OPERATION AND MAINTENANCE MANUAL

HYPERSPIKE® MODEL HS-14 RAHD

Ultra ELECTRONICS | **HYPERSPIKE**

Sound that Moves

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SAFETY PRECAUTIONS

The HyperSpike® HS-14 RAHD uses high operating voltages and sound levels. The primary safety risks are: 1) electrical shock and 2) hearing damage or loss. Only properly trained personnel should operate the HS-14 RAHD and abide by the critical safety warnings identified in this manual to prevent injury or death during operation.

WARNING:

**LIFE THREATENING ELECTRIC SHOCK BY ELECTROCUTION.
100 - 250 VAC IS PRESENT WHEN ENERGIZED.**

Always plug the unit into properly grounded electrical outlets.
Never allow any part of the system to sit in pooled water, or to be immersed in water.
Do not operate the device if the power cable is pinched, frayed, or cut.

WARNING:

**TEMPORARY OR PERMANENT HEARING DAMAGE MAY OCCUR.
HIGH LEVEL OF SOUND CAN BE EMITTED.**

Always wear hearing protection according to OSHA's hearing conservation program.
Operators must remain behind the HS-14 RAHD during operation.

Additional Electrical Safety Measures

Following these basic safety measures will prevent dangerous or potentially deadly situations from arising :
- Inspect the power cable for damage before each use.
- Keep the power cable away from heated surfaces.
- Never remove the power cable from an outlet by pulling on the cord.
- Never override any of the HS-14 RAHD's electrical safety features.

Sound Safety Measures

The National Institute for Occupational Safety and Health (NIOSH) recognizes 120 dB as the threshold of pain for unprotected hearing. Operators should wear hearing protection and ensure that personnel are not directly in front of the device, at close range, when the power is ON.

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1. Hardware

1.1. Hardware

The HyperSpike® HS-14 RAHD (Remote Acoustic Hailing Device) is designed for ease of assembly. It is suitable for both static and mobile applications. The RAHD unit can be equipped with optional accessories including but not limited to cameras, spotlights, and laser dazzlers per customer requirements.

Figure 1: HS-14 RAHD

Note: Full physical, electrical and acoustic specifications are contained in Section 2.

1.2. Included in Box

Included Items are:

1x HS-14 RAHD Assembly, P/N 90169A-801-XX
1x Power/Data Cable, P/N 42222A-801
1x Interconnect Cable, P/N 42206A-801

Optional items are:

Light Kit, P/N 72348B-801
Camera Kit, P/N 72336B-801

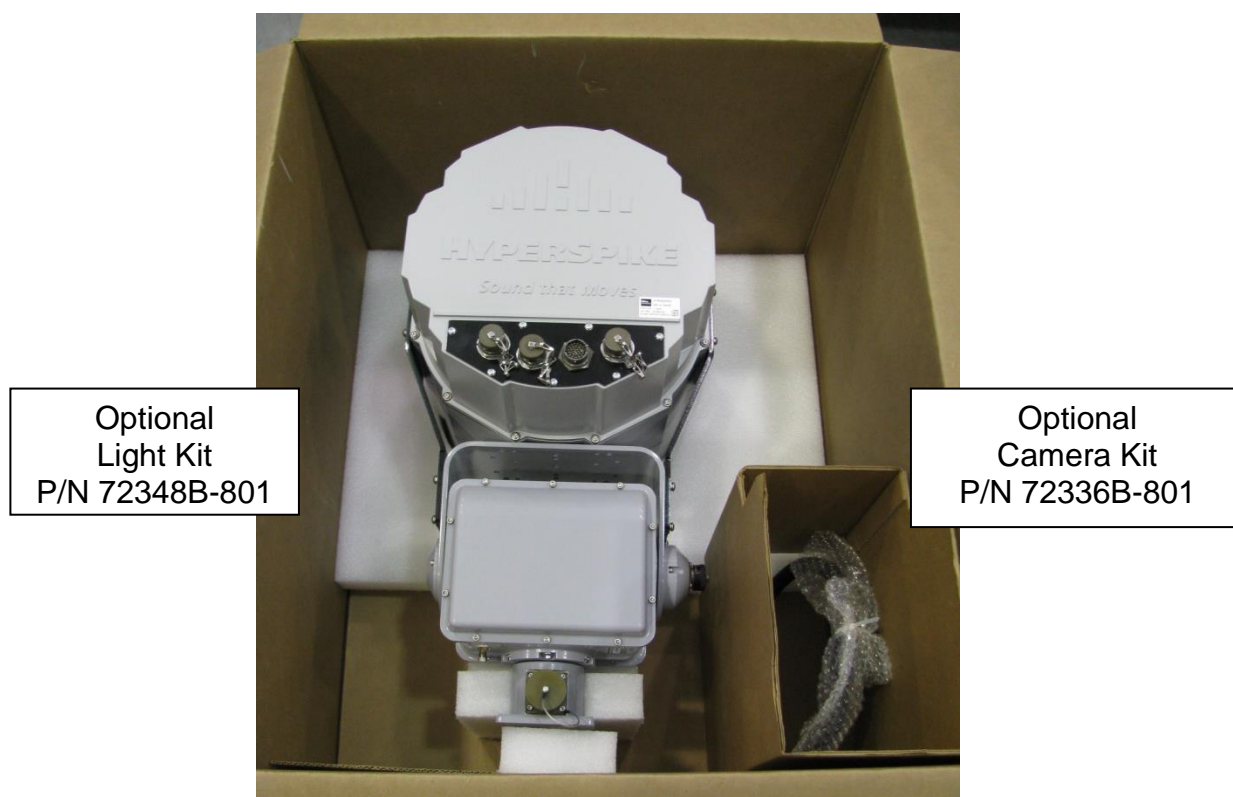| Optional Light Kit P/N 72348B-801 | | Optional Camera Kit P/N 72336B-801 |

Figure 2: HS-14 RAHD – In Packaging

CAUTION:

**The HS-14 RAHD ASSEMBLY IS A MINIMUM TWO PERSON LIFT.
HEAVY OBJECT - OVER 50 lbs.**

Straps connected to the mounting bracket and pan/tilt base may be used to assist lifting.

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2. Hardware Specifications

2.1. Physical Characteristics

HS-14 RAHD WEIGHT	
Complete System	83.6 lbs (37.9 kg)
HS-14 RAHD DIMENSIONS	
System Width	15.4 in (39.1 cm)
System Height	27.1 in (68.8 cm)
System Depth	18.6 in (47.2 cm)
Front Wind Load Area	260 in^2 (1677 cm^2)
Side Wind Load Area	350 in^2 (2258 cm^2)

2.2. Electrical Specifications

HS-14 RAHD ELECTRICAL SPECIFICATIONS	
Power Input	100-130 VAC, 200-250 VAC with Transformer
Frequency	50/60 Hz
Typical Current Draw, Normal Voice	2.4 Amps, 120 V
Typical Current Draw, Maximum Tone	4.0 Amps, 120 V
Auxiliary Power Output	12 VDC, 24VDC
Output Current -12 VDC Aux. Supply	Fused at 1 A, shared by connectors A, B, D
Output Current- 24 VDC Aux. Supply	Fused at 7.5 A, shared by connectors A, B, D

2.3. Acoustic Specifications

HS-14 RAHD ACOUSTIC PERFORMANCE	
Beam Width	+/- 12° (24° conical @ 2 kHz /-3 dB)
Communication Range	Up to 1500 m
Frequency Response	300 Hz - 8 kHz
Sound Pressure Level, Peak, A-Weighted	148 dB @ 1 meter
Speech Transmission Index (STI-Intelligibility)	0.81 out of 1.00

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Ultra ELECTRONICS
90169A-MAN-HS14RAHD

3. RAHD and Electronics Assembly Setup

3.1. RAHD Installation and Mounting

Secure the Sound Emitting Assembly and transformer box (if equipped) to a stable surface. To maximize water protection, the recommended orientation of the transformer box is with connectors facing down. Refer to mounting details in Figure 4 and Figure 5.

Ensure that mounting locations account for the cable length available. The standard length of cable between the emitter and transformer box is 5 feet. Optional lengths are available at customer request.
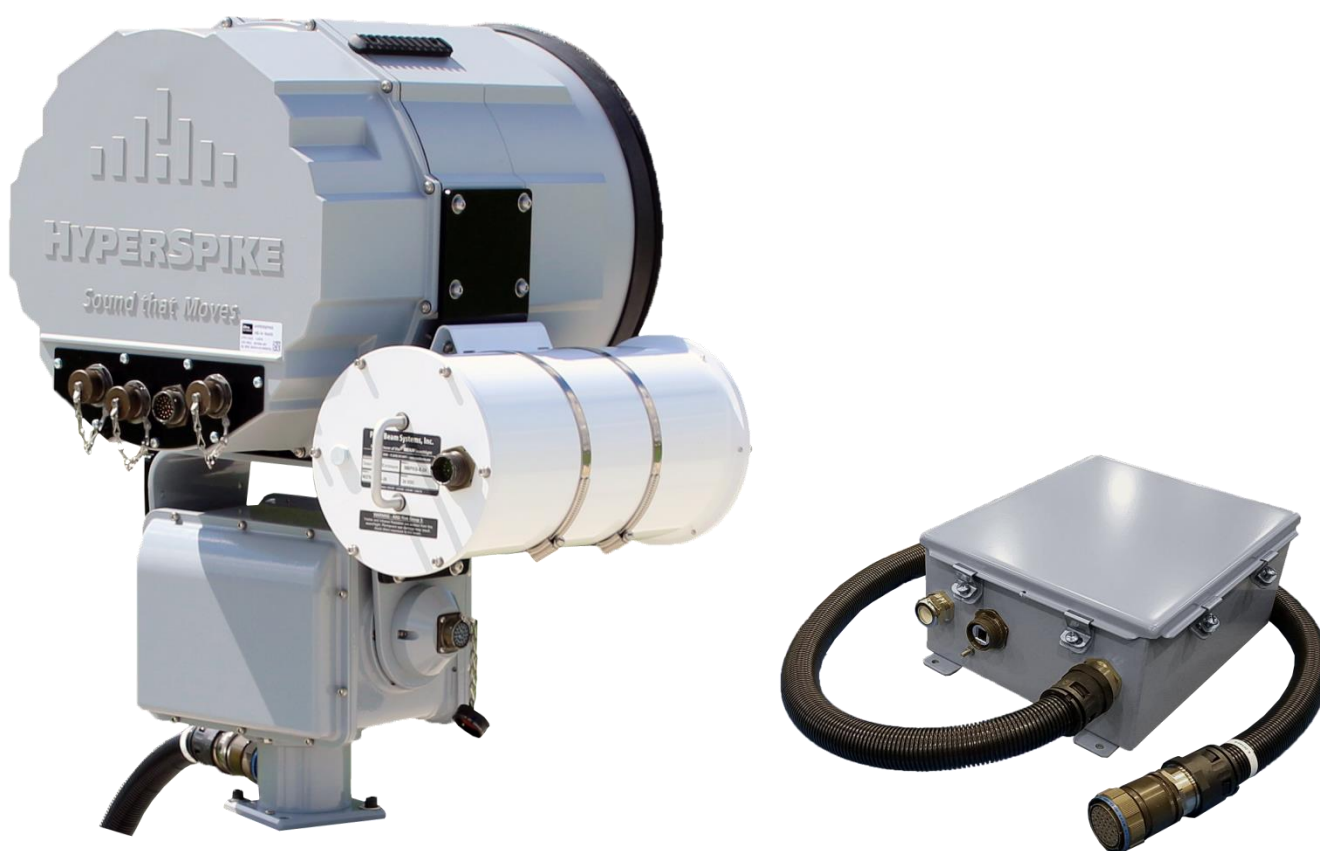
Figure 3: Sound Emitting Assembly and Transformer Box
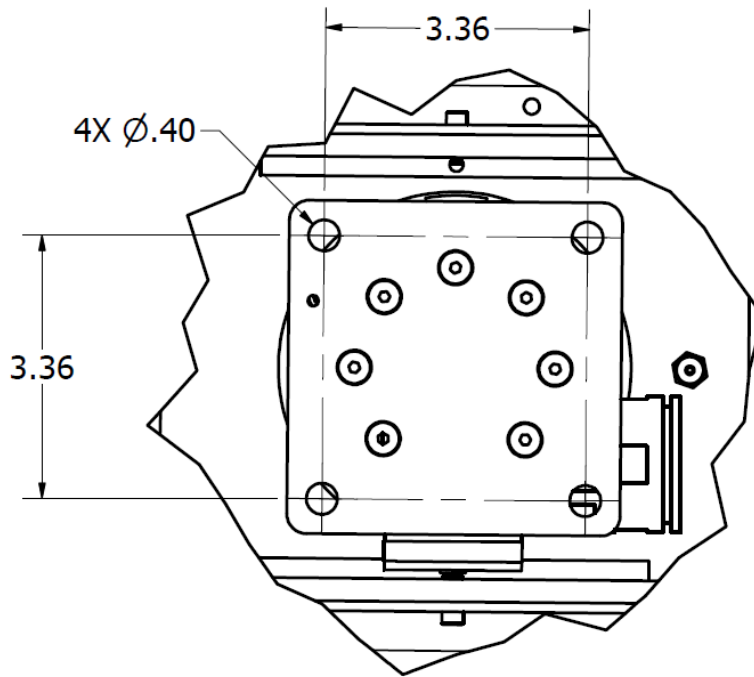
Figure 4: HS-14 RAHD Interface Mounting Dimensions

Figure 5: Transformer Box Interface Mounting Dimensions

3.2. System Wiring

<div style="border:2px solid red">

WARNING:

AC INPUT POWER MUST BE DISCONNECTED OR REMOVED FROM THE SYSTEM PRIOR TO CONNECTING OR DISCONNECTING ANY CABLES.

</div>

There are six sealed, weather resistant, connectors on the HS-14 RAHD, and one connector on the transformer enclosure. Three of these connectors are designed to interface with search lights, cameras, laser dazzlers, and othe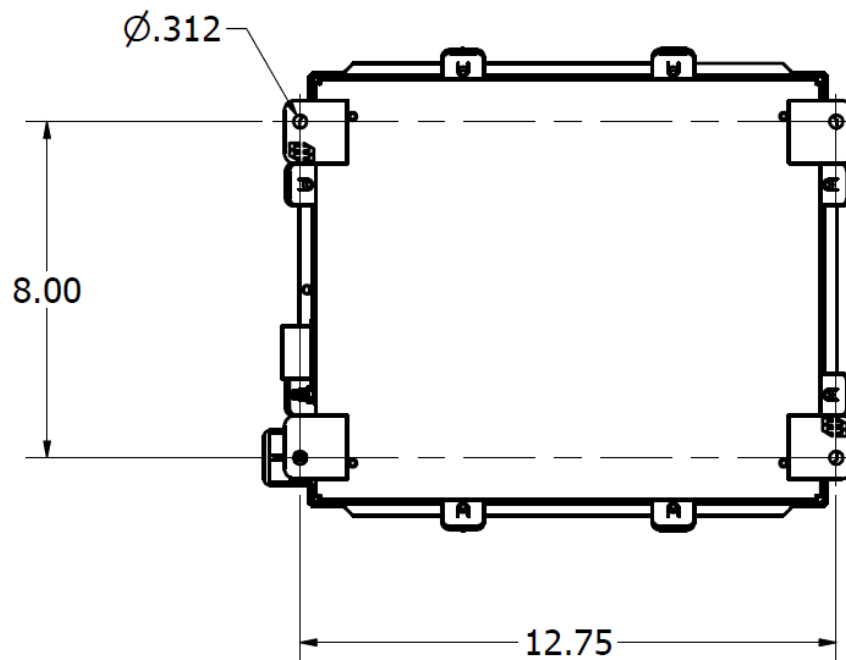r auxiliary devices. Contact Ultra Electronics- USSI if you are interested in connecting an auxiliary device other than a standard accessory to the HS-14 RAHD. We will work with you to ensure a smooth integration of your accessory devices.

