Hydrophone Hub User Guide

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1 Hydrophone Hubs

Ocean Sonics' hydrophone hubs are designed for connectivity and communications with multiple **icListen** Smart Hydrophones. These hubs will act as an Ethernet switch to connect the Ethernet communications channel between hydrophones, and also connect the sync bus of the hydrophones to allow for precise time sync between devices.

Hub devices offered by Ocean Sonics include the **icLink** and the **Host Interface** (24, 36, 48, and 375 V models are available). All hubs provide Ethernet communications and time sync, but other features will vary between models. These devices are both capable of setting their system time using IEEE 1588-2008 Precision Time Protocol v2 (PTPv2). When creating a digital hydrophone array, a **Host Interface** will generally be used in combination with an **icLink**, but may also be used with either hub type may also be used independently.

The **icLink** can be used in a variety of configurations to provide in-water hub solutions for connecting **icListen** hydrophones. It can provide power conditioning for use with the various **Host Interface** voltage output levels, and connects to up to 4 hydrophones, or a bus adapter to allow more than 4 hydrophones. It may optionally also connect an **icTalk** In place of one of the 4 hydrophone connections, or in addition to the hydrophone bus connection.

The **Host Interface** provides a shore side solution for connecting multiple hydrophones. The **Host Interface** may be configured to connect with a **GPS Time Sync Master** for better timing accuracy, connect to a radio connection (24V POE) for long distance wireless communications, contain a **Host Controller** for combining data from multiple hydrophones, and may connect to USB hard disks for log file storage. The voltage supplied to the remote connection of the **Host Interface** will vary based on the device type intending to be connected on the remote side.

2 Features of the icLink

The **icLink** provides an in-water hub solution for connecting multiple **icListen** hydrophones. This allows for a reduced number of cables going back to shore, and allows all connected hydrophones to have their time of day precisely in sync with each other.

Time of day may be set on the **icLink** automatically using IEEE 1588-2008 Precision Time Protocol v2 (PTPv2), or manually through a telnet session.

This hub is generally paired with a **Host Interface** for power conditioning (if necessary), and more advanced processing, communication, and time sync features.

2.1 icLink (4 Port Model) - Feature Summary

- Connect up to 4 hydrophones (or up to 3 hydrophones and one **icTalk**)
- Precise time sync of all connected hydrophones and **icTalk**
- IEEE 1588-2008 (PTPv2) time sync support
- Power input requirements: 24, 36, or 48 VDC (+/-15%)
- Size: 83 mm dia., 260 mm long
- Depth rating: 200 meters

Figure 2-1: icLink (4 Port Model)

2.2 icLink (Bus Adapter Model) - Feature Summary

- Connect more than 4 hydrophones
- Connect **icTalk** smart projector
- Precise time sync of all connected hydrophones and **icTalk**
- IEEE 1588-2008 (PTPv2) time sync support
- Power input requirement, 375 VDC +10%/-30%
- Size: 83 mm dia., 265 mm long
- Depth rating: 200 meters

Figure 2-2: icLink with Bus Adapter, Ethernet Uplink and Serial/icTalk Port

3 Features of the Host Interface

The **Host Interface** provides a shore side hub solution for connecting multiple hydrophones. Generally, a **Host Interface** is paired with an **icLink** to enable more advanced features to be used with a hydrophone array.

Time of day may be set on the **Host Interface** by connecting a **GPS Time Sync Master**. The **Host Interface** will use the time acquired from the **GPS Time Sync Master** to become a PTP grand master for syncing downstream devices using IEEE 1588-2008 Precision Time Protocol v2 (PTPv2). Any hydrophones directly connected to the **Host Interface** will be synced using a pulse per second (PPS) signal generated by the **Host Interface**.

The **Host Interface** may be configured with a radio connection (24V POE) for long distance wireless communications, a **Host Controller** for combining data from multiple hydrophones, and the ability to connect USB hard disks for log file storage.

Host Interfaces can supply either 24, 36, 48, or 375 VDC to their remote connection. The 375V model is generally paired with an **icLink** that makes use of a Bus Adapter connection for arrays of more than 4 hydrophones.

Figure 3-1: Host Interface

3.1 Host Interface - Feature Summary

- Connect multiple hydrophones
- Precise time sync of all connected hydrophones
- Local debug/maintenance port (RJ45 Ethernet connector)
- IEEE 1588-2008 (PTPv2) grand master (if **GPS Time Sync Master** connected)
- **Host Controller** for combining multiple hydrophone data
- Log combined hydrophone data to external USB drive
- 24V POE radio connection option available
- Power input requirement, 24 VDC +/-15%, or AC line voltage (voltage varies by region)
- Remote power output: 24, 36, 48, or 375 VDC
- Size (24, 36, and 48 V models): 245mm (height) by 197mm (width) by 104mm (depth)
- Size (375 V models): 175mm (height) by 300mm (width) by 350mm (length)
- 24, 36, and 48 V models are water resistant/dust proof (IP65)
- 375V models are IP33

3.2 24V, 36V, and 48V Host Interface - Front Panel Indicators

The 24V, 36V and 48V **Host Interface** models includes several indicators on the front panel.

The Following LED indicators are present:

- VDC ACTIVE: This LED is lit when the power output on the remote port is active. This will be labelled 24 VDC ACTIVE, 36 VDC ACTIVE, or 48VDC ACTIVE depending on the GCI model.
- FAULT: This LED will light up during startup while the input supply voltage is being verified. After several seconds this the light should go out and only be relit if there is a cable fault.
- PPS ACTIVE: This LED blinks while the **Host Interface** is producing a PPS for hydrophones to sync to. This should begin blinking as shortly after the **Host Interface** is powered up (unless configured not to produce a PPS signal).
- TIME LOCK: This LED is used to indicate if the **Host Interface** has a GPS time lock.
- POWER: This LED is located above the power switch, and will be lit when the internal 24V supply has turned on.

Figure 3-2: 24V Host Interface Internal Panel

3.3 375V Host Interface - Front Panel Indicators

The 375V **Host Interface** model includes several indicators on the front panel.

The Following LED indicators are present:

- FAULT: This LED will light up during startup while the input supply voltage is being verified. After several seconds this the light should go out and only be relit if there is a cable fault.
- AC LINE: This LED is lit to indicate that the AC power input is safe and stable.
- PPS ACTIVE: This LED blinks while the **Host Interface** is producing a PPS for hydrophones to sync to. This should begin blinking shortly after the **Host Interface** is powered up (unless configured not to produce a PPS signal).
- CURRENT LIMIT: This LED will turn on briefly during startup, then turn off again. This LED will light up if a differential fault is detected in the cable/equipment while the 375V output is active (375V output will also be shut of when this occurs).
- TIME LOCK: This LED is used to indicate if the **Host Interface** has a GPS time lock.
- 375 VDC ACTIVE: This LED is lit when the 375V output on the remote port is active.
- POWER: This LED is located on the power switch, and will be lit when the internal 24V supply has turned on.

An ISOMETER isoRW425 insulation monitor is also incorporated into this **Host Interface** model, which has its own display panel visible from the front panel.

