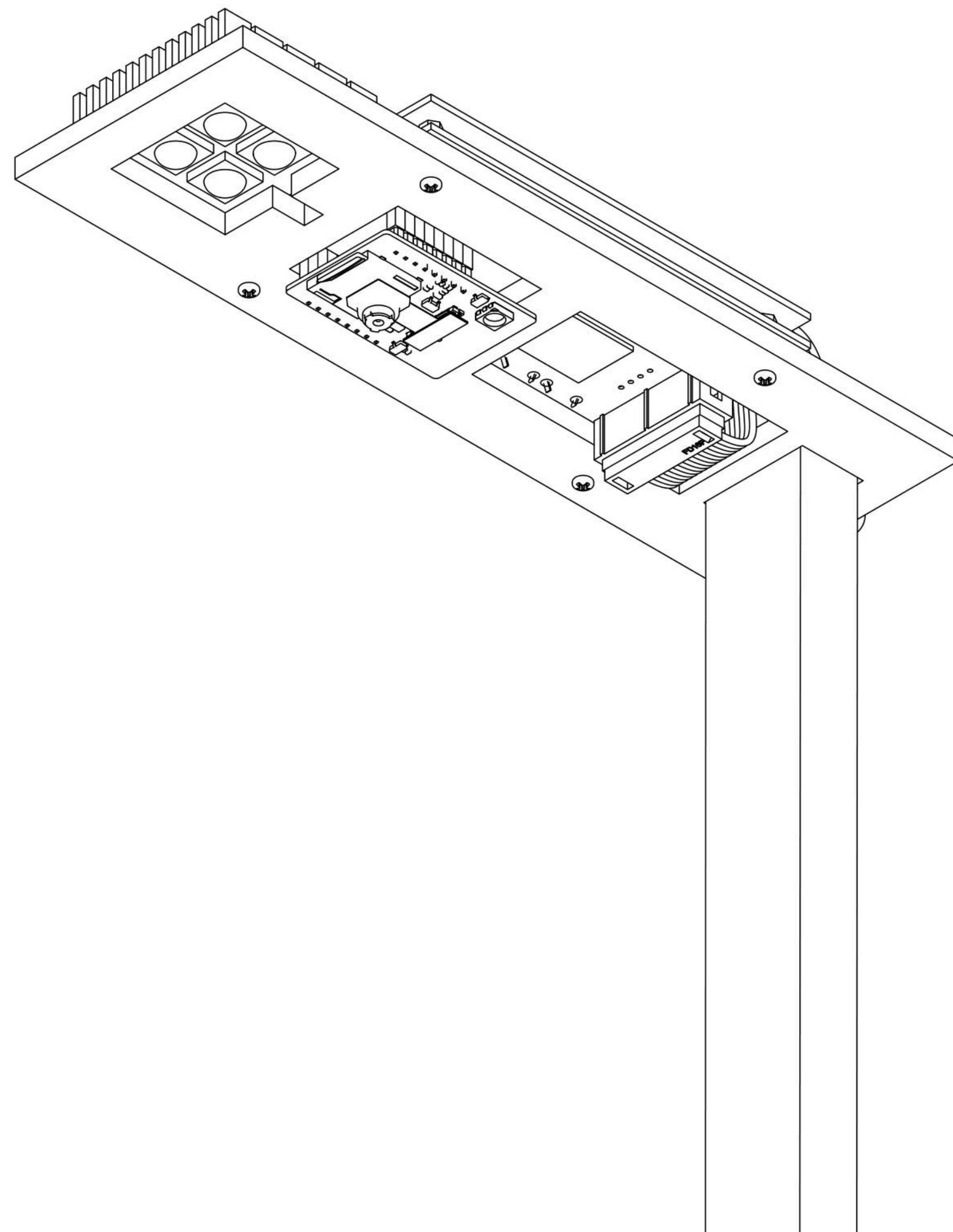
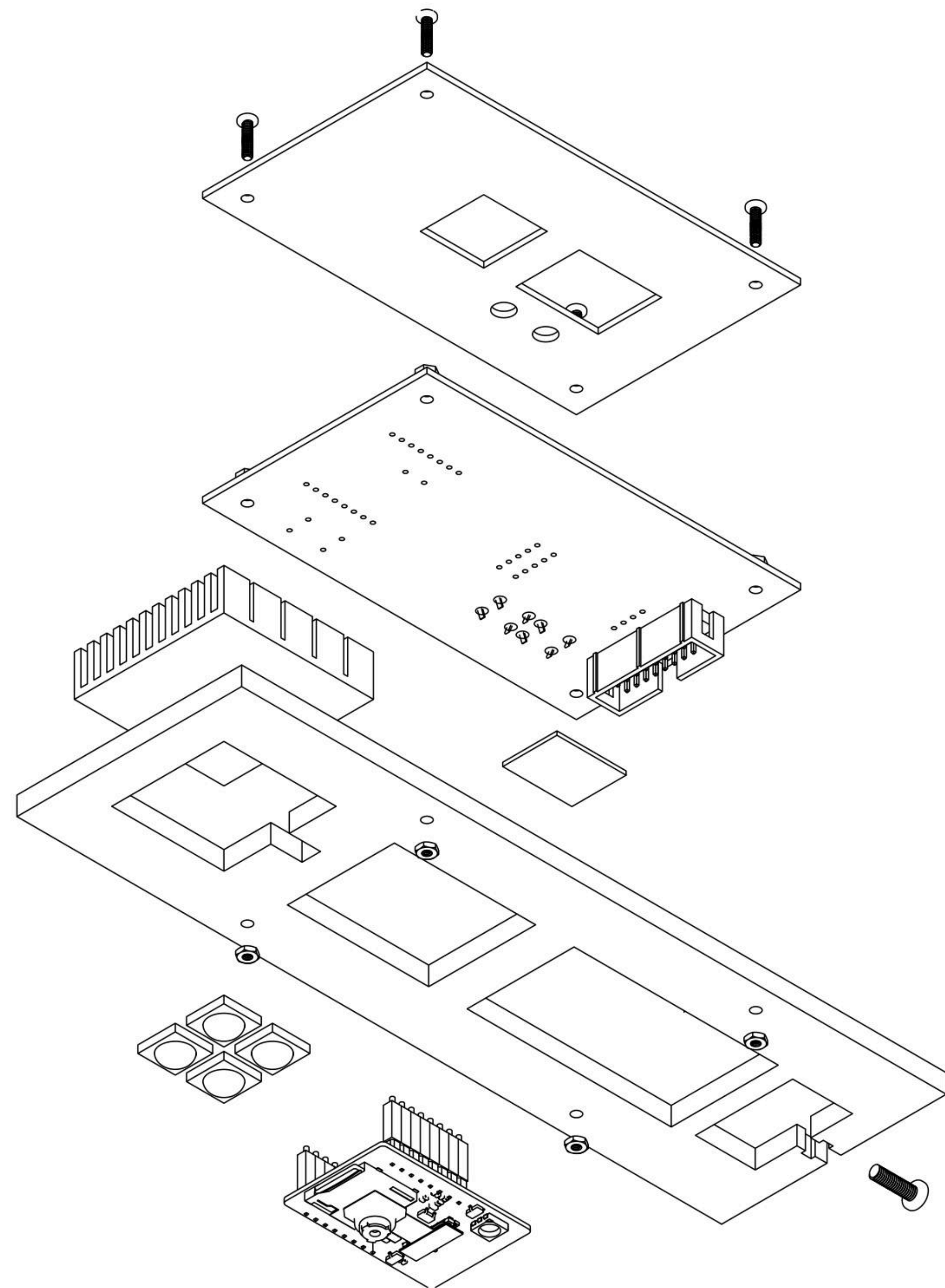