For proper operation, only use the connectors in accordance with the following list of designated purposes.

Connector A – Camera/Auxiliary
Connector B – Auxiliary
Connector C – Pan/Tilt Out
Connector D – Searchlight/Auxiliary
Connector E – Pan/Tilt In
Connector F – Power/Data
Connector G – Ethernet In
Connector H – Power In
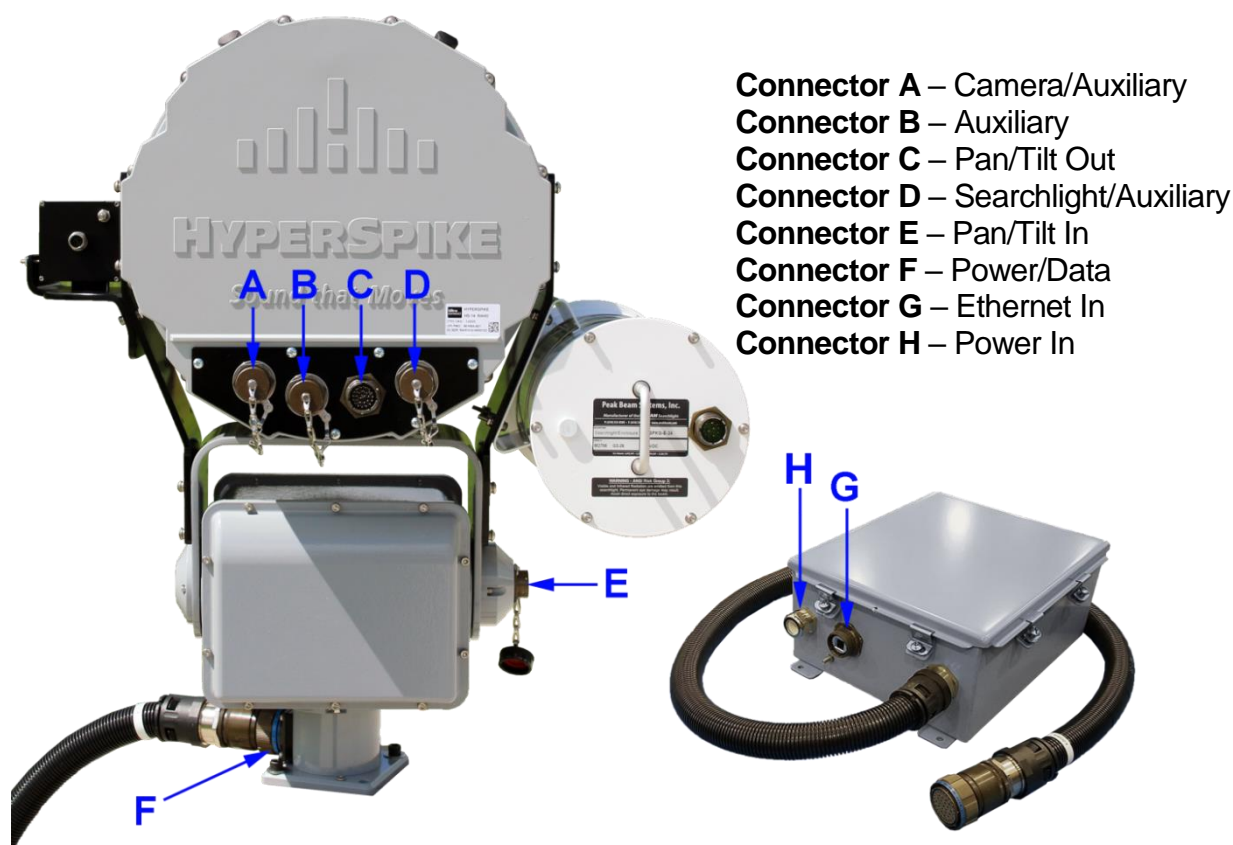
Figure 6: Connector Diagram

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To wire your HS-14 RAHD for operation, refer to the following wiring instructions:

3.2.1. Connection #1: Interconnect Cable

Connect the Interconnect Cable, P/N 42206A-801, from connector C to connector E. This cable passes data and AC power to the Emitter's electronics housing. Tighten each end of the cable firmly to ensure a weather tight seal.

3.2.2. Connection #2: Power/Data Cable

Connect the Power/Data Cable, P/N 42222A-801, to connector F. Tighten the cable firmly to ensure a weather tight seal.

While the HS-14 RAHD is designed for direct operation on a 20 Amp, 110 VAC circuit, a step-down transformer is available for locations that have only 220 VAC. An isolation transformer is also available for locations with non-standard or unreliable AC power.

Follow the wiring diagrams provided below to properly wire your HS-14 RAHD's Power/Data Cable.
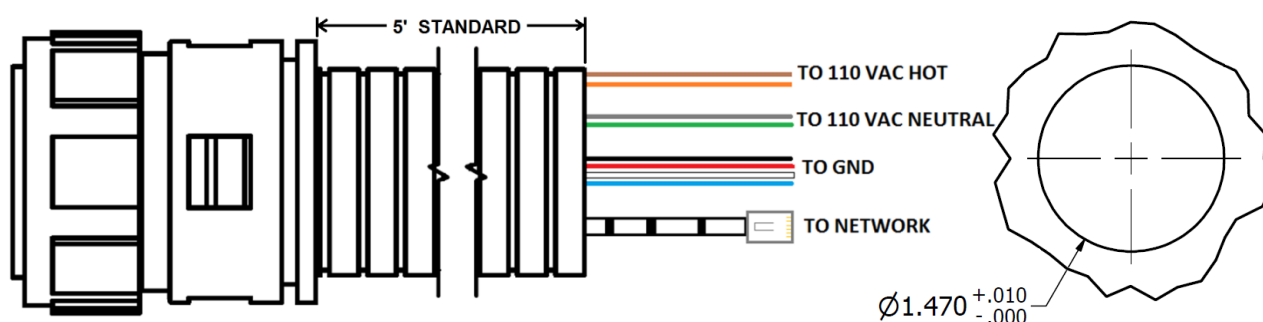
Figure 7: Wiring Diagram for 110 VAC- No Transformer and Hole Size

Wiring Color Chart - Power/Data Cable P/N 42222A-801	
Brown	110VAC Hot
Orange	110VAC Hot
Gray	110VAC Neutral
Green	110VAC Neutral
Black	Ground
Red	Ground
White	Ground
Blue	Ground
Ethernet Cable	Network

3.3. Wiring Diagram for 110 VAC Installation - With Transformer

ASSY-801
WIRING FOR 110V INSTALLATION
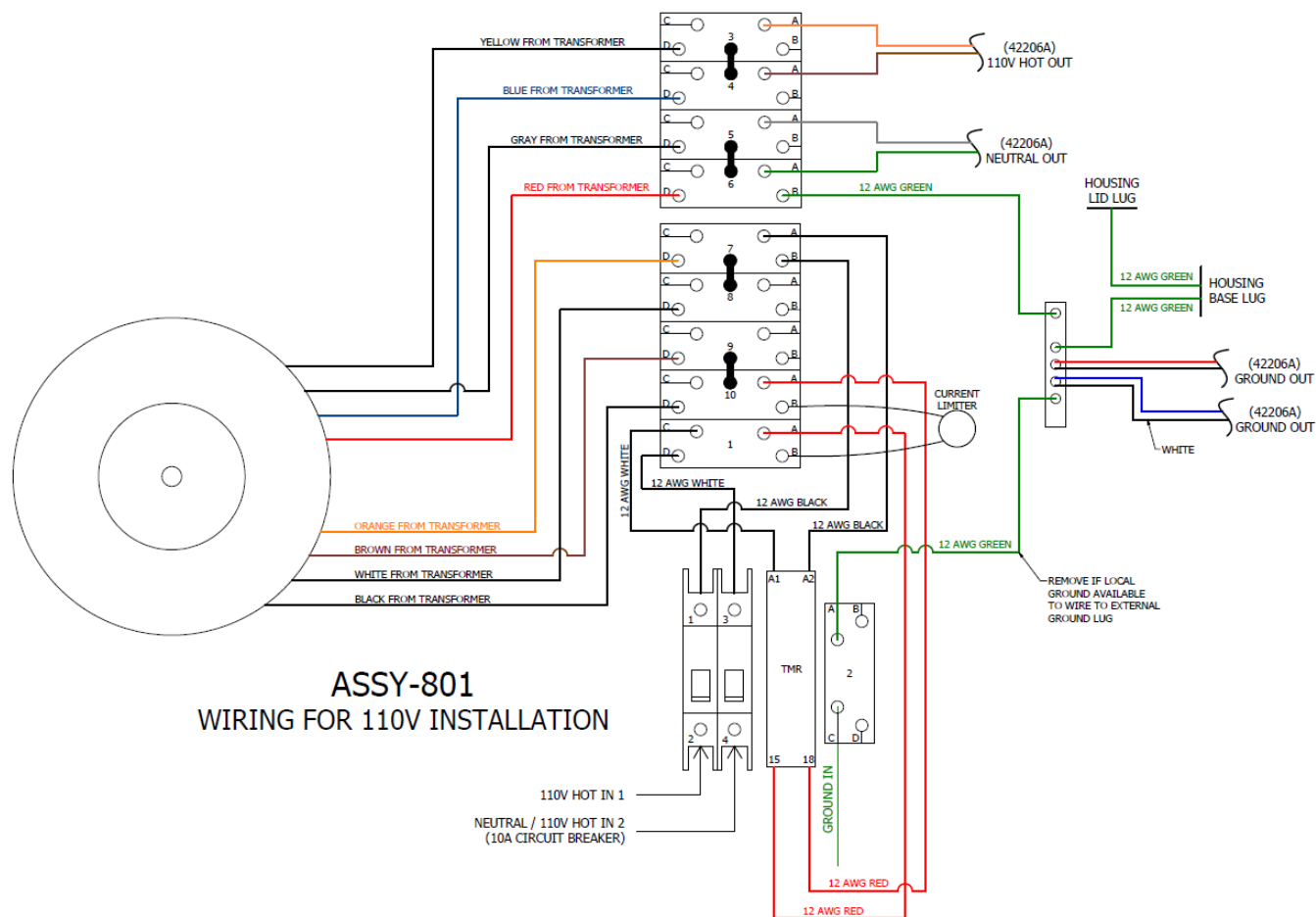
3.4. Wiring Diagram for 220 VAC Installation - With Transformer

ASSY-802
WIRING FOR 220V INSTALLATION
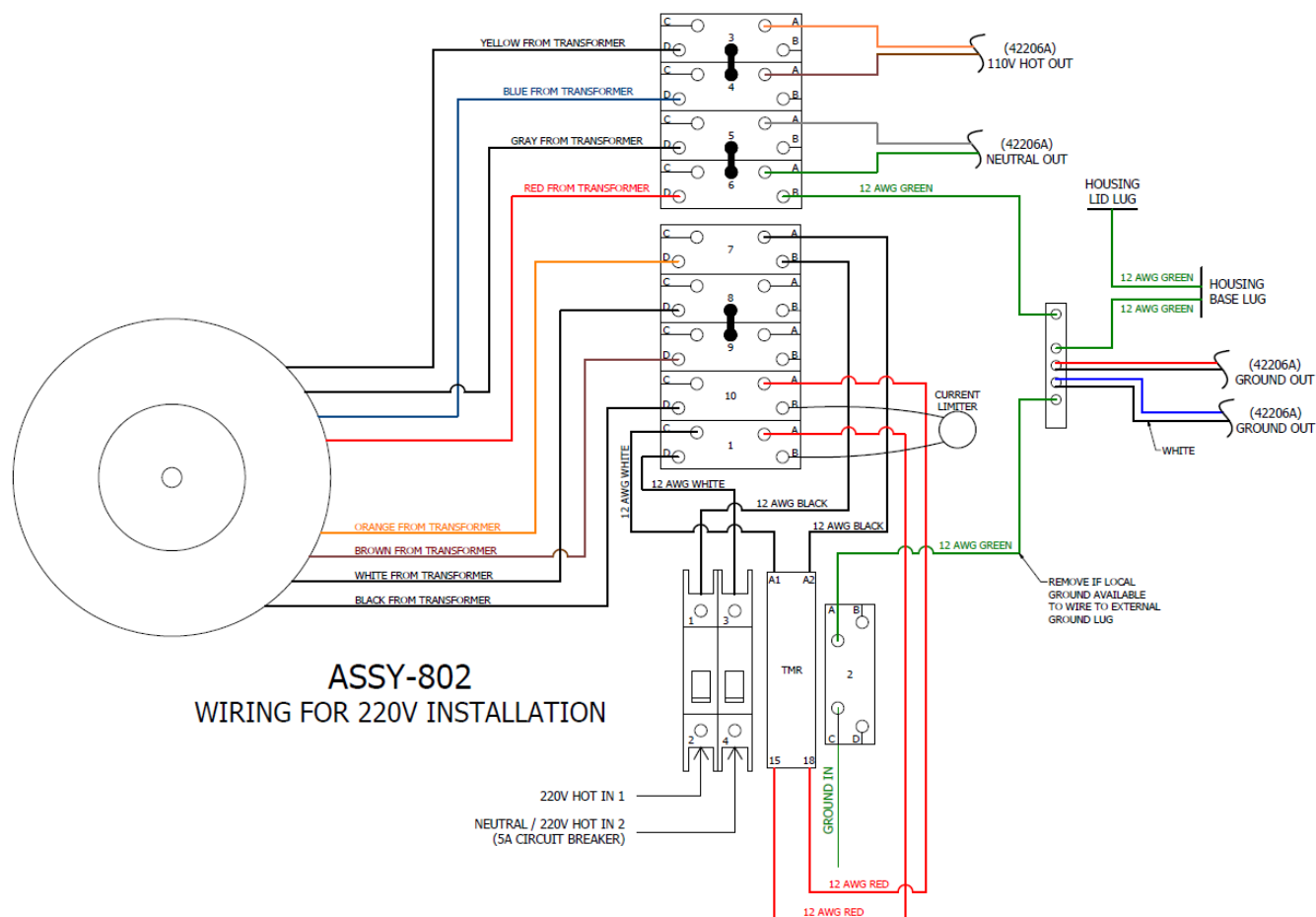
3.5. Connection #3 Auxiliary Connections (optional)

Accessories such as search lights, laser dazzlers and cameras can be powered and controlled via connectors A, B, and D. Some accessories require unique interfaces with the HS-14 RAHD; therefore, please connect your accessories according to the following recommendations:

Accessory	Assigned Connector
Daytime Camera	A
Searchlight	D
Other Accessories	B

If accessory connectors are to be used in permanent installations, weather sealing caps can be removed by cutting the chain. This is recommended to avoid snags and impacts that could damage the housing or nearby connectors.

