Lucy II User Guide
(v1.0.1 Beta)

August 2023

Contents

Introduction

Lucy II is a PC software program from Ocean Sonics that aims to build and improve upon the original Lucy software application. *Lucy* II has been designed for the use with multiple hydrophones and allows users to stream data from hydrophone arrays. Currently, *Lucy* II is a **Beta** release, created to provide the basic functionality of the previous Lucy software and can be used to set-up, stream, record, and process icListen hydrophone data. The program presents data to the operator in a graphical and numerical format designed for field operations personnel, making it highly task focused.

With the release of this Beta software, we will continue the development of new features and improve upon the current interface and functionality. Please send any issues, comments, or suggestions to Ocean Sonics Support (support@oceansonics.com).

This document outlines the operation of the *Lucy II Beta software v1.0.1* released in **August 2023**.

1 Getting Started

This section will describe how to download the software, start the program, connect to the devices, set up the sampling and stream the data. For more information or if you have questions after completing the initial setup, see each Features section for the Device Setup, Lucy Setup and Charts.

1.1   Initial Setup

Download the Software

1. To get started with *Lucy* II, download the software program from our resources site: *icListen.com/users/software* → *Lucy II*

Start the Program

2. To start the program, you can open the application from your computer's **Start Menu** or the **Desktop Shortcut**.

When *Lucy* II is launched for the first time, the start up window will provide options for the program setup on the "**Program Initialization**" window (Figure 1-1).
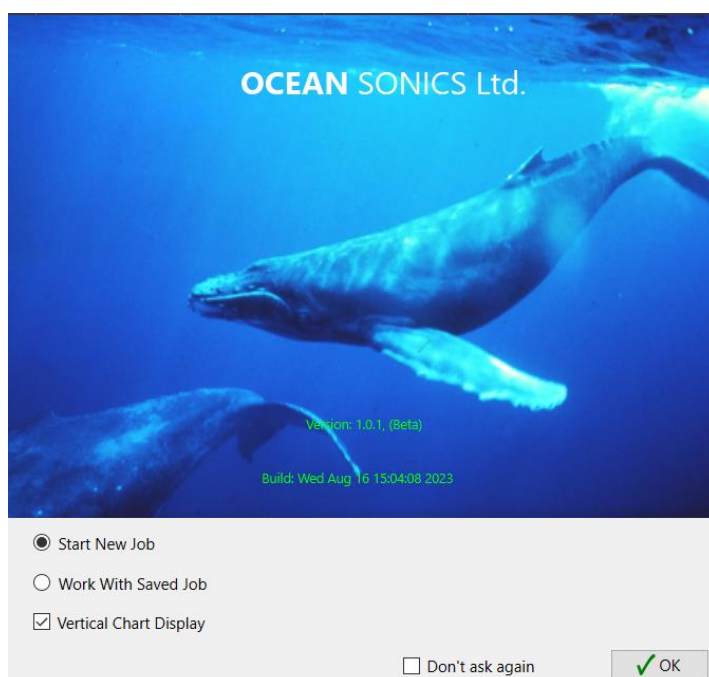
Figure 1-1 – Program Initialization Window

3. For the first-time setup, select '**Start a New Job**'.
    a. Check the box for **Vertical Chart Display**.
    b. Click "**OK**".

> - **Work with Saved Job:** will open the previous setup on Lucy, connecting to hydrophones and setting sampling rates for streaming.
> - **Vertical Chart Display:** Sets charts to display in a vertical direction. If not checked, the charts will be displayed horizontally.

Connect to the Devices

The main Device Setup display will be presented where you can connect to icListen devices.

4. Connect the icListen hydrophone(s) to power and a connection to the computer.
   a. For a single hydrophone connection, you can use the icListen Quick Start Guide to connect the power and the test cable to the computer.
   b. For an array setup, use the setup required for your deployment.
5. Select tab "**Device Setup**", then "**Device Link**" (Figure 1-2).

Figure 1-2 – Device Setup – Device Link Tab.

6. Click on the "**Find all units**" button (Figure 1-2) to retrieve a list of the devices on the network. If you need to access to remote devices, see section on: "Remote Device Connection".
7. Select a device from the device list (left table, available devices) (Figure 1-3).
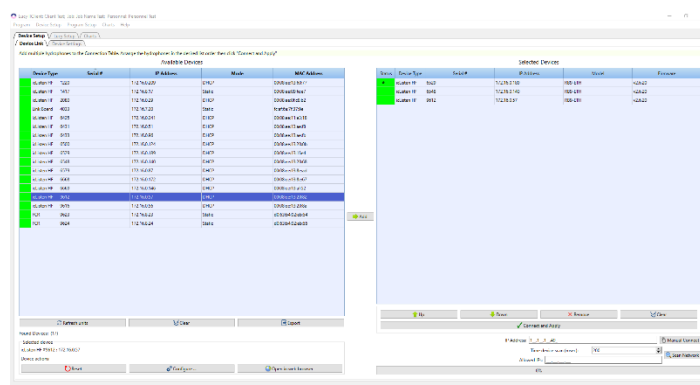
Figure 1-3 – Device Link – Selecting an Available Device to Connect.

8. Click on the "**Add**" button or double click on the hydrophone row. The device will be added to right table (Selected Array Devices) (Figure 1-3).
9. In the Selected Device Table, arrange the hydrophones using the Up and Down arrows to the device order for your array. The hydrophone at the top of the list will have a star (*) in the green box, indicating it is the Primary hydrophone.
   NOTE: The Primary hydrophone will set the sampling rates for the waveform and FFT data and epoch settings for all hydrophones added in the Select Device Table.
10. Click on the button "**Connect and Apply**" (Figure 1-3).

The program will open to the **Device Settings** Tab to select and update settings for your deployment (Figure 1-4).

You will not need to setup new devices every time you open *Lucy II* – the program will remember your last devices list and it can be loaded in by clicking on "Work with Saved Job".
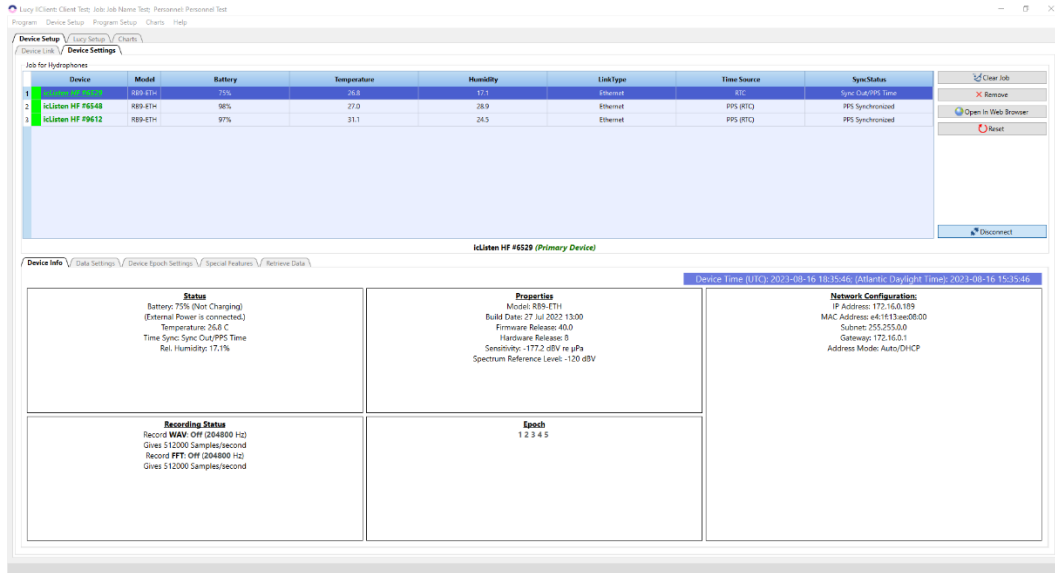
Figure 1-4 – Device Setup - Device Settings

Setup the Device Data Settings

Data Settings panel displays the current configuration of device and allows this configuration to be updated (Figure 1-5).

The Primary icListen settings for the **Waveform and Spectrum (FFT) Sampling Rates [Bandwidth]** and epoch trigger settings are applied to all other secondary hydrophones (all hydrophones added to the Device list).
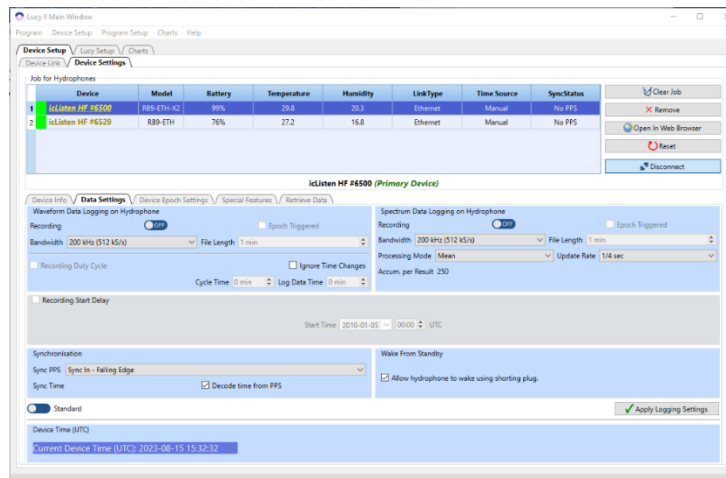

Figure 1-5 – Data Settings

All other device settings can be set up independently for recording on the icListen hydrophone's internal memory. All Local recording on the computer will use the same hydrophone data settings set in this tab.