Rendering: February 27, 2020

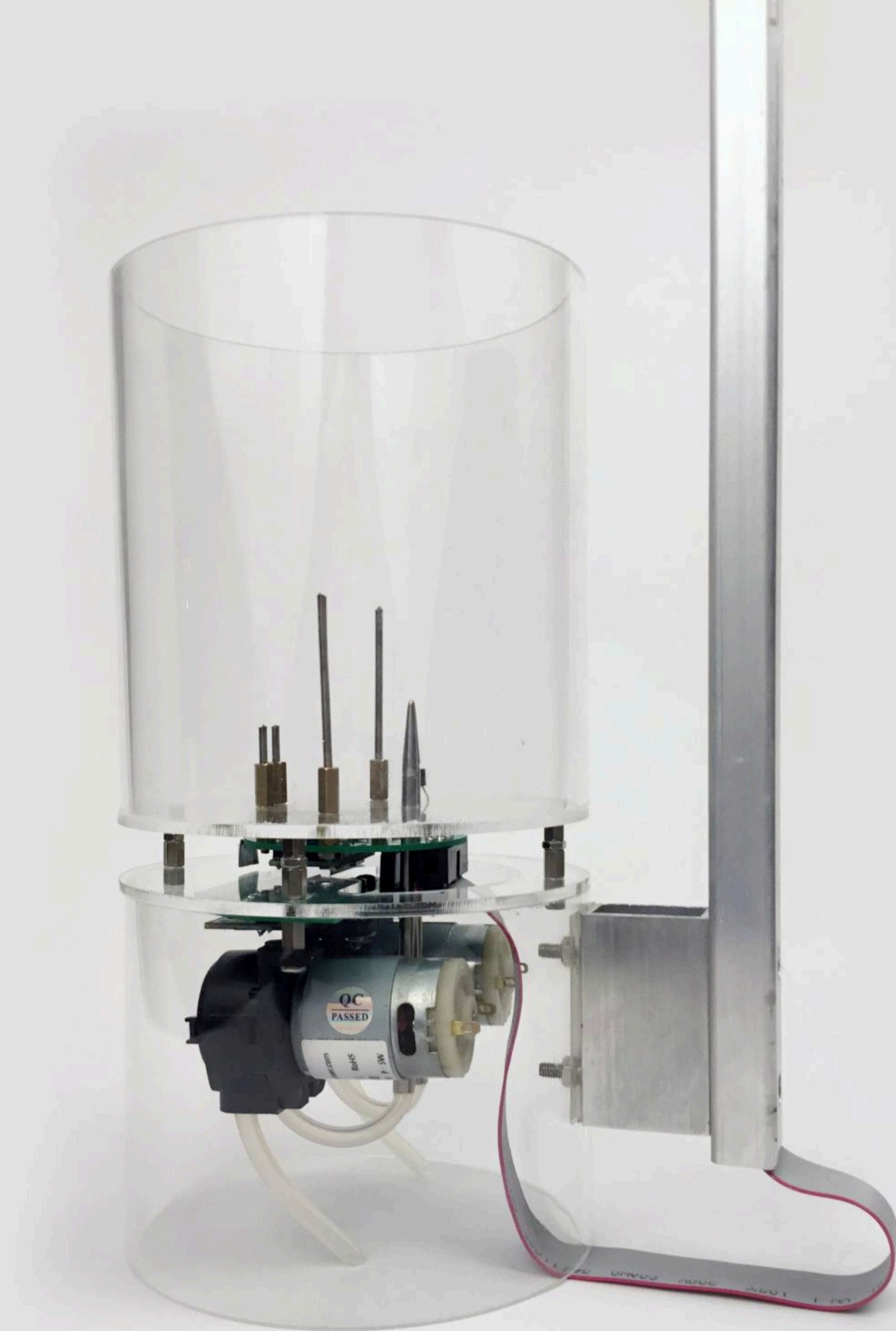


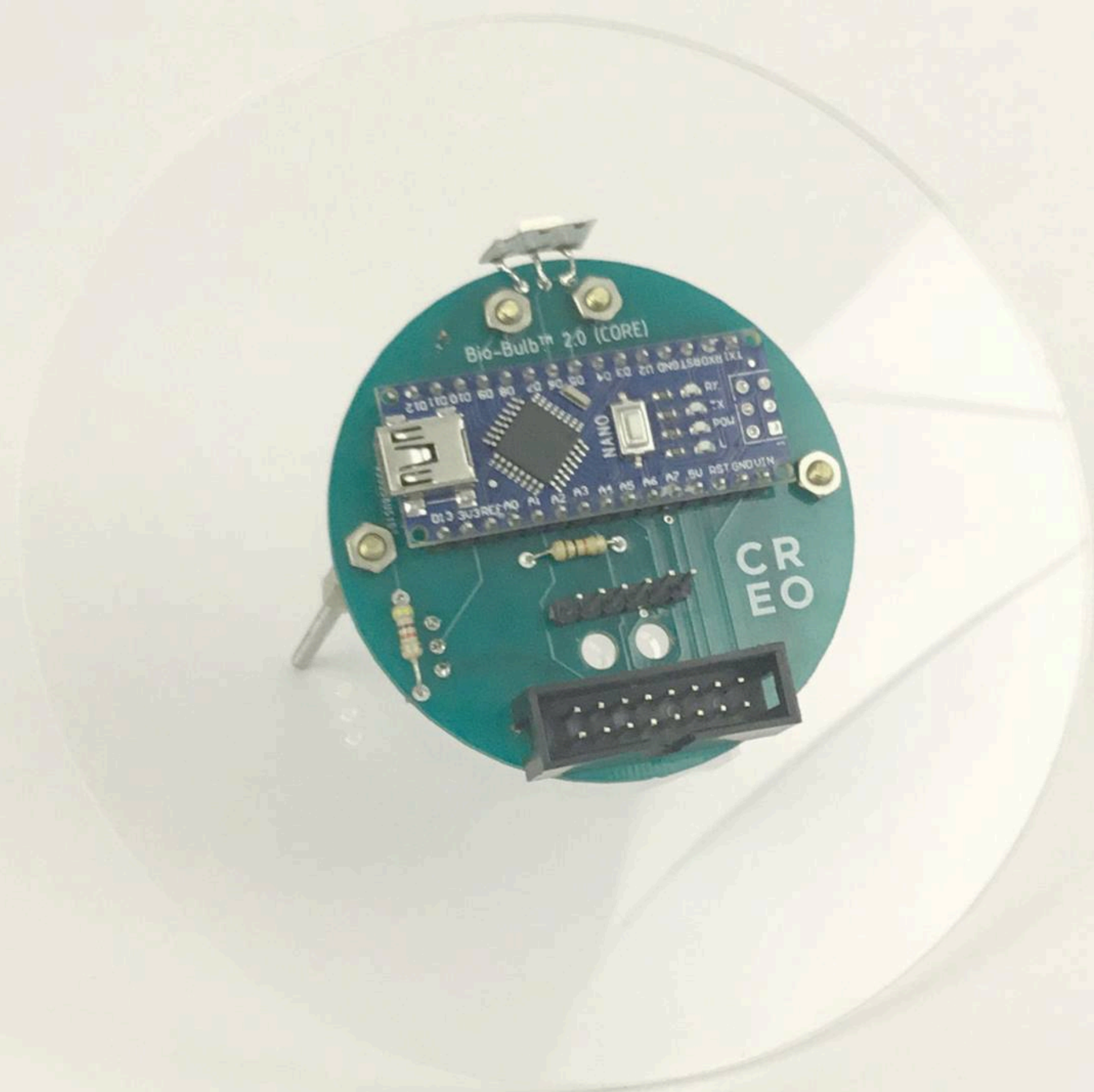
Rendering: February 27, 2020



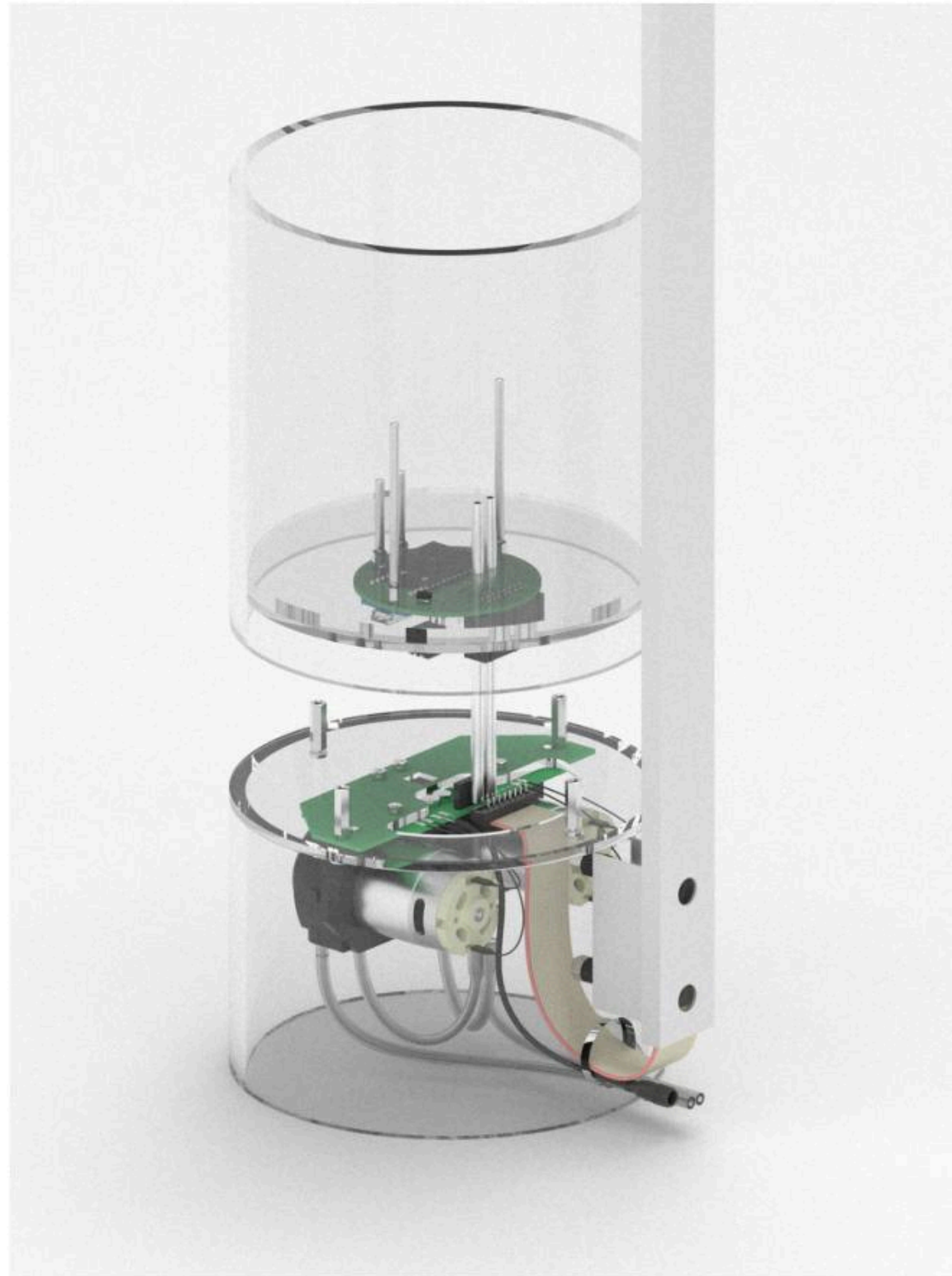


Prototype





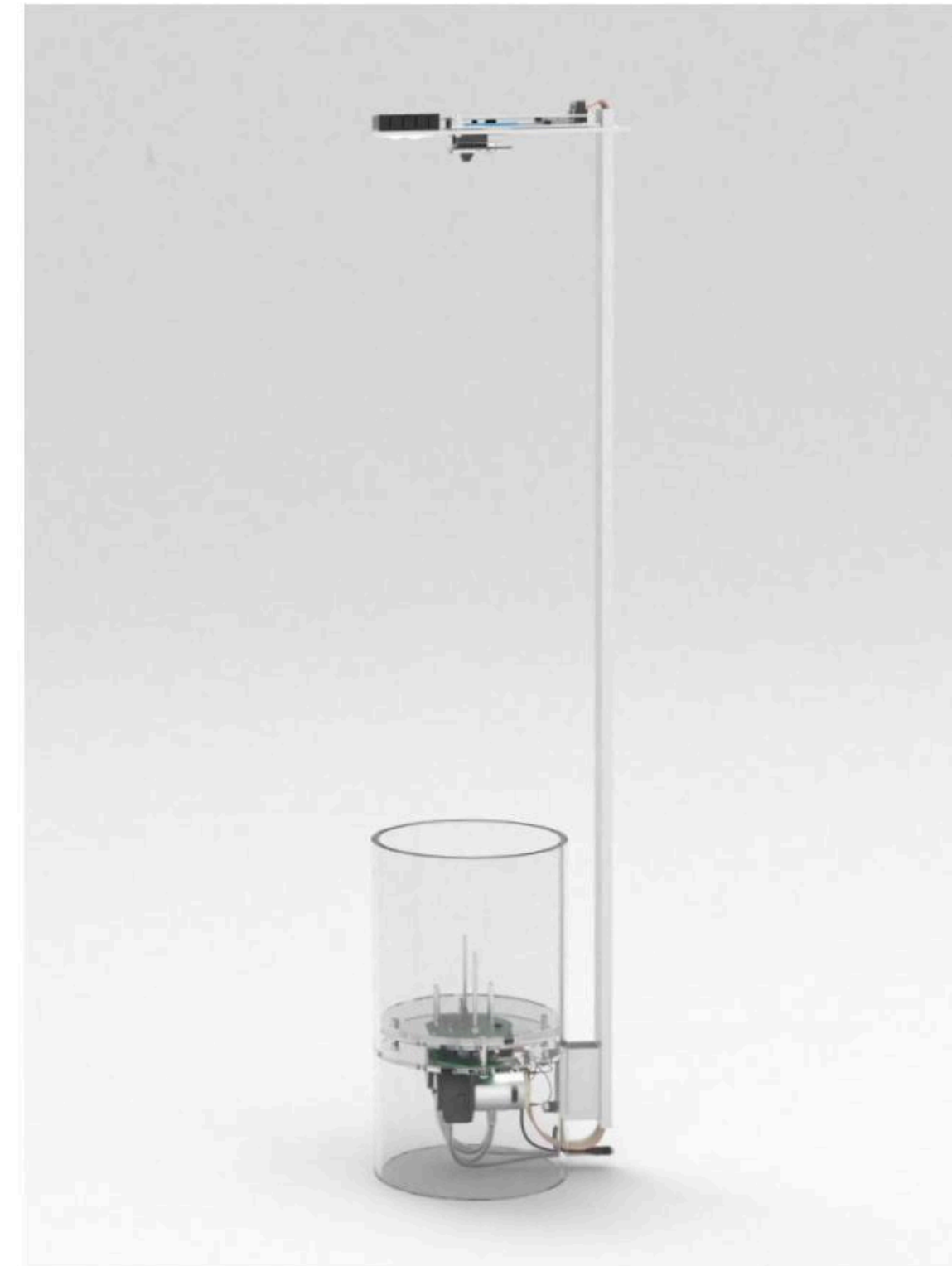




Rendering



Prototype



Rendering



Prototype

DARWIN - CREO-Cloud (server)

Darwin connects to an existing WiFi network (one created by your wireless router) is called Station (STA). In STA mode it gets the IP from the connected wireless router. With this IP address, it can set a web server and deliver web pages to all connected devices under existing WiFi network and post DARWIN's data and pictures to the cloud.

DARWIN Software

Darwin side : Open-source electronics platform based - easy-to-use hardware and software. IDE based on C/C++ languages.