4. Networking and Device Setup

The HS-14 RAHD is designed to be controlled over a TCP/IP based network equipped with either a static IP address or a DHCP server. By default, the HS-14 RAHD has a static IP address of 192.168.123.10/24. If configured as a DHCP client (see Section 5.17.1), the HS-14 RAHD will receive a dynamic IP address when powered on. Take note of the IP address assigned to your HS-14 RAHD (if your DHCP server also serves DNS, you should be able to access the RAHD by hostname as well, which is the serial number of the unit). You will need this information to set up the device. If you do not know how to identify the IP address of your HS-14 RAHD, consult your network manager.

4.1. Installing the CA certificate

The HS-14 RAHD signs its encrypted digital communications as its own certificate authority (this is not the same as a self-signed certificate). This means that a client machine that is accessing the Command and Control Interface (CCI) can be configured to trust that signature. Without installing the certificate for the certificate authority, which includes the signature to be trusted, modern browsers will display a warning and prompt users for whether the webpage should be trusted. However, once the certificate for the RAHD's certificate authority is installed in the trust store of a client machine, the Command and Control Interface (CCI) webpage will register as having come from a trusted source and will no longer prompt with a warning. In addition, cross-domain calls from browser environments to the REST API become possible. To install the certificate in the Windows trust store, follow the steps below:

1. [Request a copy of the certificate from Hyperspike Customer Support](#)
2. Save the received file – "rahdStaticIpCA.pem" to the client machine
3. On the client machine, open the Microsoft Management Console – type mmc in the program search or run box
4. File->Add/Remove Snap-in…
5. Select "Certificates" from the "Available snap-ins" menu and use the Add > button to move it to the "Selected snap-ins" box. Select the OK button
6. Expand the Certificates menu item on the left part of the screen and right-click "Trusted Root Certification Authorities". Choose "All Tasks -> Import…"
7. Use the wizard to navigate to the "rahdStaticIpCA.pem" file.
8. Select "Finish"
9. There should be a popup indicating the import was successful
10. The Hyperspike Certificate Authority should now be listed in the "Trusted Root Certification Authorities" folder.

All RAHDs use the same certificate authority, so importing the certificate to a client machine's trust store will cause that machine to trust the CCI of any RAHD that is accessed. Also, the same "rahdStaticIpCA.pem" file can be used on multiple client machines.

4.2. Initial Setup

The HS-14 RAHD is designed to be operated through the use of its built-in web based Command and Control Interface (CCI).

To access this interface:

- Power on your access device (Desktop or Laptop Computer)
- Open the web browser* on your access device
- Enter the IP address of your HS-14 RAHD into the URL entry field in the same fashion you would type in the name of any other website.

*While the Command and Control Software is supported on most desktops, laptops, and mobile devices, it is recommended that your access device have the latest version of the Google Chrome Browser installed. Other browsers may not be fully compatible with the CCI. To learn more about Chrome Browser, go to https://www.google.com/chrome/

5. Controls and Operations

The following subsections will guide you through the use of the HS-14 RAHD's Command and Control Interface (CCI). While all necessary user functions are readily accessible through the CCI, if a user desires to write custom control software, a REST API is also available (see Section 5.17.4).
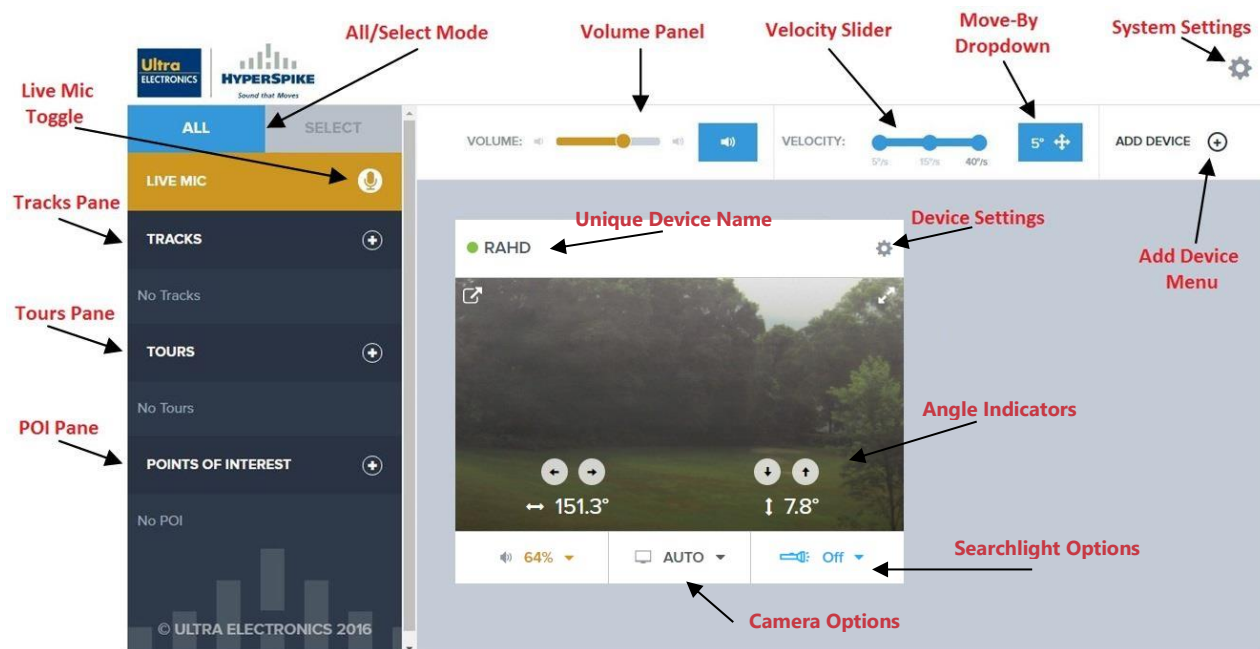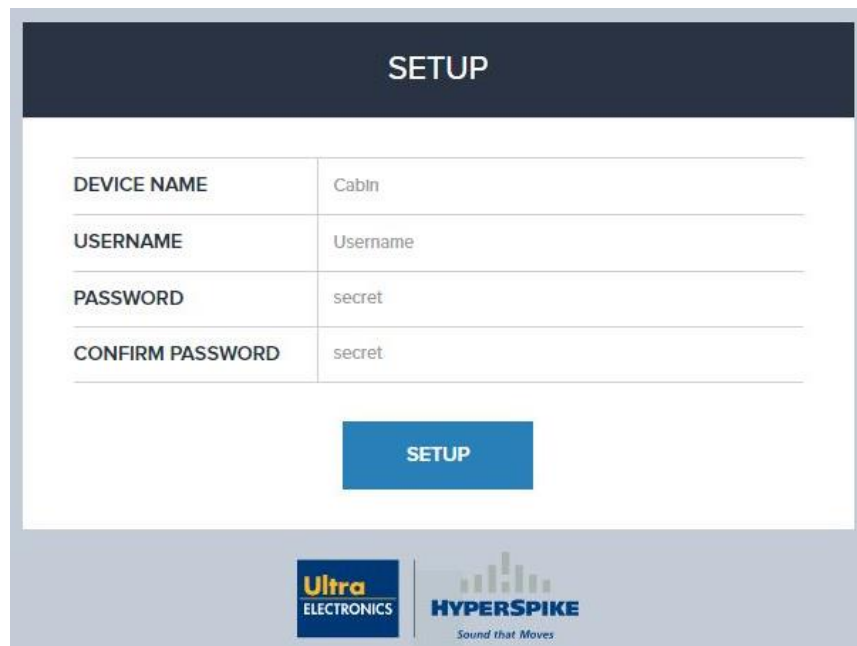

Figure 8: Command and Control Home Page

5.1. First Time Setup

When connecting to an HS-14 RAHD for the first time, the "Setup" popup window will be presented. To configure the device, enter an identifying name for your HS-14 RAHD in the **Device Name** field, a username in the **Username** field, and a password in the **Password** and **Confirm Password** fields. The Command and Control Interface is configured to operate with only one user account. If desired, the password can be changed at a later time.
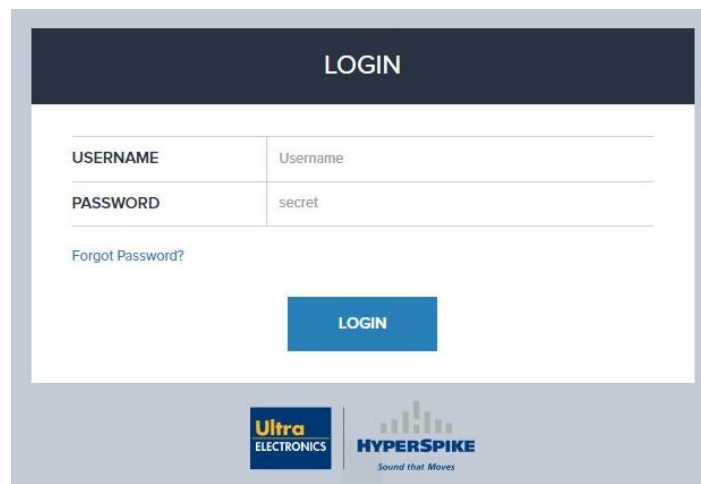
Figure 9: Device Setup

Click on the "Setup" button to continue to the login screen. Once one HS-14 RAHD has been configured, follow the procedure listed in Section 5.3 to set up any additional HS-14 RAHDs.

5.2. Login Page

After initial setup, or after connecting to the IP address of the HS-14 RAHD through your web browser, enter your username and password in the text fields of the popup window. Remember this username and password as they will be needed the next time that you need to login.
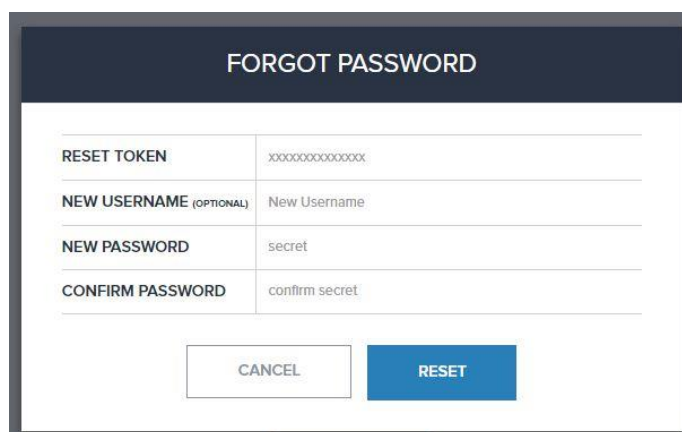
Figure 10: Login Page

If login was completed successfully, the CCI Home Page will be presented.

If the username or password is forgotten, click on "Forgot Password?" to initiate the reset process. In the text boxes, enter the following information:

Reset Token   The full serial number of the device. Ex. RAHDHS14XXXXXX. The serial number is listed on the white label placed on the back of the system.

New Username   If you would like to reset the master username, enter it here.

New Password   The new password for the device.

Confirm Password The new password for the device.

Figure 11: Forgot Password Page

Click on the "Reset" button to complete the reset process.

5.3. Simultaneously Controlling Multiple RAHDs

The CCI is designed to allow the user to control multiple acoustic hailing devices simultaneously. When multiple devices are detected, the user has the ability to send commands to an entire fleet of RAHDs at the push of a button. To add a second RAHD to the Home Page, click on the "+" button in the top right corner of the page.
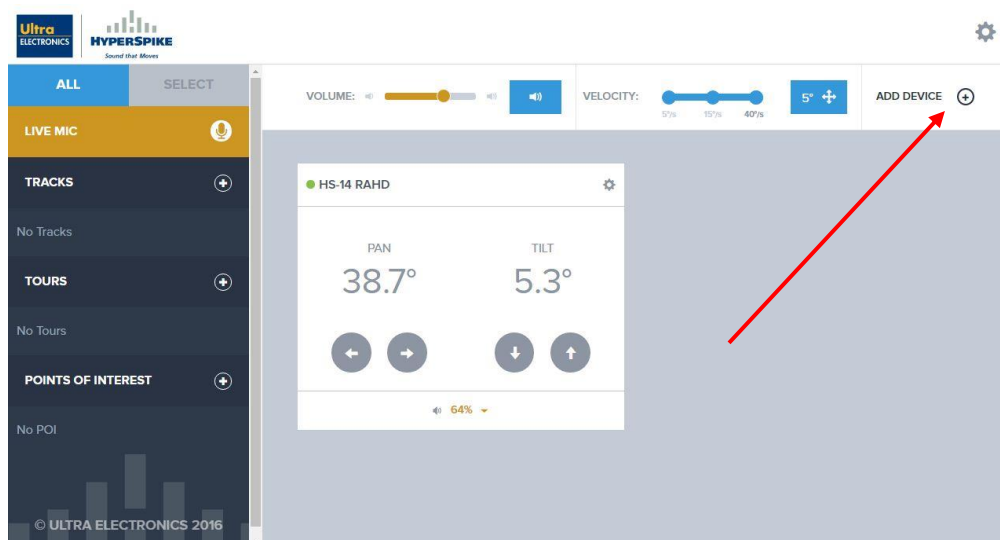
Figure 12: Add Device "+" Button

Enter the IP address of the device you would like to add in the **IP Address/Hostname** field, and enter an identifying name for the device in the **Name** field. If you do not know the IP address of the device, consult your network manager. If the device has not already been configured, the CCI will automatically copy the master username and password to it. After completing this step for every HS-14 RAHD on your network, all of the devices will share a common username and password.

Figure 13: Add Device Popup Window

Once **IP Address/Hostname** and **Name** information are supplied and the "Add" button has been pressed, the new device should appear on the Home Screen. After appearing on the screen, inspect the color of the "Status" indicator next to the Device Name.

