



**OCEAN** SONICS

# Coastal Acoustic Drifting Buoy User Guide



April 2020

Version 2.1

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## Introduction

The Ocean Sonics Coastal Acoustic Drifting Buoy is an easy way to deploy one or more icListen Smart Hydrophones while keeping them synchronized. Users can create a custom array using the extension cables and Smart Cables as building blocks. The setup and configuration of the hydrophones can be done with the buoy's internal Wi-Fi access point.

The yellow drifting buoy is small and lightweight, so it can be deployed from a small vessel by 1 or 2 people. This solution combines power, Wi-Fi, and time synchronization with a hydrophone array.

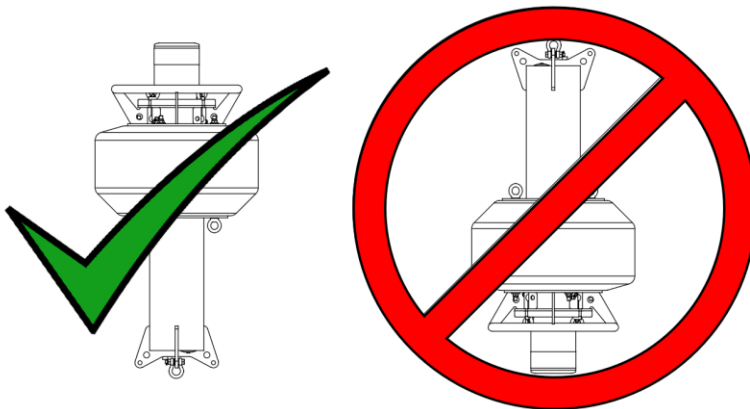
## Important Notes

- Buoy battery life will depend on set-up of deployment, number of hydrophones and smart cables.
- **Do NOT allow the batteries to deep discharge if the buoy does not have a low voltage cut-off module.**

**Batteries should not be discharged below 21 V.**

**To confirm the battery voltage, see [Appendix D](#)**

- Turn the buoy **OFF** when not in use.
- Recharge batteries after each 6 to 8-hour deployment.
- Stand the buoy upright or lay on its side.
- Do NOT flip the buoy or turn upside down.



- Battery positioning is ballasted for upright position.
- Turning the buoy upside down could result in damage to batteries.

## Specifications

<b>WEIGHT</b>	25 kg in air
<b>DIMENSIONS</b>	1 m x 0.5 m

## Features

- Built-in Rechargeable Batteries
- GPS Time Synchronization & Logging
- Selectable cable lengths
- Buoy and Moorings are designed to be acoustically quiet
- ON/OFF Switch
- Hydrophones Synchronized within 1  $\mu$ s
- Up to 6 icListens per Buoy
- Wi-Fi for Real-time Set Up, Status, and Spectral Display

# Ocean Sonics Buoy Quick Start



**OSL Tip:** For a quick setup install **Ocean Sonics'** Software Programs [Marco](#) and [Lucy](#) on your PC prior to setting up your **Ocean Sonics Buoy**.

## Assemble Buoy Configuration

1. Ensure the buoy is fully charged and in the OFF position (OFF Position: **0**).

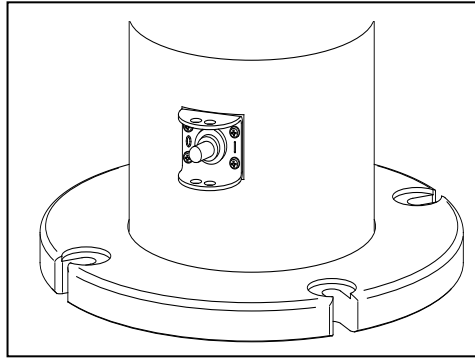


Figure 1. Top Hat of Buoy, Off (**0**) Position

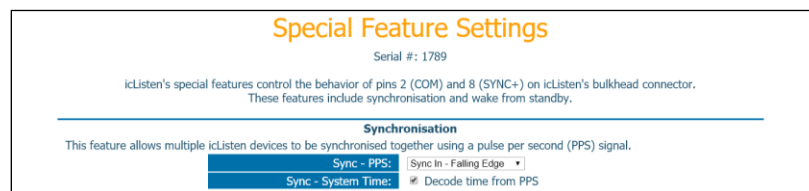
2. Attach cables and hydrophones in configuration for deployment (see [Appendix F](#)).
3. Turn on Ocean Sonics Buoy (ON Position: **1**).

