

User Manual

Outland OTI-1080-4NX DVR
ROV User Manual

Outland Technology, Inc.

Address: [38190 Commercial Court, Slidell, LA 70458](https://www.google.com/maps/place/38190+Commercial+Court,+Slidell,+LA+70458)

Phone: [+1 \(985\) 847-1104](tel:+19858471104)

Email: sales@outlandtech.com

Website: www.outlandtech.com

Table of Contents

1	Introduction	3
2	Home Screen	4
	2.1 Menu Button.....	5
	2.2 Page Buttons.....	5
	2.3 DVR Indicators	5
	2.5 Edit Mode	6
	2.5.1 Notes.....	7
	2.5.2 HUD Elements.....	8
3	Menus	9
	3.1 Library	9
	3.2 Diagnostics Menu	13
	3.2.1 Thruster Options.....	14
	3.2.2 Communications.....	15
	3.2.3 Spare Line Options.....	16
	3.2.4 Power Section.....	18
	3.2.5 Video Channel Options	18
	3.2.6 Sensors Options	21
	3.3 HUD Options Menu.....	23
	3.1.1 Heads Up Display (HUD) Elements.....	23
	3.1.2 Display Logo.....	27
	3.1.3 Display Custom Data.....	27
	3.1.4 Buttons	28
	3.4 DVR Options Menu	29
	3.4.1 Camera Options	30
	3.4.2 Drive Manager Menu.....	32
	3.4.3 PIP Options Menu	33
	3.4.4 Network Options Menu	34
	3.4.5 Controller Options Menu.....	36
	3.4.6 HDMI Options Menu.....	37
	3.4.7 Time and Date Menu	37
	3.5 Update Options Menu	38
	3.5.1 Update ROV Device Menu	39
	3.5.2 Manual Command Menu	40
	3.5.3 Update DVR Options.....	40
	3.5.4 Save Overlay Config	41
	3.5.5 DVR Firmware Nuber	41

REVISION TABLE		
REV.	DESCRIPTION	DATE
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1 Introduction

Congratulations on the purchase of an Outland Technology DVR!

Outland Technology takes great pride in supplying high-quality underwater video systems.

This manual serves as your indispensable companion, providing detailed insights and instructions for maximizing the efficiency and performance of your underwater exploration endeavors.

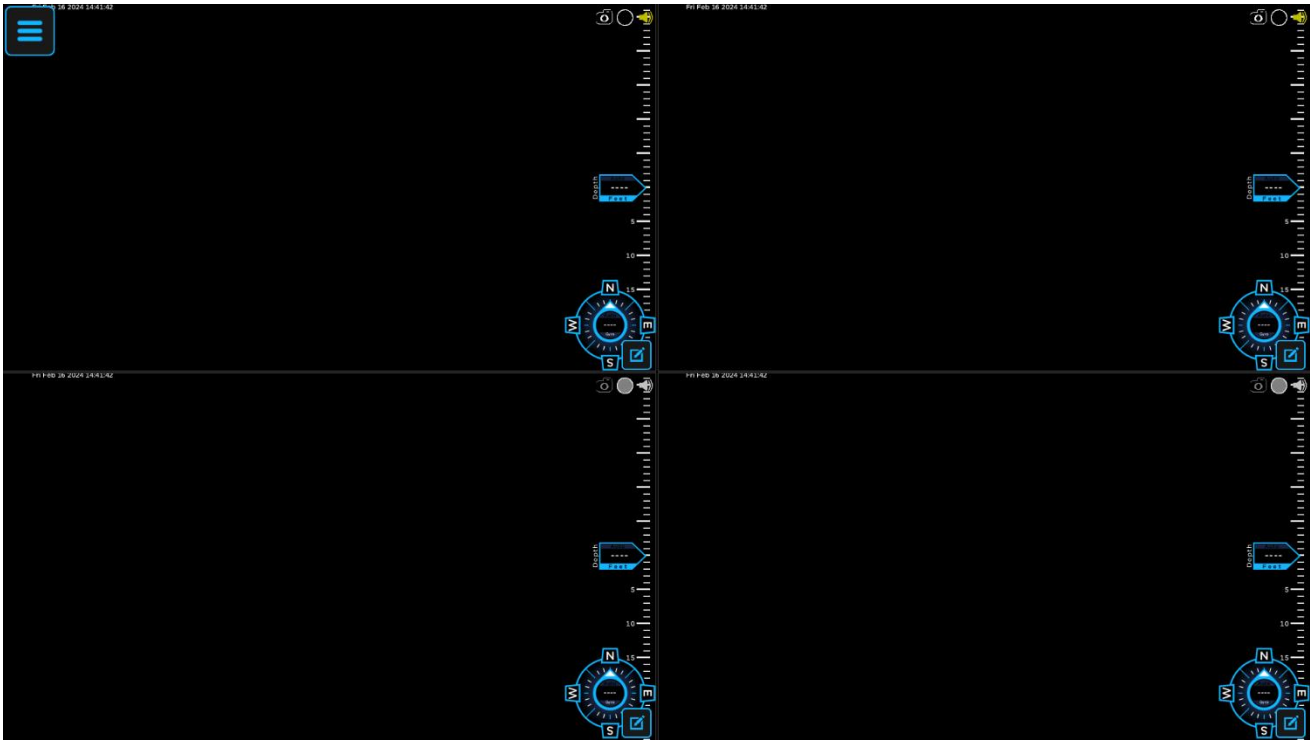
Designed and engineered by Outland Technology, a leading name in underwater technology solutions, the OTI-1080-4NX Dive System represents the pinnacle of innovation and reliability in underwater video recording. Whether you are a professional diver, a marine researcher, or an adventure enthusiast, this cutting-edge DVR system promises to revolutionize your underwater experiences, capturing every moment with unparalleled clarity and precision.

Thank you for choosing Outland Technology as your partner in underwater exploration. Dive in, explore, and capture the wonders that lie beneath the surface with the OTI-1080-4NX ROV System.

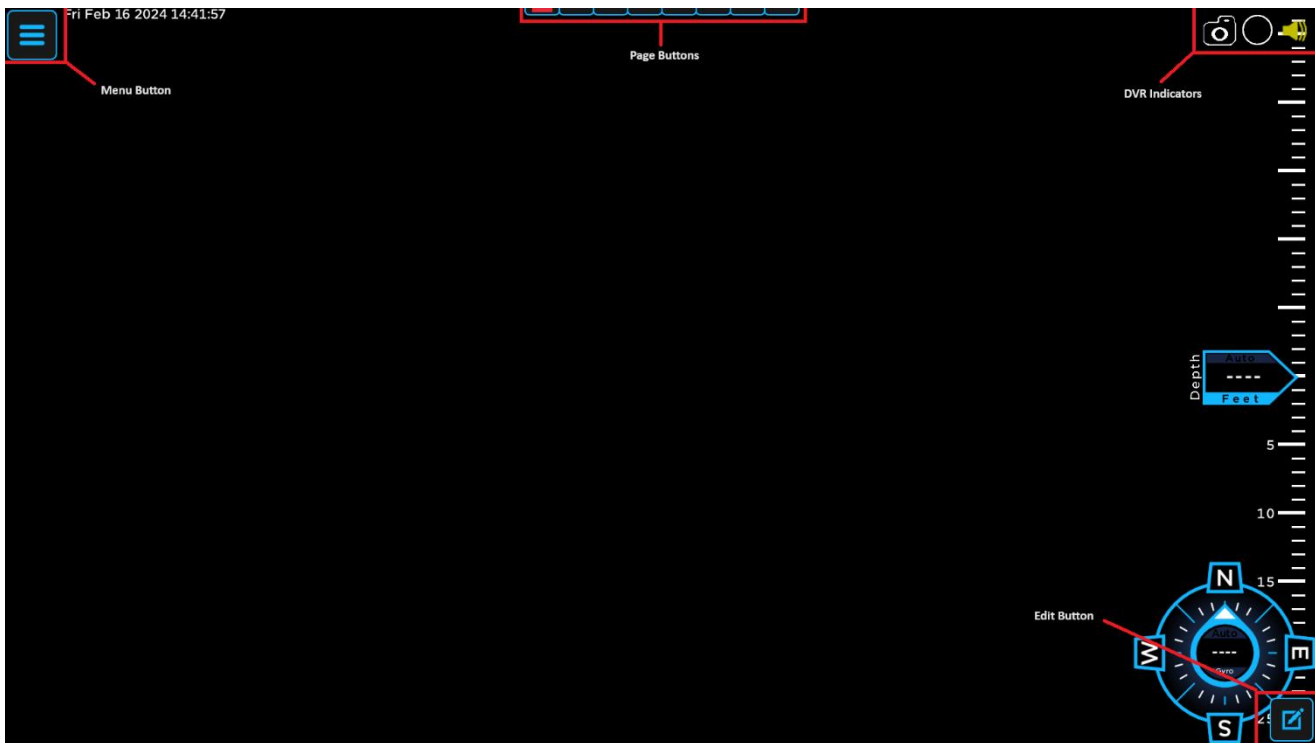
If you have any issues or questions with the DVR, please do not hesitate to contact us. Outland is more than happy to assist with any questions.

2 Home Screen

When the DVR first turns on, you will see the Home Screen. It will show all four camera inputs.

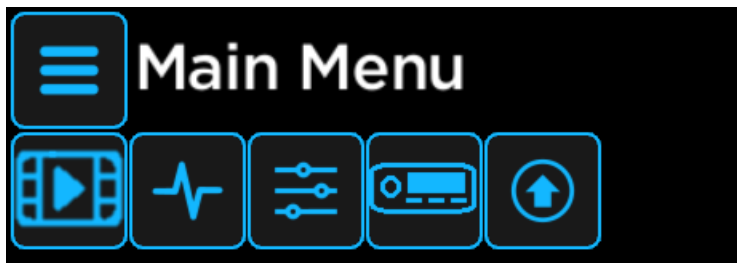


To select a camera for full screen you can double click on any quadrant. You can also cycle through the inputs by pressing the SWAP button on the front of the DVR, or by pressing the RIGHT arrow key on your keyboard.



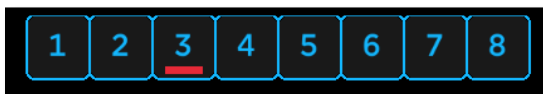
2.1 Menu Button

To access the various menus of the DVR, click the menu button, press the ‘SELECT’ button on the front of the DVR or press the Enter key on your keyboard. The menus will be described in more detail later.



2.2 Page Buttons

The page buttons allow you to save multiple “pages” of on-screen notes. A small red indicator on the bottom of the number will tell you which page you are currently on. (Photo shows page 3 active)



The pages may be different between channels, so each camera can have a different set of notes. To change page, you can click on a number to switch to that page. You can also press the PAGE button on the front of the DVR or press the LEFT arrow key on your keyboard. The on-screen notes will be described in the EDIT MODE ([section 3.1](#))

2.3 DVR Indicators

The DVR indicators allow you to see the recording setup of each channel.

The camera indicator will either be black, indicating that the channel will take a screenshot if the SCREENSHOT button on the DVR is pressed, or gray indicating that it will not.

The circle “Record” icon will be red if the current channel is being recorded, black if the channel will begin recording when the RECORD button is pressed, or gray indicating that the channel will not record. You can also click on this button to begin recording. It will record all selected channels, just like pressing the RECORD button on the front of the DVR.

The third icon is the audio input icon. It will either be gray, indicating that no audio input channel has been selected for this channel to record, or yellow indicating that one has.