Figure 3-3: 375V Host Interface Internal Panel

3.4 Time Lock LED Patterns

The Time Lock LED makes use of several different blinking patterns to inform the user what the current state of synchronisation is.

In generally we transition form OFF, when not syncing, to ON when sync'd as a master, with the LED blinking for in between state. The LED blinks faster for better states of sync.

Detailed descriptions of each state, and the associated pattern are shown in the following table.

State	Description	TIME LOCK LED Pattern
No sync	No PPS input, or sync master detected on the network	Off
Holdover	Unit was formerly syncing or sync'd, but currently has no PPS input or sync master on the network	1 second on/1 second off (one blink each 2 seconds)
Syntonizing	Locking to PPS input, but no time of day detected yet	0.5 seconds on/0.5 seconds off (1 blink per second)
Syncing	Locking to time of day	0.25 seconds on/0.25 seconds off (2 blinks per second)
Sync'd as Slave	Sync'd to another sync master on the network	1.9 seconds on/0.1 seconds off (brief blink off every 2 seconds)
Sync'd as Master	Sync'd as a master (generally to GPS)	On

4 Hydrophone/Hub Accessories

Ocean Sonics provides some additional accessories which can be used with **icListen** hydrophones and hydrophone hubs. In some cases, the features of these accessories can also be built into the hydrophone hub products so that the standalone accessories are not required.

4.1 GPS Time Sync Master

The **GPS Time Sync Master** is a device which produces GPS messages, as well as a pulse per second (PPS) signal which encodes the time of day for syncing time on **icListen** hydrophones. Connecting this device to an **Host Interface** will cause it to become an IEEE 1588 PTP grand master for any devices connected on its "Remote" port. Ocean Sonics' Ethernet extenders and **icLinks** are all capable of time sync using this protocol.

The **GPS Time Sync Master** will produce a PPS signal at all times when powered, but will not encode a time of day signal within the pulses until a valid fix has been achieved. When a valid time fix has been achieved, the pulse widths will be modulated to encode the time of day (1 pulse per second is always produced, but the widths of the ON/OFF periods will vary).

Figure 4-1: GPS Time Sync Master

4.2 Bus Adapter

The **Bus Adapter** is used in combination with an **icLink** to connect more than 4 hydrophones. The **icLink** makes use of a high power 24V bus, with a differential time sync pair, to supplying power and sync to multiple hydrophones. The **Bus Adapters** provide conversion points at which **Smart Cables** or hydrophones can be connected. **Bus Adapters** can be daisy chained with more cables/adapters to extend the bus further and allow more hydrophones to be connected.

Figure 4-2: Bus Adapter

4.3 Smart Cable

The **Smart Cable** allows up to 5 hydrophones to be powered, sync'd and connected to Ethernet using a single cable. **Smart Cables** can be used in combination with **Bus Adapters** and an **icLink** in order to build large hydrophone arrays.

A **Smart Cable** may also be used without additional hub devices or **Bus Adapters**, if no extra power conditioning, communication signal extension or real time multichannel processing is required.

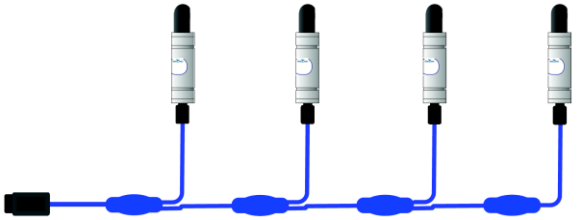

Figure 4-3: Smart Cable

4.4 Ethernet Repeater

The **Ethernet Repeater** is used to overcome the 100m limitation of Ethernet. It is intended for cable lengths between 100m and 500m in length. Above 500m other solutions, such as **Ethernet Extenders**, may need to be used.

Figure 4-4: Ethernet repeater

4.5 Ethernet Extender

The Ethernet extender option converts between Ethernet and DSL communications to overcome the 100m limitation of Ethernet. Extenders are available for 500m, 1000m, and 1500m lengths.

Ethernet extenders may be purchased as standalone devices, which is useful when a single hydrophone is to be used, or when additional **Host Interface** features are not required for an array.

Figure 4-5: Standalone Ethernet Extender

When using Ethernet extenders, both the host (shore side) and device (hydrophone side) ends of the link must be equipped with the Ethernet extender technology. The connector used for the extender are 5 pin subsea connectors, rather than the 8-pin subsea connectors used by **icListen** and **icLink**.

Figure 4-6: 5-pin and 8-pin Subsea Connectors

Power requirements for the load at the device end of the extender and cable length, will both influence the power conditioning required for the extender pair. For this reason, extender cables are not usually interchangeable, and adding together multiple lower load cables will not work for a higher load situation (ie: two 500m cables will not work in a system that requires a 1000m cable).

5 Connector Descriptions

This section describes the function of each connector on the **icLink** and **Host Interface**.

5.1 4Port icLink Connections

The 4 port **icLink** comes with up to 5 connectors. Most or all connectors can be for Ethernet (for **icListen**), with one port optionally set up for RS422 serial (for **icTalk**). The uplink connection (shore side) will always be a male bulkhead and all remaining connectors will be female bulkheads.

Figure 5-1: icLink 4 Port Connectors

5.1.1 icLink Connections with Bus Adapter Option

The **icLink with Bus Adapter** comes with 3 connectors. Connector 1 is the hydrophone bus connection, Connector 2 is a serial connection (for **icTalk**), and Connector 3 is the uplink connection (shore side), and is the only male bulkhead. Connectors 1 and 3 (bus/uplink) both provide an Ethernet connection.

Figure 5-2: icLink with Bus Adapter and Serial Connectors

5.2 Host Interface Connections

The **Host Interface** comes equipped with variety of connections available. Connectors used in general operations are all located on the lower face of the **Host Interface**, while connections for service/maintenance are located on the internal panel.

Operational connectors are labelled as per their functions beside each connector. Available connections include: Power (DC IN 24V or AC line power), GPS, Radio PoE, Ethernet, Local Hydrophone, and Remote.

Figure 5-3: 48V Host Interface Operational Connectors

Figure 5-4: 375V Host Interface Operational Connectors

5.2.1 Host Interface USB DATA DRIVE Connector

If applicable, there are USB ports on the **Host Interface's** internal panel, which allow for an external USB hard drives to be connected. This allows for data to be logged locally on the **Host Interface**, and provides a convenient method for quick data retrieval of large quantities of data.

A hook & loop style strap is provided to secure the hard drive within the **Host Interface**. Ocean Sonics recommends using a rugged or solid state hard drive to avoid damage caused by shock, vibration or temperature at the location of the **Host Interface**.

5.2.2 Host Interface TEST Port

An 8P8C modular jack (often referred to as RJ45) is located on the inside panel of the **Host Interface**. This port is provided so that the **Host Interface** can be quickly connected to a local network or laptop for convenient maintenance/debugging when necessary. This port may function as the main link to the network if necessary, but because the **Host Interface** must be opened to gain access, this will remove the IP65 dust/water protection of the device, and as such is not recommended.