The three color codes for the status indicator are as follows:

- Green – All systems functional
- Red – Connection not established
- Orange – Initialization error (see Section 7.3)
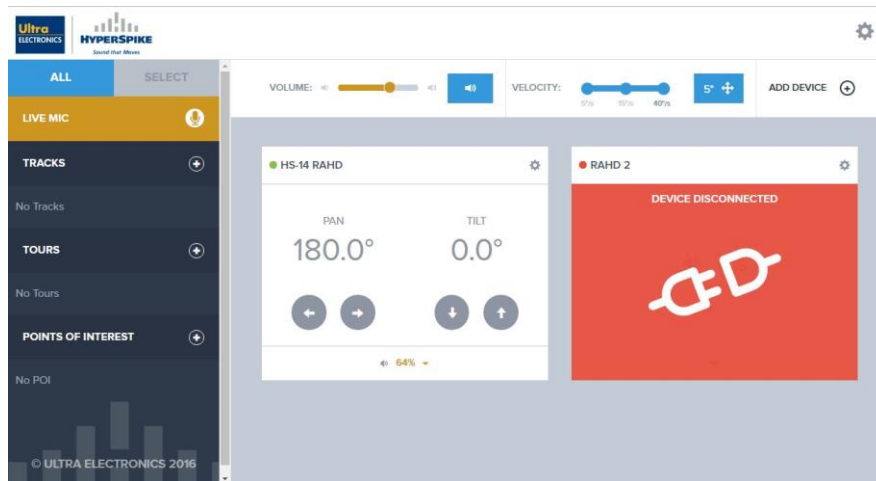
Figure 14: Multiple Connected Devices

After adding a new HS-14 RAHD, inspect the Status Indicator. If it is not green, refresh your browser page. If the indicator remains red, refer to Section 7 for troubleshooting information.

5.4. Removing a Device

To remove a device, click on the Device Settings "gear" as shown in Figure 8. Click on the "Advanced Settings" button on the bottom of the popup window, and then click on the "Remove Device" button on the next popup window.
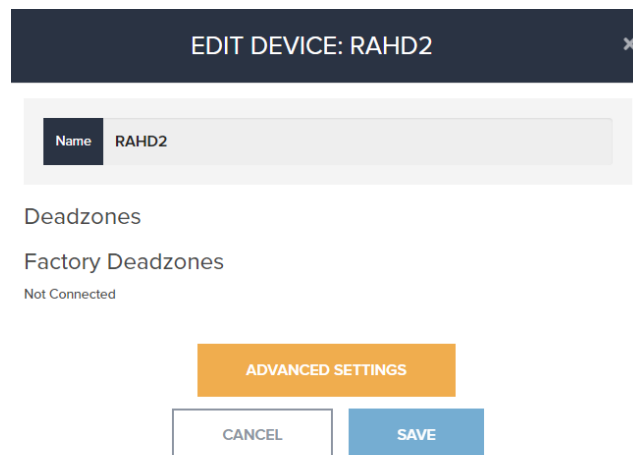
Figure 15: Edit Device Window

5.5. Volume Panel

Figure 16: Volume Panel

Adjust the slider to vary the master Volume Level of the system. When the slider is all the way to the left, the volume of each RAHD is set to 0% of its individual maximum volume. When the slider is all the way to the right, the volume of each RAHD is set to 100% of its individual maximum volume. Click on the "volume" button to vary the individual volumes of each connected device. To mute a device, click on the mute "speaker" icon.

Figure 17: Individual Volume Dropdown

5.6. Pre-Recorded Tracks

Pre-recorded tracks can conveniently be accessed from the Tracks pane in the Side Panel. To play a track, simply click on the play button (▶) to the right of the track name.
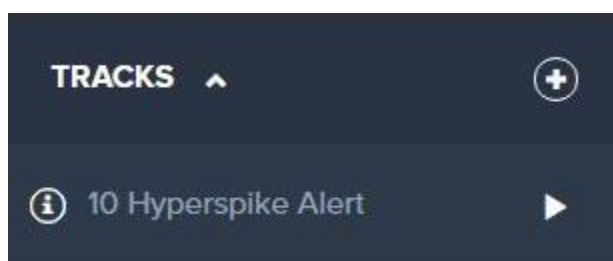
Figure 18: Playing a File

Note: The "information" circle next to track names will change to a "warning" symbol when a track is not present on all devices. A track must be present on a device to enable playback on that device. Follow the procedure in 5.6.1 to upload a track to all connected devices.
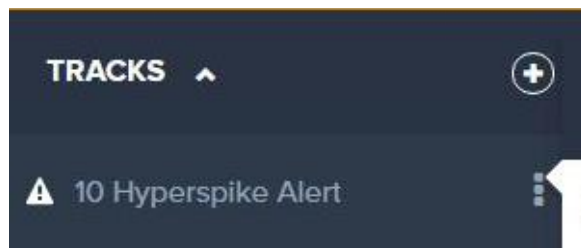
Figure 19: Playing a File

5.6.1. Uploading Audio Files

To add an audio file, click on the "+" button in the Tracks pane of the Side Panel. This will open the Add Track menu. Drag and drop files into the popup window, or use the file browser to select desired files.
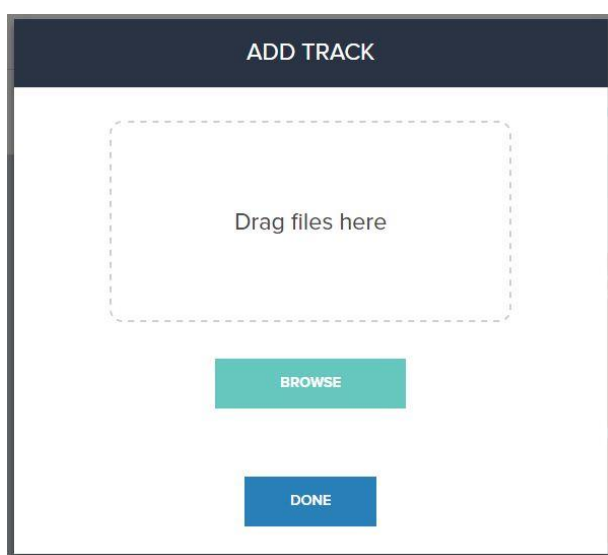
Figure 20: Add Track Popup Window

If the track upload is successful, the filename will appear with a "100%" completion rate. To change the name of the track, click "Edit". To cancel the upload of an unwanted track, click "Delete". When you are finished selecting tracks for upload, click "Done".

5.6.2. Stopping a Playing Track

When a track is actively playing, the triangular "play" button will become a square "stop" button (■). Clicking on this "stop" button will cancel the track being played.

5.6.3. Editing or Deleting a Track

To edit or delete a track, click on the "information" circle next to the track name. This will bring up the Edit Track menu.
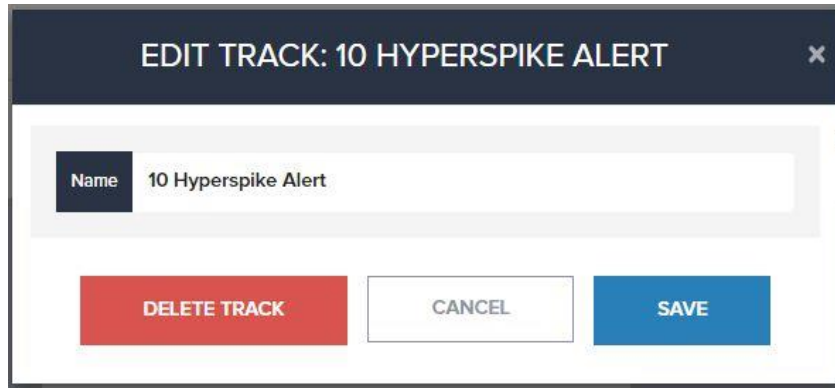
Figure 21: Edit Track Menu

The name of a track can be changed by replacing the text in the "Name" text field. To delete a track, simply click on the "Delete Track" button.

5.7. Live Microphone

To utilize the live microphone capability, the access device must have a microphone installed. To stream a live microphone through the acoustic hailing device(s), click on the "microphone" icon located above the Tracks Pane, as shown in Figure 8.

Some web browsers may display a popup warning requesting access to the installed microphone. Navigate through the popup window and allow the browser microphone access.

Figure 22: Example Browser Popup Window

Once live microphone data is being played through the acoustic hailing device(s), the "microphone" button will become a "stop" button. Any device streaming the live microphone data will also show a "Live Mic Active" banner. To stop the transmission from the microphone, click on the "stop" button.
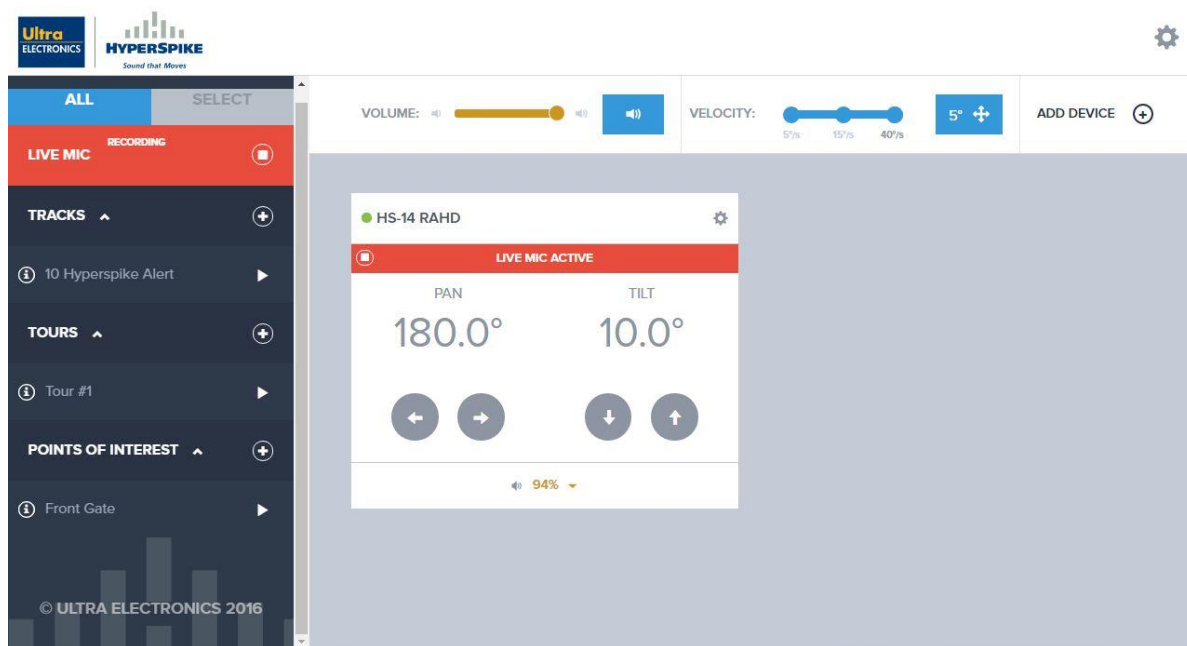
Figure 23: Live Microphone Active

5.8. Searchlight Control

If your RAHD is equipped with a Peak Beam Searchlight, the CCI will automatically expand its homepage to include searchlight control capability. To access the searchlight controls, click on the "flashlight" icon as shown in Figure 8. When selected, a popover will appear allowing the user to turn the light on or off, cause the light to strobe, and adjust the light's beam width.
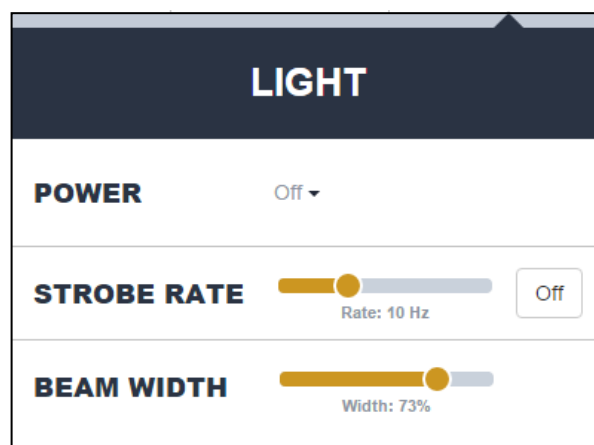
Figure 24: Searchlight Control Popover

The Peak Beam Searchlight offers four separate power levels, accessible through the "Power" dropdown. The available levels are Off, Low, Medium, and High. Users should note that the searchlight may initially turn on to High power for a few seconds, despite the commanded power level. This is required to warm up the optic element. Once the element has reached operating temperature, the searchlight will automatically adjust to the commanded power level.

To vary the strobe rate or beam width, adjust the yellow sliders.

5.9. Camera Control

If your RAHD is equipped with a camera, the CCI will automatically expand its homepage to include camera control capability. To access the camera controls, click on the "TV" icon, as shown in Figure 8. When selected, a popover will appear allowing the user to adjust the zoom and focus level of the camera. It is recommended to keep the camera's Focus Mode set to "Auto" to ensure a quality picture is always displayed on screen.
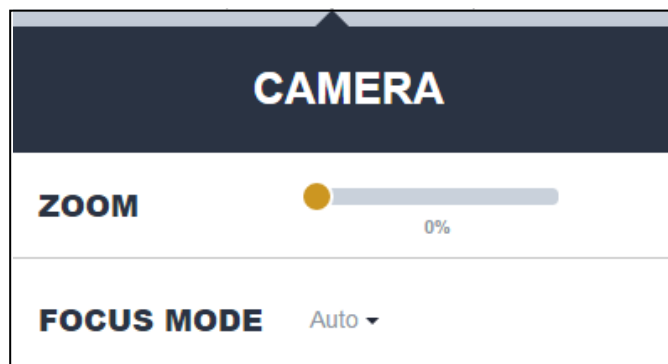

Figure 25: Camera Control Popover

If desired, the video feed from a RAHD can be displayed in full screen mode. To do this, click on the "Full Screen" button. Similarly, clicking on the "New Tab" button will open a new browser tab containing the video feed. Both of these buttons can be viewed in Figure 26.
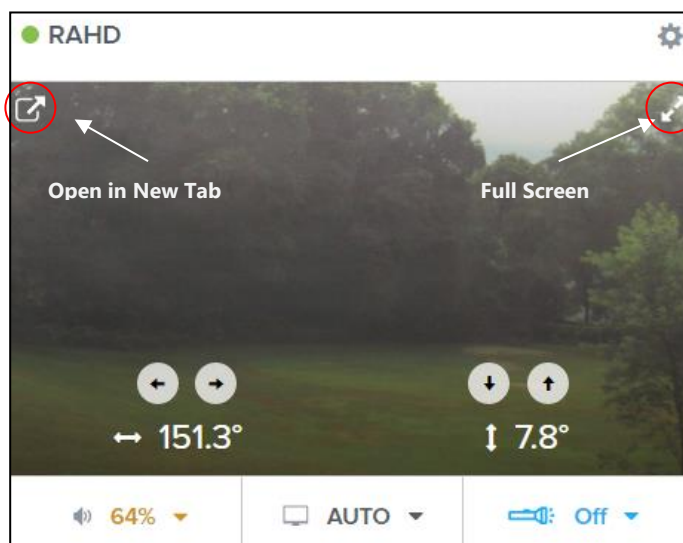
Figure 26: Full Screen and New Tab Options
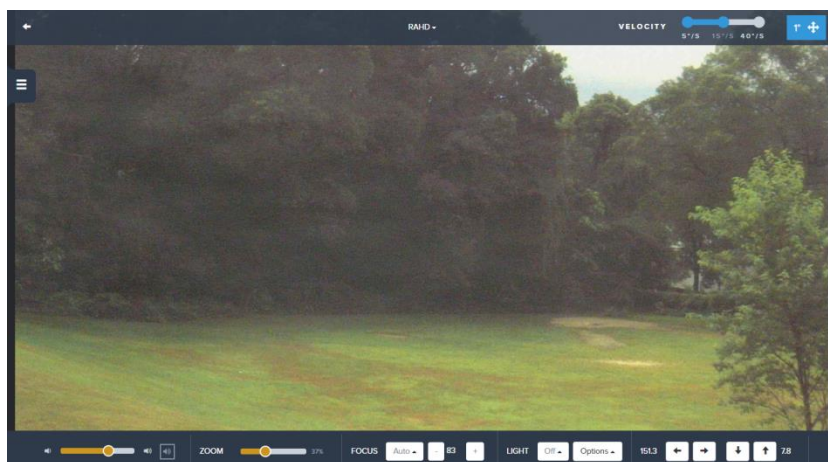
Figure 27: Full Screen Mode

As shown in Figure 27, all of the controls normally available on the homepage are also available in Full Screen mode.