Server Side : Php Server and MY/sql database

	Function	Sensor	Hardware	
			MCU- (CORE PCB)	MCU- Cam+Wifi (Vision PCB)
1	Read Soil Temp	Temp sensor		
2	Read Soil Moisture	Moisture sensor		
3	Read Soil EC	EC sensor		
4	Read Ambient Light	Light Sensor		
5	Read Plant Light	Light Sensor		
6	Read Room Temp/Hum	DHT Sensor		
7	Control Water Pump	Mosfet		
8	Control Nutrient Pump	Mosfet		
9	Control Plant Lamp	Mosfet		
10	Control LED	RGB LED		
11	Reset Button	Button		
12	Led Button	Button		
13	Take Picture	Camera module		
14	Connect Internet	Wifi module		
15	Read Config	internal memory		
16	Update Config	internal memory		
17	Post Data	Wifi module		

CREO-Cloud Data Types

Soil Temp (Celsius and/or Fahrenheit)

Soil humidity (%)

Soil EC (ppm or Siemens)

Ambient temp (Celsius and Fahrenheit)

Ambient humidity (%)

Ambient light in (lux)

Plant light in (lux)

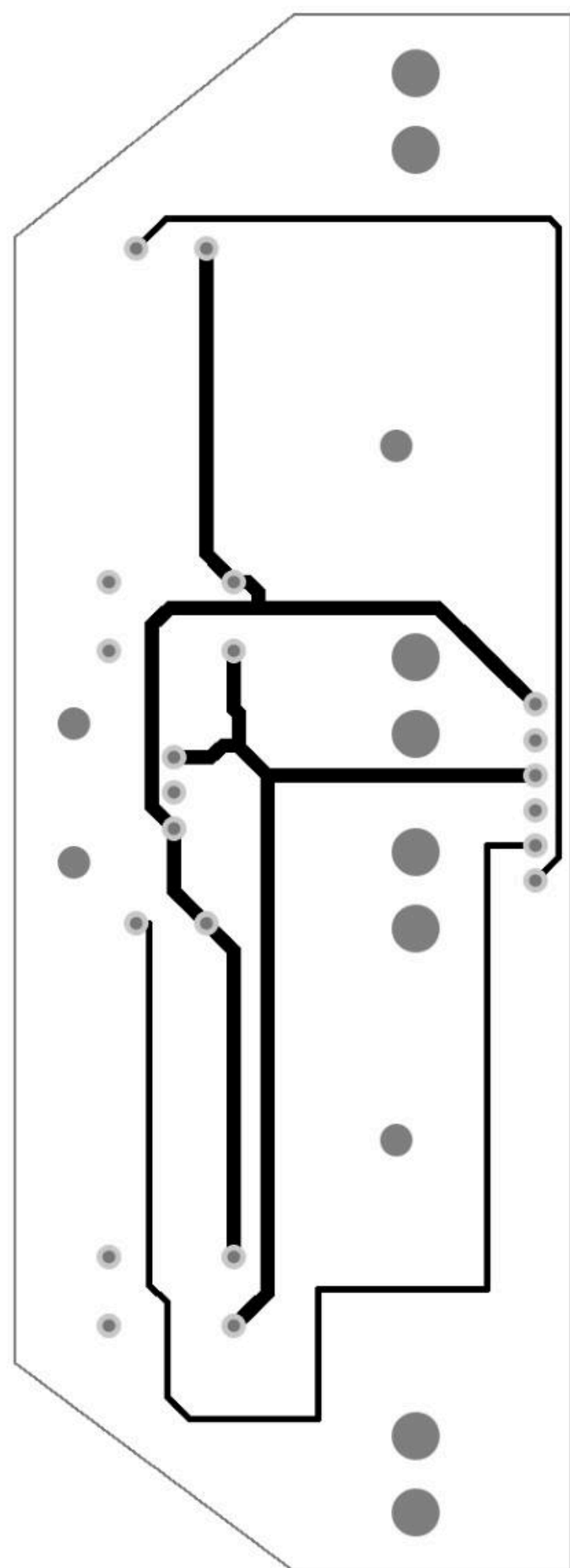
Water feeding time, duration and volume (cc)

Lighting time and intensity (LED%)

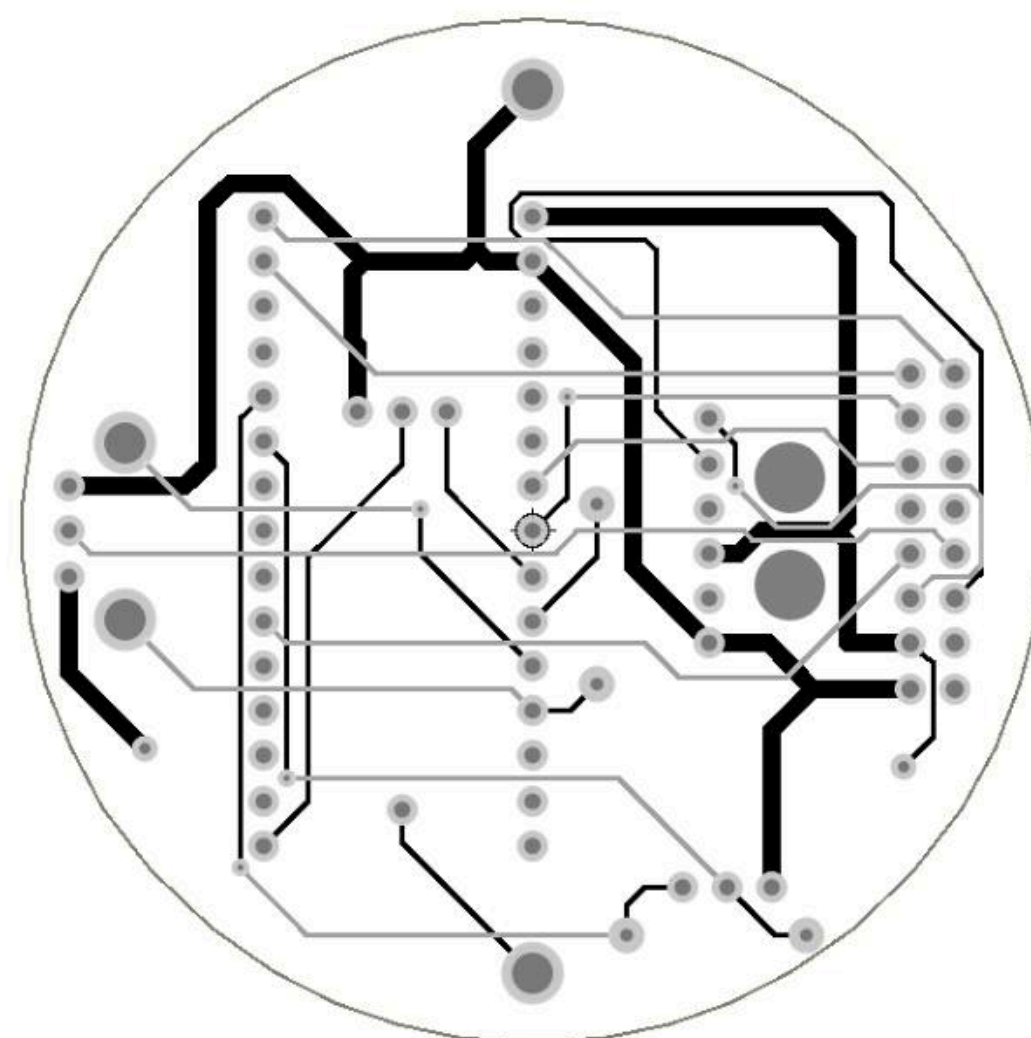
Nutrition time, duration and volume in (cc)