All indicators off



All indicators on



Recording

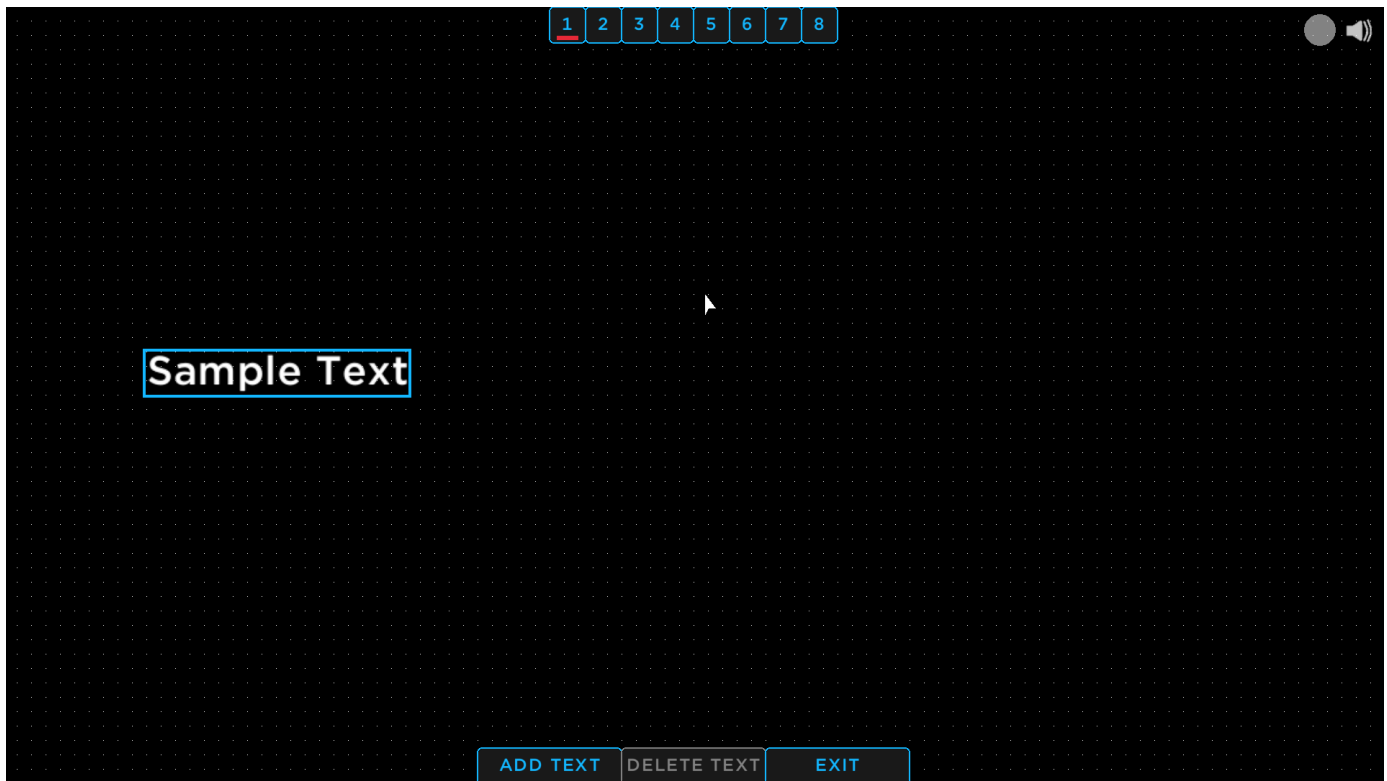
Up to two additional icons will appear while recording.

The first is the star icon. Clicking on the star icon allows you to add a highlight to the video you are recording on the channel you click on. This will add a star next to the video in the library and the timestamp of the click will be highlighted in the playback. This will be covered further in the Library [\(section 3.5\)](#)

If there is a USB microphone plugged in to the DVR, a microphone icon will also appear. By default, the audio from the USB microphone will not be recorded and the microphone icon will be gray. Clicking and holding on the microphone icon will begin mixing the USB audio. Each channel is controlled separately and the Push to Talk button for each channel is different. The '1' key on a keyboard will enable USB audio recording on channel 1, the '2' key on channel 2 etc. The '0' key enables recording on all 4 channels.

2.5 Edit Mode

The button at the bottom right of each channel will enable edit mode for the channel that you click. Edit Mode allows you to create, edit, and move notes, device data, and HUD elements that will appear on screen and in the recordings.



2.5.1 Notes

You can have up to 40 notes at a time split between the 8 pages. You may set each camera channel to have a different page, or duplicate pages between channels. The Notes can be controlled in 2 main ways.

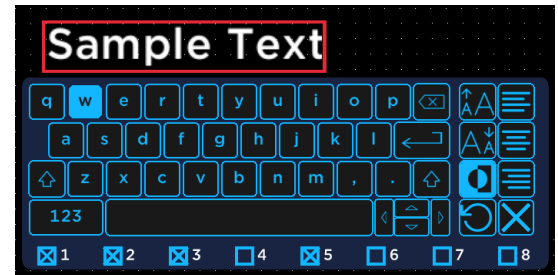
Mouse Controls:

To add a text box, click the “ADD TEXT” button, then left click on the screen where you would like to add the text box. The onscreen keyboard will then appear. You may click on the keys, or type with an external keyboard to add text to the text box. When you are finished, Right click the mouse to close the keyboard. You may also move a textbox by holding the left mouse button over a text box and dragging it to the desired position. While a textbox is selected, you may also click on the “DELETE TEXT” button to delete the text box. You can change which pages the text box will appear on by checking or unchecking the boxes on the right side of the keyboard. You may also move the keyboard by clicking on the arrow icon in the bottom right and dragging the keyboard.



Front Panel controls:

To add a text box with only the front panel controls, you press the UP or DOWN buttons to cycle through the text boxes and buttons until the “ADD TEXT” button is highlighted (the entire button is blue) then press the SELECT button. A new textbox will be generated, and the onscreen keyboard will appear. You then use the front panel keys to highlight the key you want, and press enter to add it to the text box. When finished, highlight the X in the bottom right, then hit enter again. To edit a text box, use the UP or DOWN buttons to cycle through the text boxes (you can tell a box is selected by the box around the text turning red) then, press the select key to re-open the onscreen keyboard. To move a text box, cycle through like you would above, then press the LEFT or RIGHT buttons. This will change the the box around the text to green. Press SELECT to begin moving, then use the arrow buttons to move the box. Press the BACK button to stop moving the box. You can change which pages the text box will appear on by checking or unchecking the boxes on the bottom of the keyboard.



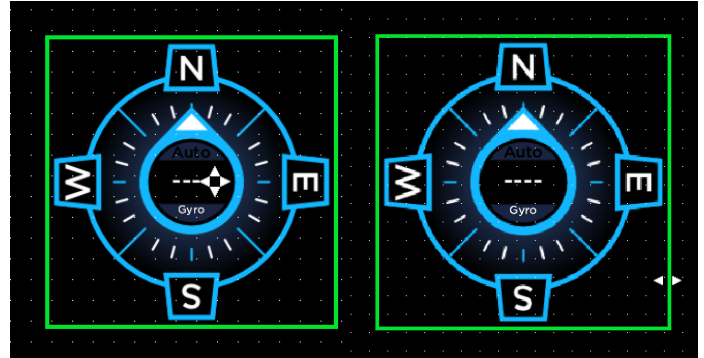
The onscreen keyboard has some additional functionality. The keys on the right side of the keyboard increase/decrease font size, Justify the text left/center/right, invert the text color, or rotate the text box. The small blue check boxes with the numbers next to them control which page(s) the current text box will appear on.

2.5.2 HUD Elements

There are a number of Heads Up Display (HUD) Elements that can be toggled on or off in the HUD Options Menu ([Section 3.1](#)). In Edit mode, you can move and resize these elements in two main ways.

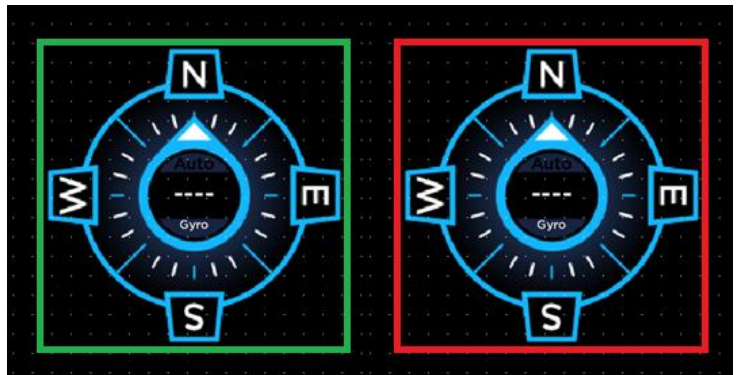
Mouse Controls:

HUD elements can be moved and resized with the mouse. To move an element, click and hold on the element near the center when there is a four way arrow over the element (left image), then drag the element to the desired position. To resize an element, click and hold on an element towards the edge, when there is a two way arrow (right image), then drag to the desired size.



Front Panel Controls:

HUD elements can only be moved, not resized when using the buttons. You can cycle through the active HUD elements by pressing the up and down keys on the front panel of the DVR the element highlighted will have a green square around it (left image). You then need to select the element by pressing the SELECT button. The selected element will have a red square around it (right image). You can then move the elements with the arrow keys on the front panel. When done, press SELECT again to deselect the element.



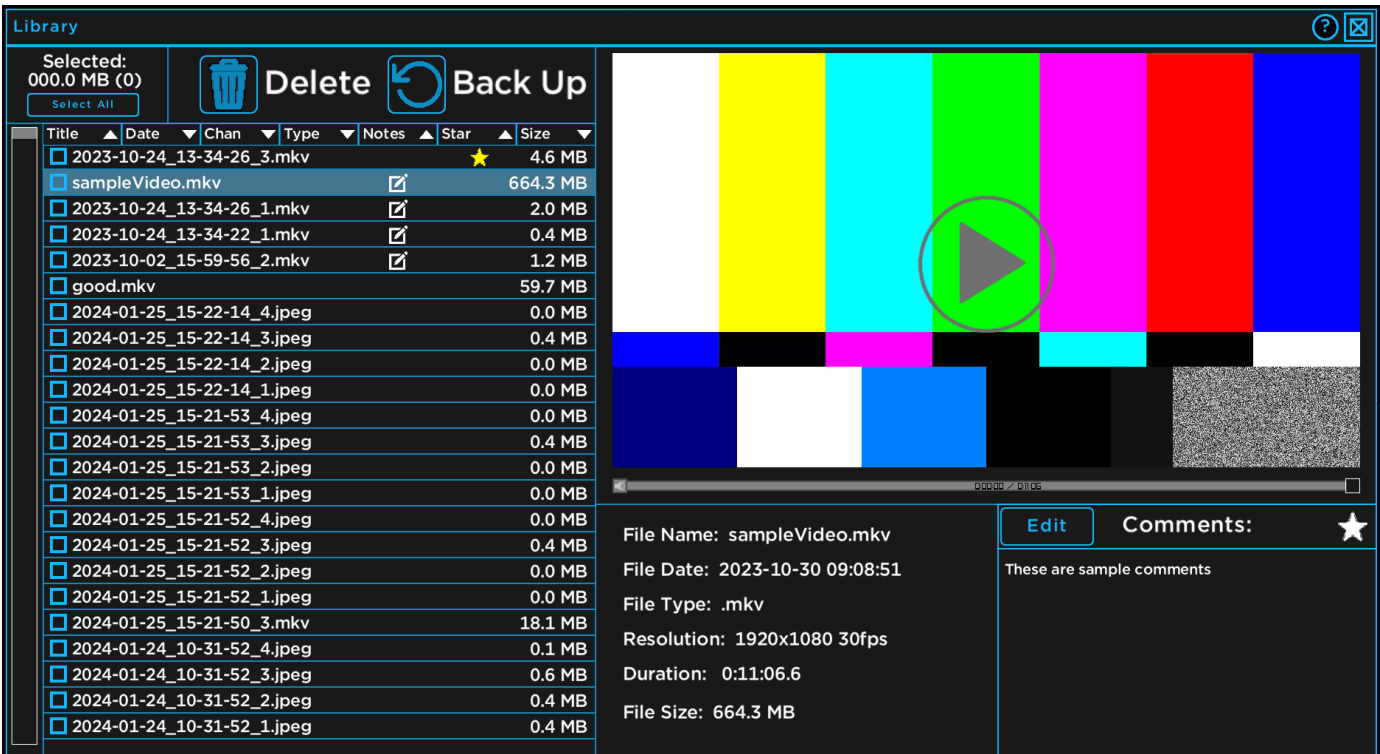
3 Menus

The top menus are as follows: Library, Diagnostics, HUD Options, DVR Options, and Update Device.

3.1 Library



The Library Menu allows you to manage and view videos and images on the internal hard drive.



The left side of the Library Menu shows the name and size of all videos and photos. If any photo or video has comments or highlights, there will also be an icon on the line of the video (note icon for notes, and a star icon for highlights). You can scroll through the photos and videos either by scrolling with a mouse, or by clicking and dragging the scroll bar on the left side of the screen. You can sort the photos and videos by clicking on the small bar at the top of the menu. There are several ways to sort the photos and videos including:

Title: The name of the photo or video.