1.2   Lucy - Job Setup

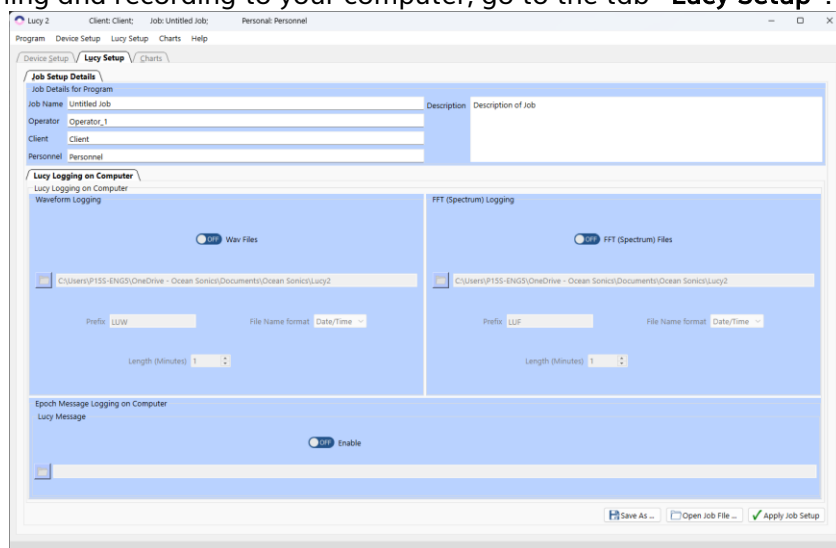To setup streaming and recording to your computer, go to the tab **"Lucy Setup"**.

Figure 1-6 – Lucy Setup – Job Setup Details

11. Add the Job Setup Details: **Job Name**, **Operator**, **Client**, **Personnel**, **Description** (Figure 1-6).
12. Set logging settings for Lucy Logging on Computer.
    a. Turn WAV and FFT Logging to ON position to have all data recorded to your computer locally while streaming on Charts section.
        i. Waveform Data (Time Series)
        ii. Spectrum Data (FFT)
13. Click on the button **"Apply Job Setup"** (Figure 1-6).
14. The program will return to the **"Device setting"** tab (Figure 1-4).
15. Review the hydrophones in the Device List ensuring they are all connected and have green boxes, with the proper synchronisation.
16. Apply the new job to all the hydrophones, click on the **"Connect"** button.

Note: *Lucy* II will automatically remember and load your last setup every time you run the program, when 'Work with Saved Job' is selected in the Program Initialization Window.
You can also save your setting in a CONFIG file that can be loaded into *Lucy II* for future setups.

1.3   Start Streaming Data - Charts

1. Select tab **"Charts"** (Figure 1-7).
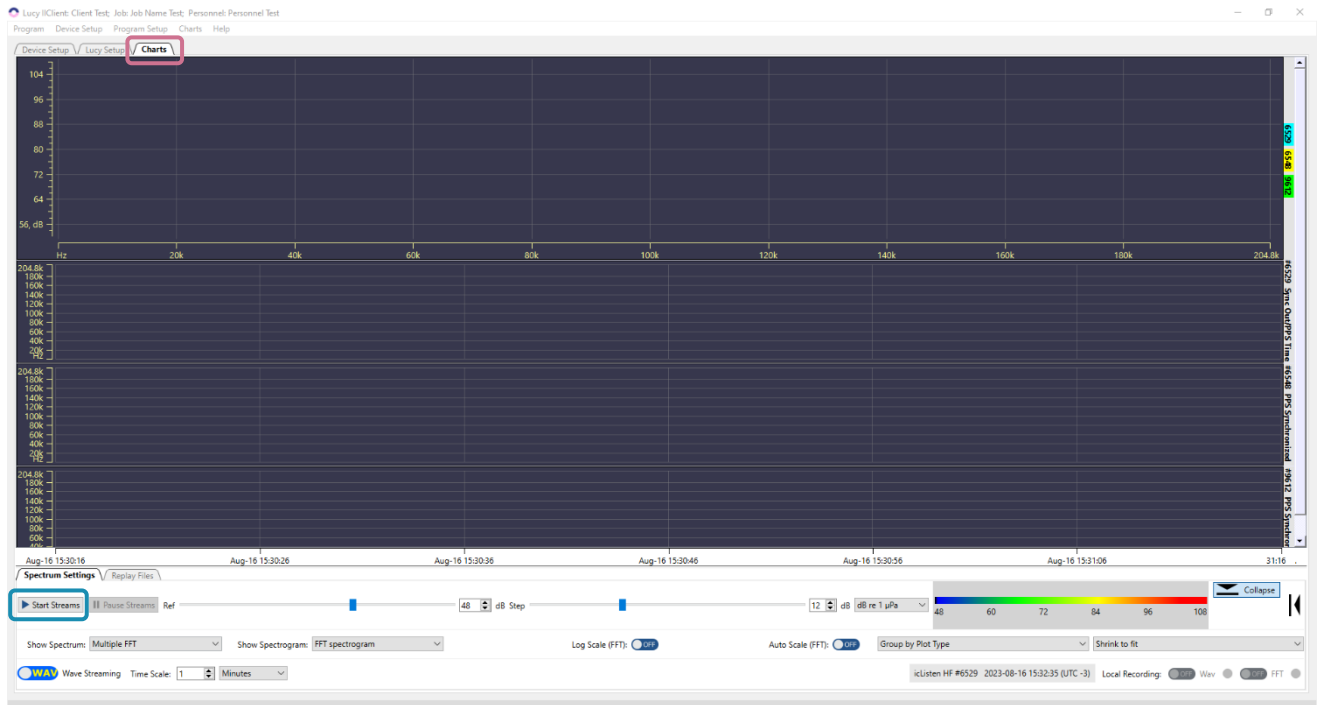
Figure 1-7 – Charts – Start Streams

2. Click on the button **"Start Streams"** to start streaming data (Figure 1-7).
3. Choose the options for streaming WAV/FFT depending on your data streaming requirements.
   a. Streaming wav data requires more bandwidth and processing for Lucy II.
   b. Switching between the WAV and FFT streams will end the current recording of waveform and FFT files on the computer. It is recommended to only switch between the two streams when needed, otherwise many files will be created.
4. Choose the charts and adjust for best view of the hydrophone streams.

2 Device Setup Features

"**Program Initialization**" options (Figure 2-1).

Figure 2-1 – Initialization Dialog

- **Start New Job:** Sets program to always require adding devices to the setup each time it opens.
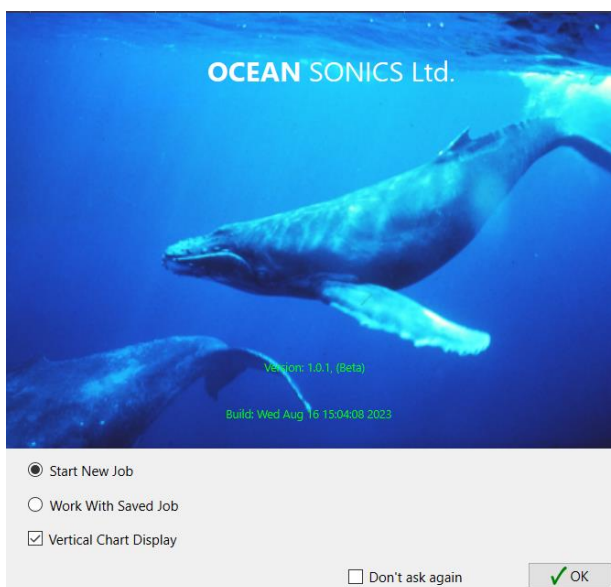- **Work With Saved Job:** Sets program to start with the previously added devices from the last job setup.
- **Vertical Chart Display:** Sets the charts to display in a vertical direction. If the box is not checked, the charts will be displayed horizontally.

2.1 Device Link

The "**Device Link**" tab shows the available devices that can be connected to stream data in Lucy as an individual hydrophone or multiple hydrophones as an array.

Available Devices - Finding and Checking Status of the Hydrophones
The table on the left shows the **Available Devices**, connected to the computer or network (Figure 2-2). The available tools for the Device Link - Available Devices table include 'Find all units', 'Refresh', 'Clear' and 'Export'. By clicking on a hydrophone, you can access the **Device Actions** to 'Reset', 'Configure…' and 'Open the Web Browser'. See below for more details.
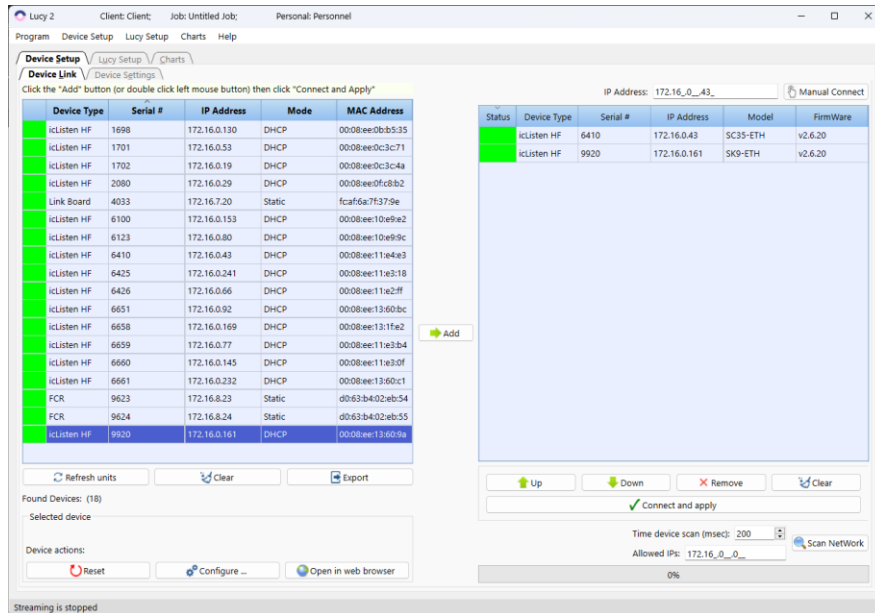
Figure 2-2 – Device Link – Finding Hydrophones

Available Tools:

List of Hydrophones

- **Find all units** – provides a list of the devices on the network or connected to computer.
- **Refresh** - Updates the status of the hydrophone(s).
- **Clear** - Removes all devices from the list. Click **Refresh** to bring back the current devices connected.
- **Export** - Will save a list of the devices to your computer in .csv format.