Advanced settings for your camera is also available if desired. To access these features, navigate to http://[RAHD IP]:8080 in your web browser. This will display a settings page from the camera manufacturer.

If your HS-14 RAHD has an Axis camera installed, access the advanced options by clicking "Setup" at the top of the page. You will then be asked for a username and a password for the camera. The username is "root" and the password is "password" for this device.

If your HS-14 RAHD has a Sony camera, the username is "admin" and the password "admin" to unlock the advanced settings.
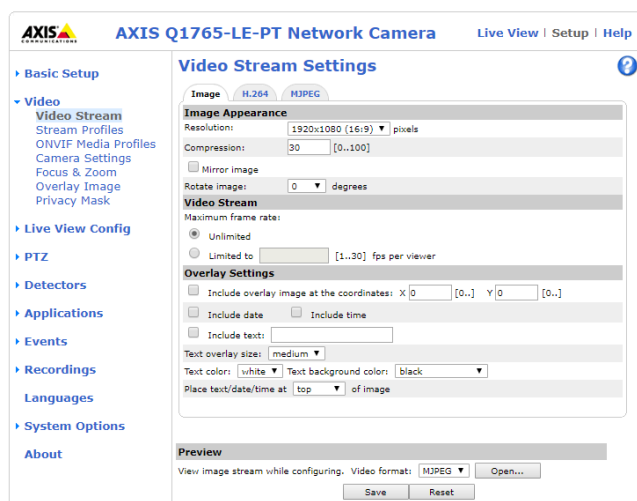
Figure 28: Axis Camera Settings

5.10. Points of Interest (POI)

POIs are preset pan and tilt coordinates. Users may use this feature of the CCI to quickly position the acoustic hailing device to a frequently-targeted area. Points of Interest can be designated by clicking on the "+" button in the POI pane as shown in Figure 8.
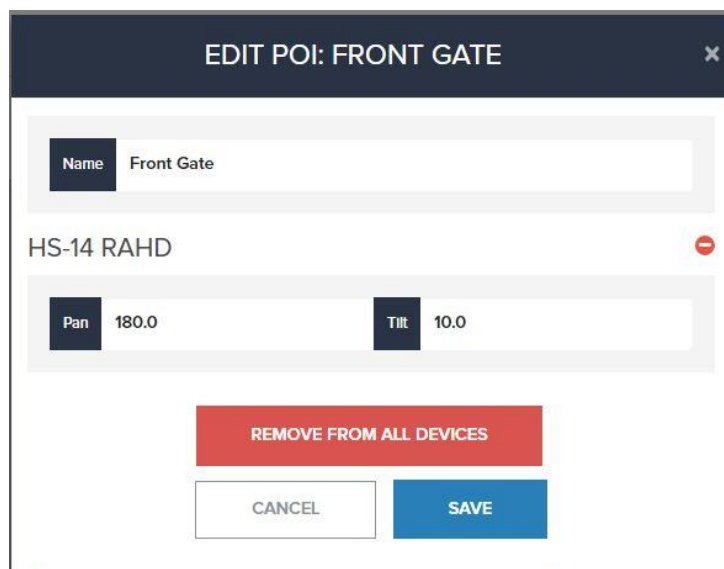
Figure 29: Add POI Popup Window

To begin creating a POI, click on the "+" button in the popup window. Enter the desired Pan and Tilt coordinates in the text fields displayed within the popup window, and give the POI a name using the **Name** field.
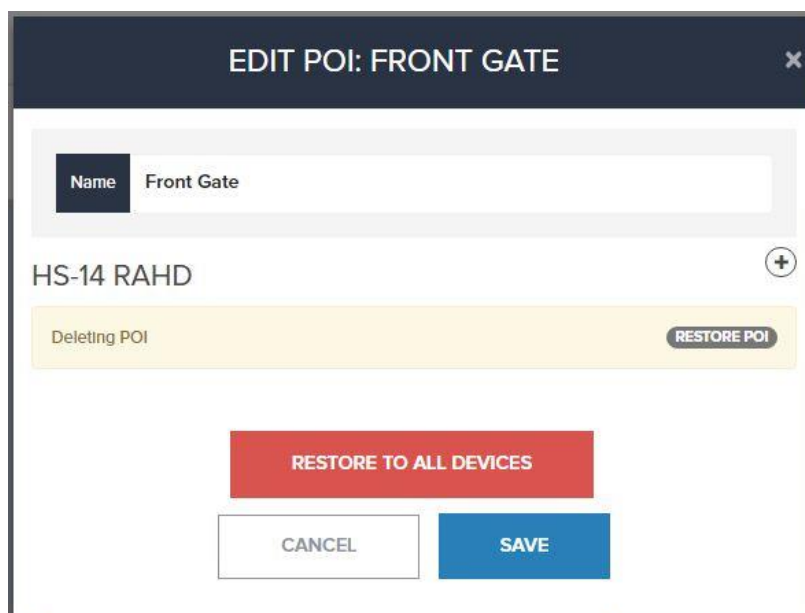
Figure 30: Add POI Popup Window-2

Multiple devices can share POIs that have the same name but different angular positions. This allows multiple devices to simultaneously target the same area, even if the RAHDs are located in different areas. If multiple devices are connected, you will have the option to define POI coordinates for each device.

To edit or remove an existing POI, from the home page click on the "information" circle next to the POIs name. This will bring up the Edit POI popup window.

Figure 31: Edit POI Popup Window

In this window, the name and position of a POI can be altered. To remove a POI from one device, click on the "-" button near the POI's name. To remove a POI from all devices, click on the "Remove From All Devices" button. If a POI is accidentally removed, simply click on "Restore POI" or "Restore To All Devices" at this step.

Figure 32: Restore Deleted POI

To move to a POI, simply click on the play button (▶) to the right of the POI name.

Figure 33: POI Start Button

5.11.   Tours

When desired, an HS-14 RAHD can execute automated, pre-designated tours. The user has the ability to define movements in the pan and tilt axes, audio output, and accessory controls. To create a tour, click on the "+" button in the Tour pane of the Side Panel as shown in Figure 8. This will bring up the Add Tour popup window.
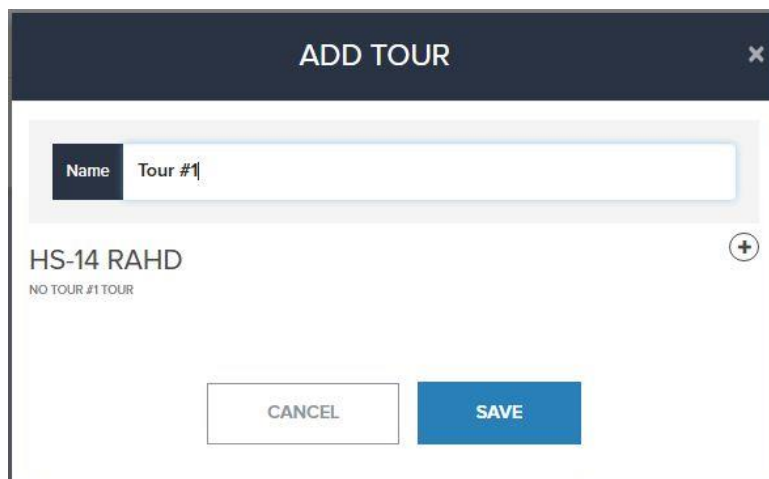
Figure 34: Add Tour Popup

Start by entering a name for the tour you are about to create. If you have multiple RAHDs connected, you can create a tour with the same name, but different actions, for each device. This means that with one key press you can trigger multiple devices to do independent designated routines.

Clicking on the "+" button will bring up the Tour Editor, which allows independent routines to be defined for each device.

Figure 35: Edit Tour Popup-A

Tours are defined in the following manner:

- **Start**
  This is the point where the tour begins. Regardless of the HS-14 RAHD's angular position at the time it is commanded to begin a tour, it will always move to this position before continuing. Once a RAHD reaches this start position, it will move on to the first leg.

- **Legs**
  Tours are broken down into individual movements called legs. Each leg is defined by a destination position. To set this destination, enter coordinates in the "Pan" and "Tilt" fields. Angles can be defined in the following ways:
  - **Absolute**
    The coordinates entered will be the destination position.
  - **Relative**
    The destination position will be the sum of the entered coordinates and the previous destination.
  - **POI**
    A predefined POI can be selected as the destination position.
  - **Delay**
    The RAHD does not move. Instead it remains stationary for the specified time.

Pre-recorded tracks can also be played during tours. If a track is setup using the volume slider and file chooser on the right side of the window, the chosen track will begin playing at the specified volume at the beginning of the leg.

Figure 36: Edit Tour Popup-B

Figure 37: Edit Tour Popup-C

To complete the leg, a leg time duration must be specified, or a travel velocity supplied. The direction in which the HS-14 RAHD will travel to reach its destination can also be set as clockwise, counterclockwise, or the fastest direction.
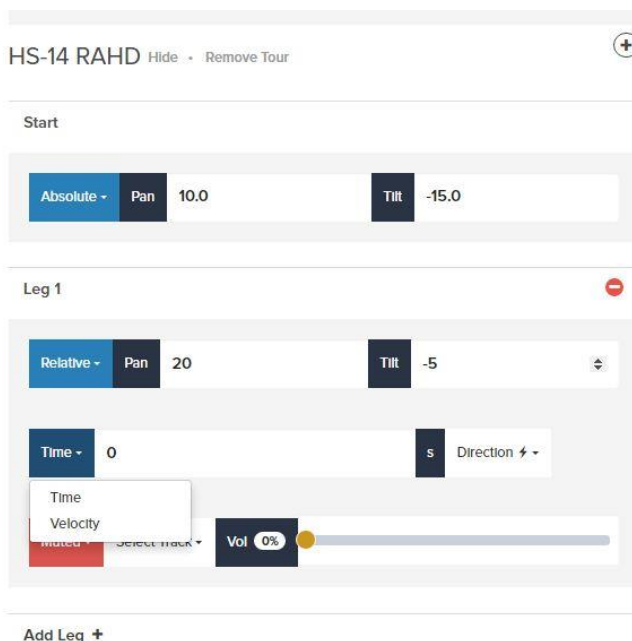
Figure 38: Edit Tour Popup-D

After the system has sequentially executed each of the defined legs, it will return to the start position and repeat the tour in a loop. When finished editing, click on the "Save" button as shown in Figure 35 to create the tour.

To begin a Tour, simply click on the play button (▶) to the right of the Tour name. To stop a tour, click on the stop button (■).
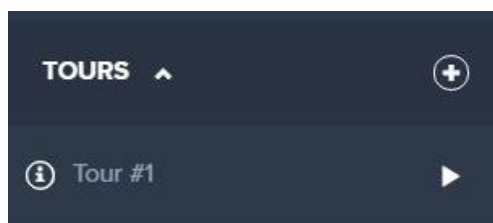
Figure 39: Tour Start Button

5.12. Deadzones

The CCI allows the user to easily define physical locations where device functionality should be restricted. For example, if an HS-14 RAHD was installed on a ship, a user can restrict the system from playing high volume audio directly at the bridge. This feature is especially useful when training new operators to use your HS-14 RAHD.

Note: The HS-14 RAHD is pre-programmed with four non-removable Deadzones designed to protect cabling from becoming pinched during operation.

To create a Deadzone, click on the "gear" Device Settings icon as shown in Figure 8.

Figure 40: Edit Device Popup – Deadzone Creation

Enter a name for the Deadzone you wish to create in the "Name" field of the Deadzones section. A Deadzone is defined by a range of pan and tilt coordinates.* Enter the desired coordinates within the "Pan" and "Tilt" text fields. In the "Restrictions" dropdown box, select the functionality you would like to restrict within the Deadzone. Restricting movement will prevent the HS-14 RAHD from entering the Deadzone at all, while restricting audio will only disable audio while traveling through the Deadzone.

*Note: A Deadzone's included angles will always be interpreted as follows:

- The range of Pan angles beginning at the "Min" angle, progressing in the clockwise direction, and ending at the "Max" angle.
- The range of Tilt angles beginning at the "Min" angle, progressing in the (+) direction, and ending at the "Max" angle.

When a device enters a Deadzone, a warning will appear on screen. This warning includes information such as the Deadzone's boundaries and restrictions.
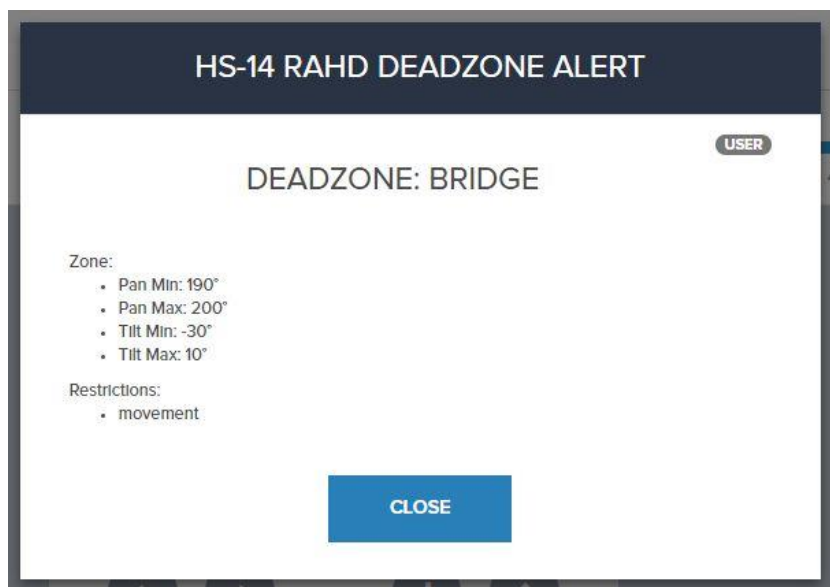
Figure 41: Dead Zone Warning

5.13. Pan/Tilt Control

The HS-14 RAHD is equipped with a rugged Pan/Tilt unit for precise angular positioning. Each connected HS-14 RAHD will appear on the Home Screen with an independent set of controls and status indicators. The current angular position, volume level, and connection status of each device are all displayed on screen.
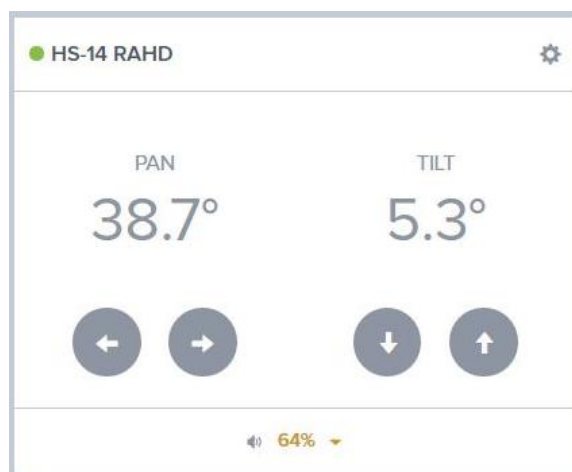
Figure 42: Control and Status Pane

To move a unit, simply press the on-screen arrow buttons. Clicking on an arrow button will cause the system to move a variable distance, selectable through the "Move By" dropdown. Clicking and holding on any directional button will cause the system to continuously move at a variable speed, selectable through the "Velocity" slider.