5.2.3 Host Interface Power Connector

This connector is used to supply power to the **Host Interface**. If there is a need to use a different power adapter from what was supplied with your **Host Interface**, the mating plug for this jack is Switchcraft part 767KS12.

This connector is labelled "DC IN 24V" in the picture above.

Note that an AC power cord is attached for the 375V **Host Interface** panel pictured above, which connects to a standard wall jack (connector varies by country).

5.2.4 Host Interface Radio PoE Connector

This connector supplies a regulated 24V POE connection at 100 Mbit/s. This is useful for running radio links, which can reduce the cabling requirements for a system, or be used when cabling is not an option.

Power is supplied on Ethernet wires 4/5 (+) and 7/8 (-). Maximum power supplied is 10W.

This connector is labelled "RADIO PoE" in the 48V **Host Interface** picture above.

5.2.5 Host Interface ETHERNET Connector

This connector supplies a regulated 24V POE connection at 100 Mbit/s. This is intended for running more permanent local Ethernet connections, so that the front panel can remain closed for better water/dust resistance.

This connector is labelled “Ethernet” on the 375V **Host Interface** picture above.

5.2.6 Host Interface GPS Connector

This connector is for connecting a **GPS Time Sync Master** to the **Host Interface** (see the *Hydrophone/Hub Accessories* section above). Connecting a **GPS Time Sync Master** to the **Host Interface** causes it to become a PTP grand master for any downstream devices on the “Remote” connection.

Using GPS for time sync will allow multiple hydrophone arrays at any location to be precisely synced with each other, and is the default method by which time is set on the **icLink**.

This connector is labelled “GPS” in the pictures above.

5.2.7 LOCAL HYDROPHONE Connector

This connection is for an Ethernet **icListen** hydrophone. The hydrophone connected to this port will be time synced via a PPS signal generated by the **Host Interface**. Any hydrophones connected on the remote port will be synced to the same time using IEEE 1588-2008 (PTPv2) protocol.

This connector is labelled “LOCAL” on the 24V **Host Interface** internal panel picture above.

5.2.8 REMOTE Connector

This connector is intended for connections to remote hydrophones/hydrophone arrays. This connection may have additional power conditioning required for the greater number of hydrophones or longer distance cabling required for it.

Time sync is accomplished over this connection using IEEE 1588-2008 (PTPv2) protocol, but will be synced to the same time as the PPS signal used to sync any hydrophone connected to the local port.

This connector is labelled “REMOTE” on the internal panel pictures above.

6 Host Controller

The **Host Interface** comes equipped with a **Host Controller**, which is capable of controlling multiple hydrophones simultaneously. It also combines the data from multiple instruments, which can then be streamed over a network or logged to an external USB hard drive.

The **Host Controller** also runs a web interface which can be used for setting configuration parameters, and viewing real-time spectrum data from multiple hydrophones.

This section will describe the features of the **Host Controller**.

6.1 Network Discovery

In order to make finding your device on a network easier, hydrophone hub products make use of Ocean Sonics' Marco/Polo protocol to discover IP addresses.

A pair of programs (**Marco** and Polo), are used to discover **Host Interface** units on a network. **Marco** is the application used by the end user on a PC which scans the network for devices, while Polo exists on the **Host Interface** unit and responds to messages from **Marco**. Using **Marco**, a unit can be discovered on a local network, or through a direct connection to a device, even when not on the same subnet. **Marco** also allows the network settings of the **Host Interface** unit to be reconfigured.

6.2 Web Interface

The **Host Controller's** web interface can be used for configuration, data viewing, and debugging of the system. The following sections will describe the pages available on the web server.

6.2.1 Web Interface: Home

This is the start page seen when first connecting to the **Host Controller's** web interface. It displays some very basic information (firmware/hardware releases, status, and system time).

It should be noted that there will be a delay between when the time is set or sync'd on the **Host Interface** and when the time is sync'd on the attached hydrophone (generally less than 3 minutes). The time used for internal log files, and data transmitted from the **Host Controller** will be the time stamped on the data by the hydrophones.

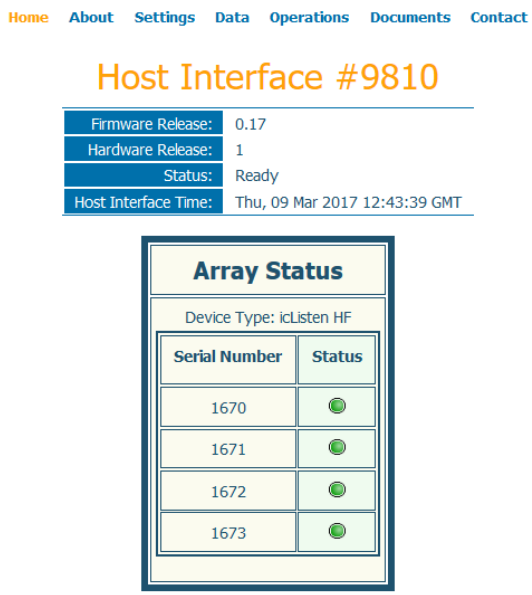

Figure 6-1: Host Controller Web Interface Home

6.2.2 Web Interface: About

This about page displays full versioning information of the components of the firmware release, as well as the IP/MAC addresses of the Host Processor, and TCP ports used by it.

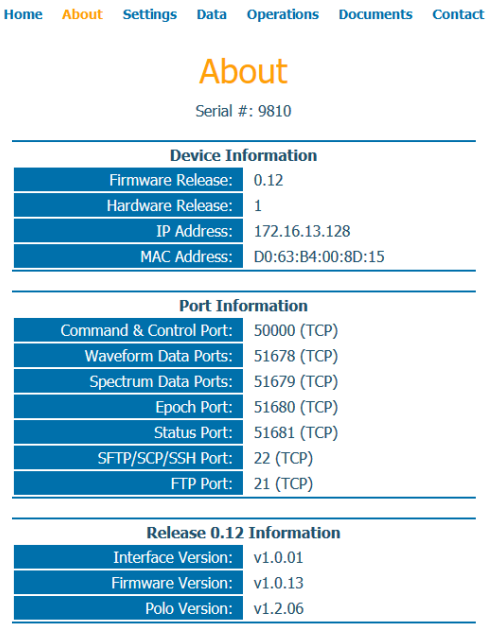

Figure 6-2: Host Controller Web Interface About

6.2.3 Web Interface: Network Settings

The network settings page displays the current settings, MAC address of the acoustic processor, and TCP ports used by the processor. Settings can be adjusted on this page as well.

After the new settings have been applied, the web interface will be moved to the location the new settings point to, and will no longer be accessible at its original address. You will be redirected to the new address if a static address is set, or can use **Marco** to locate the new address if DHCP is being used.