Device Actions

Reset - Resets the icListen hydrophone. A reboot is performed on the Linux system inside the hydrophone. This puts the hydrophone into standby and then turns the hydrophone back on. The hydrophone will buzz then double buzz, if the hydrophone does not have power supplied during the **Reset** it will go into standby mode. To turn back on from standby mode plug in the power on the test cable.

Open in Web Browser - Opens the hydrophone web page in default web browser.

Configure… - Allows the user to make changes to the IP Addressing of the icListen hydrophone (Figure 2-3). See Appendix B for further information on configuring the icListen IP address.
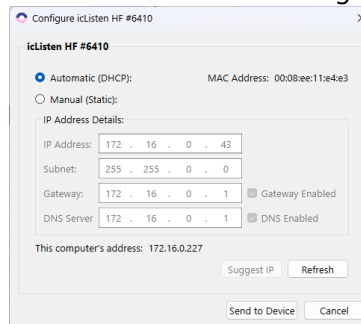

Figure 2-3 – Configure Device Dialog – Automatic (DHCP)

Connecting to Selected Hydrophones

The table on the right is the Selected Hydrophones List (Figure 2-4). This list can be used to order the hydrophones in the array using the Up and Down buttons as well as adding and removing hydrophones as needed. See the additional details of the Available tools for this list below.
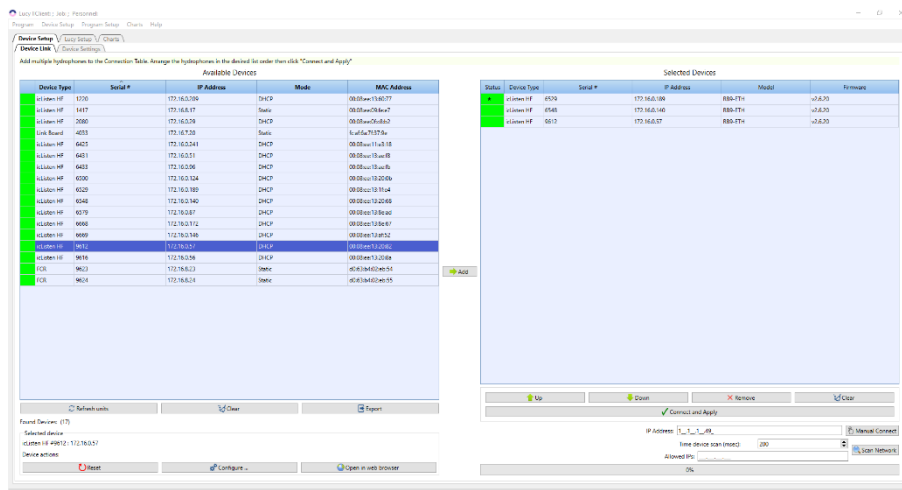

Figure 2-4 – Device Link – Hydrophones List to Connect

Available Tools:

List of Hydrophones

- **Up** – Move the selected hydrophone up in the list.
- **Down** - Move the selected hydrophone down in the list.
- **Remove** - Remove the selected hydrophone from the list.
- **Clear** - Removes all devices from the list.
- **Connect and Apply** – Connect to all hydrophones in the list and work with them in the charts tab. This list of the hydrophones will save and will load next time the program will run, if in the initialization dialog will set **"Don't ask again"** option in the **Program Initialization** dialog.

Note: **"Manual Connect"** and **"Scan Network"** commands are described in the **"Additional Advanced Operations" "Remote Device Connection"** topic.

2.2 Device Settings
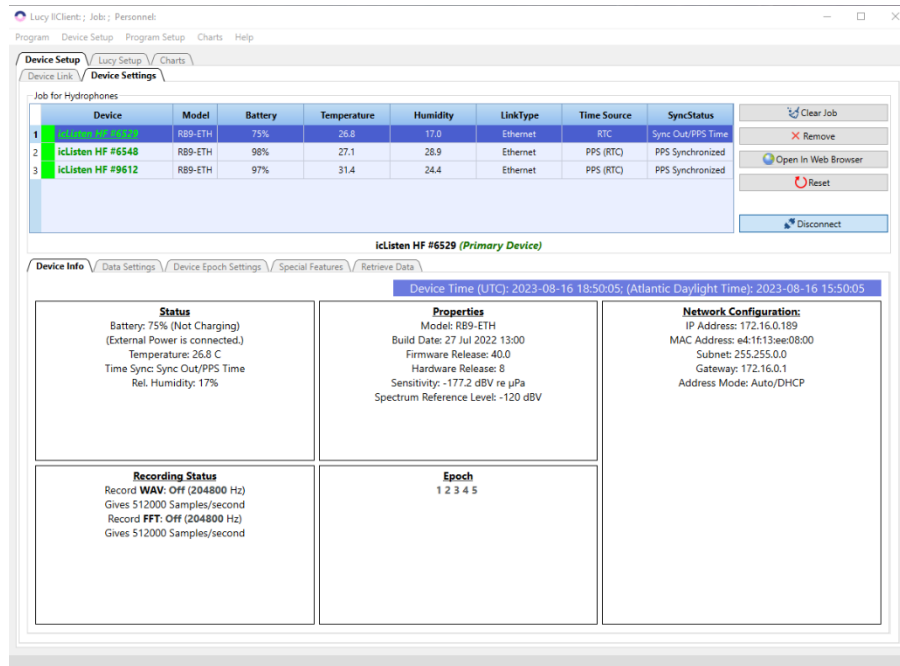
Contains the list of the connected devices (Figure 2-5).

Figure 2-5 – Device Settings

Available Tools:

List of Hydrophones

- **Clear Job** – Removes all devices from the list.
- **Remove** - Remove the selected hydrophone from the list.
- **Open in Web Browser** - Opens the hydrophone web page in default web browser.
- **Reset** - Resets the icListen hydrophone.
- **Connect** – Connect to all hydrophones in the list and work with them in the charts tab. This list of the hydrophones will save and will load next time the program will run, if in the initialization dialog will set **"Don't ask again"** option.
- **Disconnect** – Disconnect to all hydrophones in the list.

The icListen **Device Settings** panel is split into 5 tabs. These tabs are available when there are hydrophones connected on the Device Link Tab and the hydrophone is available to stream data.

Device Info

The **Device Info** tab only displays information about the selected hydrophone (Figure 2-5). The Device Info includes the current state and properties on the icListen hydrophone.

Data Settings

The **Data Settings** tab displays the current configuration of device and allows this configuration to be updated (Figure 2-6). The Data settings tab configures the internal recording on the hydrophones. The logging refers to any data that is logged to the hydrophone's internal memory and must be downloaded from the hydrophone.

While connected to more than one hydrophone, in Array Mode, the Primary icListen (the first hydrophone on the list) must be configured to set the Bandwidth - Sampling Rates for the Waveform and Spectrum data for **all** hydrophones. When the sampling rates are updated on the Primary hydrophone, all hydrophones will be set to the same settings.

Other than the sampling rate all other icListen settings can be changed including:
- Data Logging Mode
- Log File Length
- Internal time
- Duty Cycling
- Spectrum Processing
- Logging Delay
- Advanced Features
    o Data Format
    o Gain
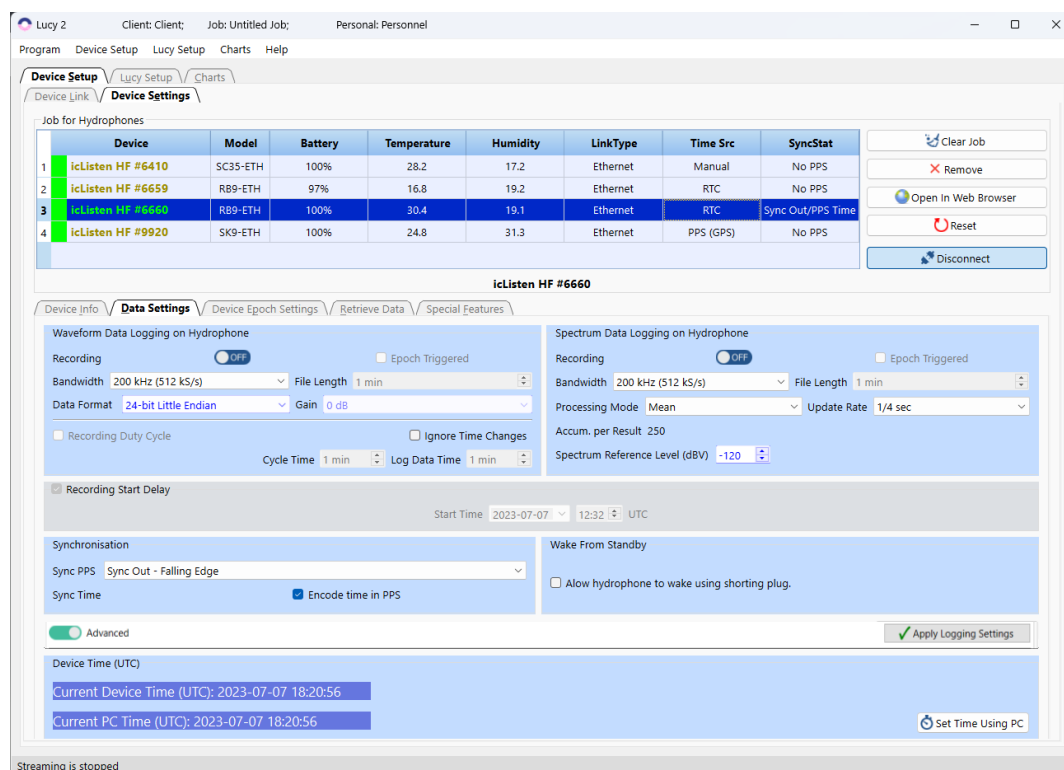   o Spectrum Reference Level

Figure 2-6 – Data Settings

Data Logging on Hydrophone
Available options are:
- Logging Off
    ▪ Data will not be logged on the icListen internal memory.
- Log Continuous

- ▪ Available for both waveform and spectrum data.
- ▪ Data is logged on the icListen internal memory.
- Log Duty Cycle
    - ▪ Only available for waveform data.
        - ○ Data is logged internally for the duration of the 'Log' cycle.
- Epoch
    - ▪ Available for both waveform and spectrum data.
    - ▪ Data is logged based on epoch trigger settings.
- Epoch & Log Duty Cycle
    - ▪ Available for waveform data only.
    - ▪ Data is logged based on epoch triggers and the duty cycle. This means data will be logged both during the cycle time, and if a trigger occurs.