Plant image

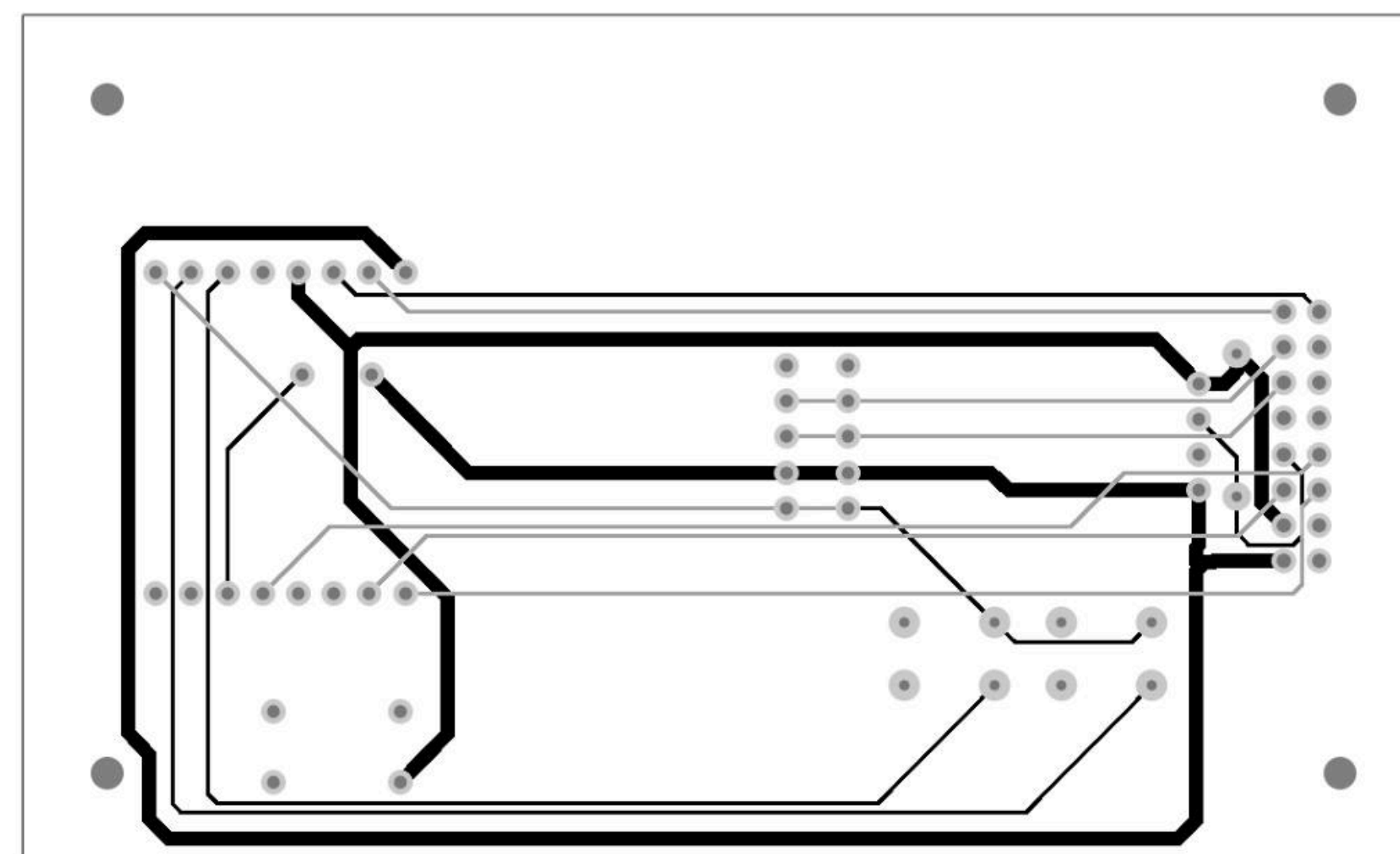
PCB



Heart PCB

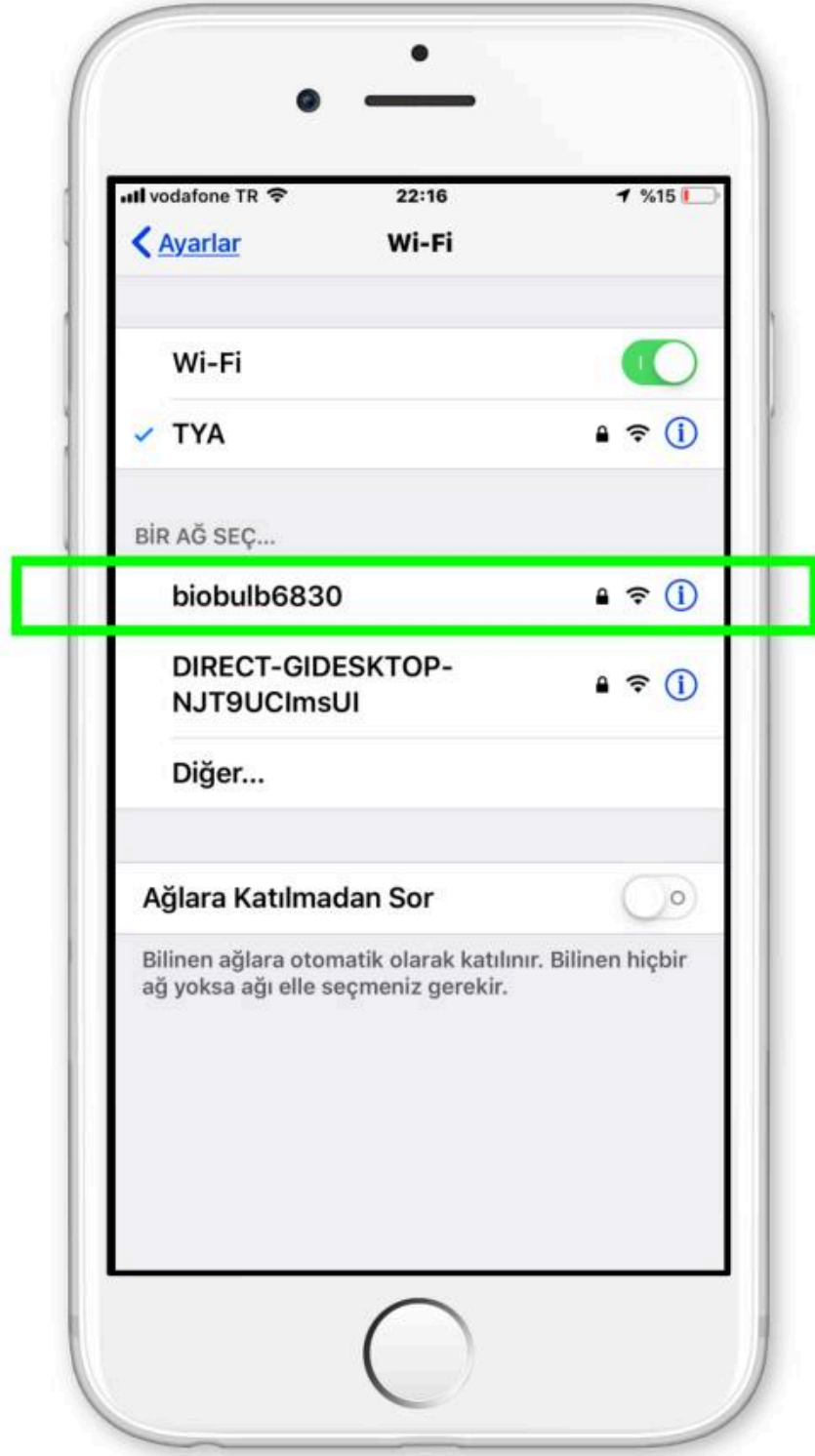


CORE PCB

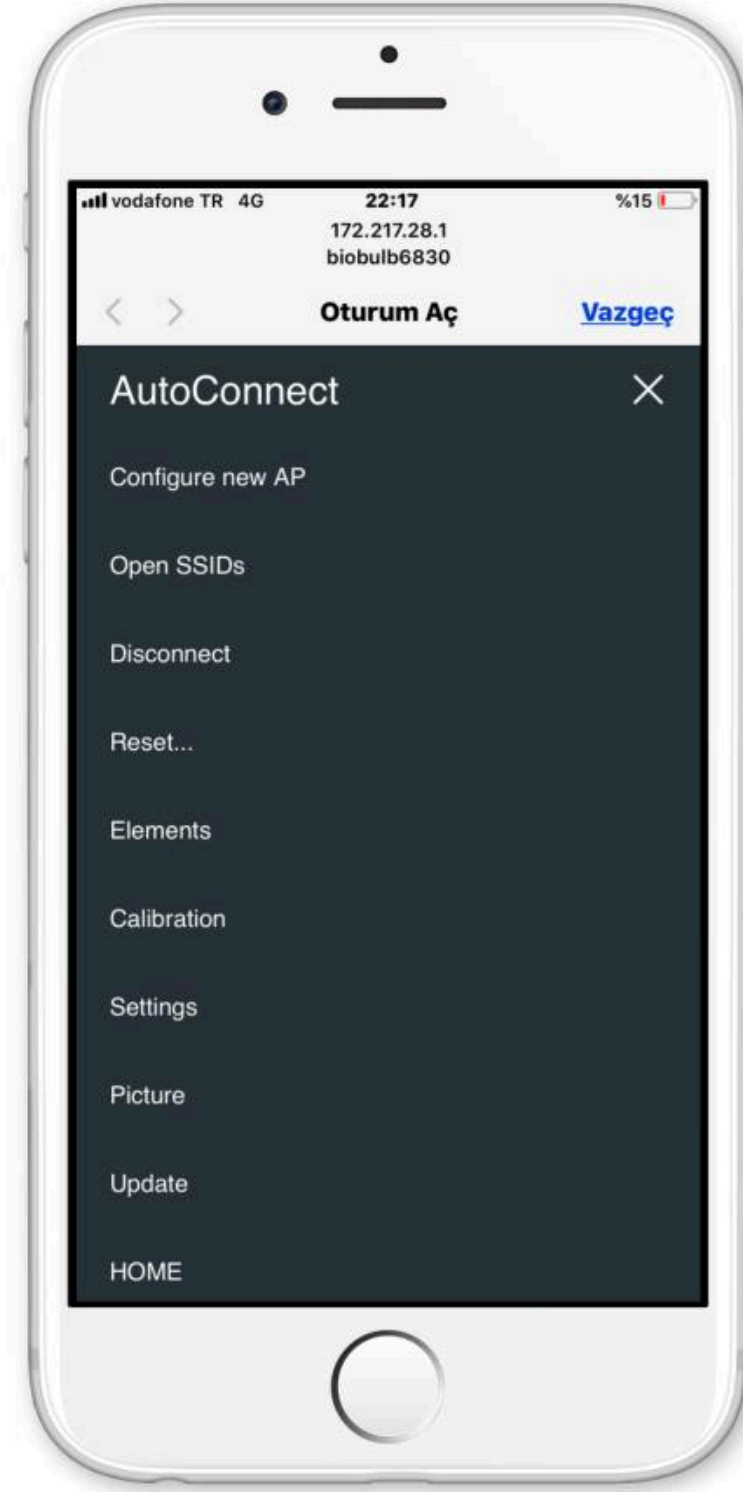


Vision PCB

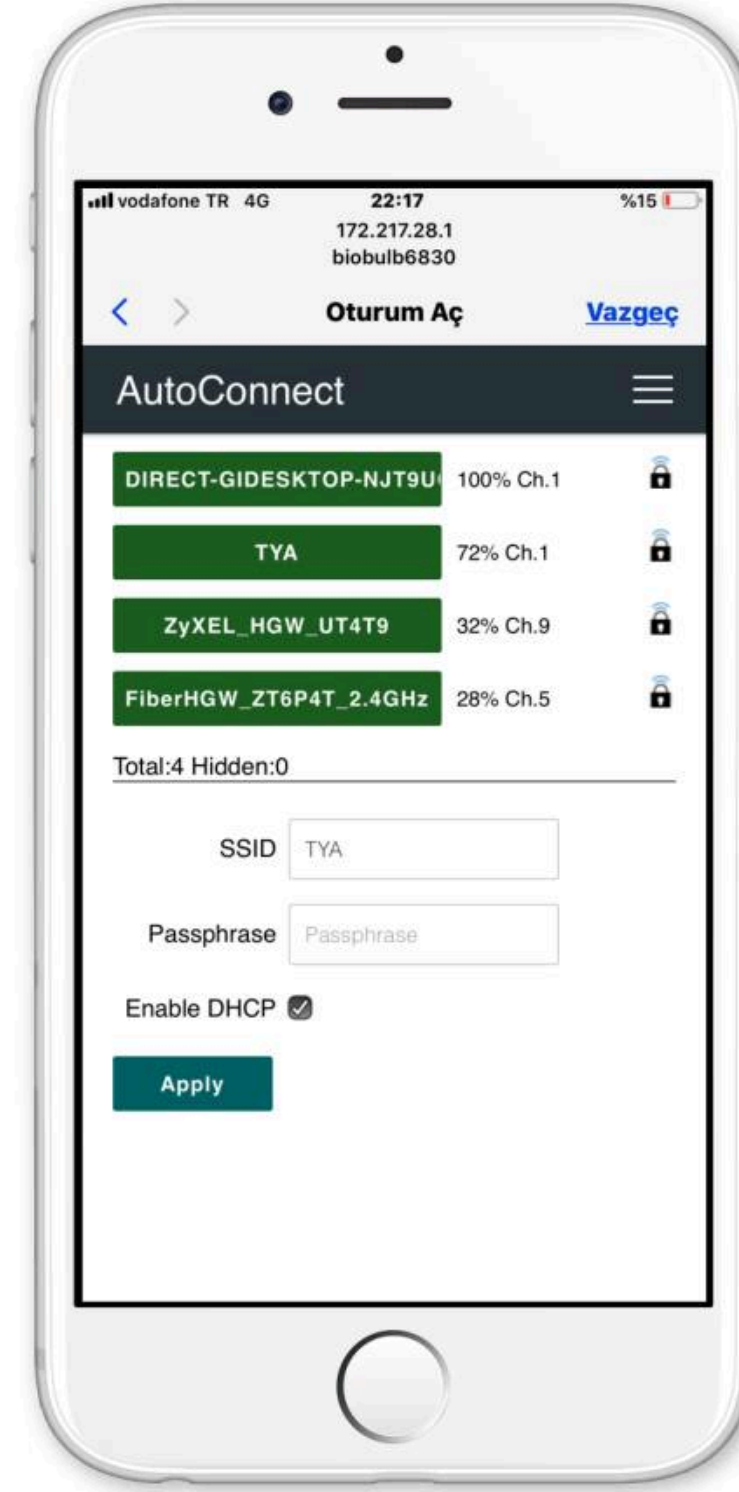