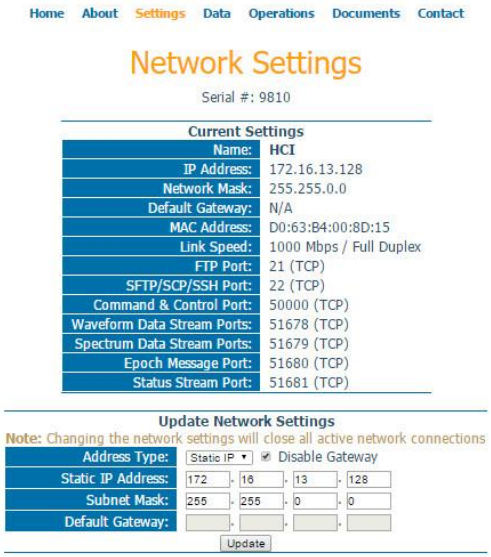

Figure 6-3: Host Controller Web Interface Network Settings

6.2.4 Web Interface: Array Settings

This page allows you to adjust what hydrophones and hub devices the **Host Controller** will communicate with in the array.

Adding hub devices will allow some of the hub controls to be performed on the “Operations” page of the web interface.

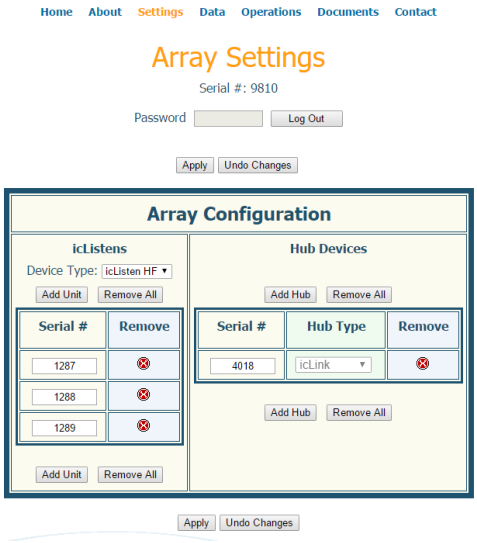

Figure 6-4: Host Controller Web Interface Array Settings

6.2.5 Web Interface: Data Collection Settings

This page allows you to adjust the data collection settings used by the hydrophones connected to the **Host Controller**. It also allow you to set if the **Host Controller** will combine the hydrophone data streams, and set what data will be logged to an attached USB drive. Settings from this page will be applied to all hydrophones included in the Array Setup on the Array Settings page. For full details of the data collection settings available to **icListen**, please refer to the *icListen User Guide*.

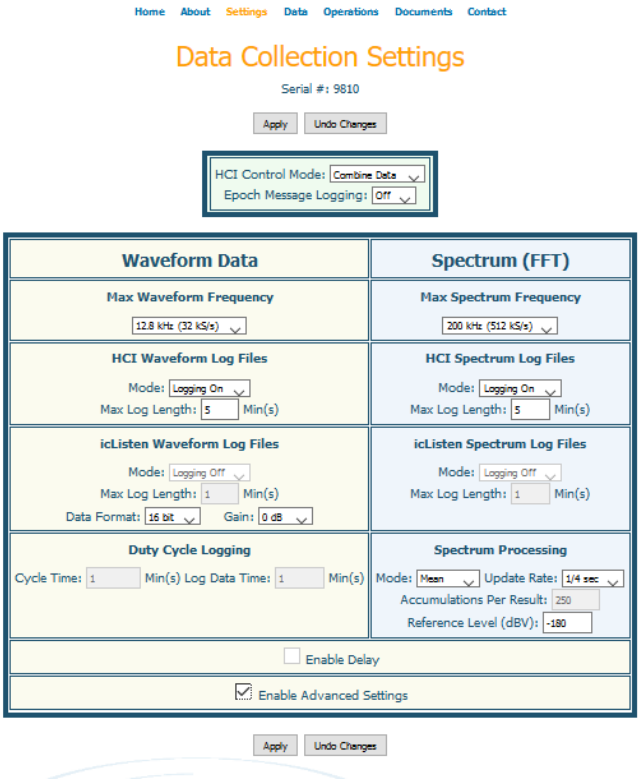

Figure 6-5: Host Controller Web Interface Data Collection Settings

6.2.6 Web Interface: Epoch Settings

This page allows you to adjust the epoch trigger settings used by the hydrophones connected to the **Host Controller**. Settings from this page will be applied to all hydrophones included in the Array Setup on the Array Settings page. For full details of the epoch settings available in **icListen**, please refer to the *icListen User Guide*, or press the '?' icon on the Epoch Settings page of your instrument.

Note that epoch triggers are checked on the actual hydrophones, and not on the **Host Controller**. As such the Record Wave/Spectrum settings will not affect acoustic data logged by the **Host Interface**. Messages sent when triggers start/end will be logged by the **Host Controller**.

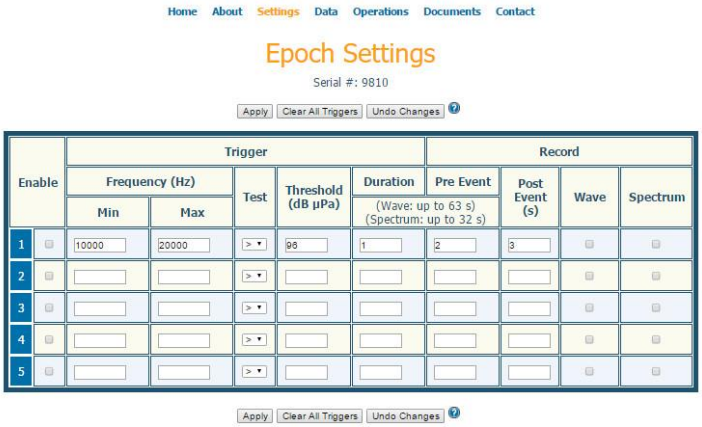

Figure 6-6: Host Controller Web Interface Epoch Settings

6.2.7 Web Interface: Spectrum Charts

This page is found under **Data→Spectrum Charts**. It provides live real-time spectrum displays for the hydrophones configured on the Array Settings page.

The top displays show single spectrum data results with frequency along the x-axis and intensity on the y-axis. Older results will fade from the display (completely disappearing after the configured persistence has run out).

Below these are waterfall displays, which show frequency on the y-axis, intensity as colour, and time on the x-axis. The colour scaling is adjusted by changing the "Step Size" (dB between each colour: black, blue, green, yellow, orange, red) and "Reference" (black level) settings. These settings can be adjusted automatically to fit within the display by using the "Rescale" button. The time scale of the x-axis is set in minutes in the box to the left of the rescale button.

The sizes of each display can be adjusted to make them fit onto your screen better, or disabled if you wish to ignore the data from a particular hydrophone.

Sometimes the internet browser may have trouble keeping up with all data plots, in which case some data will be dropped and empty/black sections will appear on the waterfall display. This does not necessarily mean that the data streams are not passing all data forward, or that data in the logs is being missed. Turning off some of the unwanted displays and/or reducing the persistence may help reduce data missed on the plots of interest.