Note: Simultaneous streaming and logging of waveform data above 50 kHz can cause issues due to the device processors. We suggest recording waveform data locally if you would like to stream the wav data on *Lucy II* at the same time. The recording on the internal memory of the hydrophone will take priority and cause gaps in the data stream on Lucy.

Bandwidth - The bandwidth is the range of frequencies available.

Log File Length - This feature allows the user to configure the length (in minutes) of files internally logged by the icListen unit.

Recording Duty Cycle - Duty cycling is available when waveform data is being logged.
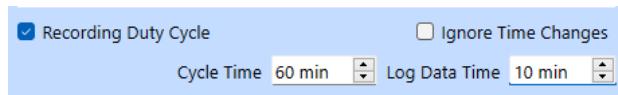

Figure 2-7 - Recording Duty Cycle

The logging cycle used is determined by the Cycle Time and Log Data Time fields. Data will be logged for the first Log Data Time minutes of the complete Cycle Time.

In the screenshot above (Figure 2-7), this means that the first 10 minutes will be logged, and the next 50 minutes will not, for the total of a 60-minute cycle. This cycle will be repeated continuously.

Advanced Setting - Gain - In icListen AF/HF, the configurable gain setting applies digital gain to the waveform data. Gain is adjustable in steps of 6 dB, ranging from 0 dB to 48 dB. This setting can only be adjusted for 16bit data, where it can be used to increase the sensitivity of the unit to compensate for the reduced resolution.

Spectrum Data Logging

The processing performed on frequency domain data can be configured by adjusting the processing mode, and the spectrum update rate.

Three types of FFT processing are available to icListen: "Mean", "Peak", and "Filter". Lucy will adjust the processing settings based on the update rate.

For a detailed description of how the FFT processing works, please refer to the Log File Format User Guide.

Advanced Setting - Spectrum Reference Level
The hydrophone will show spectral data relative to the Spectrum Reference Level, which is equal to the minimum spectral density measurement icListen can return. Valid values are between -120 and - 180 dBV. <u>Ocean Sonics recommends maintaining this at -120 dBV, unless making low noise/low amplitude measurements.</u>

Recording Start Delay
The logging delay is used to set the time at which logging is started. This is applied to both waveform and FFT data logging (including triggered logging). If **Recording Start Delay** is not checked, data logging starts immediately.

Synchronisation
The synchronisation options are used to configure icListen to synchronise with other icListen devices or devices producing a Pulse Per Second (PPS) output. If you would like icListen to be a PPS **leader** (primary) and synchronise other units to this icListen, select "Sync Out". If you would like icListen to be a PPS **follower** and synchronise to an existing source/another icListen, select "Sync In" and the correct polarity (Rising Edge/Falling Edge) of the signal. Select "Sync Disabled" if you would like no synchronisation. icListen may also be configured to Decode the time from the PPS signal. This is done with the **Decode time from PPS** checkboxes.

Wake from Standby
The **Wake from Standby** option is used to configure an icListen to wake from standby mode when the shorting plug is connected. When this option is enabled, the unit may also be woken by driving the sync line low.

Device Time (UTC)
Using the **Set Using PC** button, the internal time of the icListen can be set to match that of the PC running Lucy.

Device Epoch Settings
Device Epoch Settings display epoch triggers that are configured from the Epoch setup tab. Epoch trigger files may also be loaded or saved for device (Figure 3-8).
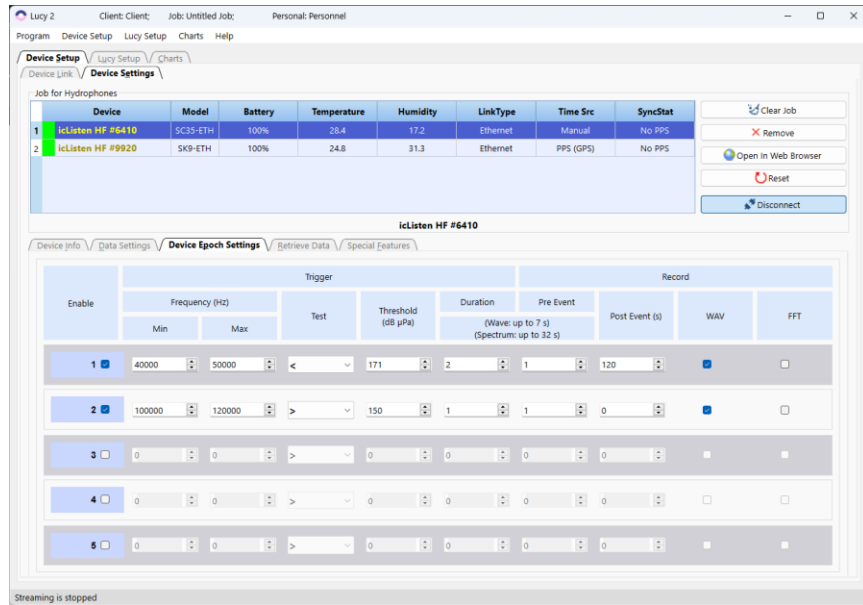
Figure 2-8 - Device Epoch Settings

In Epoch mode, icListen can be configured to detect specific signals in the real-time data and perform several tasks based on those signals. icListen can each check the data with up to 5 independent triggers.

This section will cover the setup and removal of epoch triggers from icListen or Lucy.

For the icListen any trigger out of frequency range will be disabled, all others will be adjusted for the new settings automatically, to maintain the same trigger.

Note: Lucy may round entries to the nearest values supported by icListen.

The **Device Epoch Settings** tab is divided into 5 rows, with each row representing an epoch trigger.

Trigger Conditions

The trigger conditions section is where users set up the details of a particular epoch trigger. These settings are what icListen/Lucy checks the new data against to decide if an event has occurred (Figure 3-9).

Figure 2-9 – Trigger Conditions

The frequency range is the range in Hz over which the data is checked.

The signal conditions are the amplitude of the signal to check against (in dB re µPa), the duration that the signal must be present/gone for (in seconds), and the test field (whether we are checking for a signal to become present (Greater) or disappear (Lower)).

Special Features

Special Features panel works with the Network Settings, Reset\Standby, Web Login Security (Figure 2-10).
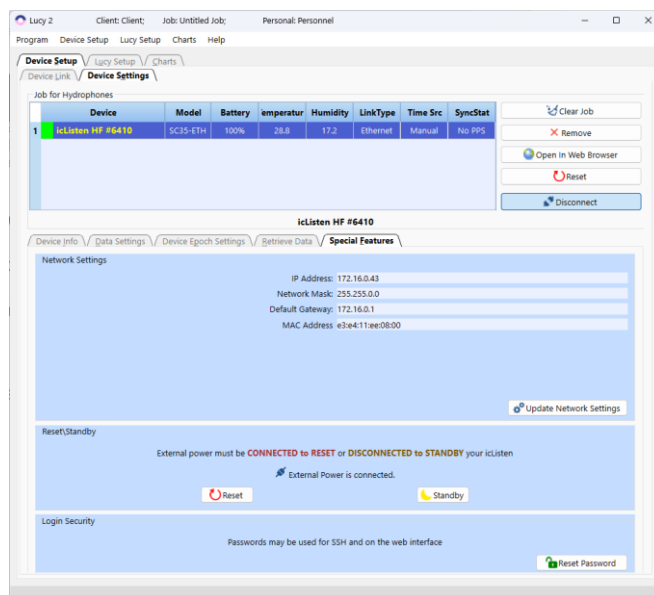

Figure 2-10 – Special Features

Network Settings – The icListen hydrophone IP address can be set manually through the Network Settings. Please use the Device Link Tools for setting DHCP and Static IP addresses for the hydrophones.

Reset\Standby
Reset – When external power is connected it resets the icListen hydrophone.
Standby – When external power is disconnected it puts the hydrophone into a low power mode, called standby mode. When the hydrophone has Wake from Standby enabled the shorting plug can be used to turn on the hydrophone.

Login Security
Reset Passwords – reset passwords for web connection.