Date: The date the photo or video was created.

Channel: The channel the photo or video was recorded from.

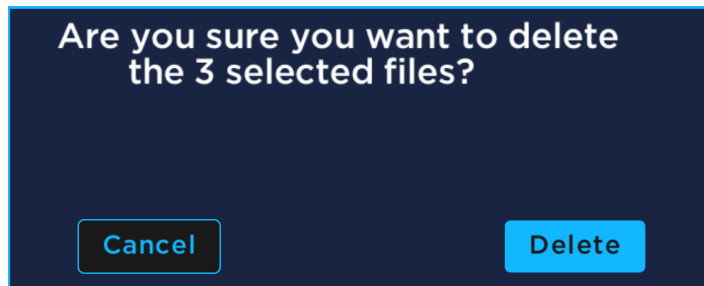
Type: Either mkv for videos or jpeg for photos

Notes: Whether or not the photo or video has notes.

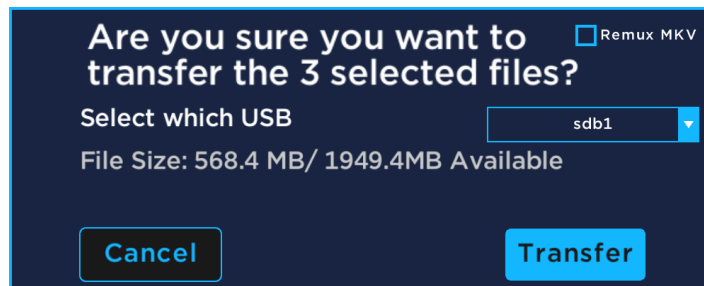
Star: Whether or not the photo or video has highlights.

Size: The size of the photo or video on the hard drive.

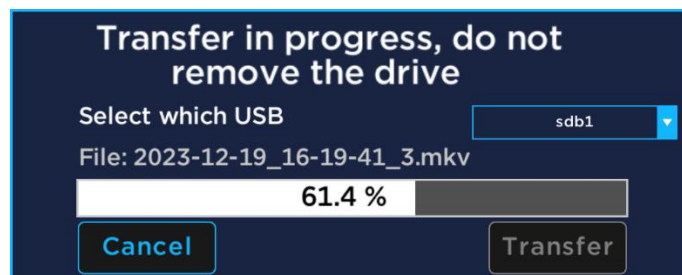
You can select multiple files by clicking on the checkbox next to each file you would like to select. The total number of files selected, and their cumulative size is displayed in the top left corner of the Library Menu. You can also select all files using the “Select All” button. You can then press the ‘Delete’ button at the top of the screen by clicking on the trashcan icon to delete the selected files or press the ‘Backup’ button by clicking on the circular arrow icon to copy the selected files to a USB storage device that is plugged in to the DVR. Both actions will display popups asking you to confirm your selections.



For the delete popup, clicking the ‘Delete’ button will permanently delete the selected files from the internal hard drive. These files are **NOT** recoverable. Clicking the cancel button will close the popup window.



For the transfer popup, there are a few more options. If more than one USB drive is detected, there will be a dropdown menu asking you to select which USB you would like to transfer the files to. There is also a check box labeled ‘Remux MKV’. This option, if enabled, will have the DVR do some additional processing to the videos during the transfer process. This is usually not necessary and is significantly slower but may resolve playback issues on the computer. Clicking the transfer button will open a new popup window that will show the transfer progress. Clicking the cancel button will close the popup window.



The right side of the Library Menu shows both the media preview and media information. The preview section is on the top right side of the screen, and it behaves differently for videos and photos.

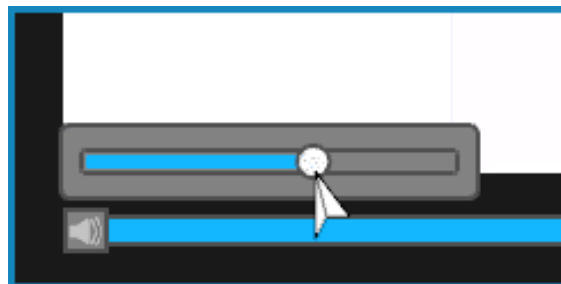
For photos, it simply displays the photo. You can toggle between the default view and a full screen view by double clicking on the image preview.

For videos, there is a video player. You can play and pause the video by clicking one time anywhere on the preview. You can also toggle between the default view and a full screen view by double clicking on the video preview. Just below the preview there is a volume slider, progress bar, and full screen button.

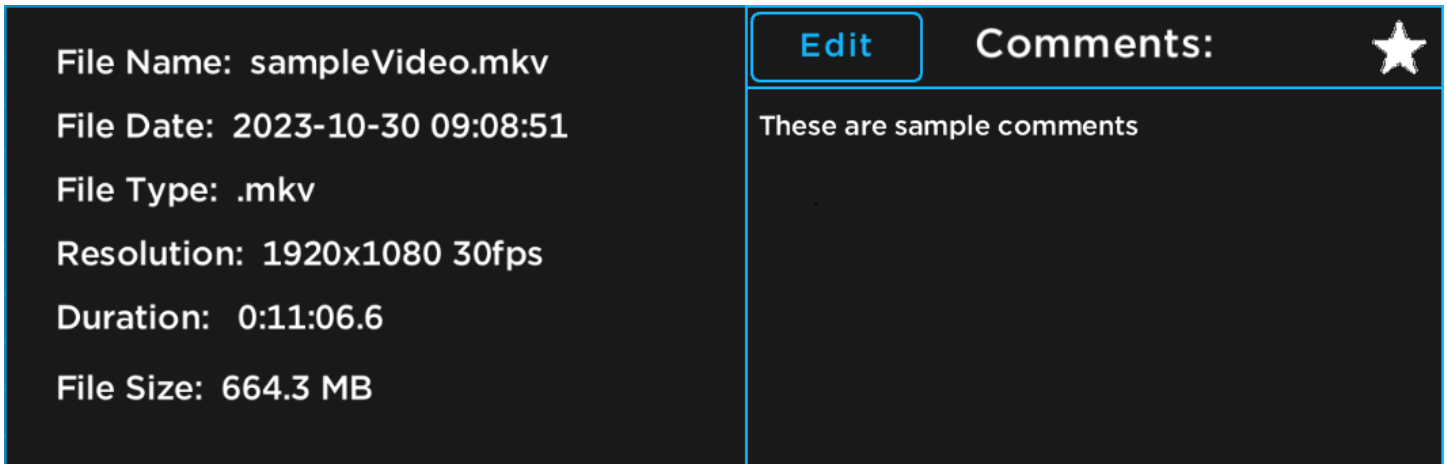
The progress bar shows the duration of the video and current position in the playback. It can also be used to seek to another point in the video. Mousing over the progress bar will show a small preview of the video at the new timestamp. Clicking will then jump to that point in the playback.



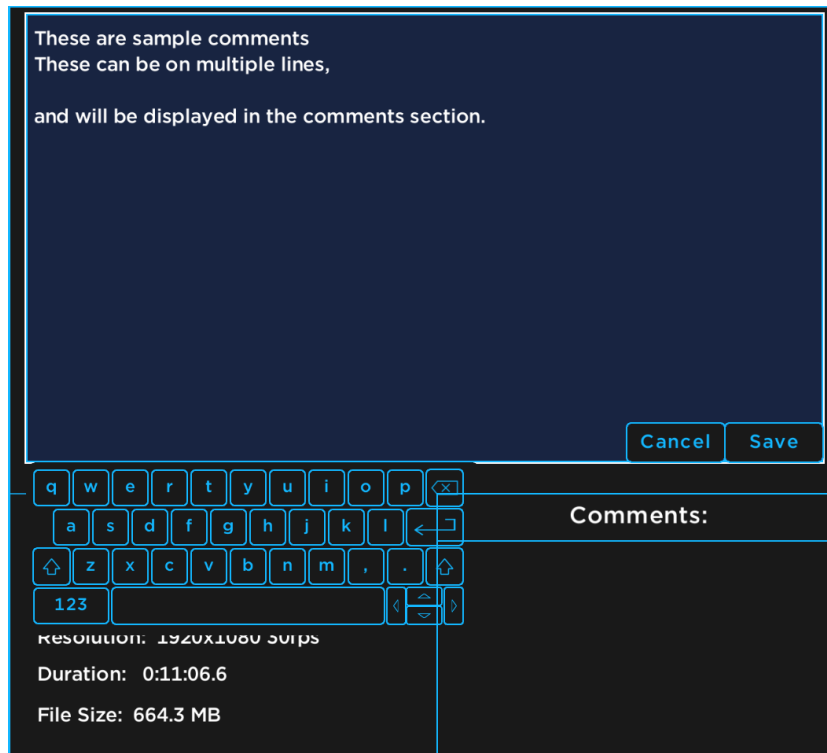
The volume slider is hidden by default but can be opened by mousing over the volume icon on the left side of the progress bar. Once open, click and drag on the slider to adjust the output volume.



Beneath the preview is the media information. The left side of the information section shows the basic information about the photo or video including the name of the file, the time and date the file was created, the size of the file on the disk and the resolution of the file. The right side of the information section will display any comments that have been added to the file, as well as allow you to edit the comments.



To add comments, click on the “Add” button at the top of the comments section. If there are already comments on the media, the button will instead say “Edit”. To delete or modify the comments click the “Edit” button. This will open a large textbox where the media preview was.



You can type with a USB keyboard or using the on-screen keyboard. The comments can be on multiple lines and can have up to 1000 characters. When you are done, you can click the ‘Save’ button at the bottom of the text entry box to save the comments to the media file, or ‘Cancel’ to discard the changes to the comments. These comments will be viewable both on the DVR, and once exported.

3.2 Diagnostics Menu



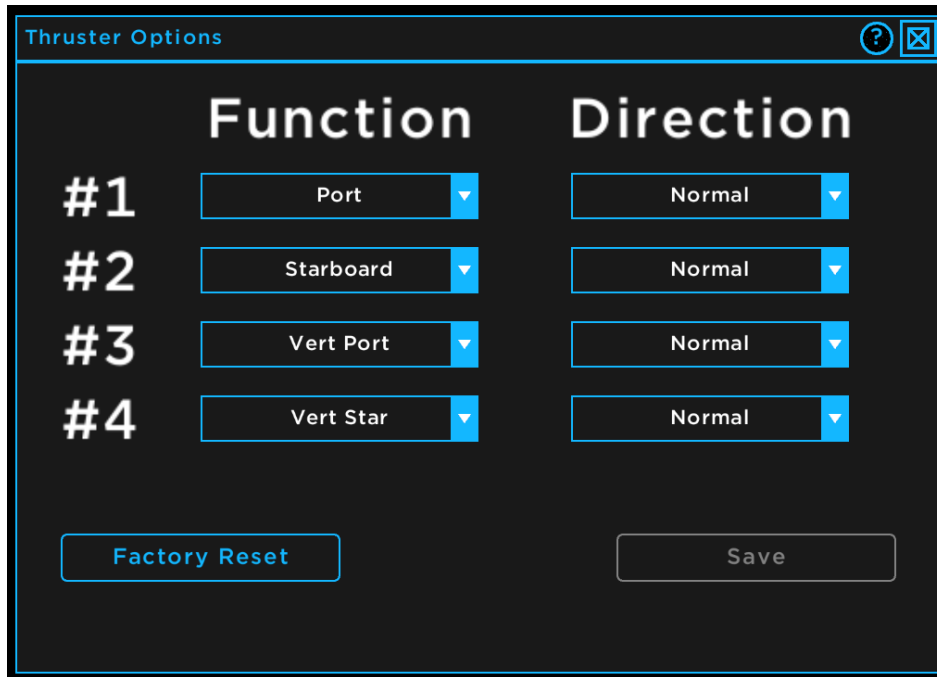
The Diagnostic Menu is the hub for all ROV information and configuration. It will show the most relevant information about the vehicle and it allows you to access the ROV submenus by clicking on the icons in the top left of each section. It is split into five sections: Thrusters, Communications, Spare Lines, Power, Video Channels, and Sensors.