Figure 6-7: Host Controller Web Interface Spectrum Charts

6.2.8 Web Interface: Data Retrieve

This page contains a link to the FTP address at which the data can be downloaded. An FTP client can also be used for this purpose (such as FileZilla). Full FTP clients will generally have better options for retrieving data than web browser.

For large quantities of data, it may in some circumstances be more convenient to physically retrieve the USB hard drive being logged to and replace it, rather than downloading it over a network connection.

6.2.9 Web Interface: Power Operations

This page allows you to reset the **Host Controller**, and control power outputs on the **Host Interface** and attached hub devices. The power operations will vary based on the options available to the **Host Controller**, and attached hub devices. It should be noted using "Power On/Off Operations" may not turn off attached devices with internal batteries such as an **icListen** or **icTalk**. "Full Power Disconnect Operations" can be used for ensuring devices with internal batteries are powered down. Logging should be disabled before performing Full Power Disconnect Operations to avoid data corruption.

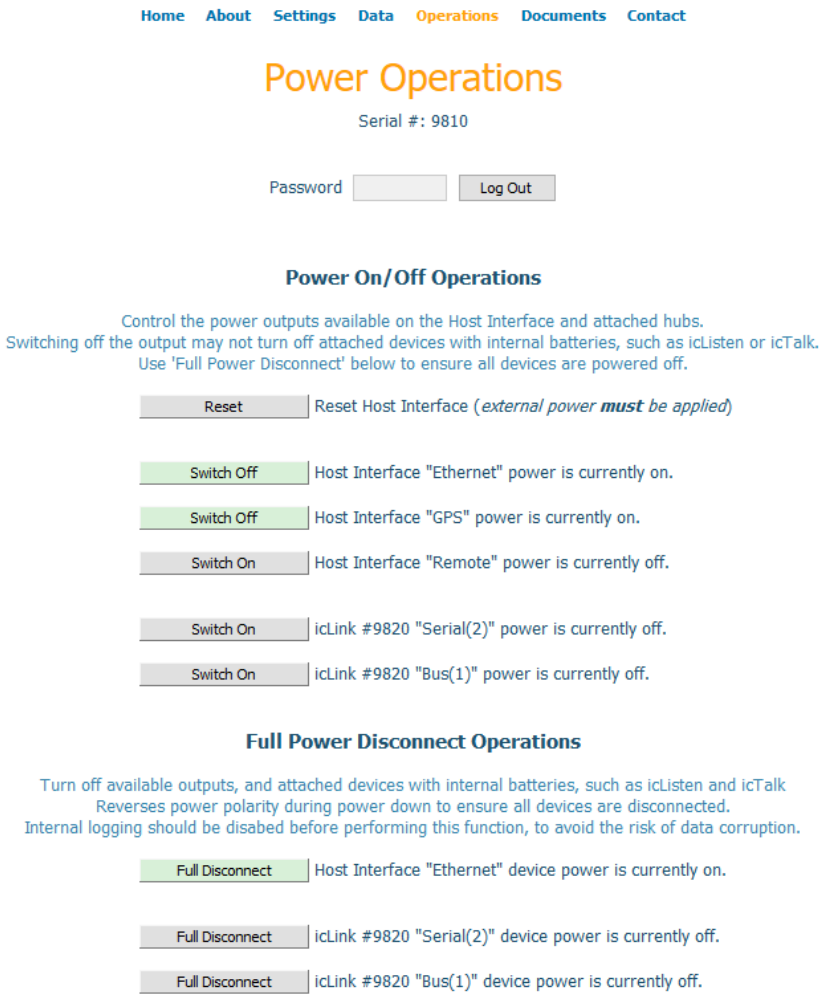

Figure 6-8: Host Controller Web Interface Power Operations

6.2.10 Web Interface: Communications Operations

This page allows you to enable and disable communication ports on the **Host Interface**, and attached hub devices. The communication buttons will vary based on the options available to the **Host Interface**, and attached hub devices.

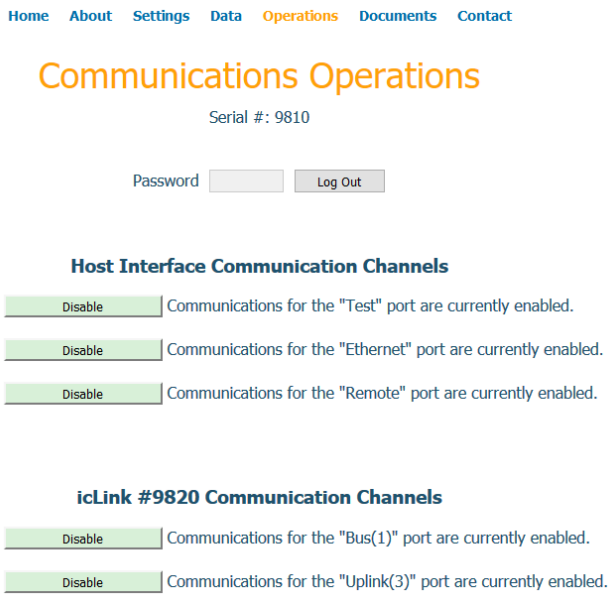

Figure 6-9: Host Controller Web Interface Communications Operations

6.2.11 Web Interface: General Operations

This page allows you to remove password protection, update the password (used for protecting settings on the **Host Controller**), and set the time on the **Host Interface**.

To remove the password, leave the "New Password" and "Re-type Password" fields blank and click the "Update Password" button.

It should be noted that the time set on the **Host Interface** will be overwritten if the **Host Interface** is a slave device to another PTPv2 time source, or has a valid GPS fix. It should also be noted that there will be a delay between the time that the time is set on the **Host Interface** and the time is sync'd on the attached hydrophones (generally less than 3 minutes).

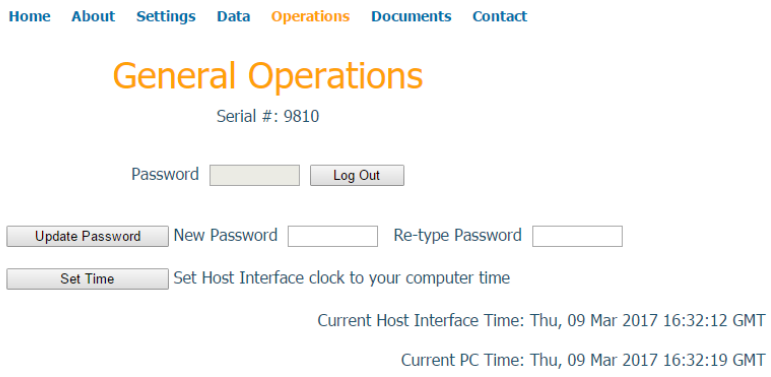

Figure 6-10: Host Controller Web Interface General Operations

6.2.12 Web Interface: Documents

This page provides access to several documents to help you while using your **icListen** hydrophones, and **Host Interface**. These documents are also available on our company website: www.oceansonics.com.

6.2.13 Web Interface: Contact

This page provides contact information, should you need to contact us for support when using your **Host Interface** or **icListen**.