## Connect to Ocean Sonics Buoy Wi-Fi

4. Use a PC to connect to the Ocean Sonics Buoy Wi-Fi (for troubleshooting Wi-Fi see [Appendix A](#))
  - a. Go to Wi-Fi settings on computer
  - b. Ensure Wi-Fi is turned on
  - c. Show available networks
  - d. Select Buoy Wi-Fi to connectFor buoy Wi-Fi settings see [Appendix B](#).

## Setup Hydrophone

5. Open **Marco** on PC [Ocean Sonics' Software Program found on icListen USB drive].
  - a. Click Refresh to view the hydrophone(s) connected to the buoy.
  - b. All units on **Marco** should be set to DHCP (See [Appendix C](#) for **Marco** Help).
  - c. Using Marco open the icListen in a Web Browser (double click on serial #).
6. Configure hydrophone for deployment.
  - a. Set icListen to Synchronise to GPS.
    - i. Under Special Features ensure **Sync In – Falling Edge** is selected and **Decode Time from PPS** is checked.



- ii. If the buoy is in a location where it can receive a GPS signal, the Home Page should indicate the hydrophone is synchronising or is Synchronised to PPS (see below).

**PPS Sync:** Synchronised to PPS (Offset = 0.00  $\mu$ s)

- iii. When it has a GPS sync, the time will indicate it was set by PPS. (This can take up to 5 minutes for a hydrophone to obtain GPS synchronisation. Ensure the correct date and time are displayed.)

**icListen Time:** Thu, 22 Mar 2018 14:13:19 GMT (Set by PPS)

- b. Set up Sampling Rates for icListen.
  - i. Under Settings Tab → Data Collection, select the settings for deployment - Sampling rates of WAV and FFT data.

## Charging the Batteries

1. Ensure the buoy is in a secure, dry location for charging.
2. Lay the buoy on its side with MCBH8 plug in accessible position. (Do **NOT** turn upside down or flip buoy onto top hat.)
3. Insert power cord into wall plug.
4. Mate connector and secure locking sleeve (see below).

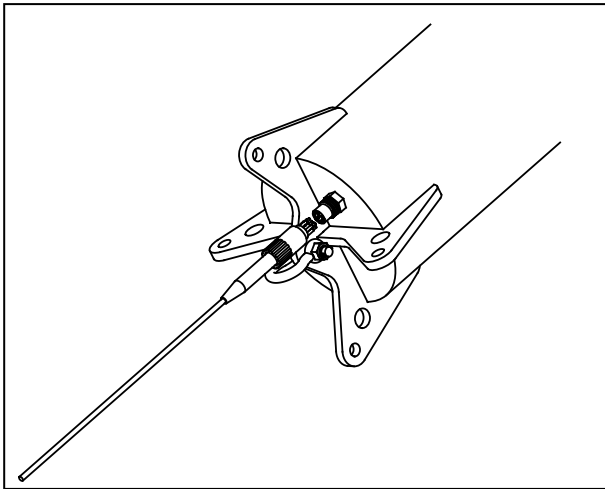
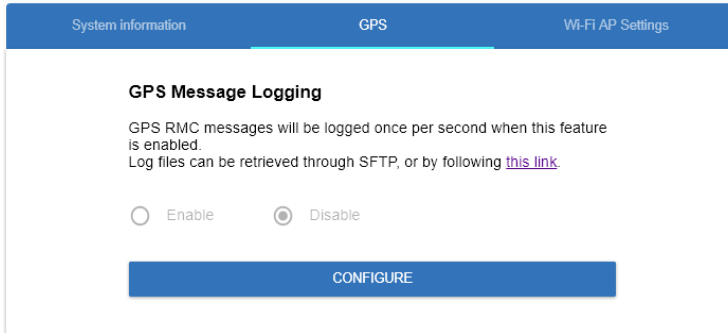