Retrieve Data

The **Retrieve Data** tab will show the current files stored on the icListen's internal memory and allow the user to download files from hydrophone to the computer (Figure 2-11).
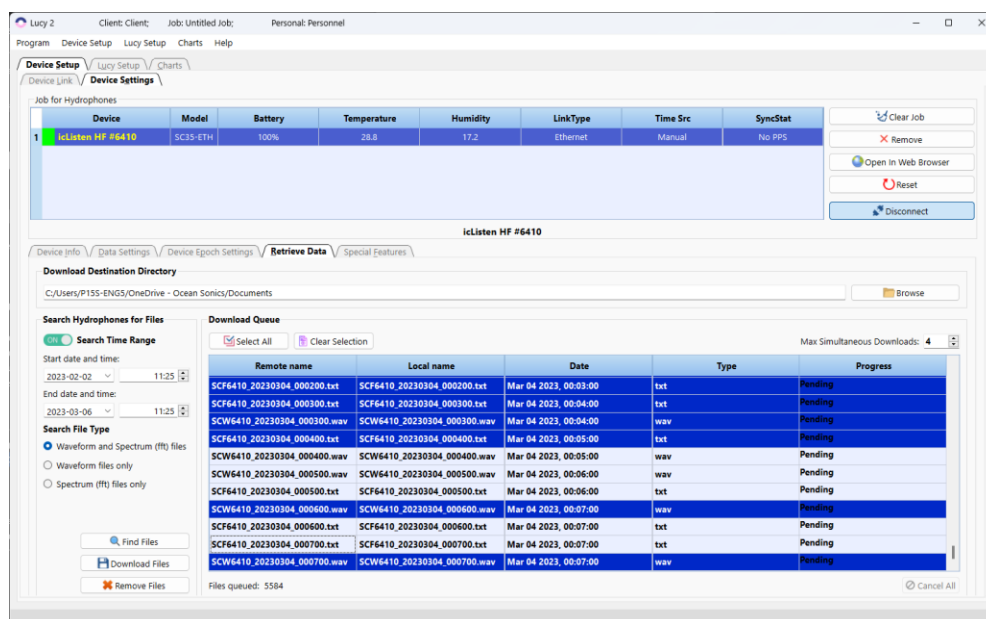
Figure 2-11 – Retrieve Data

Available Tools:
- **Download Destination Directory** – folder where the files will be saved.
- **Search Time Range / All the Data** – searching files in the given time range or obtain all existed data.
- **Search File Type** – choose type file: WAV, FFT txt or both.
- **Find Files** –searches for the files in the range provided.
- **Download Files** – download selected files on the computer into given folder.
- **Remove Files** – delete selected files from the hydrophone storage.
- **Select All** – select all files.
- **Clear Selection** – deselect all files.
- **Max Simultaneously Downloads** – number of files simultaneously saving on the computer (number of threads).

3 Lucy Setup Features

The **Lucy Setup** tab is responsible for the configuration of logging data from the hydrophone stream(s) to your computer. The setup is configured as a Job Setup, with the details added to the header of the files. Below the Job Setup details, you can also set up logging of the streamed waveform and FFT data to your computer.

3.1   Job Setup Details

The job details consist of the **Job Name**, **Operator**, **Client**, **Personnel**, and **Description** of the job (Figure 4-1). The details can be found along the top of the main display.
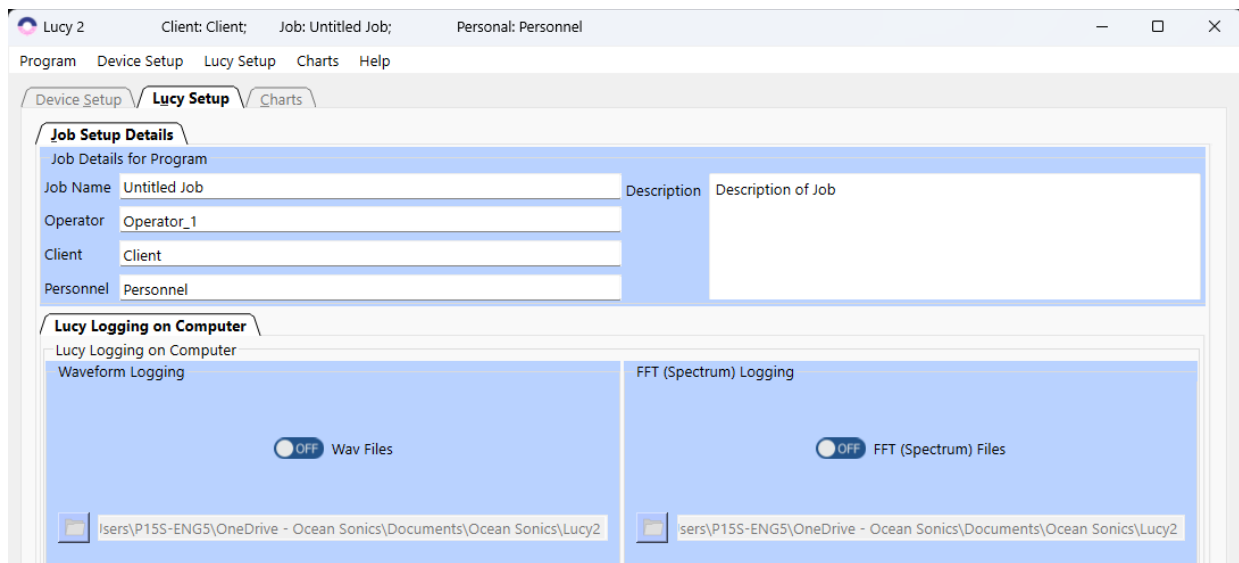
Figure 3-1 – Job Setup Details tab

Lucy Logging on Computer

The Logging options relate to Lucy logging only. For instrument logging options see **Lucy Setup** → **Job Setup Details** → **Lucy Logging on Computer** tab (Figure 3-2).

Lucy can perform two types of logging simultaneously:

- Spectrum Data (FFT)
- Waveform Data (Time Series)

Data for icListen and Lucy FFT logging stores data in a readable TXT log format, which can be imported into a spreadsheet. These files also include temperature, and humidity data. Waveform data is logged as standard WAV audio files. These files are playable in any standard audio player or editor, such as Audacity.
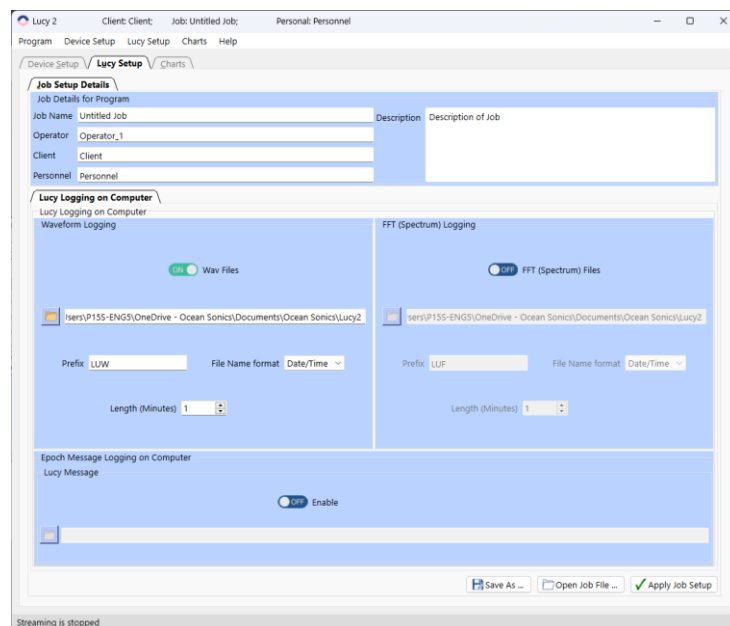

Figure 3-2 Lucy Logging on Computer tab

4 Charts Features

The **Charts** Tab displays hydrophone waveform and spectral data while streaming in real-time or when replaying previously logged data. The **Spectrum Settings** tab is used for real-time streaming and the **Replay Files** Tab is used for the Replay Mode.

To select and control the chart displays there are various drop-down menus and chart options. The charts are separated into two main groups. The first group of charts: **Spectrum**, can be set to the following displays: FFT, Multiple FFT, PkRMS and Wave. The second group of charts, **Spectrogram**, are set to a waterfall display for the streaming or replaying of data. If a group of charts is set to off, the other group will fill the display.

The Charts displays can be resized as well as the settings and panels (Figure 5-1).

Figure 4-1 – Charts Splitters

The **Charts** tab has two modes:
- **Spectrum Streaming**: Live data streaming from hydrophones.
- **Replay Files**: Replaying saved files.

Both modes have the similar main options tools.

Vertical Chart Display vs. Horizontal Chart Display

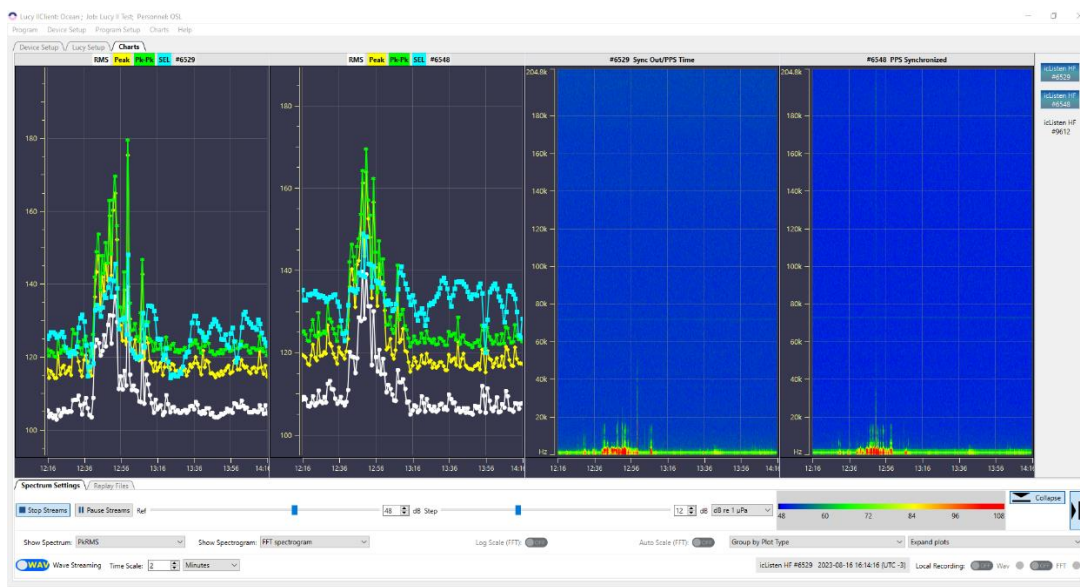*Figure 4-2 Charts – Vertical Chart Display of 2 icListen hydrophones.*

Figure 4-3 Charts - Horizontal Chart Display of 2 icListen hydrophones.