6.3 Logged Data Retrieval

Data logged on a **Host Controller** can be retrieved by several different methods:

Swapping USB Drives: All data logged on the **Host Controller** is logged onto the external USB drives connected through the internal panel. If the location of the **Host Interface** is readily accessible, swapping the full drive for an empty one is the fastest way to retrieve the logged data. The data can then be copied from the drive to a secure location, so that the old drive can be cleared for swapping when the new drive is full. Ocean Sonics recommends disabling logging during the swap process to avoid data corruption.

FTP: FTP is the fastest method of retrieving data files over a network. This is typically done using an FTP client program (such as FileZilla), but can also be accomplished using a web browser. There is no user name or password required when using FTP.

SFTP/SCP: The SFTP/SCP protocols may also be used to retrieve data files. This is typically done using an FTP client program (such as FileZilla). The login user name is “HCI”, and by default there is no password. Port 22 is used when making SFTP/SCP connections. This method is more secure, but considerable slower than using FTP.

6.4 Firmware Updates

Occasionally, Ocean Sonics may provide firmware updates for your **Host Controller**. These updates include bug fixes and feature enhancements.

Updates are applied using FTP, SCP or SFTP. Any FTP client (such as FileZilla) may be used for this. When using SFTP or SCP, connect to port 22, use “HCI” as the user name, and by default there is no password. FTP requires no user name or password. The update file will be named HCIUpdate###.icu (with ### replaced by the release number of the update).

It is very important that the **Host Interface** remains powered during the update process. Shutting down **Host Interface** mid-update will leave the filesystem in an unknown state.

Follow these steps to update the **Host Controller** firmware using an FTP client/web browser:

1. Power the **Host Interface** using the power adapter.
2. Connect to the **Host Controller** via FTP. If the IP address of the hydrophone is not known, Ocean Sonics’ **Marco** software can be used to find it.
3. Once connected, you should see a directory called "update". If this directory does not exist, create it. This directory name is case sensitive.
4. Upload the update ".icu" file onto the "update" directory.
5. The instrument must now be reset in order for the update to take place. This can be done by pressing the “Reset” button either in **Marco**, or on the “Operations” page of the web interface.
6. Allow approximately 5 minutes for the update to complete.
7. Reconnect to the **Host Controller** via your web browser. To open the web interface, type the IP address of your **Host Controller** into the address bar of your web browser, or double click on the hydrophone in the found units list in **Marco**.

Check that the “Release” number indicated on the home page matches the provided update. If the release number has not changed, try hitting the “Refresh” button or clearing your browser cache before assuming the update has failed.

7 Vertical Array Host Interface Set-Up Field Procedure

7.1 Host Interface Set-Up

1. Connect all cables needed for **Host Interface** setup
2. Turn **Host Interface** switch to ON position
3. Open **Marco** and double click on **Host Controller** to bring up a web browser
4. Go to the **Operations Page → Power** page
5. Under **Power On/Off Operations:**
    - **Switch On** Host Interface "Remote" Power
      (Turns Power on to Attached Hub Devices)
      *Note: Ensure the array is connected to the Host Interface
    - Host Interface "Ethernet" and "GPS" Power will be on automatically (if not turn on)

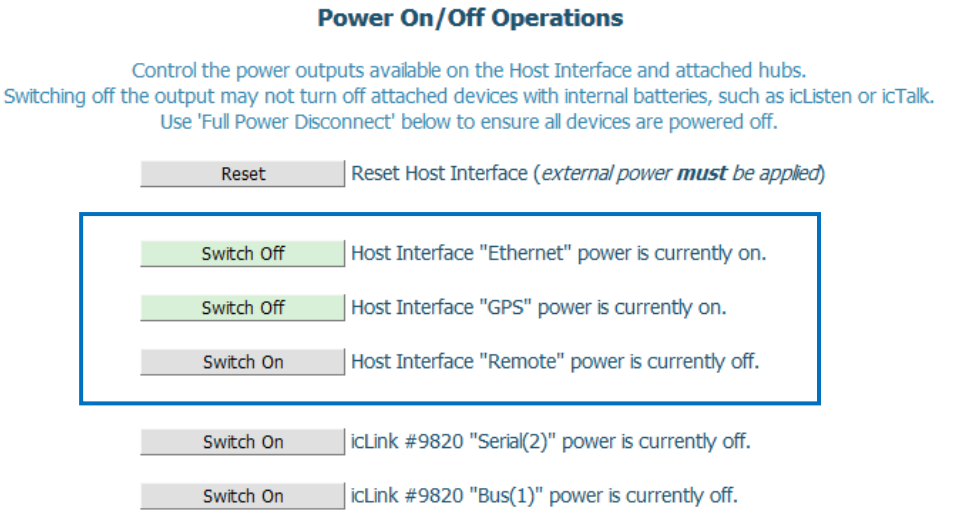

Figure 7-1: Vertical Array Setup: Host Interface Power On/Off

7.2 Add icLink and Hydrophones

1. Go to **Settings → Array**

<u>To Add icLink:</u>

2. Click the **Add Hub** button
3. Type in Serial Number of **icLink** found in **Marco**
4. Click the **Apply** button

<u>To Add Hydrophones:</u>

5. Click the **Add Unit** button to add enough space for all hydrophones in the array
6. Type in the serial numbers of all hydrophones starting with hydrophone physically located at the top of the array
7. Click the **Apply** button

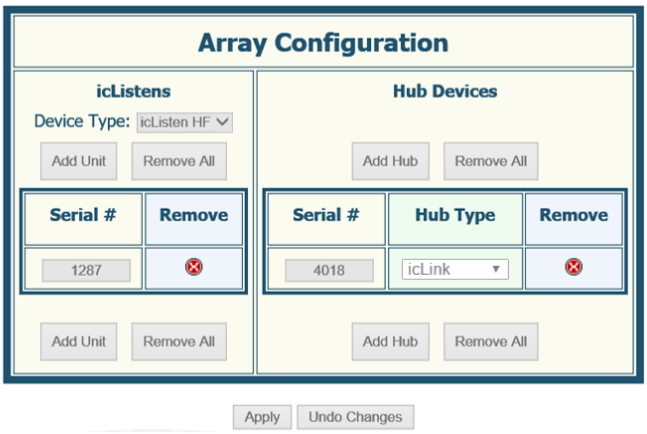

Figure 7-2: Vertical Array Setup: Array Configuration

8. Go to **Operations → Power**
9. Under **Power On/Off Operations**, Switch "Bus(1)" Power On *(Turns power on to Hydrophones)*
10. Under **Power On/Off Operations**, Switch "Serial(2)" Power On *(Turns power on to icTalk)*