Figure 2. Power Adapter connecting to Buoy

5. Charging should take approximately 8-10 hours to reach full capacity.
6. To Check Battery Voltage, see Appendix D.

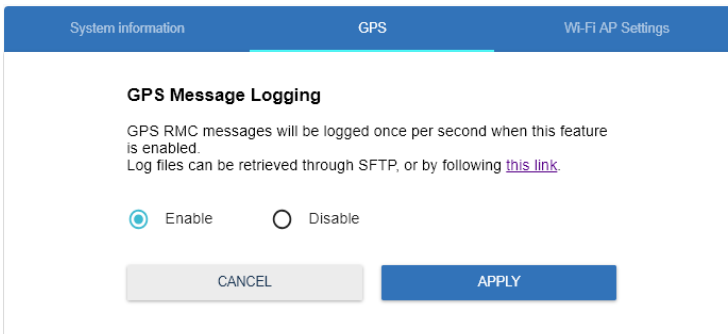
## GPS Position Logging

1. Enter the IP address: **192.168.1.1** into a web browser.
2. Select the **GPS** Tab and click **CONFIGURE**.



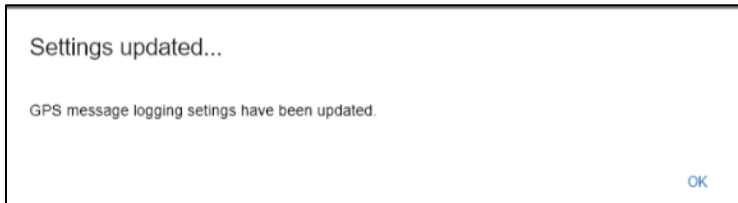
The screenshot shows the 'GPS' tab selected in a web interface. The page title is 'GPS Message Logging'. Below the title, there is explanatory text: 'GPS RMC messages will be logged once per second when this feature is enabled. Log files can be retrieved through SFTP, or by following [this link](#).' There are two radio buttons: 'Enable' (unselected) and 'Disable' (selected). At the bottom, there is a blue button labeled 'CONFIGURE'.

3. Click **Enable**.



The screenshot shows the 'GPS' tab selected. The page title is 'GPS Message Logging'. Below the title, there is explanatory text: 'GPS RMC messages will be logged once per second when this feature is enabled. Log files can be retrieved through SFTP, or by following [this link](#).' There are two radio buttons: 'Enable' (selected) and 'Disable' (unselected). At the bottom, there are two buttons: a grey 'CANCEL' button and a blue 'APPLY' button.

4. Click **APPLY**.



The screenshot shows a confirmation dialog box with the title 'Settings updated...'. The main text reads: 'GPS message logging settings have been updated.' There is a blue 'OK' button in the bottom right corner.

5. Click **OK**.

Each time Logs are turned on and off (enabled / disabled) a new log file will be created.

## Deployment

Note: For safe deployment ensure the vessel engine is stopped during deployment.

1. Set-up buoy using Ocean Sonics Guidelines for Deployment and the [Quick Start](#) above.
2. Check operation using Wi-Fi to ensure hydrophones are recording and streaming.
3. Start deployment with bottom of array cables.
  - a. Lower the bottom weight on end of cables into water.
  - b. Slowly feed in the hydrophones and cables of the array.

**Special care should be taken with the heave plates and hydrophones.**
  - c. The Buoy should be the last instrument lowered to the water.
4. The Wi-Fi connection will continue streaming to PC while the buoy is within range (up to 100 m).

## Recovery

### Note

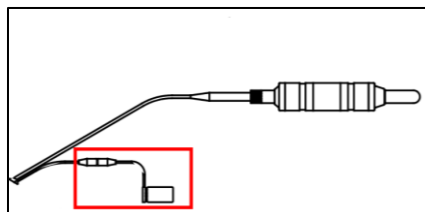
The recovery requires 2-3 individuals. It is best to have 1-2 people retrieving the equipment from the water while another person is laying the equipment out on the deck as it is retrieved taking care of fragile hydrophones and minimizing tangling of the array.

1. Transit to buoy.
2. Use gaff hook to secure buoy.
3. Tie a rope around the top ring to secure buoy.
4. Retrieve the buoy from the water.
  - a. Lay the buoy on deck while holding onto the rope attached to the cabled array below.