Chart Zoom

The chart can be zoomed in real-time to see exact values.

To **zoom in** on a chart, click and drag a selection space where you would like to zoom.

To **zoom out** of the chart simply right click on the chart display.

4.1   Live Data Streaming from Hydrophones
Spectrogram Charts Group

Single FFT Chart

The Single FFT chart displays the most recently received FFT data (Figure 4-4).
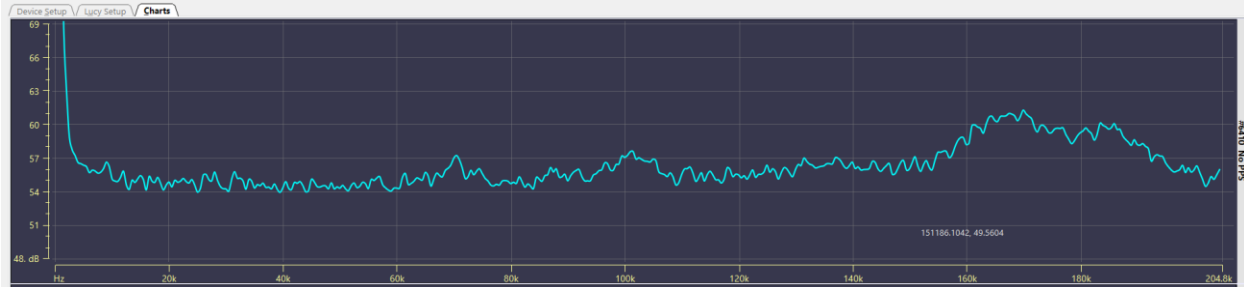

Figure 4-4 – Single FFT chart

This data corresponds to the most recent data on the *Spectrum Chart*.

The x-axis of this chart is the frequency range, which varies based on the sample rate selected. Frequency may also be plotted on a logarithmic scale, by using the log scale option to the bottom of the spectrum chart.

The y-axis of the chart is the amplitude. This is scaled using the reference scaling options in the lower left of the display.

Figure 4-5 – Reference scaling options.

These scaling options are detailed in the Spectrum Reference section. There is also an auto-scale option selectable on the bottom of the chart.

Figure 4-6 – Auto Scale (FFT) switch to turn OFF/ON.

Multiple FFT Chart

Multiple FFT chart shows the most recently received FFT data from all connected devices on one chart simultaneously (Figure 4-7).

Figure 4-7 – Multiple FFT chart

The axes are the same as the single FFT chart.

PkRMS Chart

The PkRMS chart shows the RMS (Root-mean-square), Peak (0-pk), Peak to Peak (pk-pk) and SEL (sound exposure level) of the waveform data (Figure 4-8).
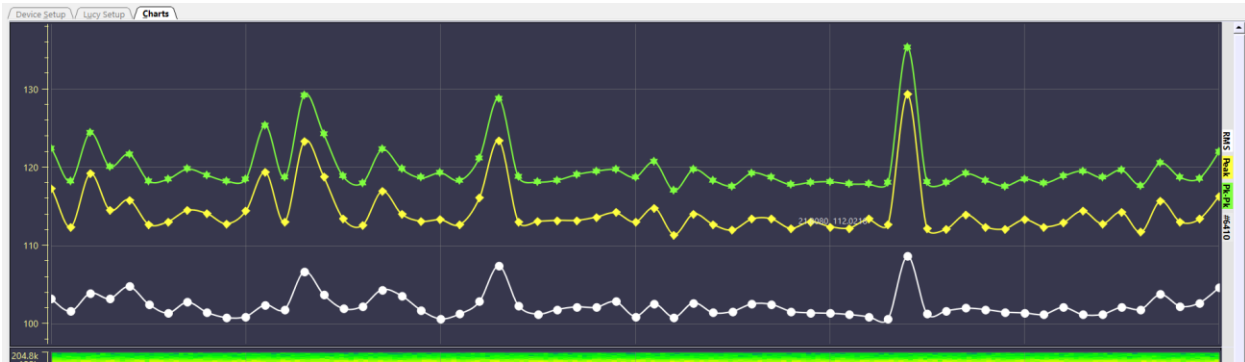

Figure 4-8 - PkRMS chart

The data is displayed in dB relative to the spectrum reference as detailed in the Spectrum Reference section.
The x-axis is time and is aligned with the spectrum chart.
The Y-axis scales automatically.

The data displayed on the charts corresponds to the sound level output of the waveform data, updated per second. If the zoom function is used, the time scale on the x-axis will not be updated.

Note 1: The PkRMS display will only show the values in the chart for **one hour** of data total. After the one hour of data is displayed, the oldest values will disappear.

Note 2: The SEL (sound exposure level) every 1 second.

Waveform Chart

The waveform chart shows recent waveform data in volts (Figure 4-9). The waveform corresponds to the sound pressure sensed at the hydrophone.
The Y-axis scales automatically. The advantage of auto scaling is that the displayed data is never clipped, though it can also make interpreting the data difficult, since the scale may change every time, the display is refreshed.
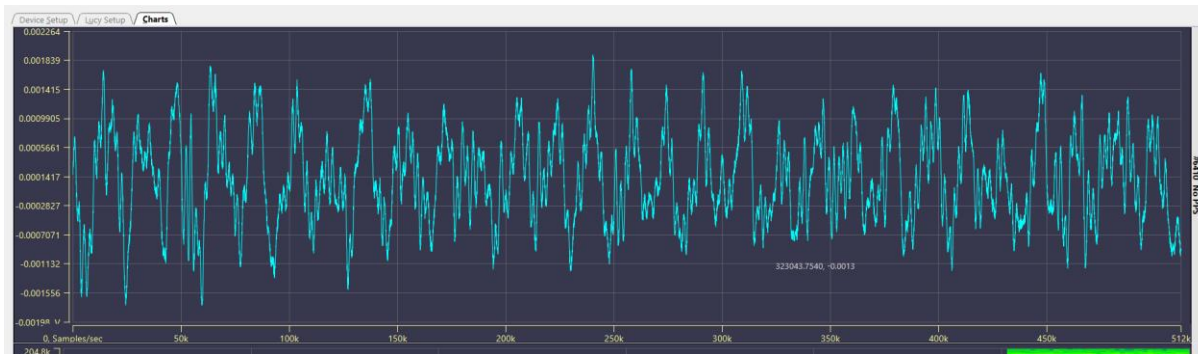
Figure 4-9 - Waveform Chart

Spectrum Chart

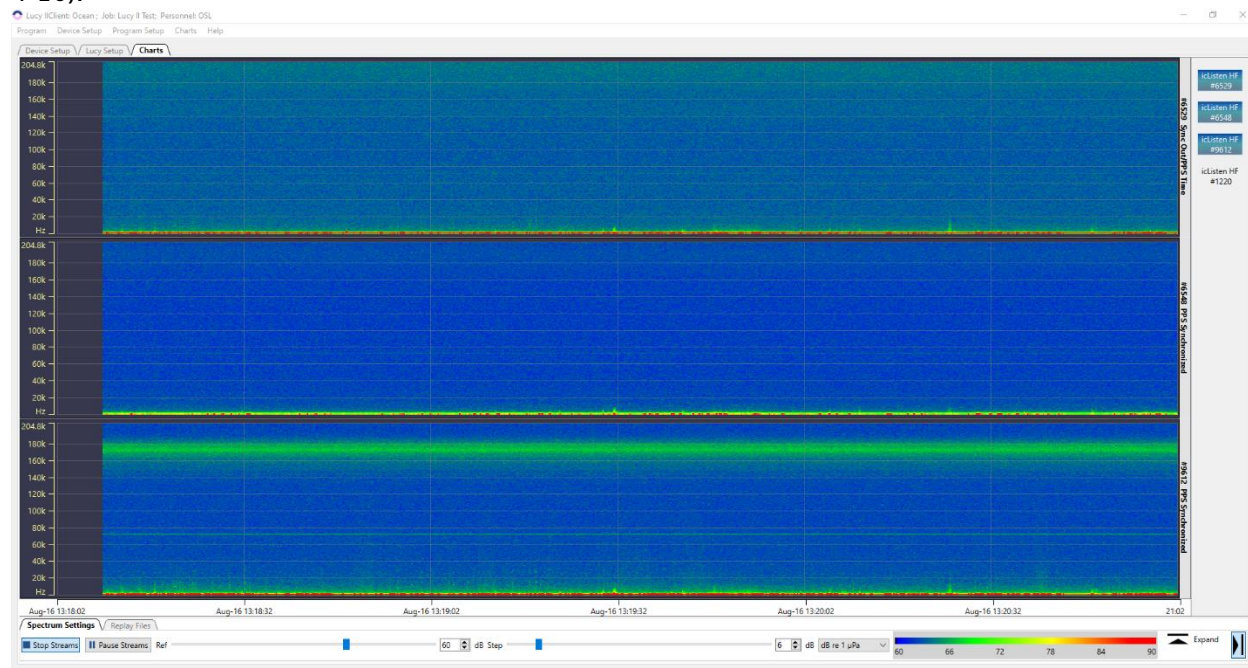The Spectrum chart is a waterfall display of the power spectrum data returned by icListen (Figure 4-10).