Figure 43: Velocity Slider and Move-By Dropdown

5.14.   Keyboard/Joystick Control

If desired, certain commands can be sent to the RAHD using keyboard shortcuts. To enable keyboard control, click in the box enclosing the device name. Use Ctrl+Click to select multiple devices. After doing so, the outline of the Device Status Pane should be blue. Cancelling keyboard control is accomplished by clicking anywhere on the page's grey background.
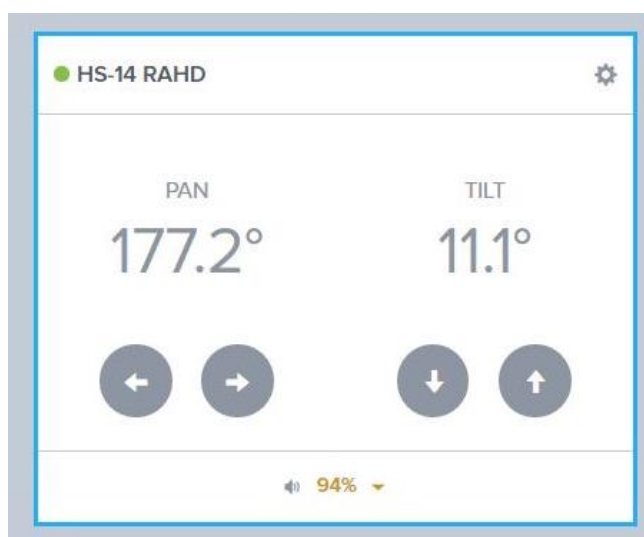
Figure 44: Keyboard Control Enabled

If you would like to control a device using a Joystick or Game Controller, use a keymapper program to map the axes and buttons of your controller to keyboard keys. There are many keymapper software packages available, such as JoyToKey by JTKSOFT.

The following keyboard shortcuts are supported by the CCI:

Function	Keystroke
Move Left	←
Move Right	→
Move Up	↑
Move Down	↓
Camera Zoom In	Shift + =
Camera Zoom Out	Shift + -
Light Low	Shift + I
Light Medium	Shift + U
Light High	Shift + Y
Light Off	Shift + O
Strobe Rate +	Shift + L
Strobe Rate -	Shift + K
Beam Width +	Shift + .
Beam Width -	Shift + ,

5.15.   All/Select Mode

A convenient feature of the CCI is the ability to toggle between All and Select modes. When the system is in All Mode, starting track playback, live mic, tours, or POIs will affect every connected RAHD. In select mode, a popover menu will appear when the user attempts to send a command. Using this popover, select the devices which should respond to the command. To select all present devices, click on the "All" button. Similarly, to de-select every connected device, click on the "None" button.

Note: If any device is missing the track, tour, or POI, its name will appear grey in the popover.
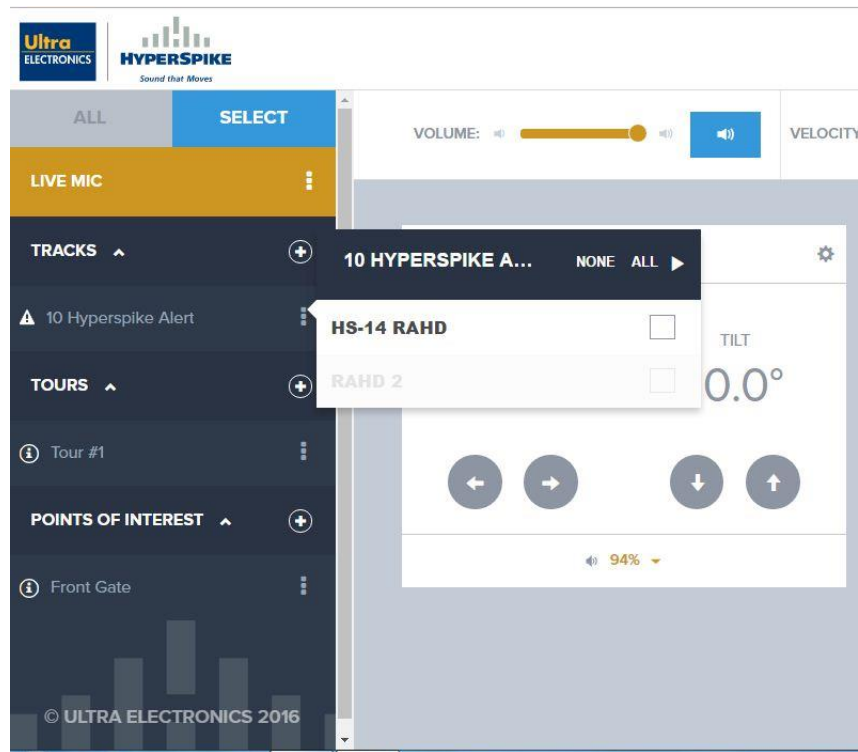
Figure 45: Playing a Track in Select Mode
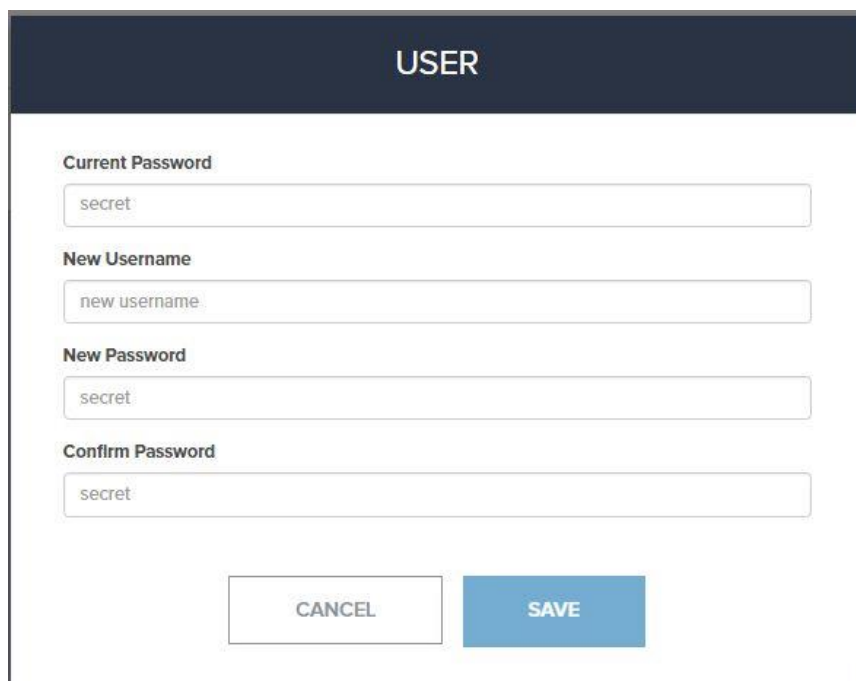
5.16. Account Options and Logout

To change the current master username or password, click on the "gear" System Settings icon as shown in Figure 8 to pull up the Settings menu.
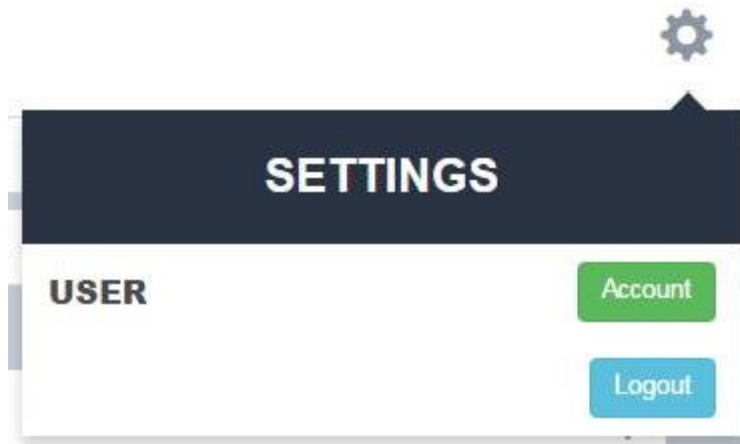
Figure 46: Settings Menu

Clicking on the "Account" button will allow the user to change the master username or password.

Figure 47: Change Username/Password Menu

To log out of the system, click on the "Logout" button.

5.17.   Advanced Settings

To access advanced settings, click on the Device Settings "gear" as shown in Figure 8. Next, click on the "Advanced Settings" button on the bottom of the popup window.

Figure 48: Advanced Settings Window

5.17.1. Changing IP Settings

To change the static IP address of the HS-14 RAHD or to configure it as a DHCP client, navigate to the "Advanced Settings" window and click the "IP Settings" button.

Figure 49: IP Settings Window
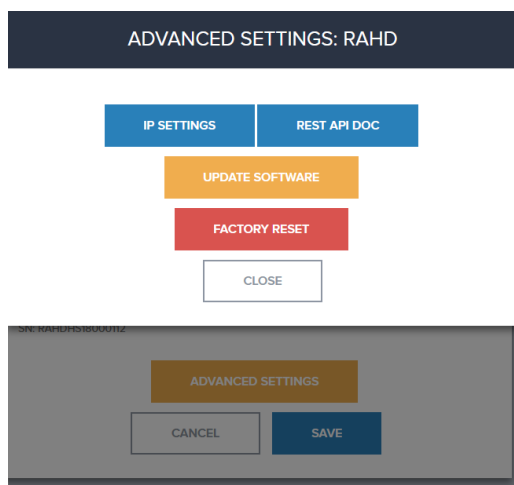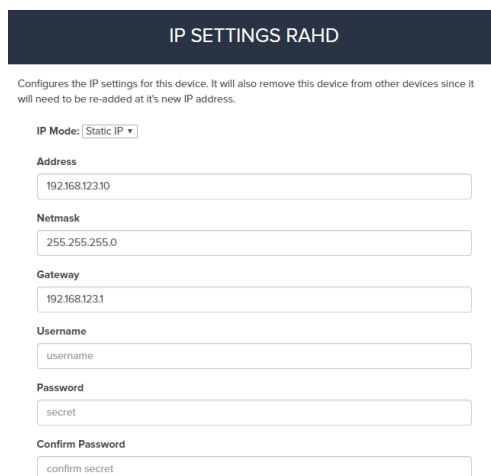
The IP Mode can be set to Static IP or DHCP. If set to Static IP, the chosen IP address must be in a private address range, as shown in the following table.

Class	Subnet Mask	Address Range
A	255.0.0.0	10.0.0.0 – 10.255.255.255
B	255.240.0.0	172.16.0.0 – 172.31.255.255
C	255.255.0.0	192.168.0.0 – 192.168.255.255

If set to DHCP, then a dynamic IP address will be assigned to the HS-14 RAHD after restarting the device.

The username and password are used to authenticate the change to the system settings. After setting the new IP settings, the RAHD will need to be re-added to the list of devices at its new address.

5.17.2. Factory Reset

If at any point it is desired to completely remove all tracks, tours, POIs, dead zones, and user information from a device, a factory reset can be performed. To do this, navigate to the "Advanced Settings" window and click the "Factory Reset" button. Performing a factory reset will NOT reset the IP address of the RAHD.

Before continuing with the factory reset, be sure to read the warning that appears. **IT IS NOT POSSIBLE TO UNDO A FACTORY RESET**.

5.17.3. Software Update

When a software update is released for the HS-14 RAHD, it can be installed by utilizing the software update feature of the system. Navigate to the "Advanced Settings" window and select "Software Update" to access this feature.
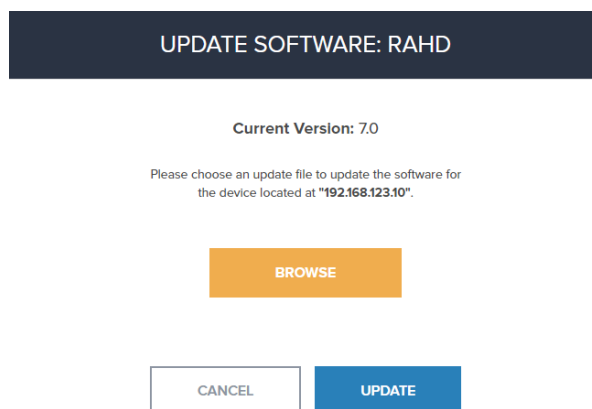
Figure 50: Update Software Window

Upon downloading the update file, click on the "Browse" button and then select that file. Afterwards, click "Update" and the file will be automatically installed onto the HS-14 RAHD.

5.17.4. REST API

The HS-14 RAHD comes with a REST API, which can be used to write custom control software for the system.

The REST API offers a series of commands that allow a program to interface with the built-in server on the HS-14 RAHD. Custom software can be created to utilize these commands. The HS-14 RAHD comes with two documentations on this feature. One is the 'Application Programming Interface Manual' and the other is the OpenAPI documentation that is linked to in the "Advanced Settings" Window of the CCI. The OpenAPI documentation is interactive, allowing a user to control the HS-14 RAHD with any of the various commands.
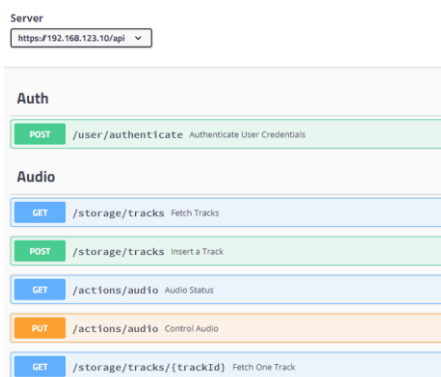
Figure 51: OpenAPI Documentation

6. Preventative Maintenance and Cleaning

The HS-14 RAHD is a multi-environment device. As a result, maintenance should be performed based upon the conditions that exist where the unit is in use. The following preventive maintenance actions are the minimum methods needed to keep the unit functioning at optimal capacity.

<div style="border: 2px solid red;">

WARNING:

**LIFE THREATENING ELECTRIC SHOCK OR DEATH BY ELECTROCUTION.
100 - 250 VAC IS PRESENT WHEN ENERGIZED.**

**TEMPORARY OR PERMANENT HEARING DAMAGE MAY OCCUR.
HIGH LEVEL OF SOUND CAN BE EMITTED.**

Always disconnect power from the unit before performing any maintenance.