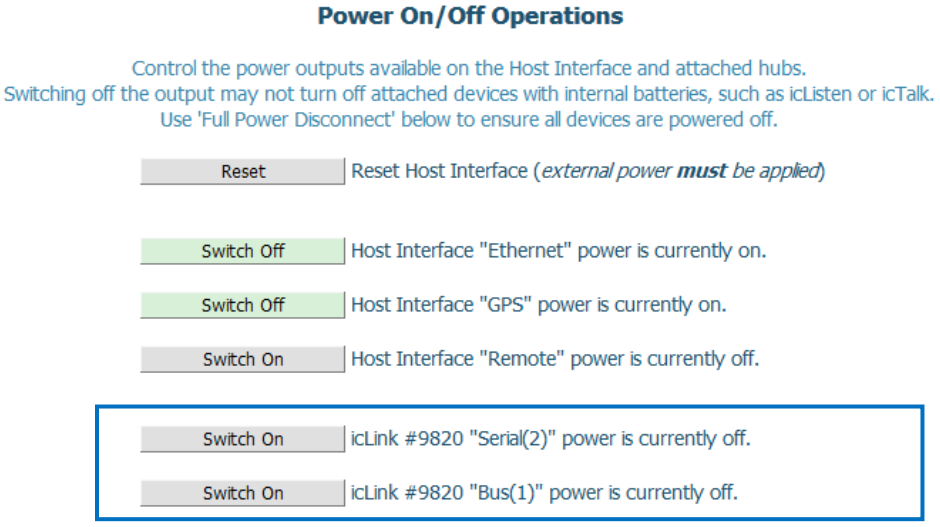

Figure 7-3: Vertical Array Setup: icLink Power On/Off

11. Look at the **Home** page to see Status of hydrophones (All should have green status lights)

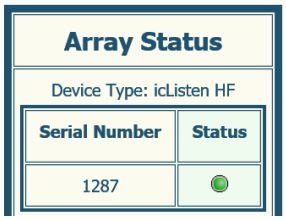

Figure 7-4: Vertical Array Setup: Array Status

12. Look at the **Data → Spectrum Charts** page to check for data streams

7.3 icTalk Set-Up

If icTalk is not being used, continue on to the next step in procedure.

1. Connect the cable from the **icLink** with a Bus Adapter connection to the **icTalk** in a float collar
2. Ensure the proper weights are tied from the float collar and the distance from the weight to the **icTalk** is measured to determine its height from the bottom
3. Ensure Virtual Serial Port is Connected and Operating (see VSP Document for further details)
4. Open **Talk Assistant**
5. Click **Find All Units**
6. Under **Configuration File** click **Load** to Load Talk Pattern
7. Ensure GPS signal is working and synced
8. Ensure **Sync – PPS** is set to **Sync in - Falling Edge** and **Decode Time from PPS** box is checked
   If needing pattern to line up on minute:
9. Click Enable on Start Delay
10. Choose time that is approximately 2 minutes in future
11. Click **Accept Changes**

7.4 Live Streaming and Logging

1. Open Logging Program: Array Manager
2. Type the **Host Interface** serial number into the space provided
3. Press the Enter key to check the network for the **Host Interface**, if found IP address will appear
4. Click **Open in Browser**

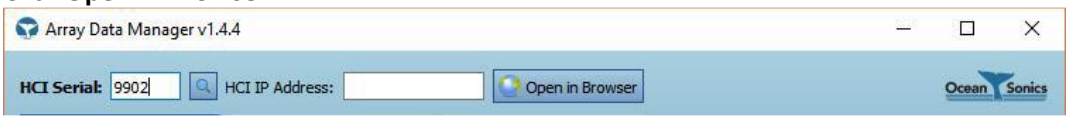

Figure 7-5: Array Data Manager

On the Host Controller Web Interface:

5. Under ***Settings → Data Collection***
6. Ensure **Combine** setting is chosen
7. Choose what data rate to record
8. Click the **Apply** button
9. Go to **Spectrum → Data Charts** to view stream

In the Array Manager:

10. Go to the **Local Logging** tab
11. Click on **Browse** on the **Logging Directory** field
12. Navigate to where the data will be saved
13. Type the desired **Log file prefix** in the input field
14. Set the **Log file length**
15. Click **Start Logging**
16. Look to see if files are logging properly, as time counts in bottom of program
17. Continue logging until desired amount of data is collected
15. Click **Stop Logging**

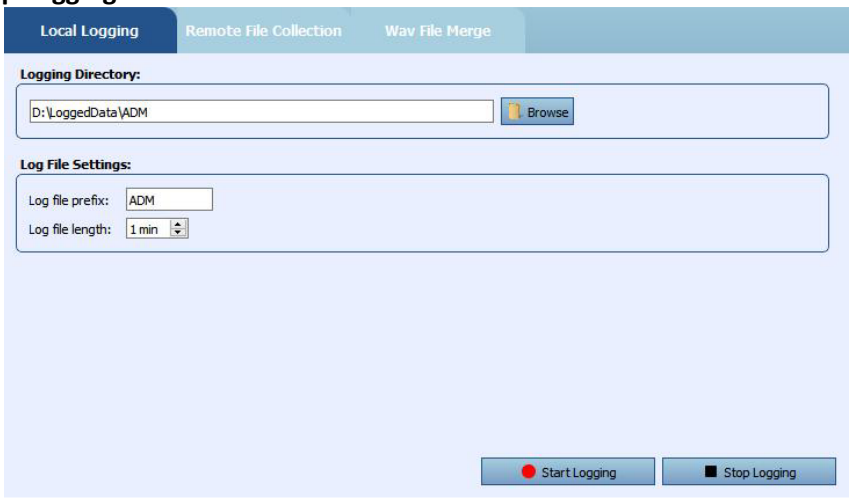

Figure 7-6: Array Data Manager

7.5 Logging Internally

On the Host Controller Web Interface:

1. Under **Settings → Data Collection** choose **Configure**
2. Choose desired data rate
3. Enable 2-minute delay
4. Turn **Logging on**
5. Click **Apply**
6. Look at a hydrophone's browser page to ensure logging was set to proper data rate

(Double click on a hydrophone on **Marco** to bring up a Browser: under **Settings → Data Collection** look to see if proper settings were applied)

7. Open any hydrophone by double clicking on it in **Marco**
8. Go to **Data → Retrieve**
9. Look to see if files are being recorded
10. Refresh page to ensure data is continuing to be recorded
11. Allow to run for the desired number of minutes

When test is completed:
On the Host Controller Web Interface:
12. Turn **Logging Off**
13. Click **Apply**

Ensure Logging is *turned off* on individual hydrophones
(Double click hydrophone on **Marco** to bring the web interface, under **Settings → Data Collection** look to see if logging is off)

7.6 To Retrieve Internally Logged Data using Array Manager

On Array Manager:
To Retrieve:
1. Go to the **Remote File Collection** tab
2. Choose **Download Directory** by typing in or clicking **Browse** and choosing place on computer
3. Select a **Start time** and **End time**
4. Choose wav files only, FFT (txt) files only, or Both wav and FFT files
5. Select Max downloads simultaneously (default being 4 but can go up to 10)
6. Click **Find Files**