Figure 4-10 – Spectrum Chart

This chart shows time on the x-axis, frequency on the y-axis, and intensity (as colour) of the signal on the z-axis.

4.2   Spectrum Streaming Settings

The Charts tab contains the controls needed for both mode operations of real-time streaming and replaying data (Figure 4-11).

Available Tools:

- **Start Streams / Stop Streams**.
- **Pause Streams / Resume Streams.**
- **Spectrum Reference**.
- **Time Scale**.

- **Streaming Type**.
- **Devices Control Panel**.

Figure 4-11 – Controls for Streaming Settings

Spectrum settings panel and Devices control panel may be collapsed or expanded.
The data collection process begins when the **Start Streams** button is clicked. Note that whenever scanning starts, the charts are cleared.

When scanning is inactive, the **Start Streams** button is active, and the **Pause/Resume** buttons are inactive. When scanning is active, the **Pause/Resume** button is active.

Spectrum Reference - The Spectrum chart lets the operator make detailed measurements from the display. The chart can display spectral data in dB re V or dB re µPa, and as spectral density data in dBV^2/Hz and dB µPa^2/Hz (Figure 4-12).
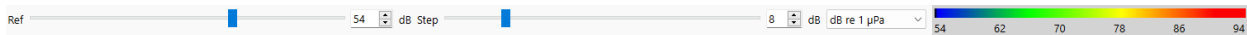

Figure 4-12 - Spectrum Reference Options

The baseline reference can be adjusted to avoid cluttering the display with data below the noise floor. The stepper adjusts by the colour step size, and specific values may be typed in.

Time Scale - The x-axis (time axis) of the spectrum chart is controlled by the **Time Scale** control, at the bottom of the chart (Figure 4-13).

Figure 4-13 – Time Scale Control

There are 2 settings for the scale: the resolution of the axis (Minutes, Hours, or Days), and the amount of data shown at the selected resolution. Data is averaged to allow the longer durations to be displayed.
The maximum size for this value varies depending on the FFT averaging settings and the sample rate, to a maximum of 1 week (7 days) of data.

Selecting the **"Wave Streaming"** or **"FFT Streaming"** options will cause Lucy to receive live real-time streamed data of the enabled type (Figure 4-14).
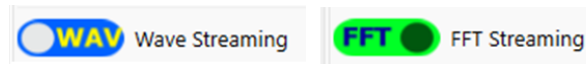

Figure 4-14 – Streaming checkbox

4.3   Replay Files

Lucy provides the operator with the ability replay previously logged files including:
- Files created by icListen in WAV, FFT, or TXT format.
- Files created by Lucy while collecting real-time data from icListen.

The format of all these files can be found in the icListen Log File Formats document.
Select the **Replay Files** tab from the Lucy **Charts** panel to work with the replay process (Figure 4-15).
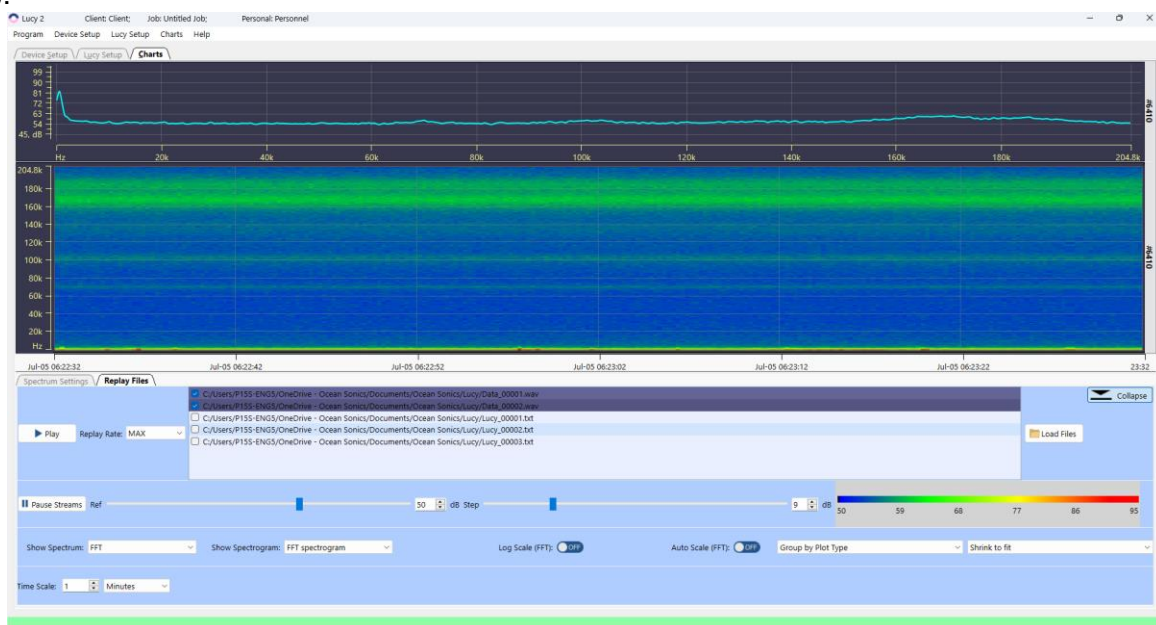

Figure 4-15 – Replay Files

Multiple files may be selected. The files will be played in the order shown in the selection window. Files of different types may be played in the same sequence, but the screen will be cleared when switching between file types.

Load Files command opens standard dialog for files loading. The list of all selected files will be saved and loaded next time the program run. A previously replayed files can be viewed once more by clicking the **Play** button, using the same settings.

The speed of the replay is set with the **Replay Rate** field. This ranges from **"Real Time"** to **"Max"** with 2 speeds in between. The display is still updated at the set refresh rate during replay; however, the amount of new data per refresh is changed by the replay rate. **"Real Time"** is the rate which the data was initially displayed at, and the speeds increase respectively from there. When a file is replaying, it may be paused or stopped using the controls.

TXT log files are stored in tab separated value (TSV) format. These files can be viewed by a spreadsheet viewer (such as Excel) as well as through Lucy. When replayed, the data is displayed as it was when initially received.

Certain settings (such as chart scaling) are viewing aids only and are not stored with the data. The TXT log files contain FFT (Spectrum) data.

5 Additional Advanced Operations

5.1 Remote Device Connection

1. Launch **VPN** and "**Lucy**".
2. Select "**Lucy Setup**", then "**Link Setup**" (Figure 5-1).
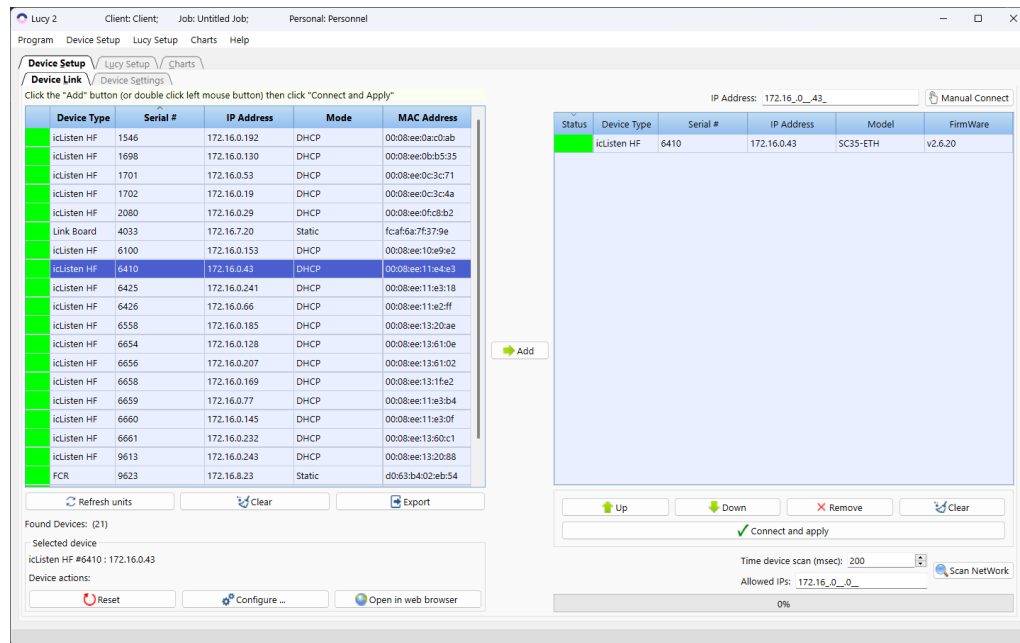

Figure 5-1

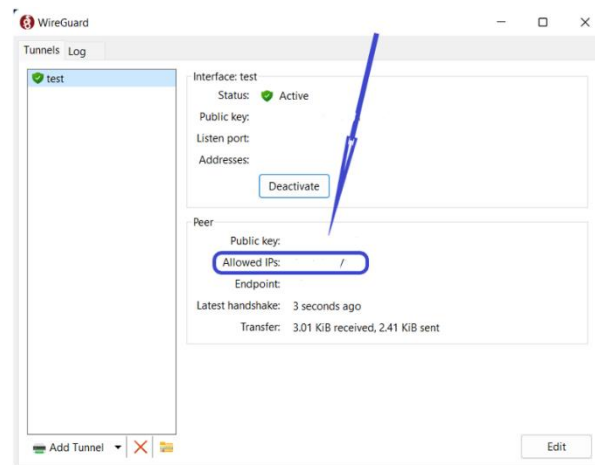3. Allowed IPs are in the "**WireGuard**" (Figure 5-2).