System Diagnostic ? [X]

<p>Thrusters</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Port</td><td><input type="text"/></td></tr> <tr><td>Starboard</td><td><input type="text"/></td></tr> <tr><td>Vert Port</td><td><input type="text"/></td></tr> <tr><td>Vert Star</td><td><input type="text"/></td></tr> </table>	Port	<input type="text"/>	Starboard	<input type="text"/>	Vert Port	<input type="text"/>	Vert Star	<input type="text"/>	<p>Communications</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Hand Cont.</td><td>1 Found</td><td>Comm</td><td>1 Found</td></tr> <tr><td>Aux Cont.</td><td>0 Found</td><td>Mux</td><td>1 Found</td></tr> <tr><td>Demux</td><td>1 Found</td><td>Lamps</td><td>1 Found</td></tr> <tr><td>GFI</td><td>1 Found</td><td>Cameras</td><td>1 Found</td></tr> <tr><td></td><td></td><td>Manipulators</td><td>0 Found</td></tr> <tr><td></td><td></td><td>Nav</td><td>1 Found</td></tr> <tr><td></td><td></td><td>Alt</td><td>0 Found</td></tr> <tr><td></td><td></td><td>Pwm</td><td>1 Found</td></tr> <tr><td></td><td></td><td>DVL</td><td>0 Found</td></tr> </table>	Hand Cont.	1 Found	Comm	1 Found	Aux Cont.	0 Found	Mux	1 Found	Demux	1 Found	Lamps	1 Found	GFI	1 Found	Cameras	1 Found			Manipulators	0 Found			Nav	1 Found			Alt	0 Found			Pwm	1 Found			DVL	0 Found	<p>Spare Lines</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td colspan="2">Spare Line #1</td></tr> <tr><td>USB</td><td>Port 1</td></tr> <tr><td colspan="2">Spare Line #2</td></tr> <tr><td>DB9</td><td>Port 3</td></tr> <tr><td>Telem.</td><td>OFF</td></tr> <tr><td>GPS In</td><td>OFF</td></tr> </table>	Spare Line #1		USB	Port 1	Spare Line #2		DB9	Port 3	Telem.	OFF	GPS In	OFF
Port	<input type="text"/>																																																									
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Vert Star	<input type="text"/>																																																									
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DB9	Port 3																																																									
Telem.	OFF																																																									
GPS In	OFF																																																									
<p>Power</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Top Voltage</td><td>292.65V</td></tr> <tr><td>Top Amps</td><td>0.07A</td></tr> <tr><td>Rov Voltage</td><td>293.40V</td></tr> <tr><td>HV Bias</td><td>0%</td></tr> </table>	Top Voltage	292.65V	Top Amps	0.07A	Rov Voltage	293.40V	HV Bias	0%	<p>Video Channels</p> <p>HD <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p> <p>1 2 3 4 5 6 7 8</p> <p>Light Control</p> <p>0%</p> <p>Fault History</p> <p><input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/></p> <p>Last Power Up ▲</p>	<p>Sensors</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Compass</td><td>314.1 °</td></tr> <tr><td>Depth</td><td>0.0 Ft</td></tr> <tr><td>Depth Rating</td><td>725 psi</td></tr> <tr><td>Altimeter</td><td>-----</td></tr> </table> <p>Dump Configuration <input type="button" value="↗"/></p>	Compass	314.1 °	Depth	0.0 Ft	Depth Rating	725 psi	Altimeter	-----																																								
Top Voltage	292.65V																																																									
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Depth	0.0 Ft																																																									
Depth Rating	725 psi																																																									
Altimeter	-----																																																									

3.2.1 Thruster Options

The top left section of the Diagnostics Menu is for the thrusters. Each bar in the Thruster Section represents one thruster. The bars are in order of the ports, so port one is the top bar, bar two is next etc. The function assigned to the port is displayed on the left side of the bar and the bar will show the control power of the thruster. To change the mapping of the thrusters, click on the icon in the top left of the Thruster section to open the Thruster Options menu.



In this menu, each row corresponds to a single thruster. The left shows the physical port number, the middle is the function assigned to that port, and the left shows the direction of the thruster. The number of thruster ports will automatically be detected based on the model of the vehicle connected. To change the function assigned to a port, click on the dropdown menu that corresponds to the port you want to change, then click on the new function. To change the direction, click on the dropdown menu that corresponds to the port you wish to change, then select "Normal" or "Reverse". After any change, you have to press the save button at the bottom right of the screen to sync the thruster map to the vehicle. You also can only change a single thruster at a time, and save after each.

There is also a "Factory Reset" button. Pressing this button will open a confirmation window asking if you would like to set all thruster back the factory default. If you confirm, all thrusters will be set to a default value based on the model of the vehicle that is connected to the DVR.

3.2.2 Communications

The top middle section of the Diagnostics menu is the Communications Section. This section will show how many of each device are detected in the ROV system. This includes devices in the ROV, the console, and the power supply. To see more information about the connected devices in the Devices Screen, click the icon in the top left of the Communications section.

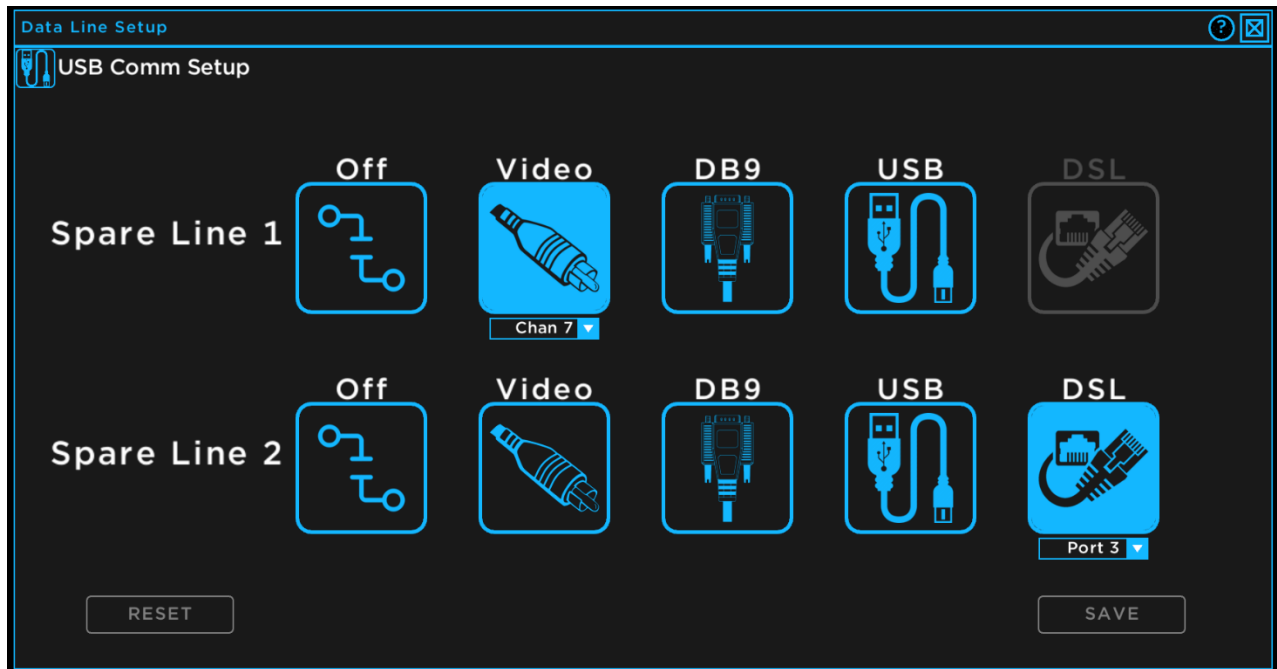
Nav Module	Update		Nav Module		<input type="checkbox"/> Config	<input type="checkbox"/> Raw	<input type="checkbox"/> Turbo
Port	Version:	1.2.9	Firmware:	0x00940129			
Starboard	Analog:	0.003 V	Hardware:	0xFFFFFFFF			
Vert Port	Depth:	0.1	Assembly:	0xFFFFFFFF			
Vert Star	Rating:	725 PSI	Serial:	0xFFFFFFFF			
Off	Compass:	312.1 °	0x14:	0x00000000			
Off	Pitch:	-0.1	0x15:	0x00000000			
Camera 4	Roll:	-0.1	0x16:	0x00000000			
Comm Board	Gyro:	312.1	0x17:	0x00000000			
Power Supply GFI	CP1:	0.025 V	0x18:	0x00000000			
Hand Controller	CP2:	0.021 V	0x19:	0x00000000			
Mux Board	WaterTemp:	19.4 C	0x1A:	0x00000000			
Demux Board	0x0B:	0x0000	0x1B:	0x00000000			
Altimeter	0x0C:	0x0000	0x1C:	0x00000000			
PWM Comm	Voltage:	15.875 V	Commit:	0x00000000			
Lamp 1	0x0E:	0x0000	0x1E:	0x00000000			
DVR Info	0x0F:	0x0000	Command32:	0x00000000			
GPS Info							
Hand Controller (other)							

The left side of the devices screen show the names of all connected devices. To view the data for a device, click on the name in the list. The selected device will be highlighted in blue, and displayed at the top of the menu. Each device has its own set of variables that will be displayed on the right part of the screen. There are a three checkboxes on the top right of the screen. The “Config” checkbox will show the request configuration of the specific variable instead of the values. The “Raw” checkbox will show the raw hexadecimal values instead of the correct units. Both of these checkboxes should not be necessary in normal operation. The “Turbo” checkbox will increase the refresh rates of all of the variables for the selected device.

There is also an “Update” button. This button allows you to update a device in the ROV from the DVR. See the Update Options section for details ([Section 3.5.1](#))

3.2.3 Spare Line Options

The top right of the Diagnostic Menu shows the spare line configuration and the USB COM devices. Your ROV has two spare lines that can be configured for sonars, additional cameras, USBL's and other devices. The Spare Line Section also shows whether a USB GPS is connected, and whether the USB data out is configured. To edit the spare lines and USB communications, click on the icon in the top left of the Spare Lines Section.

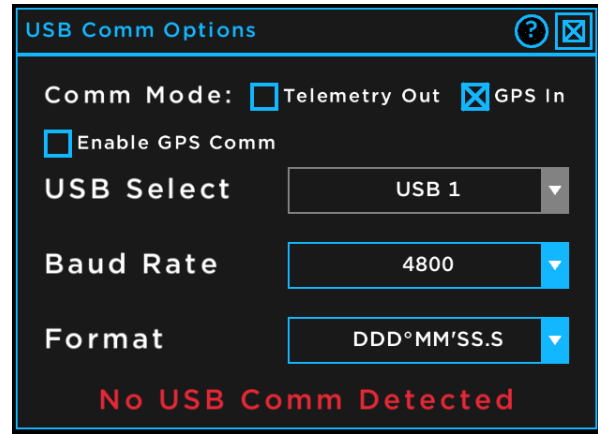
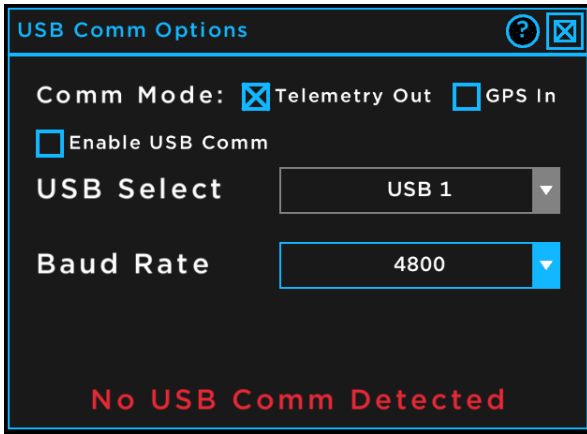


To change the spare lines, click on the icon that corresponds to the function that you want. For example, if you have an ethernet based sonar plugged in to the spare line 2 port, click on the DSL icon on the spare line 2 row, then click the save button. These changes are saved in the vehicle, and only need to be configured once for each ROV.

Any change must be saved by clicking the 'SAVE' button to affect the vehicle.

There is a 'RESET' button on the bottom right of the screen. Pressing this button will clear the changes that you have selected and sync the DVR menu with the actual spare line configuration that is saved in the vehicle.

There is also a USB Comm Setup icon on the top left of the Spare Line Options Menu. This button allows you to configure the DVR for a USB GPS, or to output the telemetry of the vehicle via USB.