A winch can be used to allow easier retrieval of buoy on deck.
  - b. Slowly pull out the heave plate and recover the remaining array by hand, with special care handling hydrophones.
5. Connect to the Wi-Fi on the Buoy.
  - a. Note: The Buoy may shut off Wi-Fi link if batteries are low power.
    - i. If this is the case, use the test cable instead of the buoy Wi-Fi.
6. Turn off recording on all hydrophones- using the Web Browser or Lucy.
7. Turn off Ocean Sonics Buoy (OFF Position: **0**).
8. Rinse the Buoy, hydrophones and equipment with fresh water.
9. Hydrophones can be **Powered Down** to retain battery at 100%.

For each hydrophone:

  - a. Attach test cable.
  - b. Insert the reset tool.

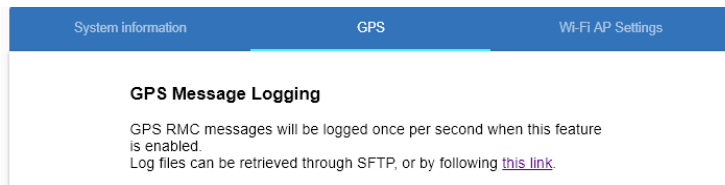


## GPS Position Data Retrieval

Position data can be retrieved either by following the link provided in the GPS tab or using an FTP client such as FileZilla.

### From Web Browser [IP: 192.168.1.1]

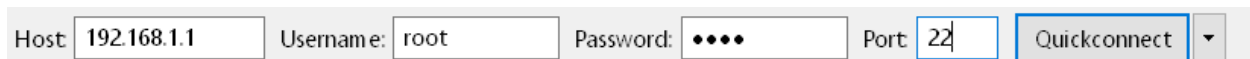
1. On GPS Tab follow the hyperlink “[this link](#)”



2. Find File with date logged and download.

### FTP Client (FileZilla)

1. Fill out the fields as shown below with the password being root.

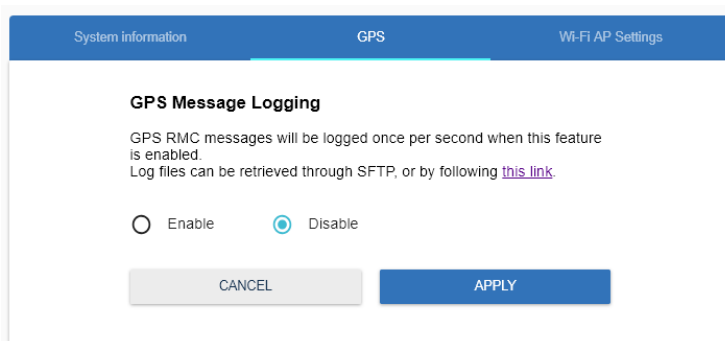


2. Choose a destination folder on your computer and copy over the log files in the log folder following the steps outlined for downloading hydrophone data.

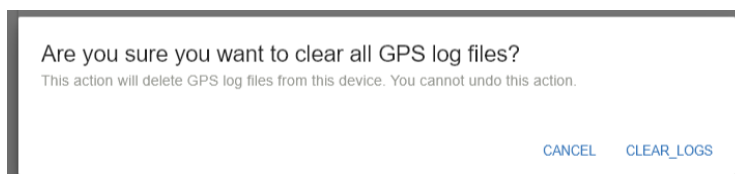
### Clearing Log Files

To delete all logged GPS files.

1. Disable GPS logging in the web browser.



2. Click **CLEAR\_LOGS**.





## Maintenance

- The buoy should be thoroughly rinsed with fresh water after each deployment to remove saltwater and debris.
- The buoy should only be opened when it is safe to do so in a clean environment without chance of water entering the inside.
- The buoy should be recharged after each deployment.

## Contact Ocean Sonics Ltd.

To download Ocean Sonics Software please visit:

<https://sites.google.com/a/oceansonics.com/ocean-sonics-resource-site/>

### Service

To request an RMA or technical support

Email: [support@oceansonics.com](mailto:support@oceansonics.com)

Phone: 1-902-655-3000

### Sales

For general sales inquiries

Email: [sales@oceansonics.com](mailto:sales@oceansonics.com)

Phone: 1-902-655-3000

### Website

<https://OceanSonics.com>

### Mailing and Shipping Address

Ocean Sonics

110 Parkway Dr.

Truro Heights, NS Canada

B6L 1N8

# Appendix A

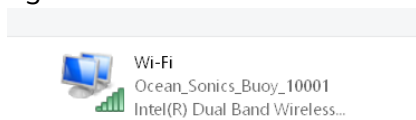
## Troubleshooting Wi-Fi Connection

If advanced Network Settings have been changed on a computer, it may be necessary to check with your network administrator for permission to change network settings.