Figure 5-2

4. Click "**Scan Network**" button (Figure 5-1).
5. Go to the "**Connect To Device**" part.

5.2   FCR connection

To connect to FCR program uses UDP protocol. To work with the UDP connection to device through IP address we need to give access to the application to work with the internet (to private network to work in the net and to local network to work directly) in the **Windows Defender Firewall** (Figure 5-3).
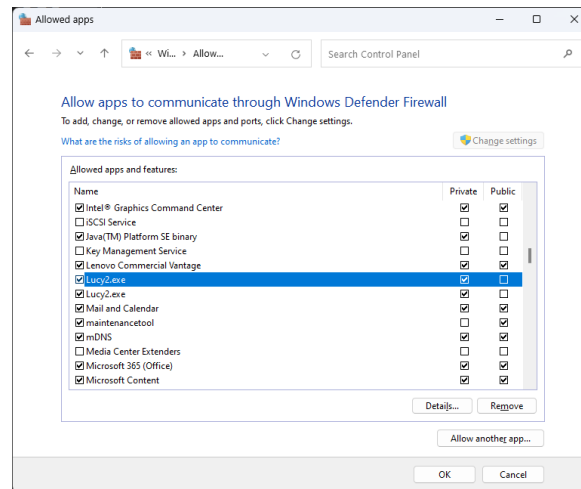

Figure 5-3

To add program to the allowed list run **Windows Defender Firewall** and select "Allow an app and feature through Windows Defender Firewall".
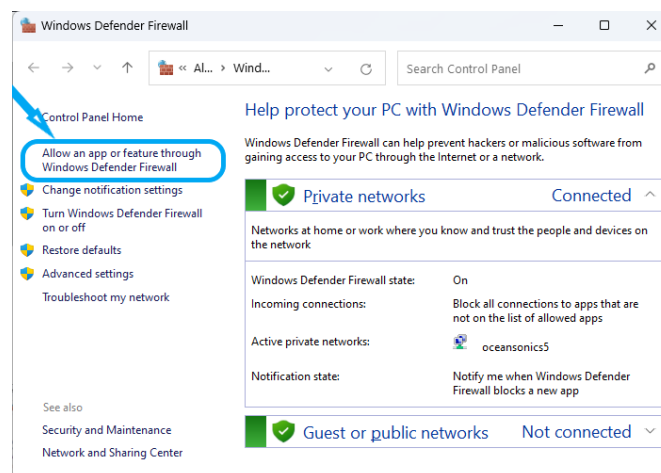

Figure 5-4

Then select "Change settings", then – "Allow another app …" and add Lucy II program into the allowed list.
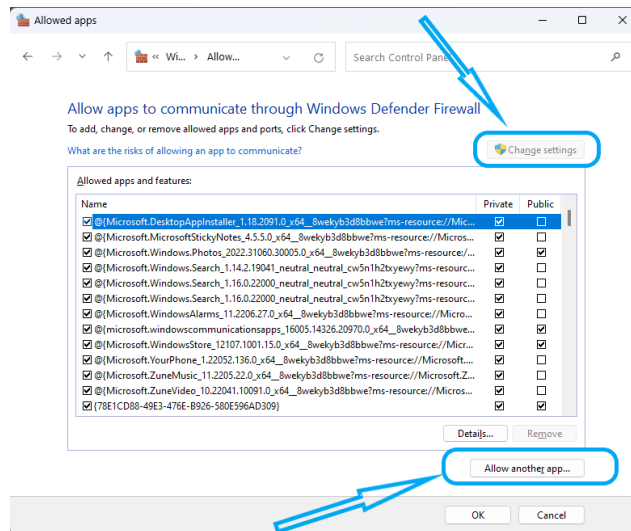
Figure 5-5

6 Appendices

6.1 Appendix A - Troubleshooting

Troubleshooting connection to hydrophone

The hydrophone isn't showing up on program devices list.
The hydrophone is showing up periodically.
The hydrophone has a grey block.
The hydrophone is showing up with a yellow or red block.

The hydrophone isn't showing up in program devices list.
To begin the troubleshooting perform these steps in the following order:
1. Clear and **Refresh** devices list.
2. Turn hydrophone power off and on again (using power down tool or Launch Box). **Refresh** devices list.
3. While turning on the hydrophone ensure it buzzes once and then buzzes twice.
   a. If it does not buzz or buzzes continuously, contact Ocean Sonics Support.
   b. If it buzzes but still does not show up in the program after refreshing continue to next step.
4. Check the cabling to ensure there is no damage.
5. Check the firewalls on your network if you are using a limited access computer (some workplaces have firewalls installed on work computers).
6. Check to see if you have automated IP addressing on your computer.
7. If you are using the Launch Box or wireless communications to the hydrophone, ensure your wifi is turned on, connected to the Launch Box, and is close enough to detect the signal.

Have you powered up your hydrophone?
- The icListen will not turn on until it is powered (plugged into a power source).
- You should hear the icListen buzz once and then buzz twice.
- After the second buzzes it should appear in program devices list.

If the hydrophone buzzes three (or more) times, it was not able to power on and there is an error. Please contact Ocean Sonics Support if you have an error buzz, this indicates an internal issue.

Do you have firewalls preventing the hydrophone from showing up on the network?
Some workplaces have firewalls that will prevent the icListen from connecting. Contact your network administrator to configure your computer to allow the icListen to connect on your network.

Have you changed your IP addressing on your computer/server?
- If your computer does not have automatic IP addressing turned on, the hydrophone can not find an automatic IP address based on your computer settings.
- Choose Manual (static) IP Address and use a suggested IP address for your computer.

The hydrophone is showing up periodically:
- The hydrophone can not obtain a proper IP address.
- Check the connection of the hydrophone, cables, and power.
- If you are using other equipment with the hydrophone, it could be interfering.

If there are other DHCPs or IP addressing protocols on your server, it could be trying to readdress the hydrophone. This is sometimes a problem when using a smart cable for the first time with a Wi-Fi network such as the Launch Box.

When setting up a Launch Box with a smart cable, plug the cable in first, then plug in the smart cable with 1 hydrophone. If the hydrophone does not show up, unplug the cable and plug back in with the hydrophone connected. Once the first hydrophone has established a connection with an IP address, plug in the second hydrophone. Once they both have IP addresses continue to add the hydrophones one by one. After the first time configuring the IP addresses of the hydrophones for the Launch Box it does not appear to be a problem when plugging the hydrophones in again with the smart cable unless their IP addresses were changed.
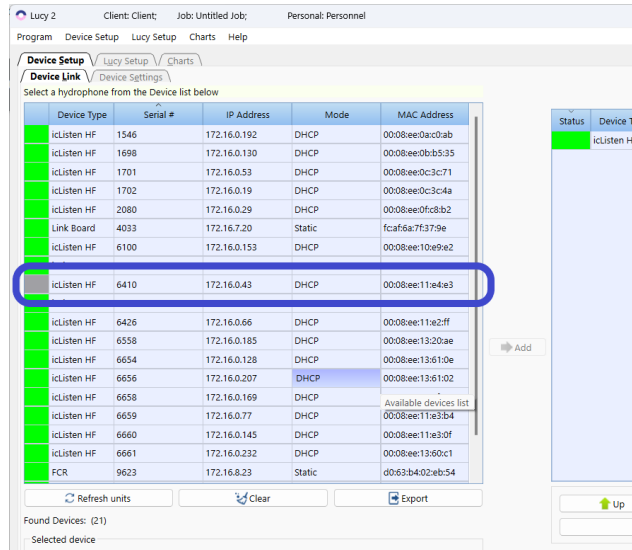
The hydrophone has a grey block:

Figure 6-1

If a hydrophone is removed from a network, the settings have changed, or it doesn't respond in time to the enquired message when program devices list is Refreshed it will appear grey.
If the list is cleared and then refreshed it will only show hydrophones and devices that are currently available on the network.

The hydrophone is showing up with a yellow or red block:
If your hydrophone shows up a red block in program devices list, the IP address is not compatible with your network. You need to change the IP address of the hydrophone to **Automatic (DHCP)** or suggest a new manual address (see **Manual (Static)**) or check the connection to hydrophone.

6.2   Appendix B - IP Network Settings:

Configure icListen - Device Link Options

Automatic (DHCP)

This is the default addressing for the hydrophones. The IP address will be given to the hydrophone based on the available IP addresses on your network. This setting is suggested for most deployments, especially when using a Wi-Fi product from Ocean Sonics such as the Launch Box or Wi-Fi Buoy.

The Dynamic Host Configuration Protocol (DHCP) is a network management protocol where the DHCP server dynamically assigns IP addresses and other network configuration parameters to each device on a network so they can communicate with other IP networks.

If your server has DHCP, the hydrophone will use this to find an IP address. If your hydrophone is not connected to a DHCP server, the hydrophone will find the IP addressing of your network and find an available address.

Manual (Static)

The hydrophone can be given a static IP address that will not change. The IP address must be allocated by the user, so it does not interfere with other IP addresses on the network. The IP address must be valid with the network the user is connected to (Figure 3-3).

Figure 6-2 – Configure Device Dialog – Manual (Static)

To find a Static address on your network:

1. Click on **Suggest IP**.
2. Check the boxes (Gateway Enabled / DNS Enabled) as applicable.
3. Click on **Send to Device.**
4. Wait for the hydrophone to receive the new IP address (up to 2 minutes).
5. The box beside the hydrophone should change from Red to Green. You can update the status of the hydrophone by clicking the **Refresh** button on the **Device Link** page.
6. If the box does not turn green within a minute, try another IP address, and repeat Steps 1-4.