Mobile



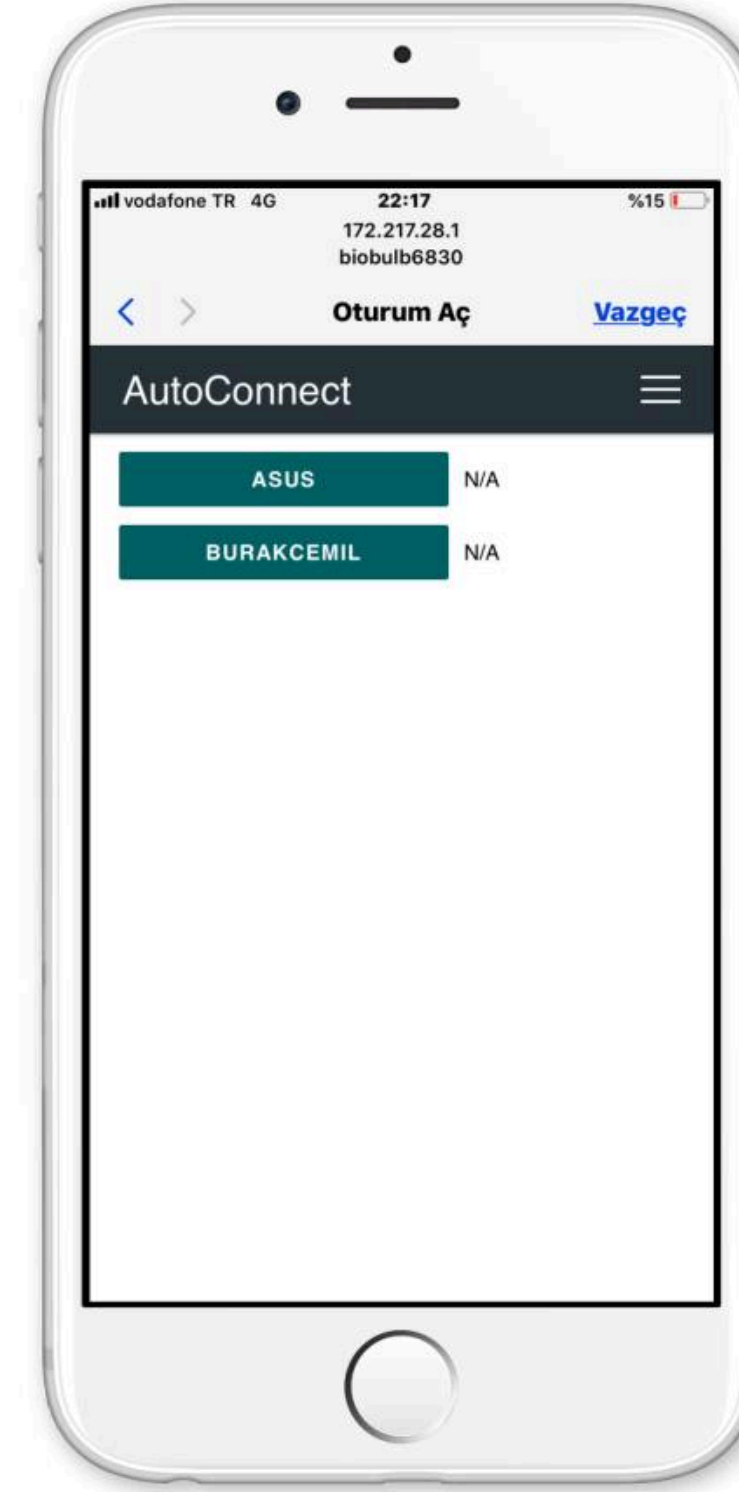
BioBulb-Hotspot



Menu

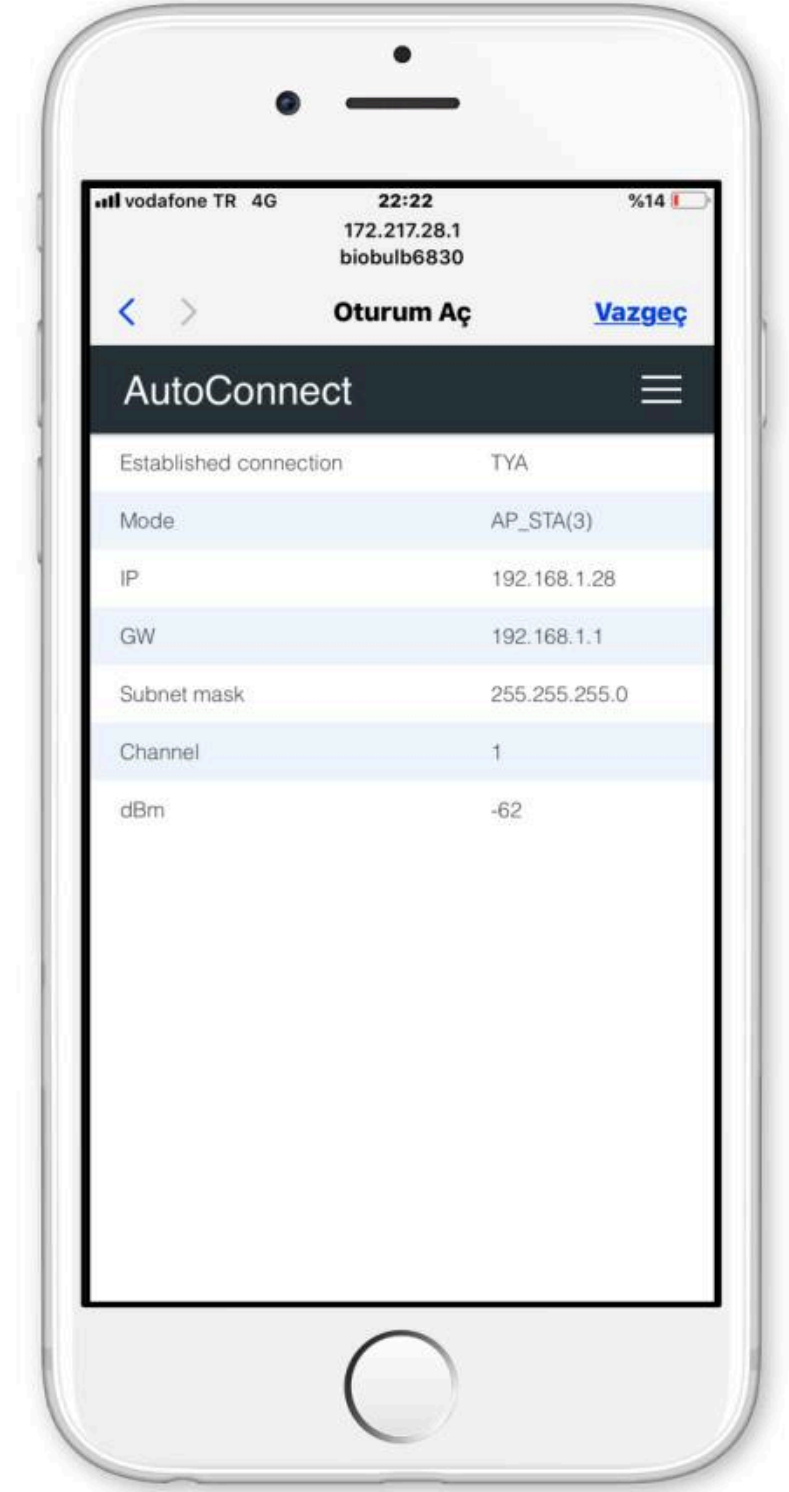


Wifi Configuration



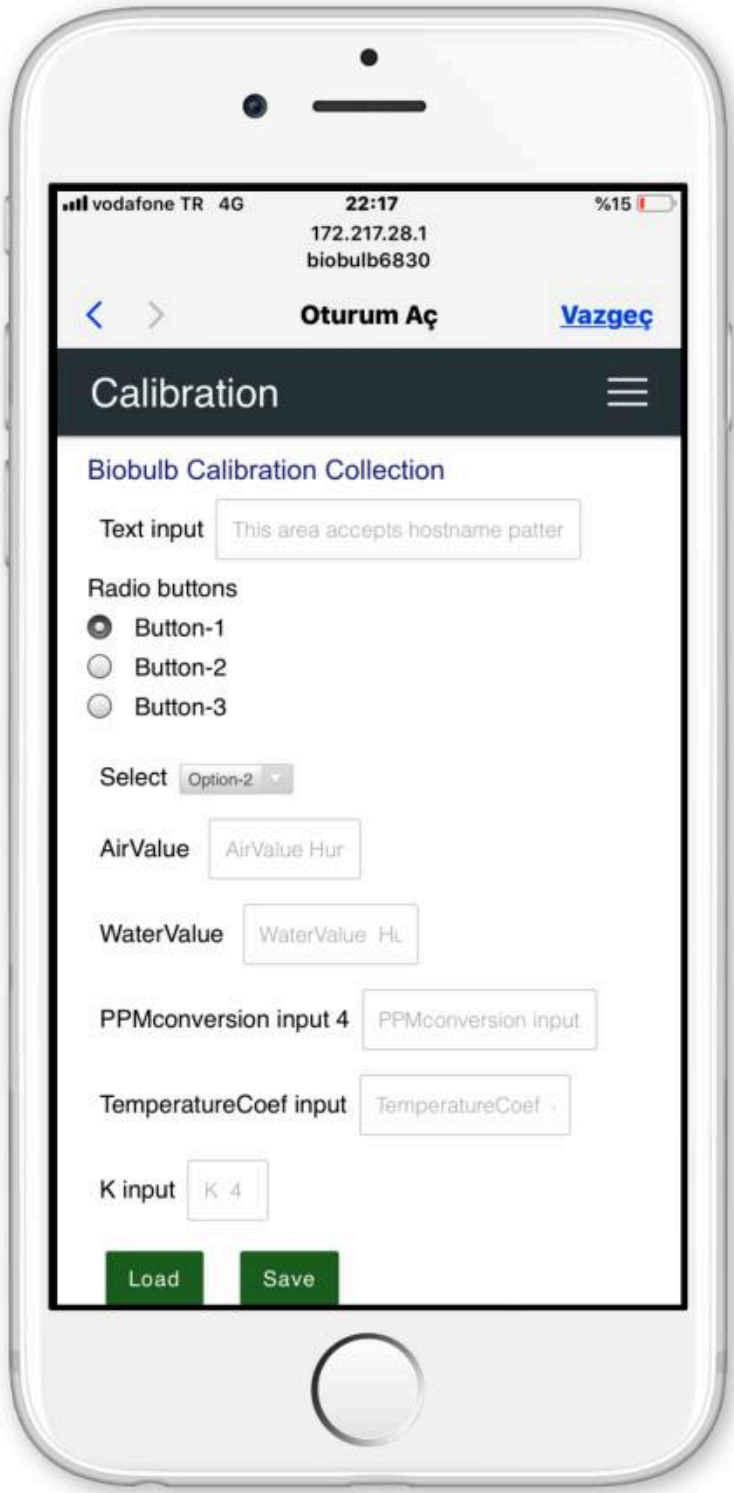
SSID Selection

(Trusted Previous Connections)