The top of the menu allows you to toggle between the configuration of the GPS or telemetry. For both menus, the bottom of the screen will display the number of external COM ports detected on the DVR. Only active comm converters and GPS devices will be detected. Both menus also have a dropdown box that allows you to select which USB (or COM device) you want to use for either GPS in or telemetry out, a Baud Rate drop down menu that allows you to select the baud rate from a list of commonly used rates, and an enable checkbox that begins the communications.

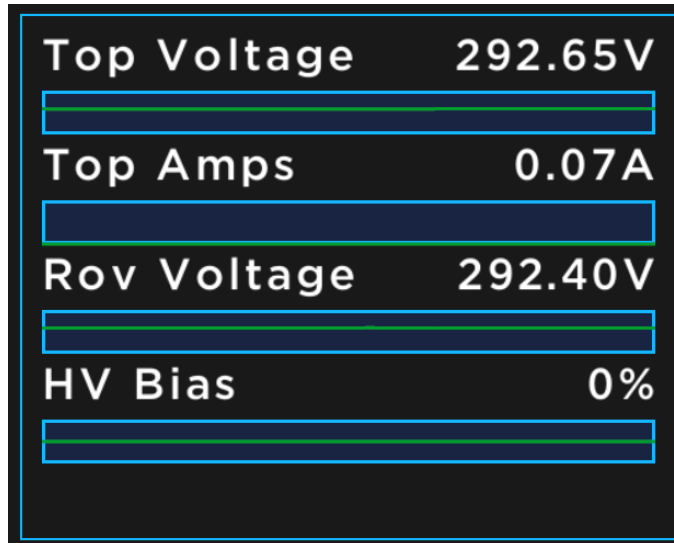
For the telemetry configuration (left image), enabling the telemetry out will immediately begin outputting the vehicle heading, altitude, depth, pitch and roll. All data is output in standard NMEA 0813 sentences, and the baud rate is selectable. The sentences used are:

Heading:	\$--HDM	Altitude:	\$PADBT	Depth:	\$--DBT	Pitch and Roll:	\$--TRO
----------	---------	-----------	---------	--------	---------	-----------------	---------

There is an additional dropdown menu in the GPS options that allows you to select the output format of the USB GPS. This is the format that will be displayed when the GPS data is enabled in the HUD Options Menu ([Section 3.3](#)). The selected baud rate in the GPS menu must match the output baud rate of the USB GPS that is being used. The DVR can only accept the following NMEA 0813 sentences: GPRMC, GPGLL, and GPGGA. It will extract the latitude, longitude, time, heading, and speed from the GPS.

3.2.4 Power Section

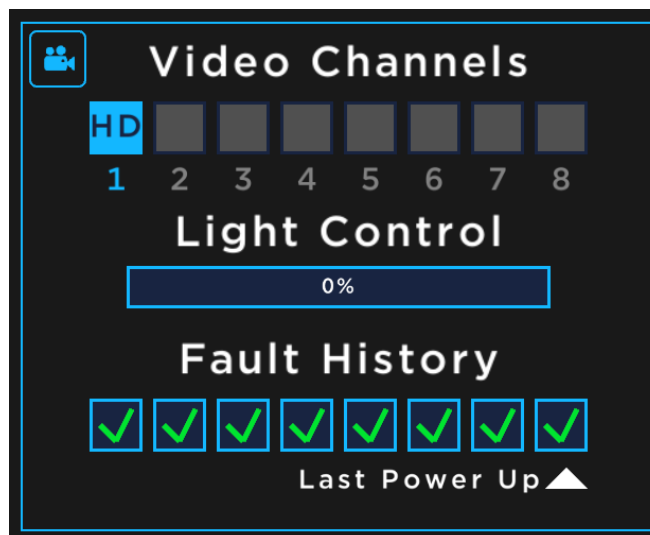
The bottom left section of the Diagnostic Menu is the Power Section. The power Section shows the topside voltage (voltage from the console), the topside current, the ROV voltage, and the high voltage bias. Each of these are displayed on a bar graph that shows the last 20 seconds of data.



Each value has a normal operational range. If the value is within this range, the bar will be green. If the value is not within this range, the bar will be red. A bar in the red may indicate an issue with the ROV system. You should [contact Outland Technology](#) if any of the power values are outside the normal operational range.

3.2.5 Video Channel Options

The bottom middle section of the Diagnostic Menu shows the active video channels, light control, and fault history.

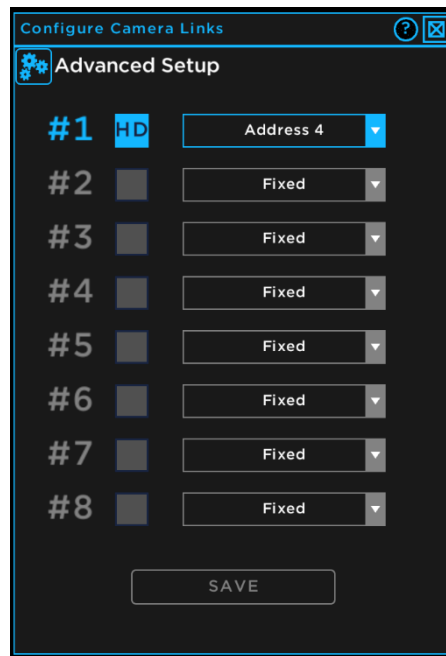


The video channels are at the top of this section. There are a total of 8 possible video channels on the ROV, and this section will display whether a video signal is detected on each channel. If a video signal is detected by the ROV, the box corresponding to the video channel will be light blue and will have either “HD” for a high-definition signal, or “SD” for a standard definition video in the center of the box. If no video signal is detected the box will be grayed out.

The center of this section shows the light control value. If the vehicle’s lights are on, the brightness will be displayed in both a percentage, and by a bar graph.

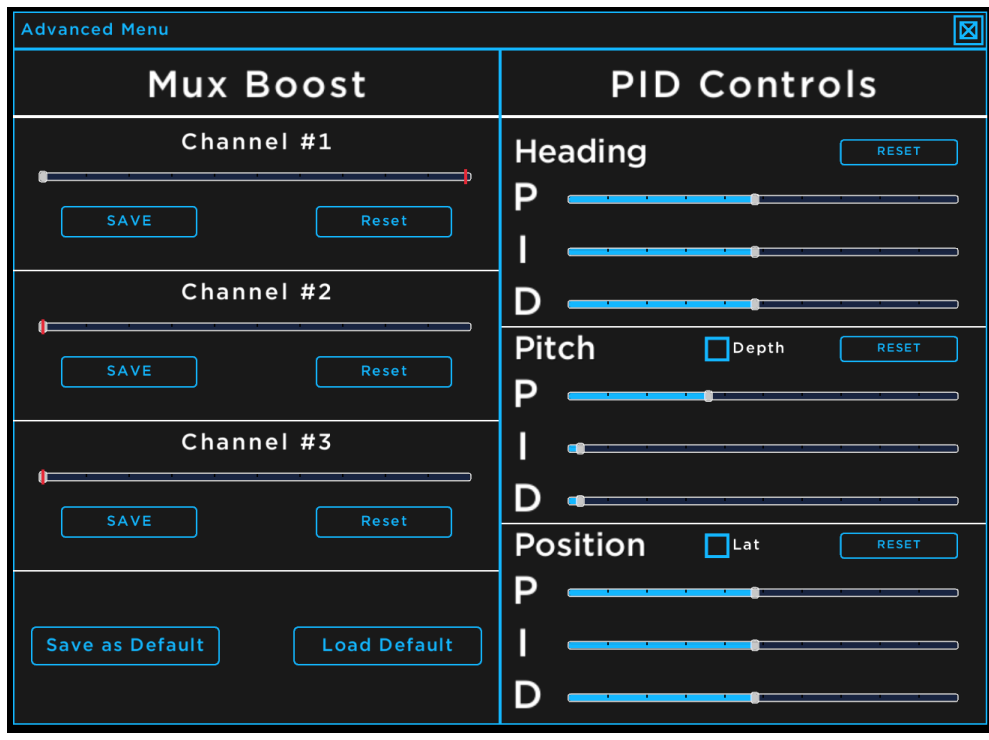
The bottom of this section is the fault history. If a high voltage fault is detected by the system, it will be displayed here. This section displays the current and the last 7 power ups. If a high voltage fault is detected in any of the last 8 power ups, there will be a red symbol in one of the boxes. The boxes are in reverse chronological order, with the most recent power up being on the far right. If the high voltage fault was detected on the positive side, a red ‘+’ symbol will be in the box, and if the fault was on the negative side, a red ‘-’ will be in the box.

There is an icon in the top left of this section that allows you to configure the camera links for controllable cameras.



The camera links only need to be configured for cameras that can pan and tilt. Each row in this menu corresponds to a video channel (like the above menu) and if a video signal is detected on that channel, a dropdown menu will be active. This dropdown menu allows you to select a control channel to link to. If two cameras are on the same control channel, they will move together otherwise only the cameras on the active control channel will move. You can change the active control channel by pressing the ‘Camera Select’ button on the hand controller.

The icon on the top left of the camera link menu opens the Advanced Setup Menu. The advanced setup menu is split into two sections.



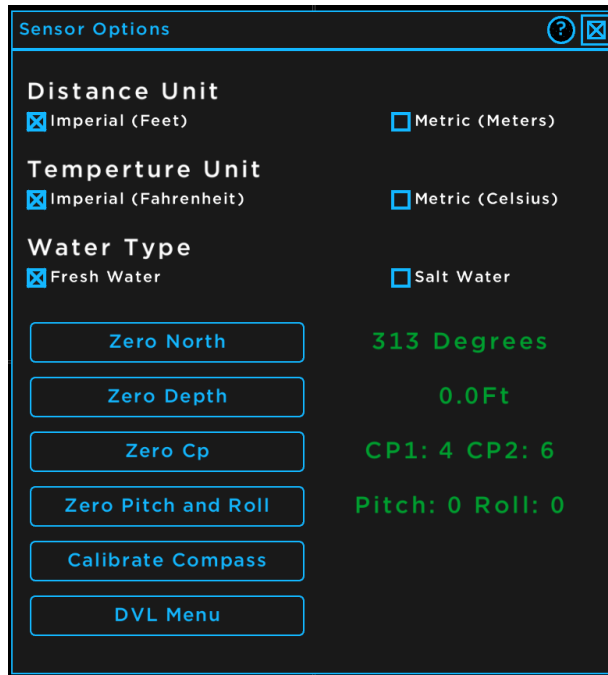
The left half of the Advanced Setup Menu is for the mux setup. This section allows you to adjust the video boost in the vehicle. There are three sliders for the mux channels that correspond to the video channels on the DVR (channel #1 is top left, #2 is top right, and #3 is bottom left). The current boost for each channel is displayed with a red line on the slider and can be adjusted with the slider value. The boost is only changed when you press the 'SAVE' button. Each channel also has a 'Reset' button that will set all boost values back to the factory default. The 'Save as Default' button will allow you to store the current boost values for loading later with the 'Load Default' button.

The right side of the Advanced Setup Menu is the PID Controls Menu. These adjust the automatic controls of the vehicle and should not be adjusted in normal operation. **Warning:** Changing these values may result in erratic behavior of the vehicle when the autos are enabled. Each set of values has a 'RESET' button to restore the factory values.

3.2.6 Sensors Options

The bottom right of the Diagnostic Menu is the Sensor Options Section. This section shows some of the most common sensor values including the compass heading, depth, depth rating, and the altitude.