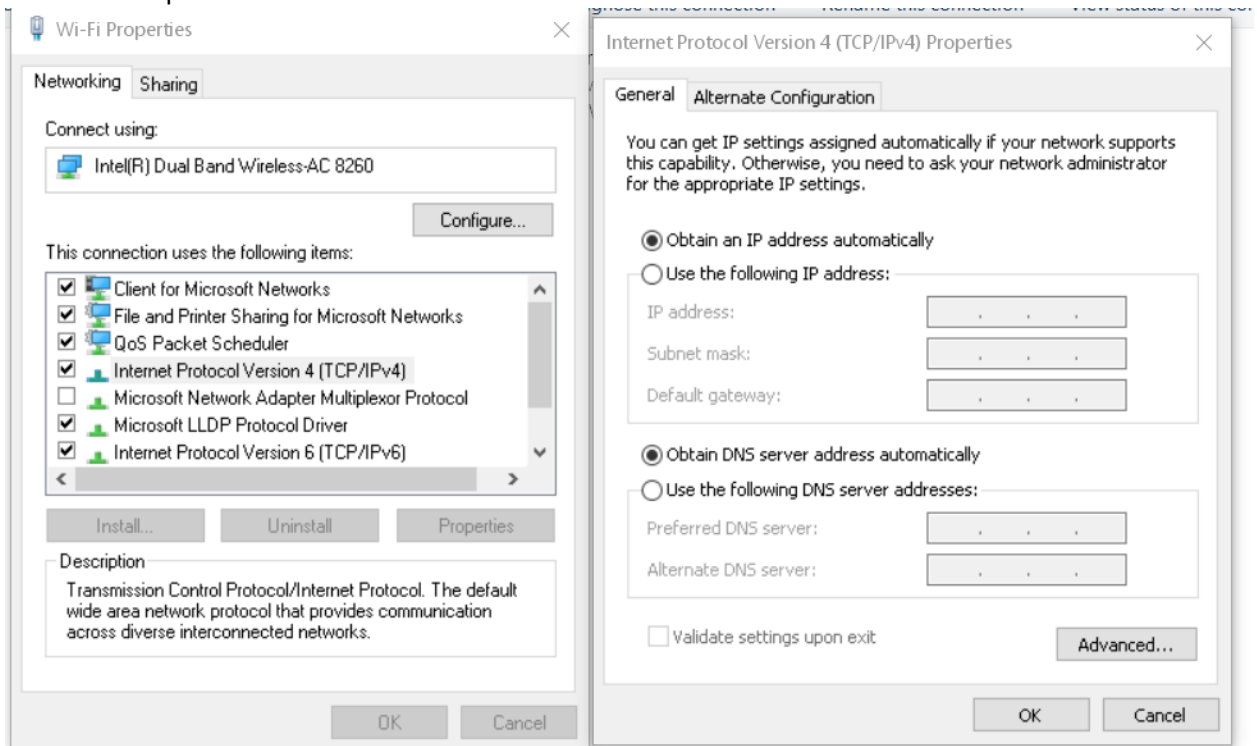
If the computer is set to a static IP address, the settings should be changed (see below) to turn on Automatic DHCP for use with the Wi-Fi Buoy.