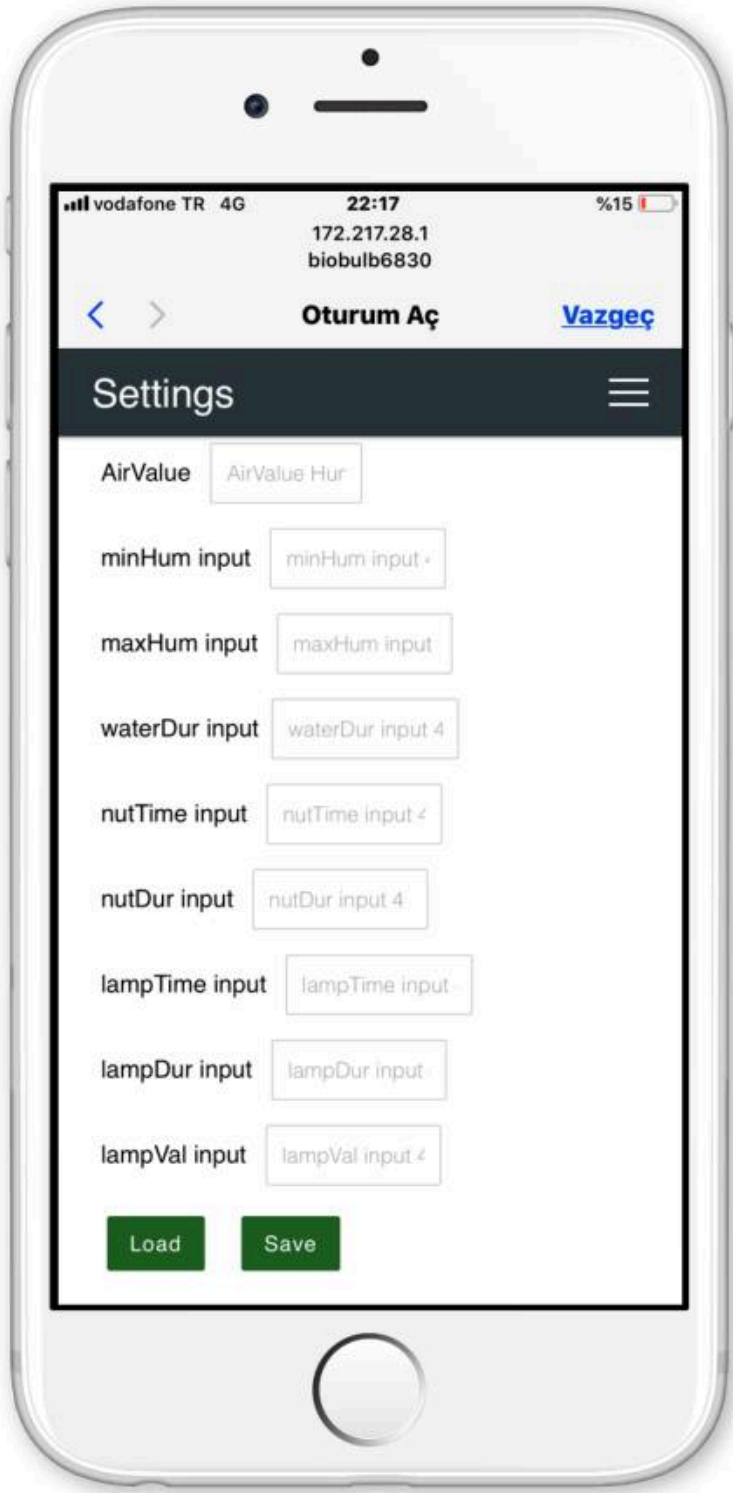


Wifi Credentials

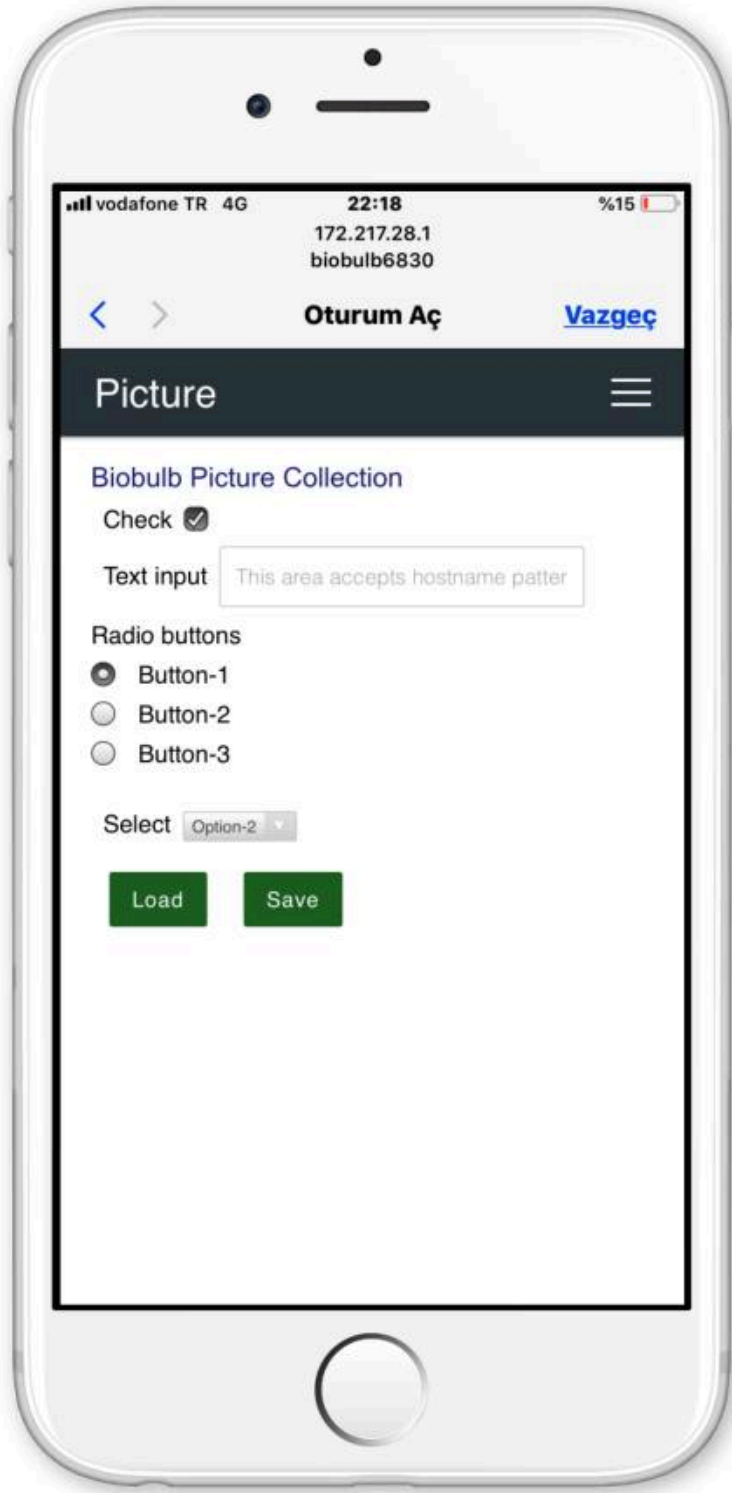
Mobile



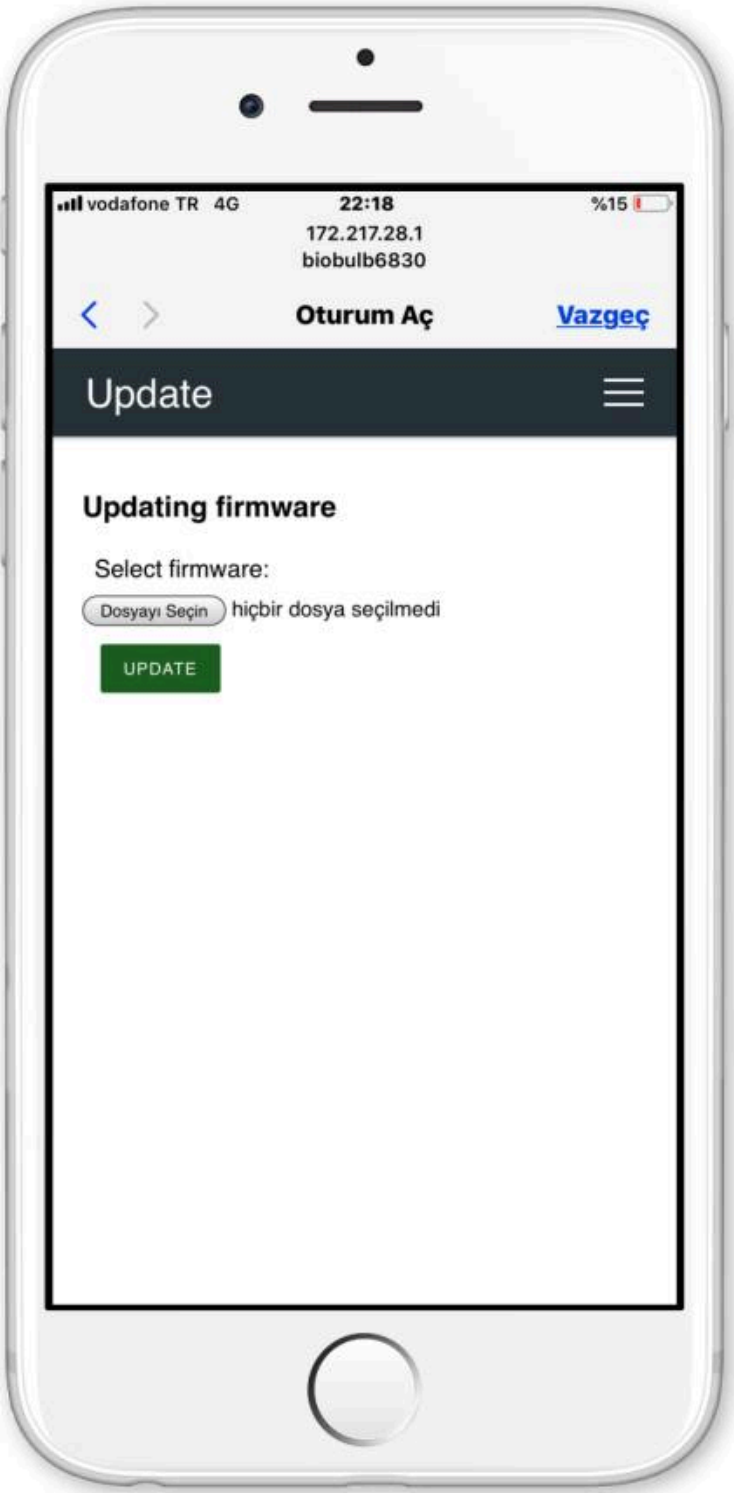
Calibration



User Settings

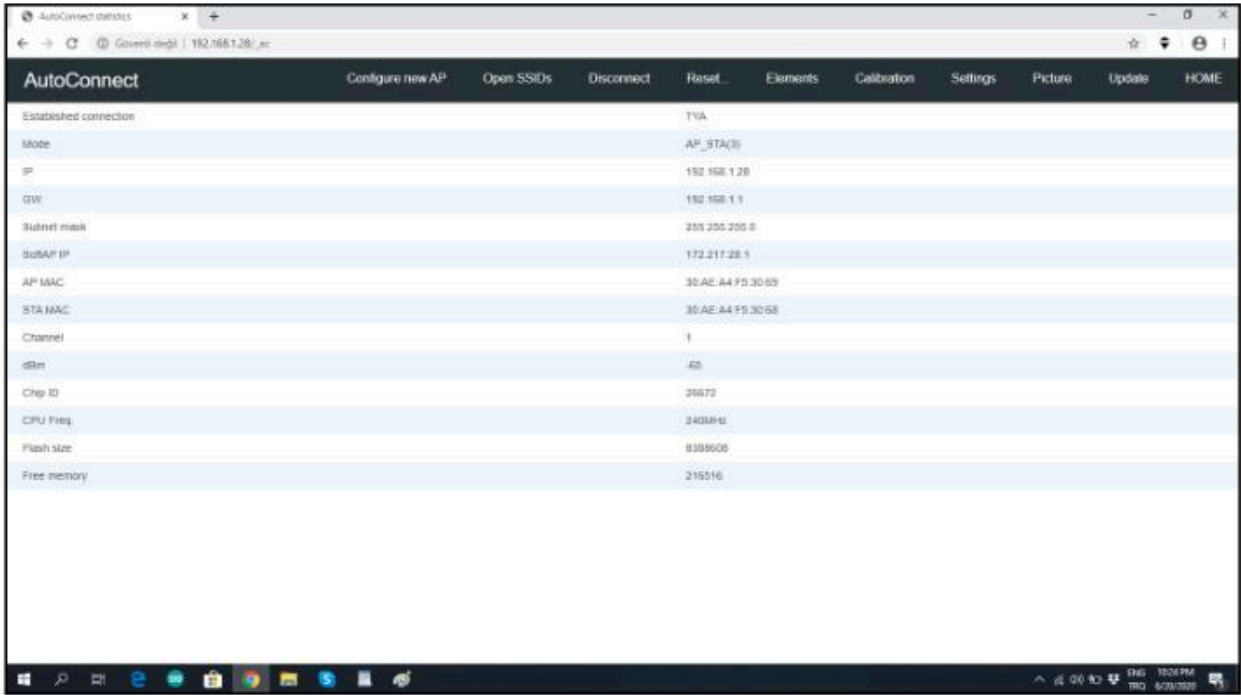
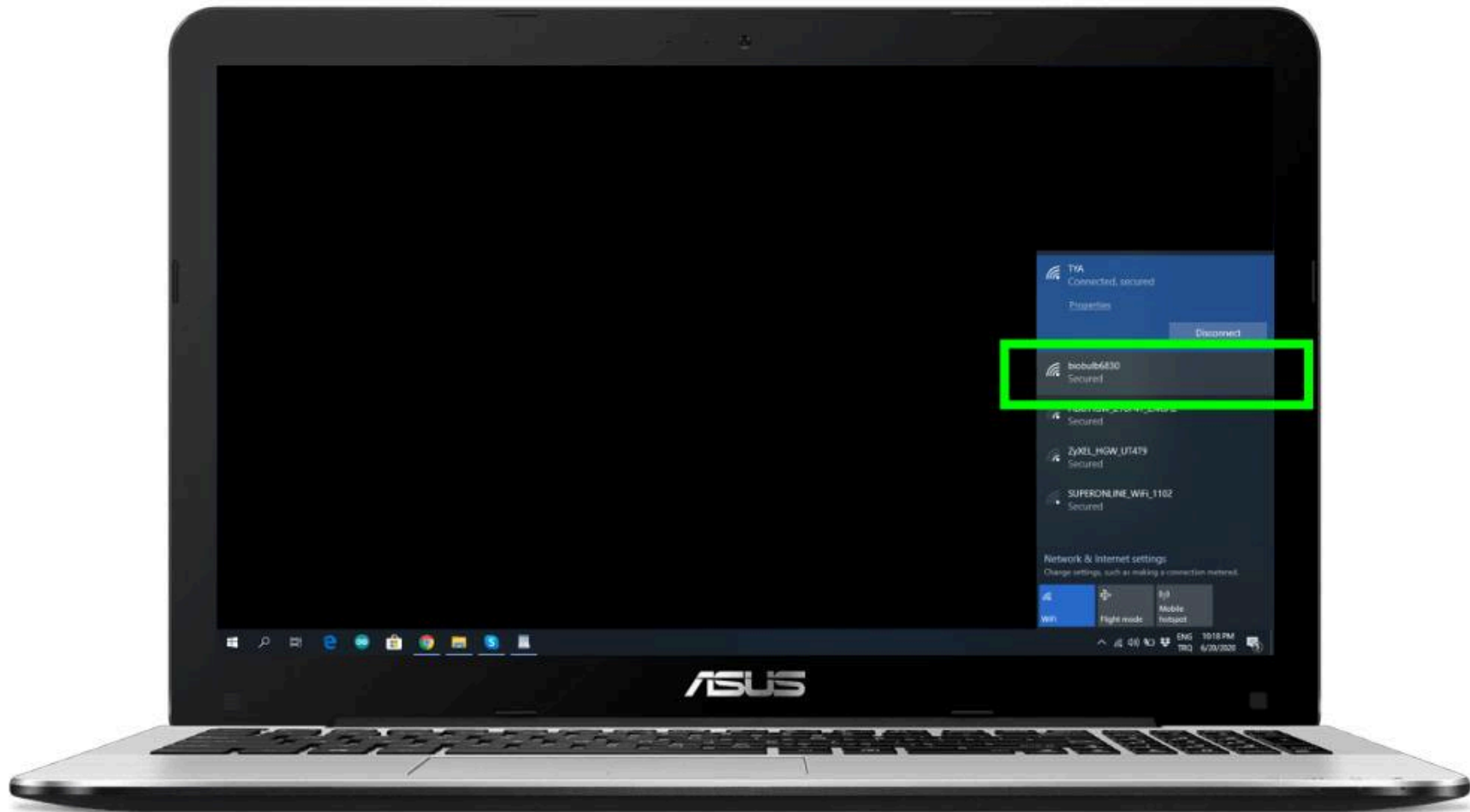