</div>

Remember to always inspect the HS-14 RAHD before powering up the unit. Also, check all cables for frays, tears, and rips. If a cable is damaged, do not use it. If the unit or cables require service beyond the methods described in this section, refer to the warranty information in Section 8.

6.1. Ground Operations and Sandy Environments

Monthly: Point the HS-14 RAHD with the front facing the ground. Gently tap and shake the unit to remove sand that may have entered during normal operation. For severely clogged units, a vacuum can be used. Place the hose directly against the unit's emitter head. Wipe down all painted surfaces and cannon plugs/connectors with a lint-free cloth soaked in clean water. Perform these measures monthly or as needed to ensure a long operational life.

<div style="border: 2px solid orange;">

CAUTION:

HS-14 RAHD CAN BE DAMAGED BY PRESSURIZED AIR OR PRESSURIZED WATER.

Never use pressurized air or pressurized water to clean the HS-14 RAHD.

</div>

6.2. Salt Water Environments

Weekly: Wipe down all painted surfaces and cannon plugs/connectors with a lint-free cloth soaked in clean water. Perform this task weekly and after inclement weather.

6.3. To prepare for storage

Remove and wipe down the HS-14 RAHD, all cables, and accessories with a lint-free cloth soaked in clean water. Dry thoroughly. Ensure all connector covers are in place. Cover the HS-14 with a maritime cover or place in a protective case. Store the unit in a dry location.

Note: These recommended preventive maintenance actions should be added to the appropriate preventive maintenance schedule.

7. Troubleshooting

If at any point you believe your HS-14 RAHD is malfunctioning, please refer to the following troubleshooting guide.

7.1. Inspect incoming Power and Data to the HS-14 RAHD.

Using the pinout for the Power/Data cable, P/N 42222A-80X shown below, ensure AC voltage is present on the expected pins of the circular connector. Verify that a good network connection is provided to the HS-14 RAHD by testing the input for network access with a suitable computer or network tester.

DO NOT connect the Power/Data cable to the HS-14 RAHD if AC Voltage is not present in accordance with the provided pinout.
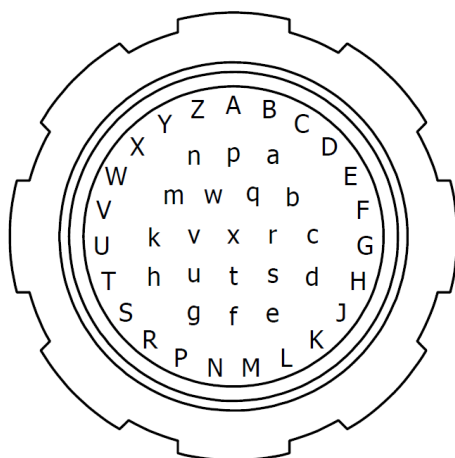
Pin	Function
G	Eth, RJ-45 Pin 1. Wh/Org
H	Eth, RJ-45 Pin 2. Org
J	Eth, RJ-45 Pin 3. Wh/Gr
K	Eth, RJ-45 Pin 6. Gr
R	Eth, RJ-45 Pin 5. Wh/Blu
S	Eth, RJ-45 Pin 4. Blu
T	Eth, RJ-45 Pin 7. Wh/Brn
U	Eth, RJ-45 Pin 8. Brn
c	120VAC Hot/Hot 1
d	120VAC Hot/Hot 1
f	AC Gnd
g	AC Gnd
h	120VAC Neu/Hot 2
k	120VAC Neu/Hot 2
n	Chassis Ground
p	Chassis Ground
All Others	RESERVED

Figure 52: Power/Data Cable Pinout

7.2. Testing for Network Connectivity

The HS-14 RAHD defaults to a Static IP address (see Section 4), but can be configured for another Static IP or to accept an IP Address from a DHCP server. If your RAHD is configured for DHCP, check to see that the DHCP server on your network has issued an address to the HS-14 RAHD. If you don't know how to do this, contact your network manager.

Once the IP address of the HS-14 RAHD has been identified, attempt to ping the device from another computer on the network. If repeated attempts to ping the device fail, your network may not be configured properly.

7.3. Troubleshooting Software

If you are experiencing issues when connecting to an HS-14 RAHD, the following troubleshooting plan may help to resolve your problems.

Case 1: Indicator light (Next to the device name) is Red
- Verify the device is not already being accessed by another user.
- Ensure the IP address listed when clicking on the Device Settings "gear" icon, as shown in Figure 8, is the correct address. If you are unaware of the IP address, consult your Network Manager. If the address is wrong, remove the improperly configured device as described in Section 5.4.
- Power Cycle the unit by powering off for 60 seconds and powering back on.

Figure 53: Indicator light in Red State

Case 2: Indicator light is Orange
- Power Cycle the unit by powering off for 60 seconds and powering back on.

If problems persist, contact Ultra Electronics USSI using the contact information listed in Section 8.

8. WARRANTY

Ultra Electronics USSI warrants its products to be free from defects in material and workmanship for a period of one (1) year from the date of shipment from USSI's facility. This warranty is extended to the original purchaser and all subsequent owners, provided a copy of the original dated bill of sale is presented when service is requested under warranty.

If your product should require service, write, phone, fax or e-mail Ultra Electronics USSI at:

Ultra Electronics USSI
4868 E Park 30 Drive
Columbia City, IN 46725
Phone: 260-248-3665 Fax: 260-248-3510
E-mail: ServiceDepartment@ultra-ussi.com
URL: www.ultra-HyperSpike.com

We will either direct you to a local service agency or provide you with a Return Material Authorization (RMA) number so that you can ship the product to our factory. Do not ship the product to us without first obtaining an RMA number. Place the RMA number on all boxes returned to the factory to prevent equipment from being lost or mishandled. Merchandise returned to us for service under warranty must be accompanied by a copy of the original bill of sale, and shipped prepaid. You are responsible for transporting your product to our factory. We will pay the return shipping charges on all products repaired under warranty.

8.1. Failures Not Covered by This Warranty

This warranty covers manufacturing defects. The warranty **DOES NOT** cover:
1) Damage caused by accident, misuse, abuse, product modification or neglect.
2) Damage incurred during shipment (you must claim these damages from the carrier).
3) Damage resulting from failure to operate the product in accordance with the instruction manual.
4) Damage resulting from attempted repairs by unauthorized personnel.
5) Claims based on any perceived agreement not explicitly stated in this warranty such as conversations with service personnel or sales representatives.

8.2. Limitation of Implied Warranties

All implied warranties, including warranties of merchantability, are limited in duration to a period of one (1) year from the date of shipment from Ultra Electronics USSI.

8.3. Exclusion of Certain Damages

Ultra's liability is limited to the repair or replacement, at our option, of any defective product, and shall in no event include incidental or consequential commercial damages of any kind. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the preceding limitation or exclusion may not apply to you.

For further information regarding this warranty, parts, or service, please contact Ultra Electronics USSI through one of the methods listed at the beginning of this warranty section.
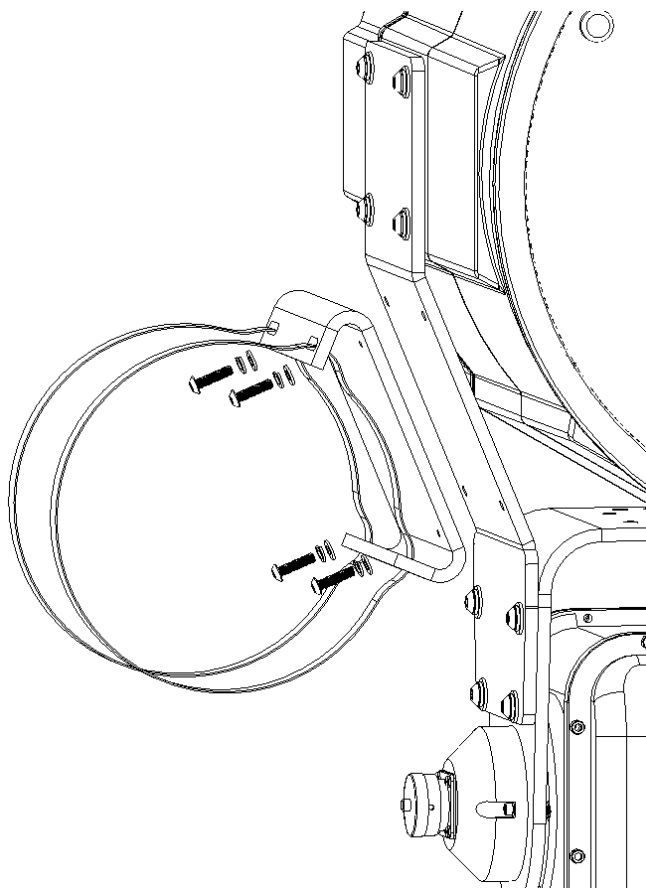
Appendix A – Light Mount Installation

1. Assembly Mounting Steps

1.1. Remove Light from Clamps
    1.1.1. Loosen the worm-gear clamps until the mounting plate and clamps will slide off the end of the light.

1.2. Attach Mounting Plate to RAHD
    1.2.1. Insert the included 10-32 screws through the lock washer, flat washer, bracket, and RAHD side bracket.

Figure 54: Mounting Light Bracket to HS-14 RAHD

    1.2.2. Tighten screws until lock washers are fully compressed (approximately 30 in-lbs).

1.3. Reassemble Light in Clamps

    1.3.1. Slide the light through the straps until it is approximately centered.

Figure 55: Sliding Light into Clamps

    1.3.2. Rotate the light so the connector is near the RAHD horn.
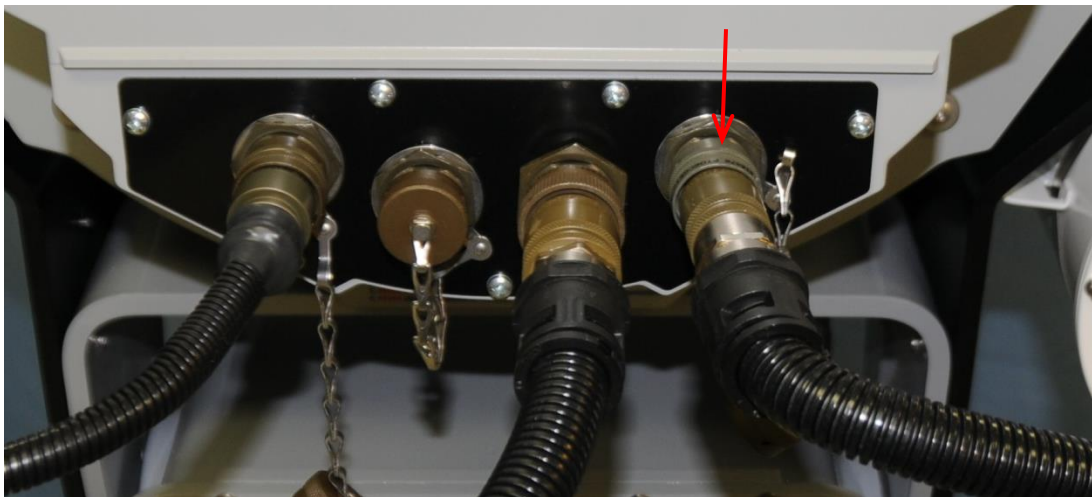
    1.3.3. Tighten the worm screws to secure the light.

1.4. Install the cable

1.4.1. Attach the cable to the light.

Figure 56: Cable Connected to Light

1.4.2. Attach the cable to the RAHD connector plate on the right-most connector.
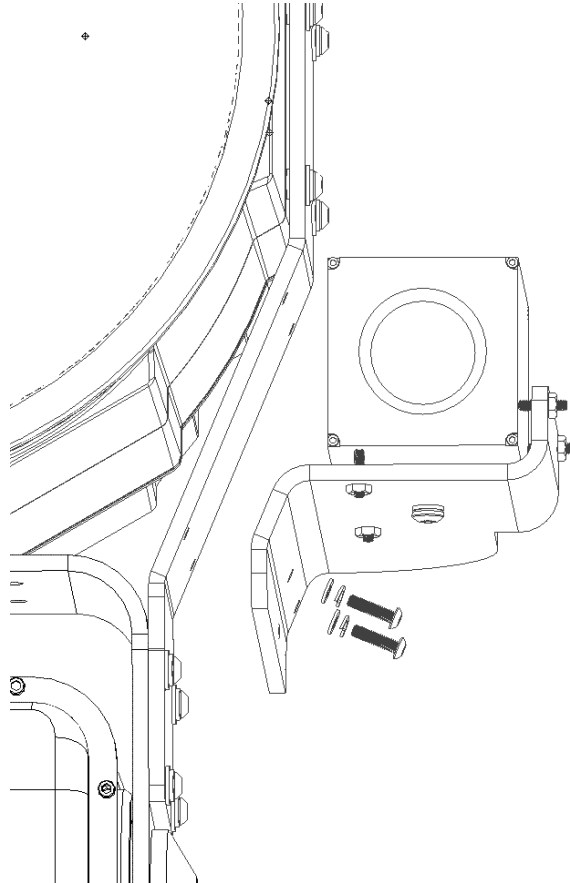

Figure 57: Cable Connected to RAHD Connector Plate

Appendix B – Camera Mount Installation

1. Assembly Mounting Steps

1.1. Attach Mounting Plate to RAHD
    1.1.1. Insert the included 10-32 screws through the lock washer, flat washer, bracket, and RAHD side bracket.
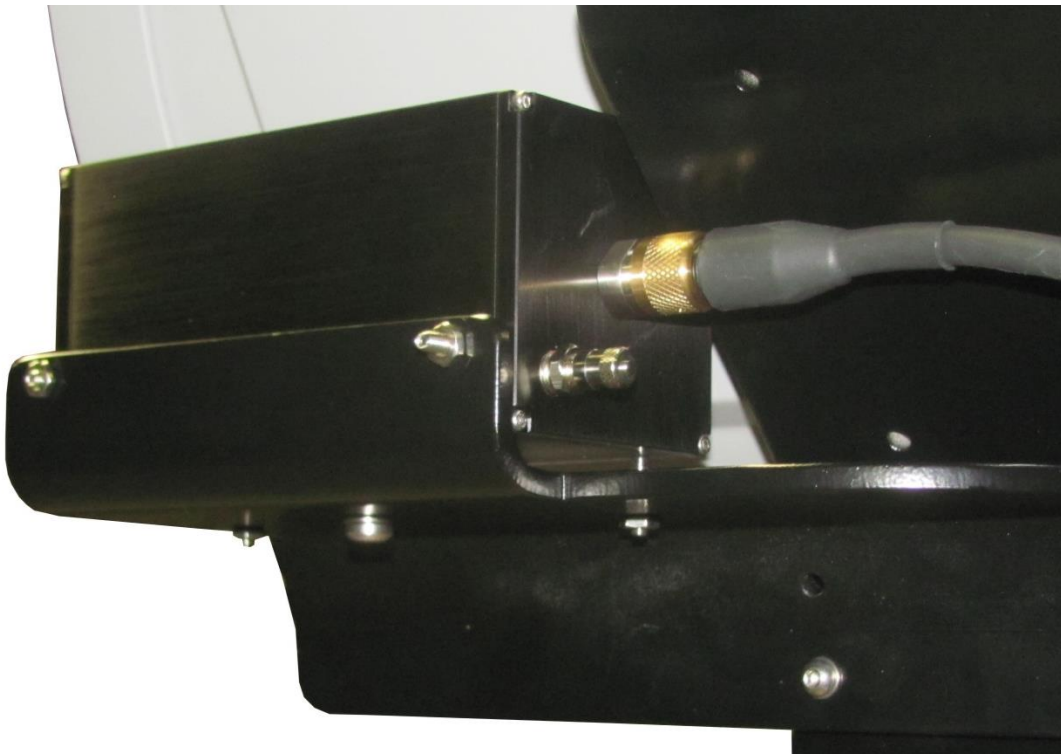