### Windows 10:

1. Go to Network Connections: Control Panel\Network and Internet\Network Connections.
2. Right Click on Wi-Fi.



3. Choose Properties.
4. Click on Internet Protocol Version 4 (TCP/IPv4).
5. Click on Properties.

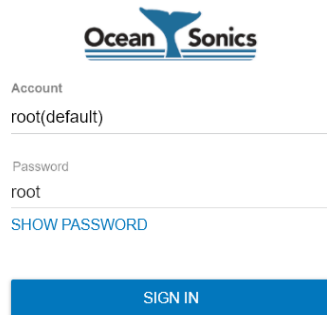


6. Ensure **Obtain an IP address automatically** and **Obtain DNS server address automatically** are chosen.

## Appendix B

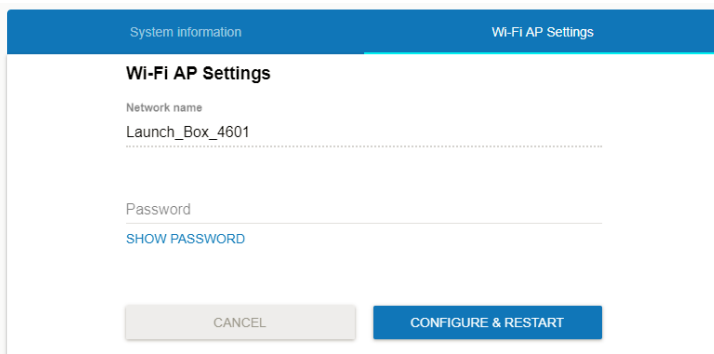
### Checking Wi-Fi Network Configuration

- a. Open your web browser of choice and type in IP Address of buoy.  
[192.168.1.1]
- b. Type in default username and password on the web page and click **SIGN IN**.  
Username: root  
Password: root



### Setting Up Wi-Fi Password

1. Type in IP Address of buoy in web browser.
2. Choose Wi-Fi AP Settings Tab.



3. Type in password (must be 8 or more characters) into Password bar.
4. Click **CONFIGURE & RESTART**.

Note: Clicking **CONFIGURE & RESTART** will cause the connection to be lost. User must reconnect and sign in to Wi-Fi with new password.

5. To delete password protection on Wi-Fi, leave Password field blank and click **CONFIGURE & RESTART**.

### Configuring Network Settings

#### To change IP Address Mode to DHCP

1. Open Web Browser with IP address of buoy.
2. Sign In.

3. Click **CONFIGURE**.

The screenshot shows a configuration screen with the following sections:

- IP Address Mode**: A note states "Note: Selecting DHCP mode will ignore the static network settings below". There are two radio buttons: "Static" (selected) and "DHCP".
- Static Network Settings**: Fields for "Current IP address" (192.168.1.1), "Netmask" (255.255.255.0), "Gateway", and "DNS server".
- Account information**: Fields for "Account" (root(default)) and "Password" (represented by four dots).
- A blue button labeled "CONFIGURE" is at the bottom.

4. Select **DHCP**.

The screenshot shows the same configuration screen as above, but with the following changes:

- IP Address Mode**: The "DHCP" radio button is now selected, and "Static" is unselected.
- Static Network Settings**: The fields for "Current IP address", "Netmask", "Gateway", and "DNS server" are present but empty.
- Account information**: The "Account" field is "root(default)" and the "Password" field is "root".
- At the bottom, there are two buttons: a grey "CANCEL" button and a blue "CONFIGURE & RESTART" button.

5. Click **CONFIGURE & RESTART** .

Note: The buoy will restart, and communications will be lost. IP address provided will no longer be the static address, the address can be found by viewing the Network Connection Settings for the Wi-Fi.

## Changing Static IP Address

1. Open Web Browser with IP address of the buoy.
2. Sign In.
3. Click **CONFIGURE**.

**IP Address Mode**

Note: Selecting DHCP mode will ignore the static network settings below

Static  DHCP

**Static Network Settings**

Current IP address  
192.168.1.1

Netmask  
255.255.255.0

Gateway

DNS server

**Account information**

Account  
root(default)

Password  
••••

**CONFIGURE**

4. Type in New IP address and Netmask.  
(Gateway and DNS server can be left blank and will not be changed.)
5. Click **CONFIGURE & RESTART**.

Note: The buoy will restart, and communications will be lost. User must reconnect to Wi-Fi and can open web browser with new IP address.

## Factory Reset

If there are problems with the Wi-Fi settings a Factory reset can be applied.

This will reset to default IP address and password. This is the same function as the Reset Button on the buoy (see [Resetting Wi-Fi](#)).

**Factory reset**

Reset the device to its default settings.

**Important: This action will remove all your data and settings from the device.**

**RESET**

## Resetting Wi-Fi

A Wi-Fi reset can be done to recover the Wi-Fi network settings to the original configuration that was provided for the buoy. **All Wi-Fi settings will be lost and restored to default.**

### **A Reset would be necessary in the following states:**

- The Wi-Fi network on the Ocean Sonics Buoy was configured and caused the Wi-Fi to stop working and communications were lost.
- The Wi-Fi password for an Ocean Sonics Buoy was set and forgotten.