Picture Settings

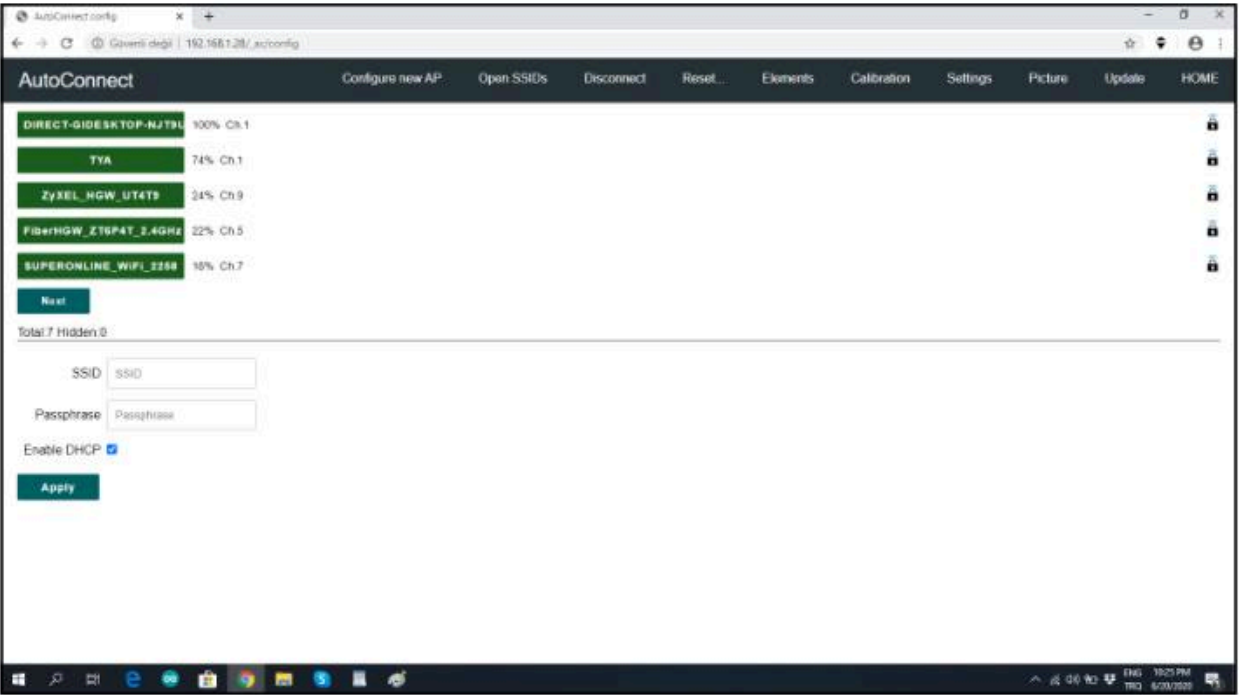


Firmware Update

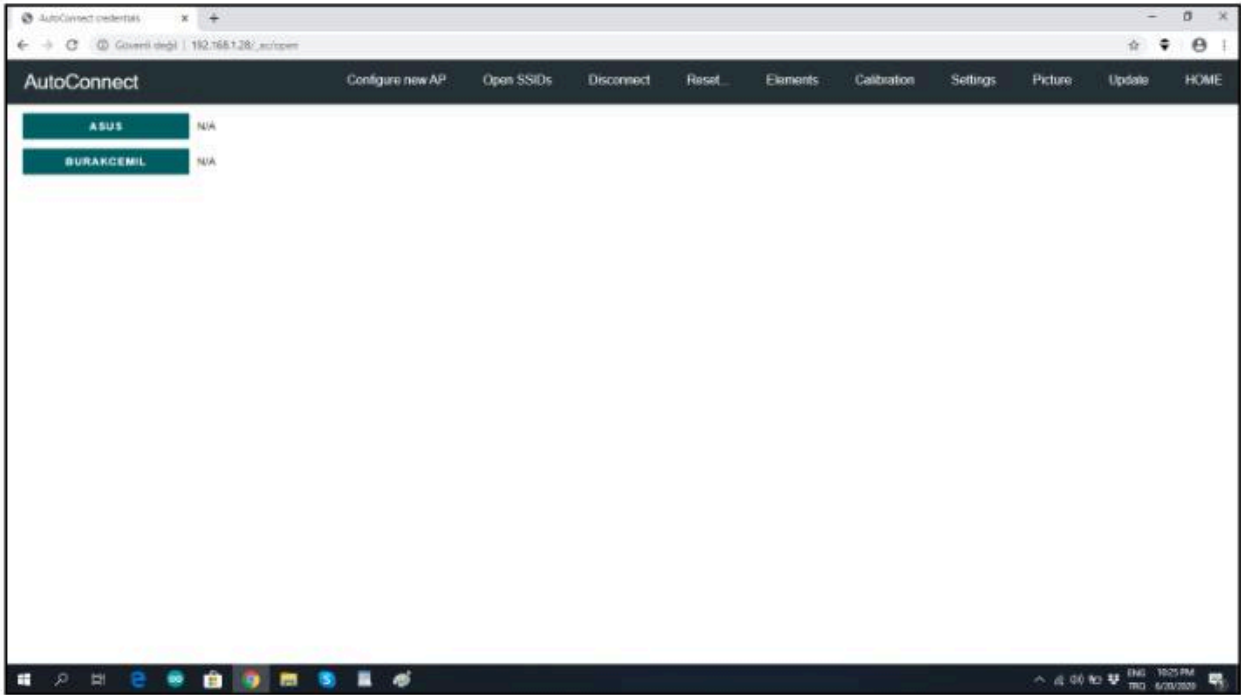
PC



Wifi Credentials

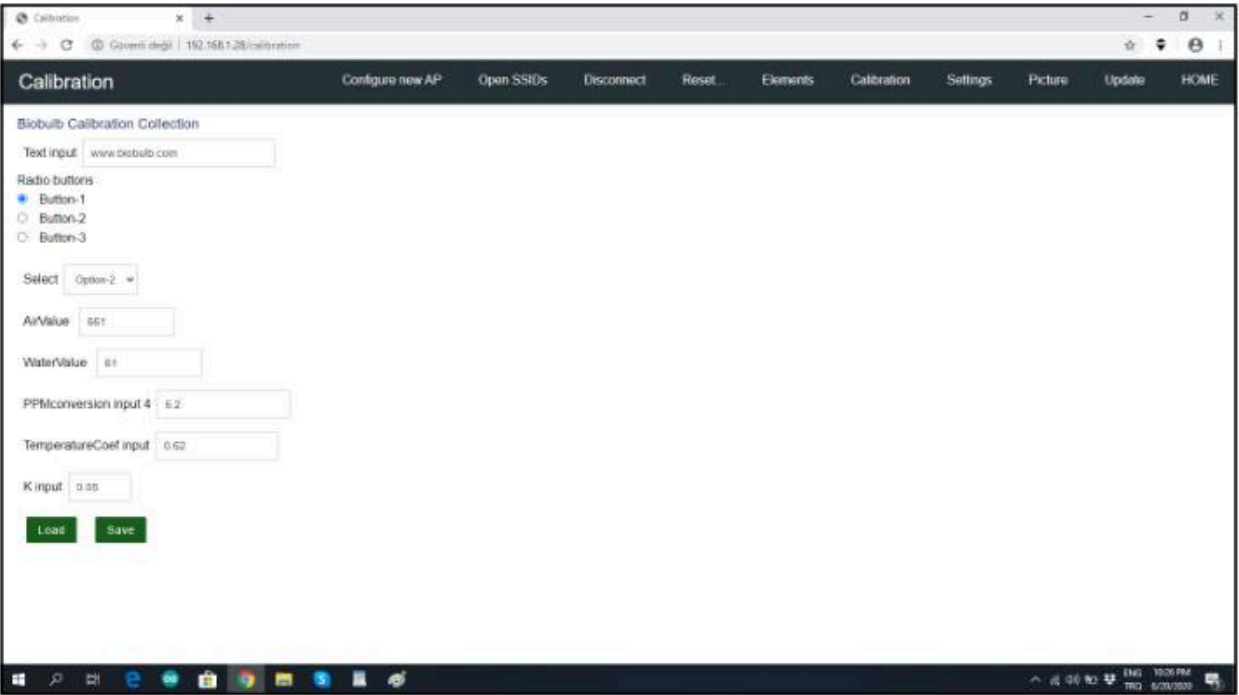


Wifi Configuration

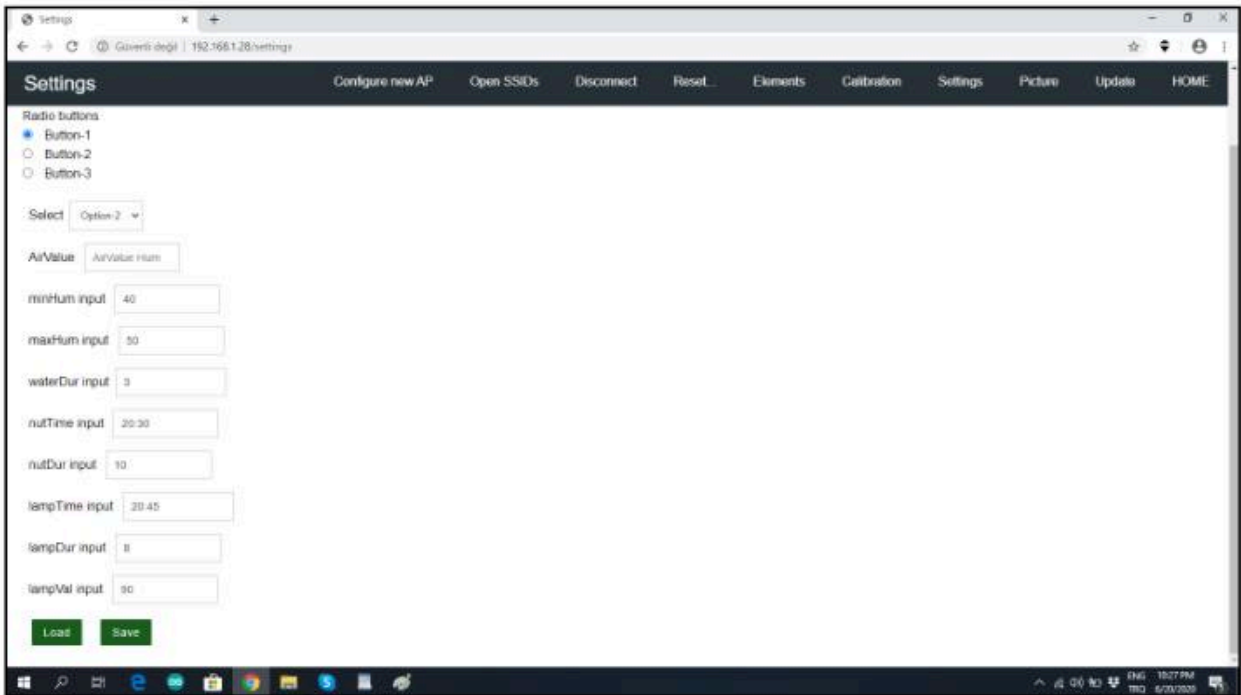


SSID Selection

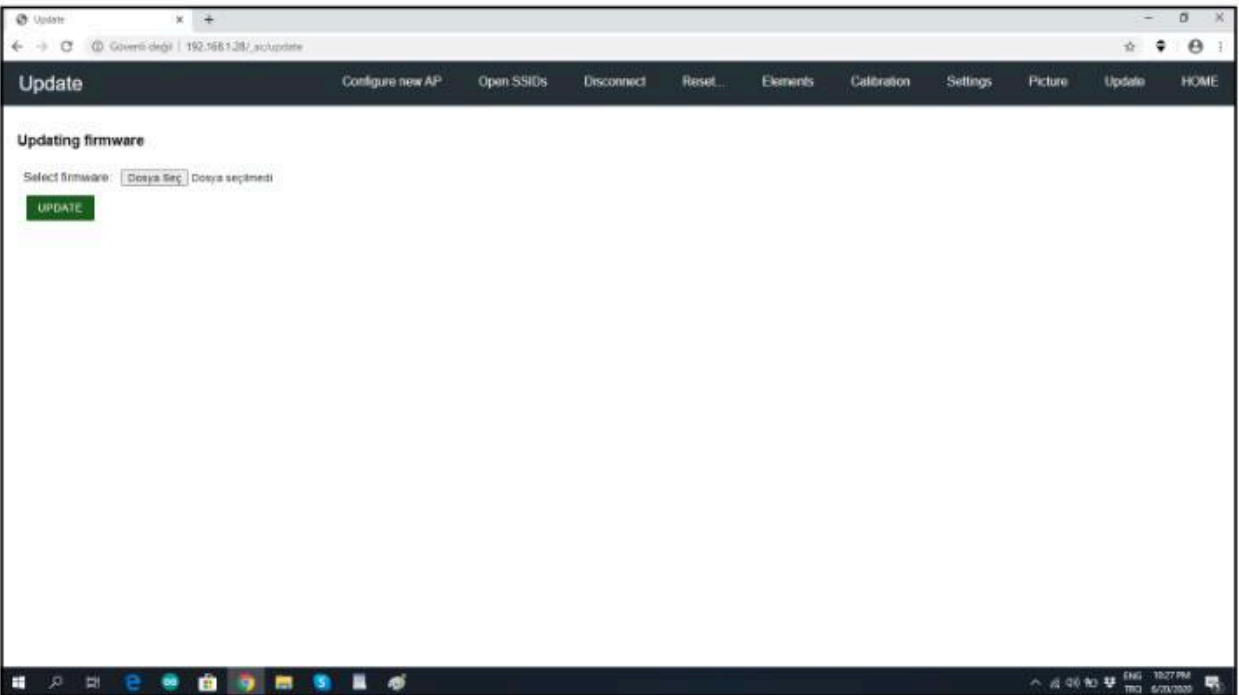
(Trusted Previous Connections)