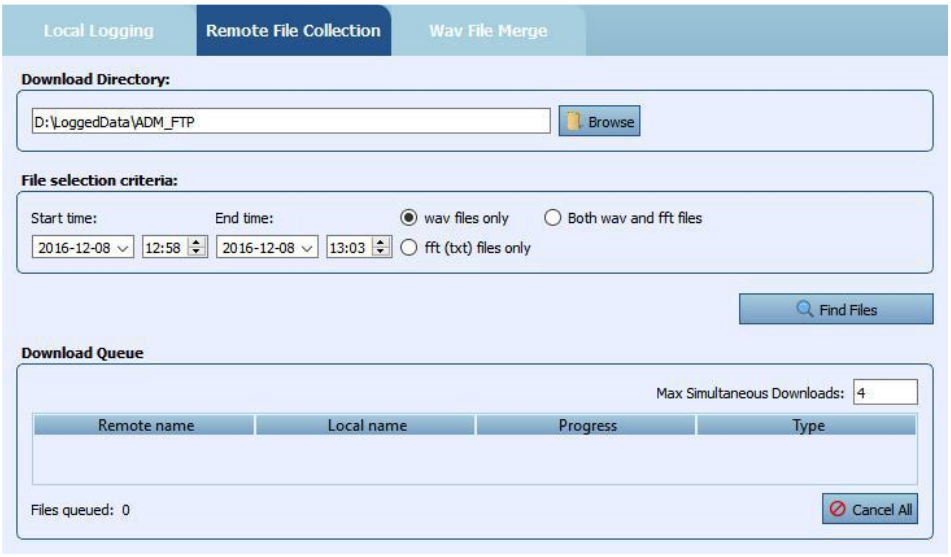

Figure 7-7: Array Data Manager

To Merge Wav Files:
7. Go to the **Wav File Merge** tab
8. Choose **Source Directory** (folder where you collected data)
9. Choose **Destination Directory** (a folder where you would like the merged files to be placed)
10. Select the **Channels File** found in the folder where the data was collected (same folder as **Source Directory**). Another **Channels File** can be used if one is not found in the folder.
11. Choose **Start Time** and **End Time** of files to be merged
12. Set the **File length** to match the length of the files to be merged.
    This will also be the length of the resulting merged files.
13. Click **Merge Files**

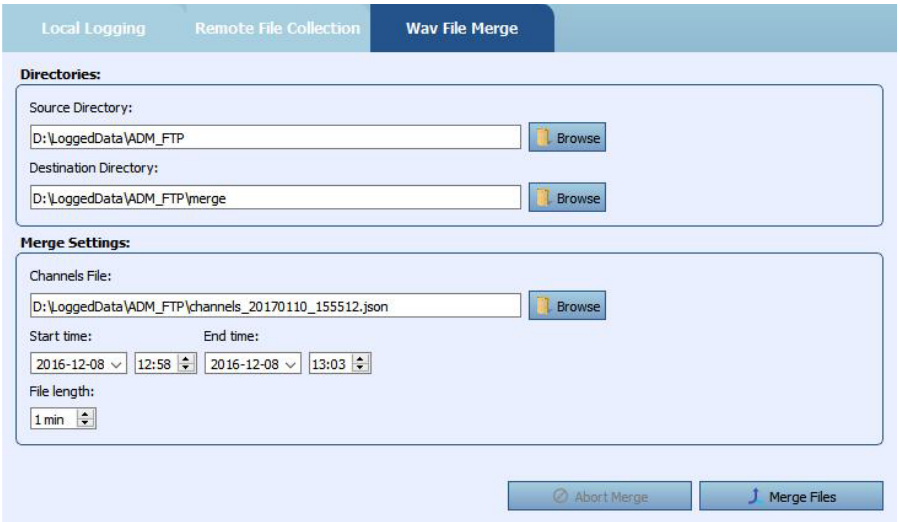

Figure 7-8: Array Data Manager

7.7 Powering Down Host Interface

1. Ensure Logging has been disabled on hydrophones
2. Go to Host Controller web interface: **Operations → Power Operations**
3. Under **Full Power Disconnect Operations** click Full Disconnect on "Serial(2)" and "Bus(1)"

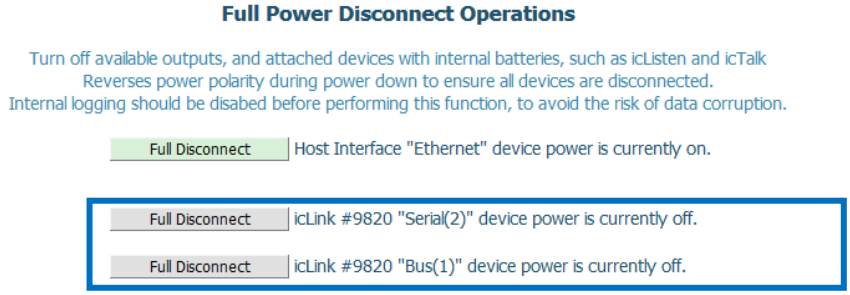

Figure 7-9: Array Data Manager

4. Under **Power On/Off Operations** Switch **Host Interface "Remote" Power** Off

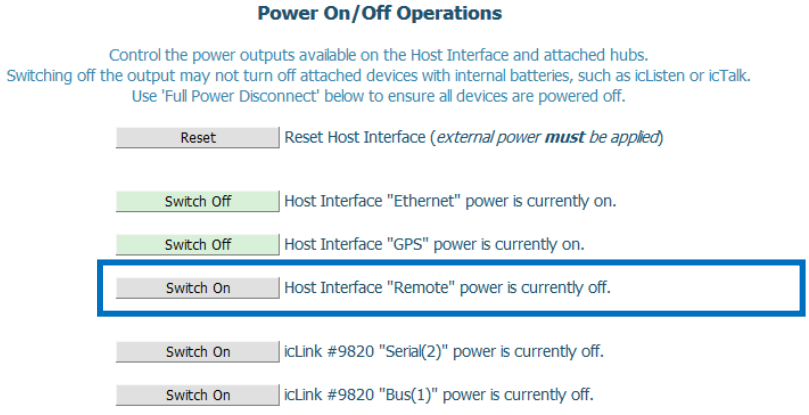

Figure 7-10: Array Data Manager

5. Turn Switch to **Off** Position on the **Host Interface**

8 FAQ - Frequently Asked Questions

8.1 What happens when the external USB hard drive fills during logging?

When the USB hard drive fills the, the **Host Controller** will stop logging. No data will be overwritten.

Data will start logging again once enough space becomes available to begin logging again.

Space can be made available by deleting files through FTP/SFTP/SCP, or by swapping the full hard drive for an empty one.

8.2 What is the login/password/port for SFTP and SCP?

The user name for logging into the instrument over SFTP and SCP is “HCI”. By default, the password for this login is empty. SFTP and SCP use port 22.

8.3 Why do I keep seeing empty/black sections on my spectrum charts?

This often occurs if your PC/browser is too busy to keep up with all of the data being sent to it. Turning off unnecessary displays, and reducing the persistence setting may help with this. Also changing to a different browser that runs more efficiently on your PC, or closing some background processes may help.

Black bands in the spectrum carts on the web interface, do not necessarily mean that the **Host Controller** is losing data in its logs. The actual logged files will need to be checked to determine if this is happening.