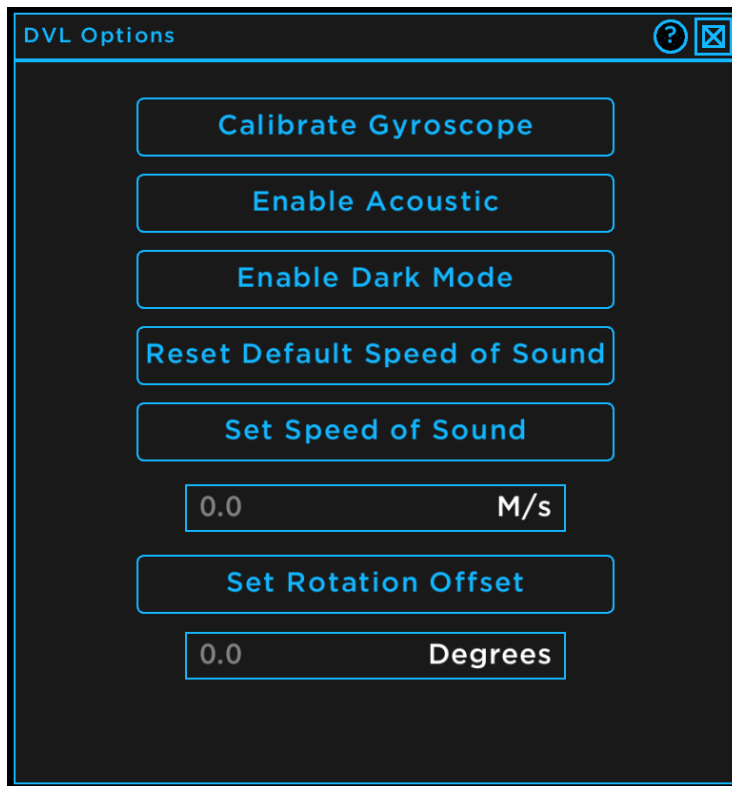
There is a dump configuration button in the bottom right of this section. If a USB drive is detected, the DVR will write a file to it with the current configuration parameters of the vehicle. This could be useful to share with Outland Technology for diagnostic reasons. There is also an icon in the top left of this section that opens the Sensor Options Menu.



The Sensor Options Menu allows you to change the units of the displayed depth and temperature, and allow you to change the salinity settings of the water for depth calculations. The 'Zero Cp' button allows you to calibrate a [CP Probe](#) if you have on connected to the ROV

It also allows you to calibrate the compass in the ROV. See the [Compass Calibration Guide](#) for more information on calibrating the compass. You can find the [Compass Calibration Guide](#) on the [Resources Page](#) of Outland's website. The guide is labeled ROV-3000 Troubleshooting Guide and can be used for the ROV-3000 or ROV-500 compass calibration.

If a DVL is detected, clicking on the 'DVL Menu' button to open the DVL Options Menu.



There are 6 buttons that do the following:

Calibrate Gyroscope: Calibrates the DVL gyroscope to reduce drifting. Make sure to set the ROV on solid unmoving ground before pressing this button.

Enable/Disable Acoustic: Toggles the DVL on or off. DVL should have acoustics disabled if powered on out of water for extended time periods.

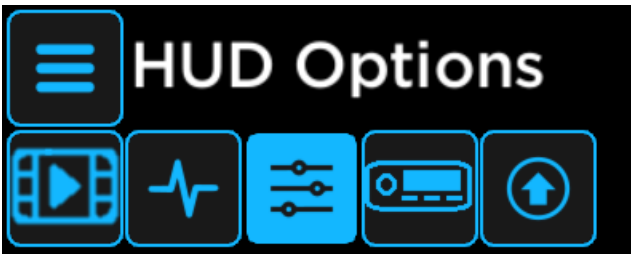
Enable/Disable Dark Mode: Toggles the LED on or off on the DVL.

Reset Default Speed of Sound: Sets the speed of sound in water to 1500 m/s.

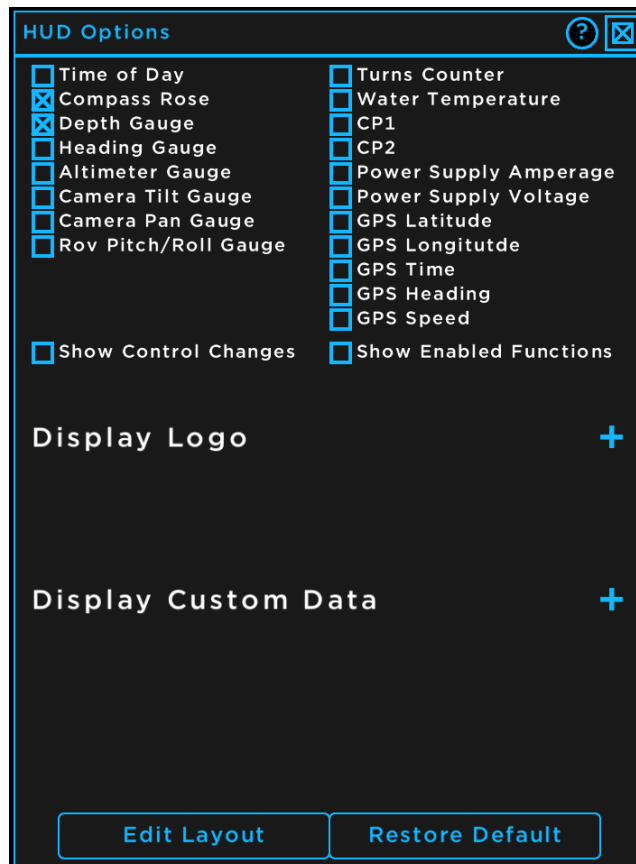
Set Speed of Sound: Sets the speed of sound in water to the value in the text box below the button.

Set Rotation Offset: Sets the rotation offset in the DVL to the value in the text box below. This value must be set to reflect the mounting angle of the DVL. Zero degrees is where the wire on the DVL is pointing to the rear of the vehicle.

3.3 HUD Options Menu



The HUD Options menu allows you to select which HUD elements you want to display on screen, display a logo or other picture, and display custom device data on the overlay. The HUD elements will only appear on channels that have the overlay enabled in the Camera Options Menu ([section 3.4.1](#)).



3.1.1 Heads Up Display (HUD) Elements

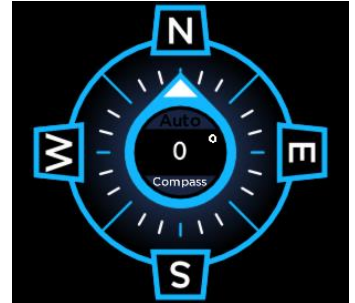
The HUD elements are represented by the check boxes at the top half of the screen. They are divided in to two categories, custom drawn elements in the left column, and text elements on the right. Each element will need to be enabled or disabled independently. There will now be a brief explanation of each of the elements.

Time of Day:

The Time of Day element displays the system time and date. The DVR has an internal real time clock. You can set the time and date of this clock through the Time and Date Options ([section 3.3](#)) You can also change the font size in that menu.

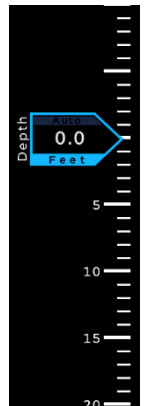
Compass Rose:

The Compass Rose displays the heading of the ROV both with a text reading in degrees, and by rotating the compass. Normally, the entire compass will rotate with the heading, but if you right click on the compass, you can lock it so that North will always be up, and the center will rotate instead.



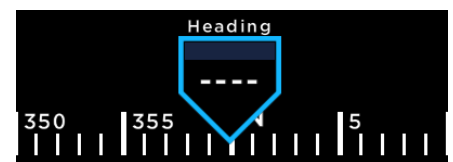
Depth Gauge:

The Depth Gauge displays the depth of the vehicle with both a text reading in feet or meters (toggleable in the Sensor Options Menu ([Section 3.4.7](#)), and by moving the hash marks on the side.



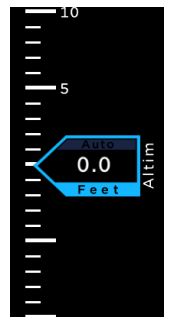
Heading Gauge:

The Heading Gauge will show the heading of the vehicle both with a text reading in degrees, and by moving the pointer to the heading in degrees.



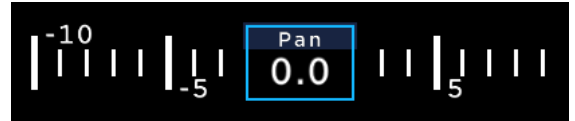
Altimeter:

The Altimeter Gauge will show the distance from the floor with both a text reading in feet or meters. Units toggleable in the Sensor Options Menu ([Section 3.4.7](#)). and by moving the hash marks on the side. The Altimeter gauge will work both with an altimeter or a [DVL](#).



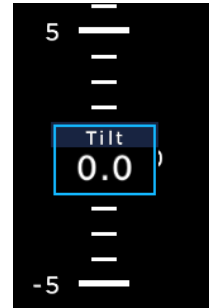
Camera Pan:

The Camera Pan Gauge will show the current horizontal angle of the active camera in degrees if the camera is able to move horizontally.



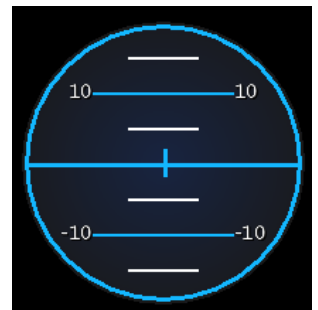
Camera Tilt:

The Camera Tilt Gauge will show the current vertical angle of the active camera in degrees if the camera is able to move vertically.



Pitch Roll Gauge:

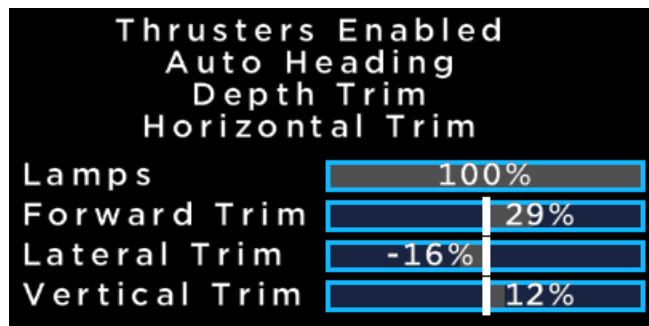
The Pitch Roll Gauge shows the pitch and roll of the vehicle. The solid blue line in the center of the gauge represents the horizon. The gauge itself will move in order to keep the center line at the horizon in the video. You can instead use a model of the vehicle if you download the model from the ROV Resources from the [DVR product page](#).



The right half of this section is for the Text Elements. The Text Elements display the most commonly used device variables in a plain text format. The format of the GPS readout can be changed in the GPS Options Window ([section 3.4.7](#)) and the unit of the temperature can be changed in the Sensor Options window ([section 3.2](#))



There are two checkboxes at the bottom of the HUD Elements .

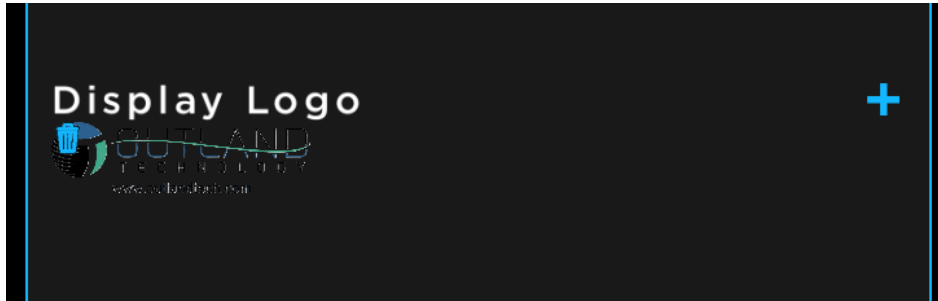


If the ‘Show Control Changes’ checkbox is enabled, the DVR will draw bars showing the trim or light intensity at the top center of the home screen whenever these values are changed with the hand controller.

If the ‘Show Enabled Functions’ checkbox is enabled, the DVR will draw text showing if thrusters are enabled, and if any auto function is enabled at the top center of the home screen.. This includes all trim functions, auto depth, and auto heading.

3.1.2 Display Logo

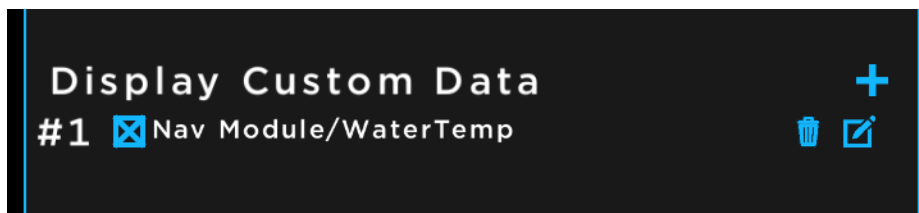
The Hud Options menu also allows you to display a custom logo on the overlay and in the recordings. To add a logo, first you must put it onto a USB flash drive as a PNG image. Then plug the drive into the DVR, go to the HUD Options Menu, then click the '+' next to the text "Display Logo". If no USB or no image is detected, text will pop up saying "No files found". If the USB drive and logo are detected, a menu will pop up with the names of all the images. Click on the name of the image that you wish to display and it will be added to the overlay and the HUD Options screen.