Calibration

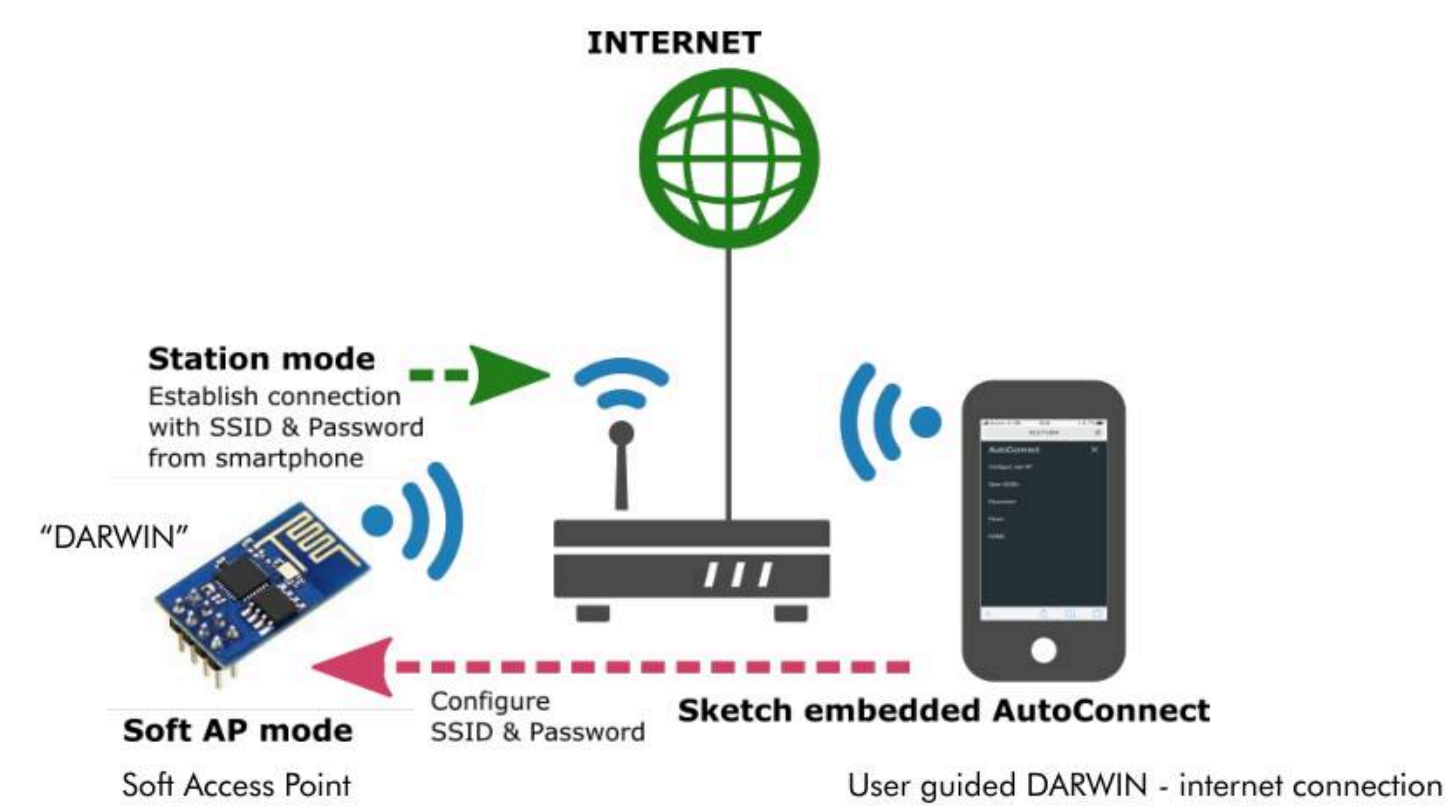


DARWIN Activation Shedule Settings



Firmware Update

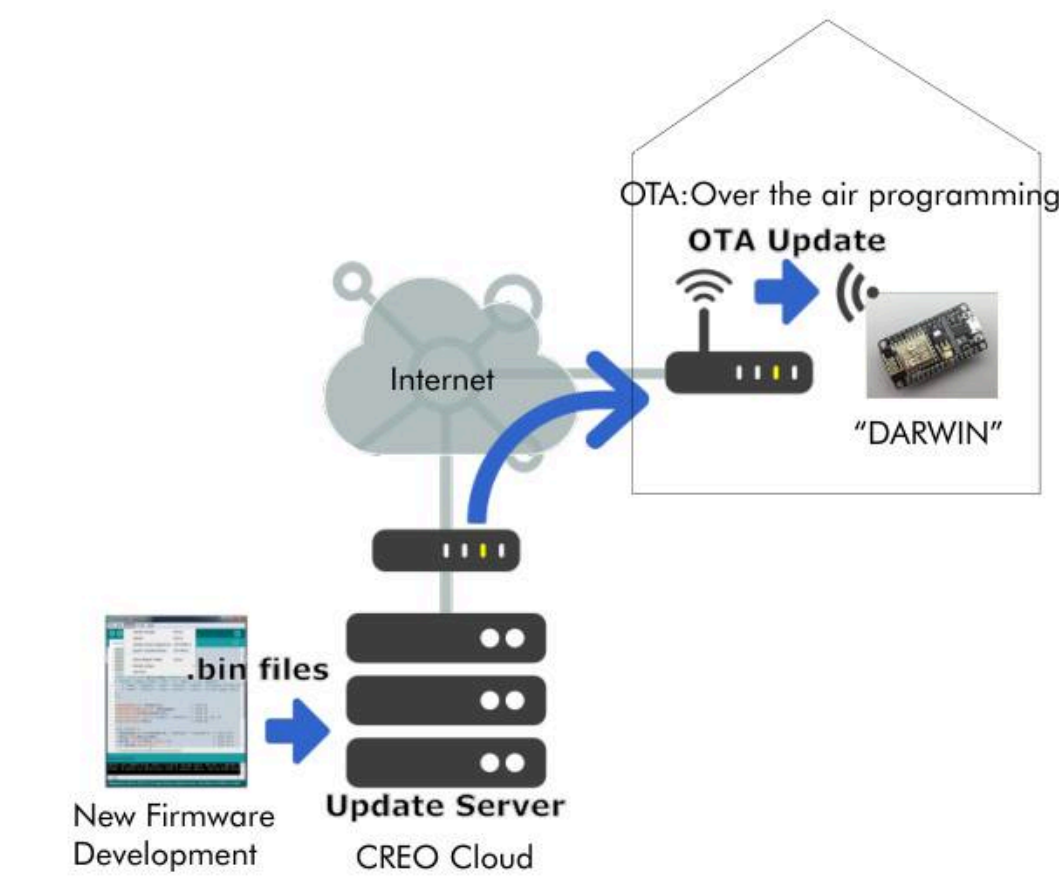
Internet Connection and Firmware Update



Hotspot and Wifi Connection



Firmware Update from the Local Pc via Wifi



Firmware Update from internet server