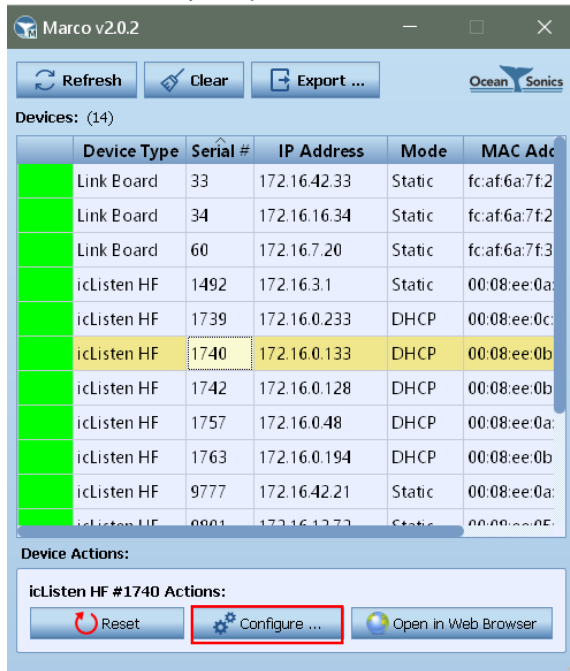
### **All Wi-Fi settings will be lost and restored to default.**

1. Remove Top Hat of Buoy.
2. Press and hold the Reset button for at least 4 seconds (as seen below).

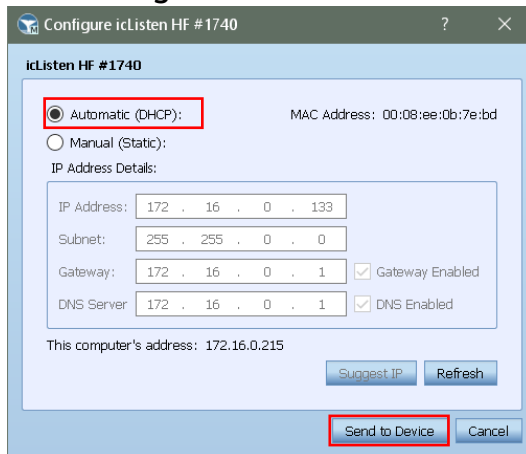
# Appendix C

## Marco Settings - DHCP

- a. Click on the hydrophone serial number.



- b. Click **Configure ...**



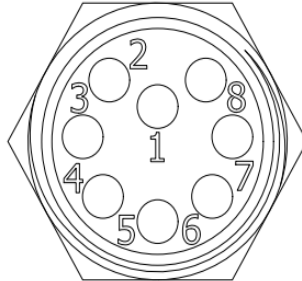
- c. Choose **Automatic (DHCP)**.
- d. Click **Send to Device** and wait for settings to be successfully sent to the unit.
- e. Continue this for each unit so they are all set to DHCP IP addresses.
- f. Units should all show up green indicating they are ready.

## Appendix D

### Confirming Voltages

A voltmeter can be used to confirm the proper voltage is being supplied to the array on the buoy.

1. Place the negative voltmeter lead (black) into pin 1 of the MCBH8F bulkhead connector on the battery pack end cap for the common connection (pinout below).
2. Place the positive voltmeter lead (red) into pin 7 (pinout below).