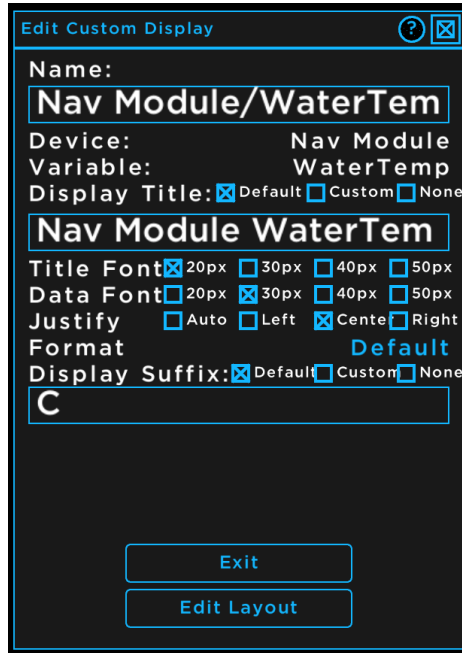
The image can then be moved and resized in Edit Mode ([Section 2.5](#)). To Delete an image, click on the trash icon on the top left of the logo that you would like to delete.

3.1.3 Display Custom Data

The Display Custom Data Section allows you to add or remove text elements from fields that are not in the most common list defined above. Each new element (field) will be on its own line.



To hide and unhide a custom field, check the checkbox next to the name of the field. To delete the field, click the trashcan icon to the right of the field. To edit the field, click on the edit icon on the far right of the field area. To add a new field, press the '+' button next to the "Display Custom Data" label. This will open a new menu asking you to select a device. Selecting a device will then open another list prompting you to select where the text element should get the data from. After selecting the device and field, another menu will open allowing you to change the title and format of the text element.



This menu allows you to set a custom title for the field by clicking custom on the "Display Title" line, then typing your custom title into the text box. You can also change the font size, format of the data and the suffix.

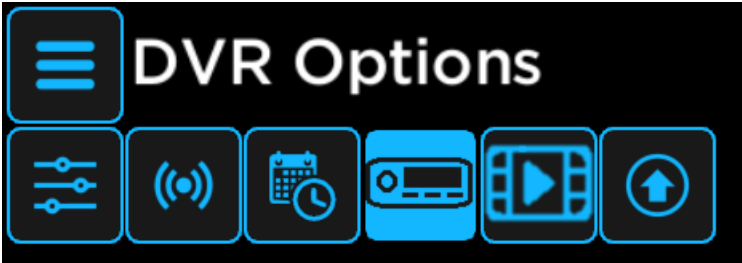
Clicking the 'Exit' button will close this menu and return to the HUD Options Menu with the new field added, and pressing the "Edit Layout" button will close this menu and enable Edit Mode ([Section 2.5](#))

3.1.4 Buttons

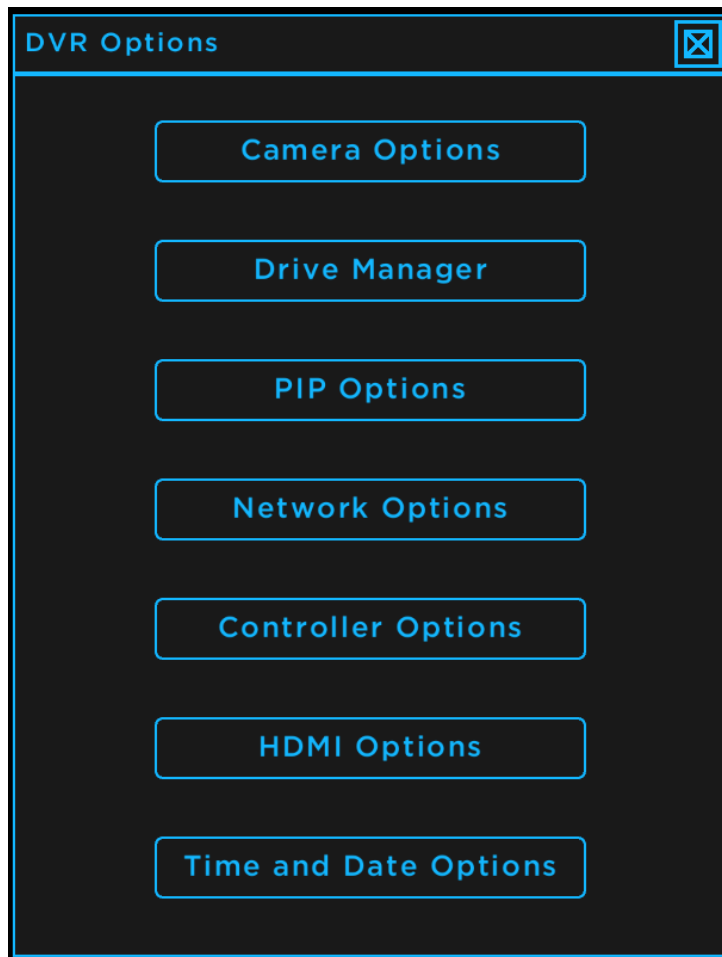
There are two buttons at the bottom of the Hud Options menu. The first is the "Edit Layout" button and the second is the "Restore Defaults" button. Both buttons will be disabled in quad mode. The "Edit Layout" button will enable Edit Mode. See [section 2.5](#) for details. The "Restore Default" button will set all elements back to their default values, including size, position, and whether or not they are enabled



3.4 DVR Options Menu

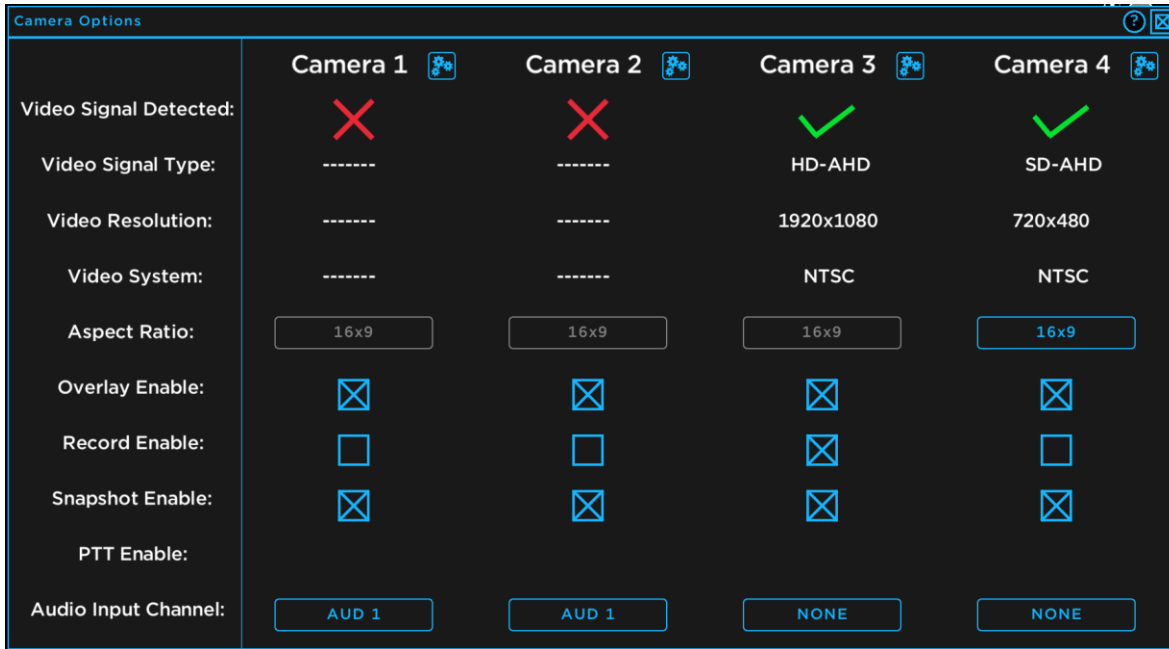


The DVR Options Menu is a collection of submenus including “Camera Options”, “Drive Manager”, “PIP Options”, “Network Options”, “Controller Options”, “HDMI Options”, and “Time and Date Options”. Each submenu will be described below.



3.4.1 Camera Options

The Camera Options Menu allows you to view and change camera and recording settings. The screen is divided into four columns, each reporting and controlling one channel. The top half of the screen shows the information about connected cameras, and the bottom half of the screen allows you to toggle recording settings. The gear icons at the top of the screen allow you to adjust the image settings of the camera.



Video Signal Detected: If there is a video signal detected, there will be a green check mark, else there will be a red 'X'

Video Signal Type: Either HD-AHD or SD-AHD for high definition or standard definition cameras respectively.

Video Resolution: Number of pixels in each frame

Video System: Either 'NTSC' for 30 frame per second sources, or 'PAL' for 25 frame per second sources.

Aspect Ratio: HD cameras will always be 16x9, and SD cameras can toggle between 4x3 or 16x9 by clicking on the "Aspect Ratio" button, allowing you to stretch SD videos to fill the screen.

Overlay Enable: Allows you to toggle the overlay on and off per channel. Disabling the overlay hides all HUD elements and notes on a channel both on the display and in the recording.

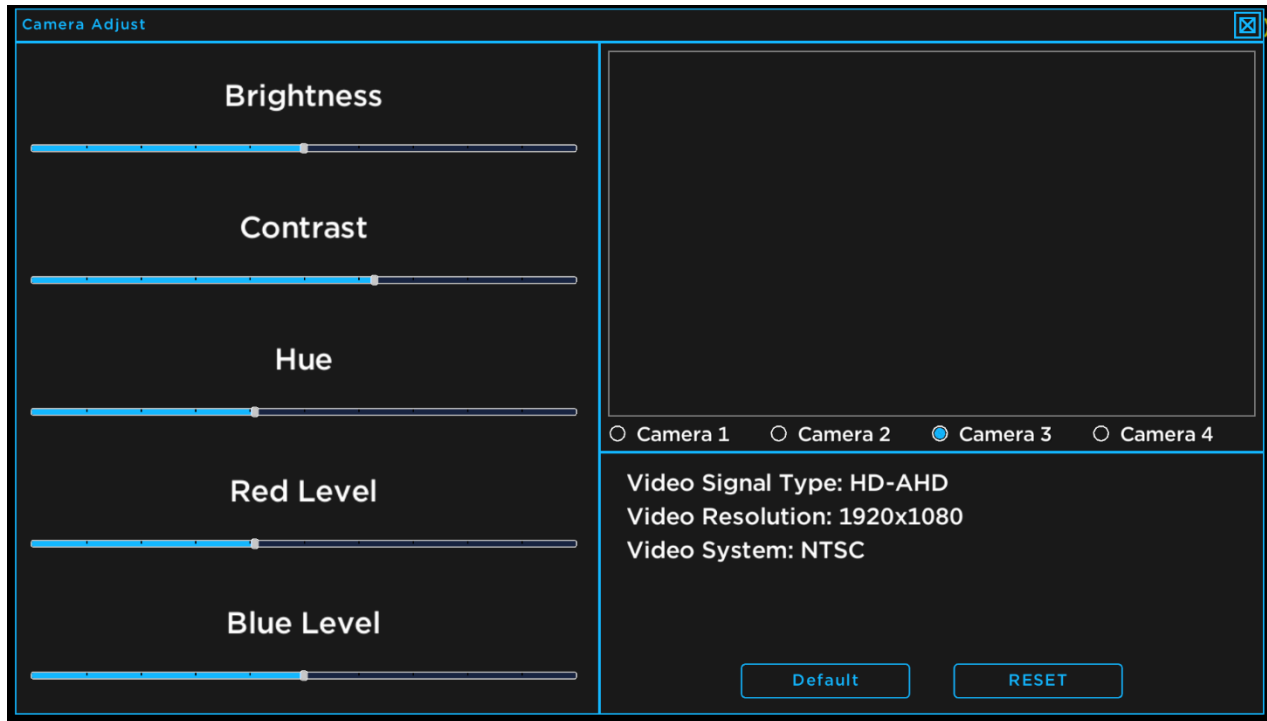
Record Enable: Allows you to toggle which channels are recorded when the 'REC' button is pressed on the front of the DVR.