Figure 58: Mounting Camera Bracket to HS-14 RAHD

    1.1.2. Tighten screws until lock washers are fully compressed (approximately 30 in-lbs).

1.2. Install the Cable
1.2.1. Attach the cable to the camera.

Figure 59: Cable Connected to Camera

1.2.2. Attach the cable to the RAHD connector plate on the left-most connector.

Figure 60: Cable Connected to RAHD Connector Plate

2. Alignment Procedure

2.1. If Light Attached

2.1.1. Turn on the light and aim the RAHD so it hits a target approximately 100m away.

2.1.2. Before adjusting the set screws, loosen the four jam nuts.

2.1.3. The camera's pan and tilt can be adjusted by turning the four set screws.
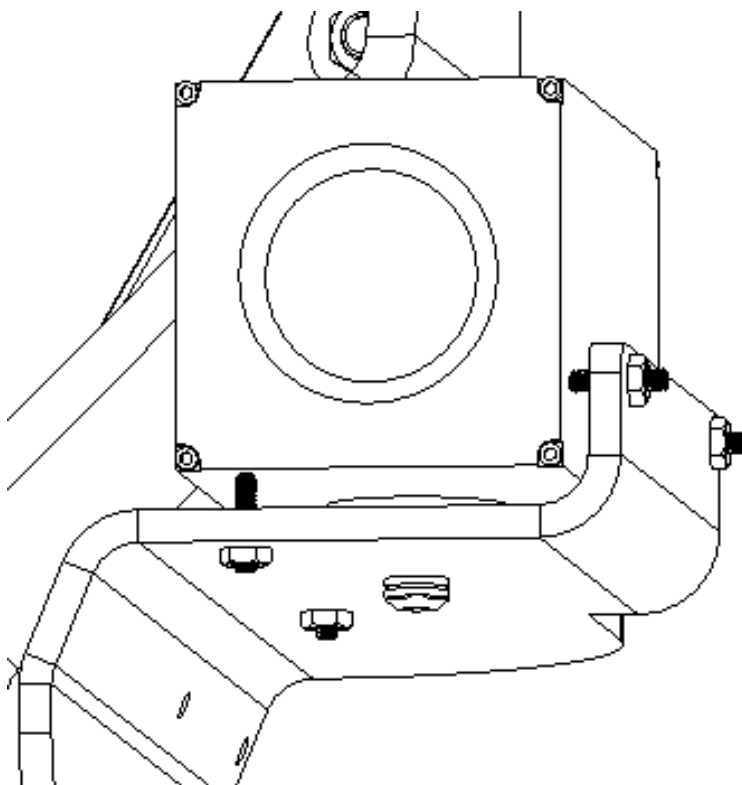
Figure 61: Pan and Tilt Adjustment Screws

2.1.4. Adjust the Pan and Tilt until the camera is looking at the target.

2.1.5. The camera roll can also be adjusted by loosening both Pan screws equally and tightening the Tilt screws equally or vice-versa.

2.1.6. All four screws should be in contact with the camera body.

2.1.7. When done, tighten the four jam nuts.

2.2. If No Light Attached

2.2.1. Aim the RAHD horn so it points at a target approximately 100m away. Sight along the edge of the horn to find the exact target.

2.2.2. Adjust the cameras targeting according to steps 2.1.2– 2.1.7 above.

.

Appendix C – Camera Mount Installation (72570B-80X)

Required Tools: 3/8" socket, 5/32" allen wrench, 1/8" allen wrench, Torx driver (supplied)

1. Assembly Mounting Steps

    1.1. Attach Camera to RAHD
        1.1.1. Using Torx driver, remove the two lower bolts on the camera attached to the base. Note that the two bolts are captive in the base. Slide the base back towards the wire glands to remove base from camera.
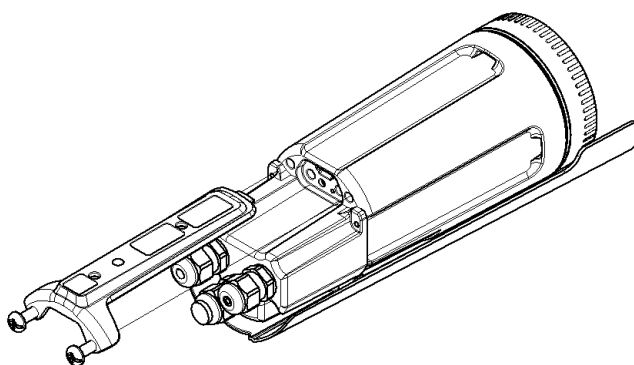

Figure 62: Camera Base Removal

        1.1.2. Install camera base to mounting bracket aligning the blind tapped hole in base with the slotted hole on the bracket. Using the 5/32" allen wrench install supplied 1/4-20 bolt and lock washer in the blind tapped hole. Leave bolt loose for later adjustment. Using the 3/8" socket and 1/8" allen wrench install supplied 10-32 bolt, lock washer, and lock nut and tighten.
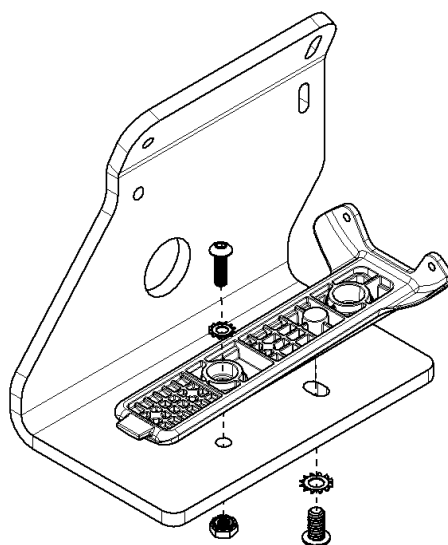
Figure 63: Camera Base to Bracket Installation

1.1.3. Using 1/8" allen wrench, mount the bracket assembly with the supplied 10-32 bolts and lock washers to the RAHD side bracket. Tighten front bolt to approximately 30 in-lbs. Leave the rear bolt loose for later adjustment.
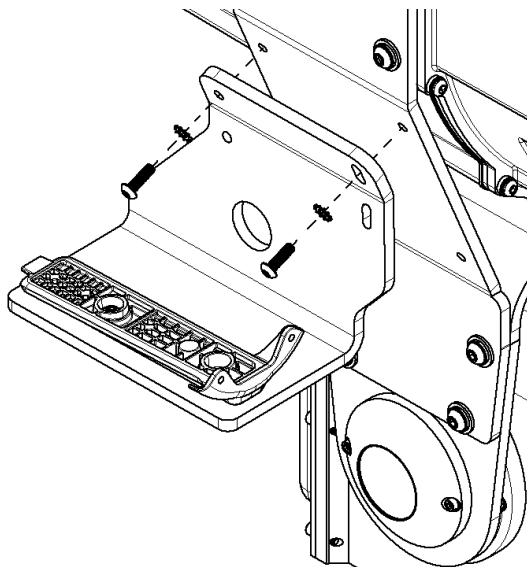
Figure 64: Mounting Camera Bracket to HS-14 RAHD

1.1.4. Slide camera onto camera base. Assure tab of the camera base slides into the front slot of the camera.

1.1.5. Thread the bolts of the camera base into the camera housing and fully tighten.

1.1.6. With the unit powered off attach the Camera cable to the RAHD connector plate on the left-most connector.


Figure 65: Cable Connected to RAHD Connector Plate

2. Alignment Procedure

2.1. With Light Accessory

2.1.1. Turn on Light Accessory and aim RAHD so the light hits a target approximately 100m away.

2.1.2. With the rear bolt that attaches the camera bracket to the RAHD side bracket loose. Adjust the tilt of the camera and bracket to align with the light. When position is set tighten bolt to approximately 30 in-lbs.
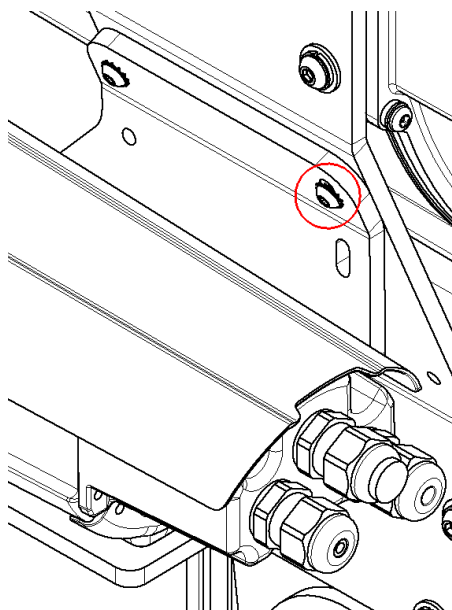
Figure 66: Tilt Adjustment

2.1.3. With the bolt on the bottom side of the bracket loose, adjust the pan of the camera to align with the light. When position is set tighten bolt.
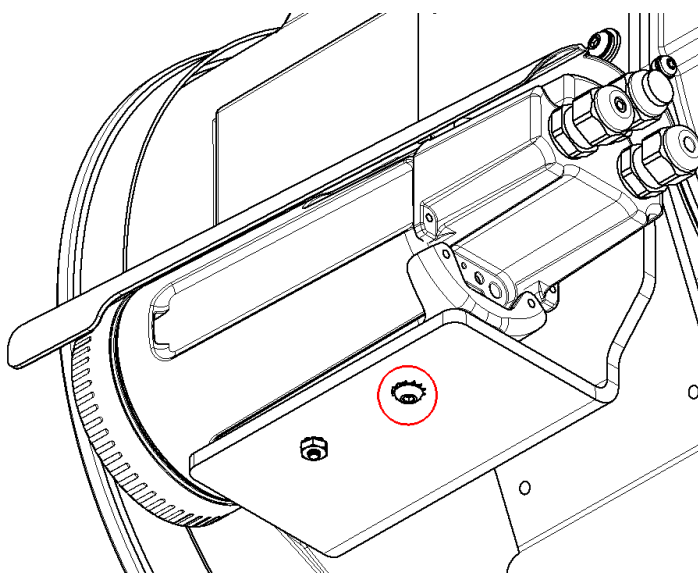
Figure 67: Pan Adjustment

2.2. Without Light Accessory

2.2.1. Aim the RAHD horn so it points at a target approximately 100m away. Sight along the edge of the horn to find the exact target.

2.2.2. With the rear bolt that attaches the camera bracket to the RAHD side bracket loose. Adjust the tilt of the camera and bracket to align with the sight. When position is set tighten bolt to approximately 30 in-lbs.
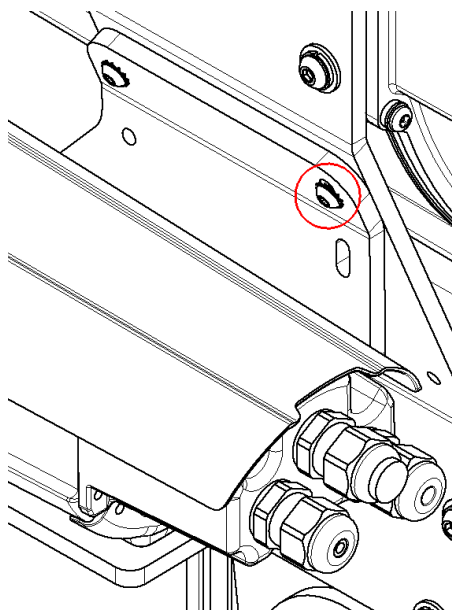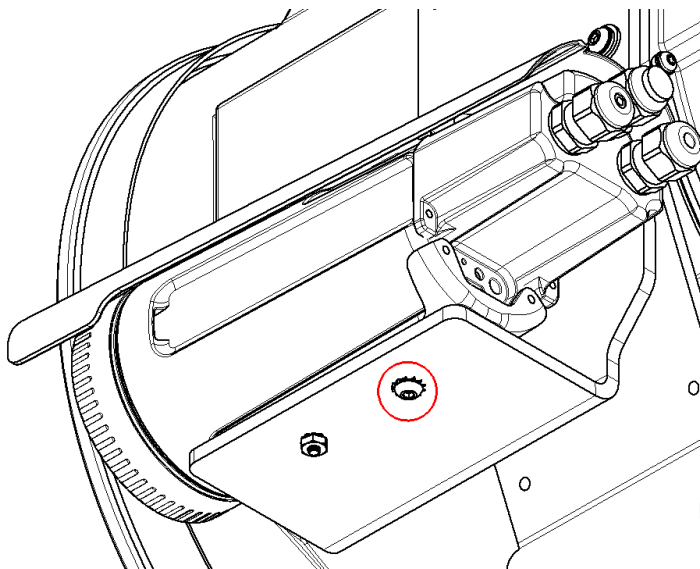

Figure 68: Tilt Adjustment

2.2.3. With the screw on the bottom side of the bracket loose, adjust the pan of the camera to align with the sight. When position is set tighten bolt.

Figure 69: Pan Adjustment

Appendix D – Frequently Asked Questions

What security measures have been taken to protect the HS-14 RAHD software?

There are several features of the Hyperspike RAHD software that are intended to deter the installation and operation of malicious software:

1. Use of a well-known, reputable Linux distribution

2. Use of a firewall to open only those ports that are necessary for operation

3. Root login via SSH is disabled

4. Remote login is enabled for only one user

5. Issuing commands requiring root permissions requires two sets of credentials

6. It is the intent of USSI to avoid sharing the main user credentials with customers

7. It is the POLICY of USSI to not share the root credentials with customers

8. RAHDs do not share root passwords

9. The hard drive of the RAHD is mostly read-only

10. The repository for installing new software has been redirected to a secure, static copy of the repo which only contains those packages required for the RAHD to operate. It does not point at the default package server for the Linux distribution.

11. Authentication of packages in our static repository is controlled by digital signatures which USSI controls – only USSI can sign a package to make it a valid part of the repository.

12. The RAHD does not have a DNS server configured for normal (static IP) operation. The customer controls this for DHCP operation.

13. Use of HTTPS for almost all network interfacing (the exception is audio streaming – it must be setup from within HTTPS, but the audio data is streamed as HTTP)

14. The REST API uses the same authentication as the CCI

Appendix E – Acknowledgments and Attribution

The RAHD incorporates open source software licensed under various public licenses which require attribution as a condition of the licensing. The following software packages are used in the RAHD software:

a. Debian Linux
b. Python
c. VLC Media Player
d. Node.js
e. AngularJS