**MCBH8F Bulkhead Connector Pinout**

**Fully Charged Batteries should measure approximately ~25 V.**

**Batteries should not be discharged past 21 V.**

## Appendix E

### Using the Ocean Sonics Buoy with a Smart Phone or Tablet

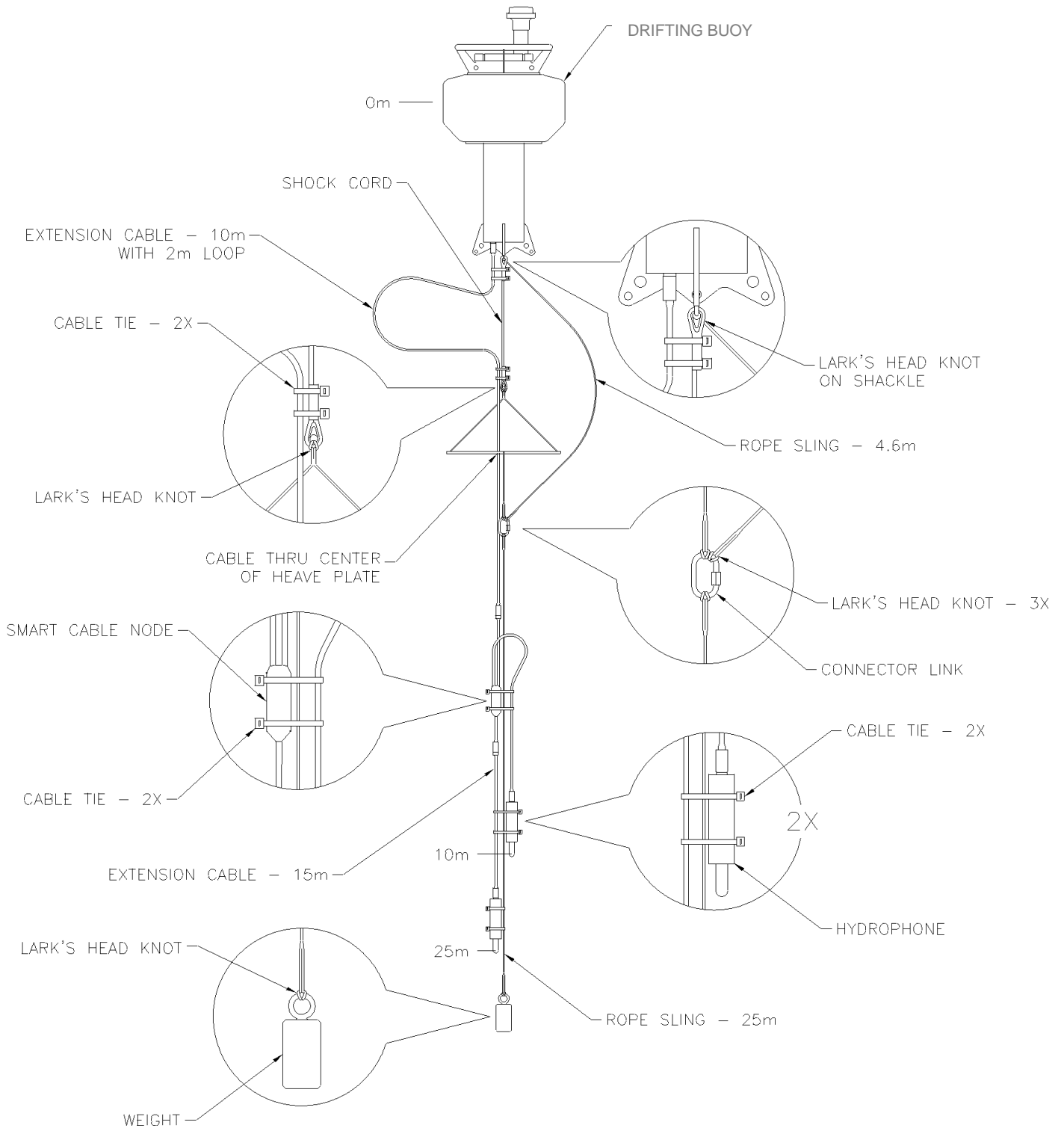
1. Download an App on your device that will allow the discovery of IP addresses on your Network. Suggested App: [Fing](#)
2. Connect to buoy Wi-Fi on device.
3. Open the Fing App to find the IP address of the hydrophone(s) connected.
4. Type the hydrophone IP Address of your hydrophone(s) found into a web browser
5. Use the web browser to configure settings for deployment as shown in Quick Start.
6. Web Browser can also be used to configure buoy Settings and set up GPS logging by going to IP Address: **192.168.1.1** (using the same instructions as above for the computer).



# Appendix F

## Sample Buoy Assembly

Buoy assembly and deployment should be performed by an experienced professional, with knowledge on deploying oceanographic equipment. Strain relief on cable connections and securing hydrophones should be done with care. Failure to follow best practices could result in damages in equipment or personnel.



# Appendix G

## Technical Drawing