Snapshot Enable: Allows you to toggle which channels take a screenshot when the 'PHOTO' button is pressed on the front of the DVR.

PTT Enable: If a USB microphone is detected, allows you to toggle whether the USB microphone audio is recorded.

Audio Input Channel: Allows you to select which analog audio channel you would like to record alongside the video for each channel.

Clicking the gear icon at the top of the screen next to a camera label will open the Camera Adjust Menu. This menu should not need to be used in normal operation. It has five sliders that can be used to adjust various camera settings.



You can toggle the channel that you are adjusting by clicking the circle under the image preview. Note that all cameras of the same format will be adjusted by the same amount if any settings are changed.

The sliders are:

Brightness: Increase or decrease the brightness of the image.

Contrast: Increase or decrease the contrast in the image.

Hue: Changes the colors of the image.

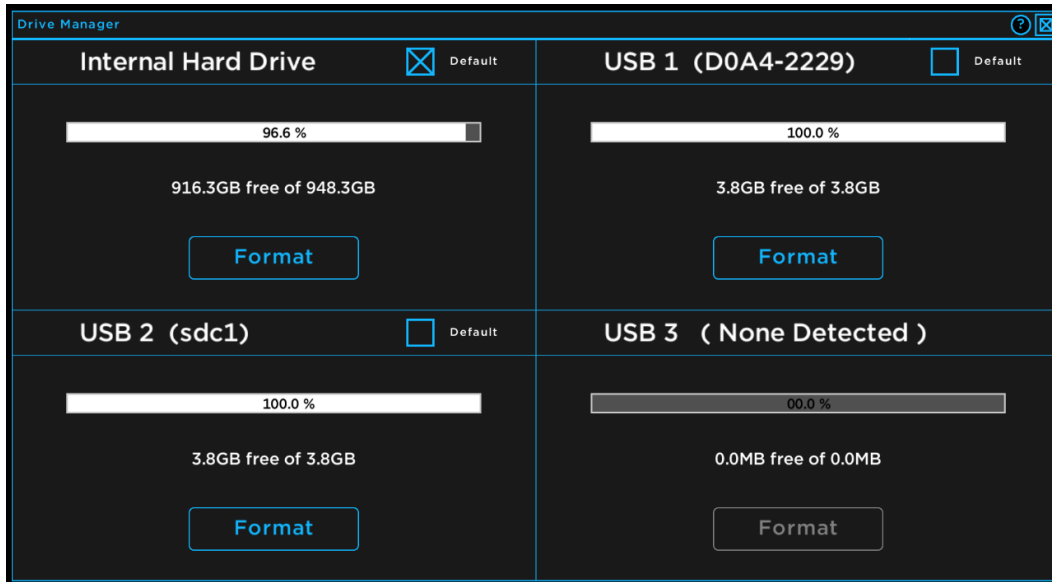
Red Level: Changes the intensity of the reds in the image.

Blue Level: Changes the intensity of the blues in the image.

There are also two buttons at the bottom of the screen. The “Default” button will change all slider values back to the default values for the current camera format. The “Reset” button will reset the camera channel, which could help resolve any glitches that may appear in the video signal.

3.4.2 Drive Manager Menu

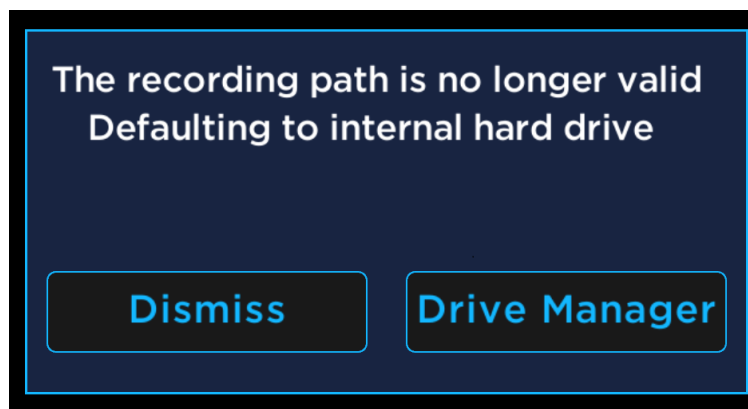
The Drive Manager Menu allows you to view and format any storage device that is detected by the DVR including the internal hard drive and any USB flash drives that may be plugged into the DVR.



Each quadrant of the screen represents a unique drive that the DVR detects. The size and free space of the drive is displayed in a bar, and in plain text. The format button allows you to delete **all files** on the drive. A popup will appear and verify that you want to **completely erase** everything on the drive first.

The internal hard drive will always be in the top left corner of the Drive Manager Menu, and USB drives will appear in the other three. If fewer than three USB drives are detected, one or more quadrants will have the size and format button grayed out.

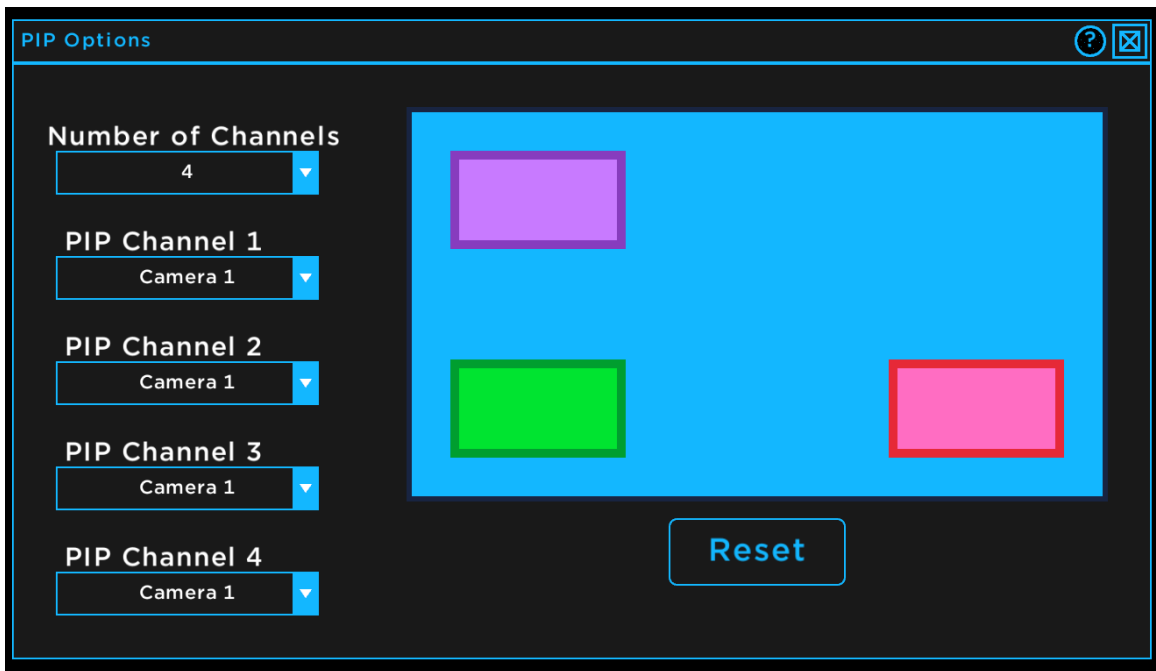
The 'Default' checkbox in the top right corner of each quadrant allows you to change the recording location. If a USB drive is selected as the default record location, any video recorded will be saved directly to the USB drive instead of to the internal hard drive. If a USB drive is selected as the record location, and it is removed, a popup will appear on the home screen, and the record location will be reset to the internal hard drive.



This warning can either be dismissed, leaving the internal hard drive as the record location, or you can open the Drive Manager allowing you to set a new recording location.

3.4.3 PIP Options Menu

The PIP Options Menu allows you to configure the cameras that are enabled in Picture-in-Picture mode.



There are five drop-down menus. The top drop-down menu allows you to select how many channels total you want displayed while in picture in Picture-in-Picture mode, from 2-4. The other four drop-down menus allow you to select which channel is displayed in which box. The “PIP Channel 1” drop-down selects the main channel that is displayed in the background (light blue), and channels two through four select the cameras displayed in the smaller boxes (purple, green, and red).

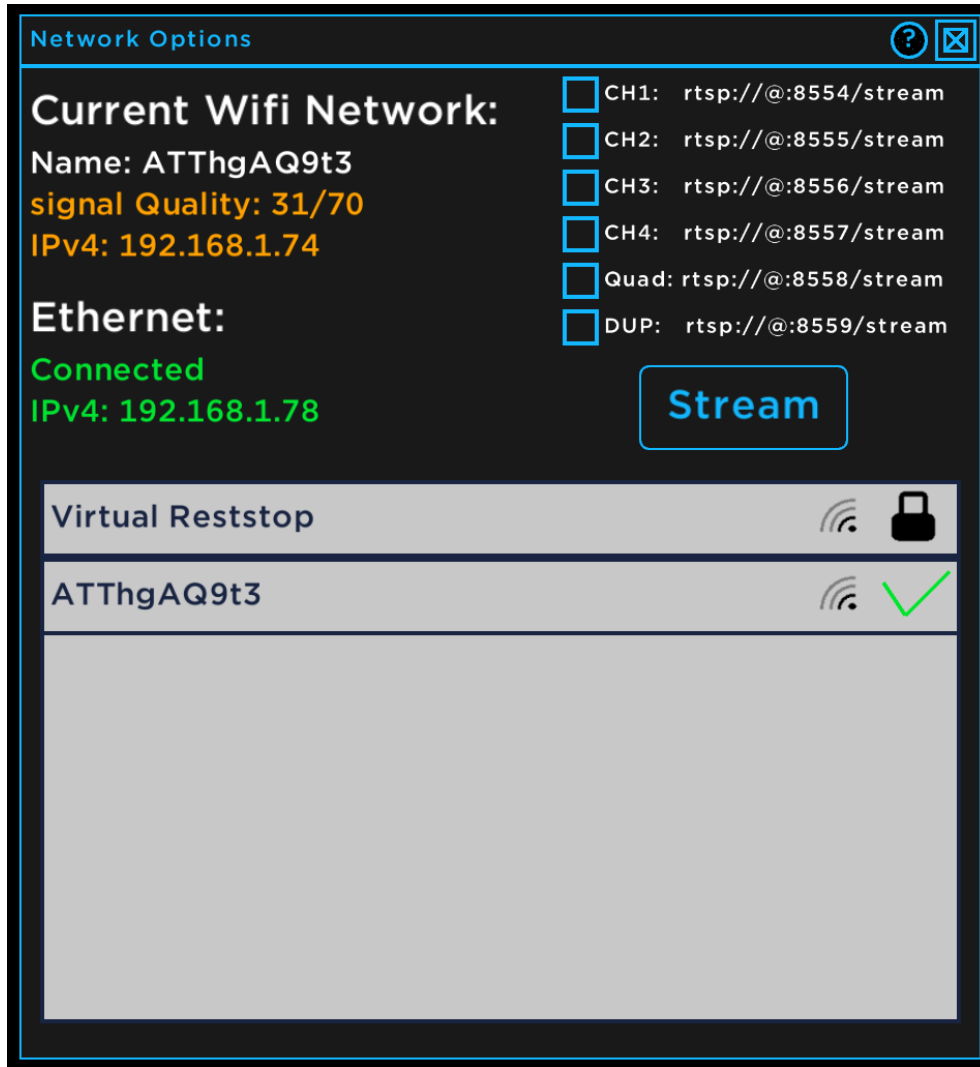
The channels can also be moved and resized in this menu. The diagram on the right side of this menu is a simplified preview of what Picture-in-Picture mode will display. To move a channel, left click and drag on the center of a box, then release the mouse where you would like to display the channel. To resize a channel, left click and drag on the edge of a box, then release the mouse when the box is the desired size.

The “Reset” button will move and resize the foreground channels back to the default positions and sizes.

To enable Picture-in-Picture mode, first exit all menus in the DVR, then press the ‘PIP’ button on the front of the DVR. To swap which channel is in the foreground, press the swap button on the front of the DVR.

3.4.4 Network Options Menu

The Network Options Menu allows you to view and edit the network connection for the DVR and allows you to begin streaming over the connected network.

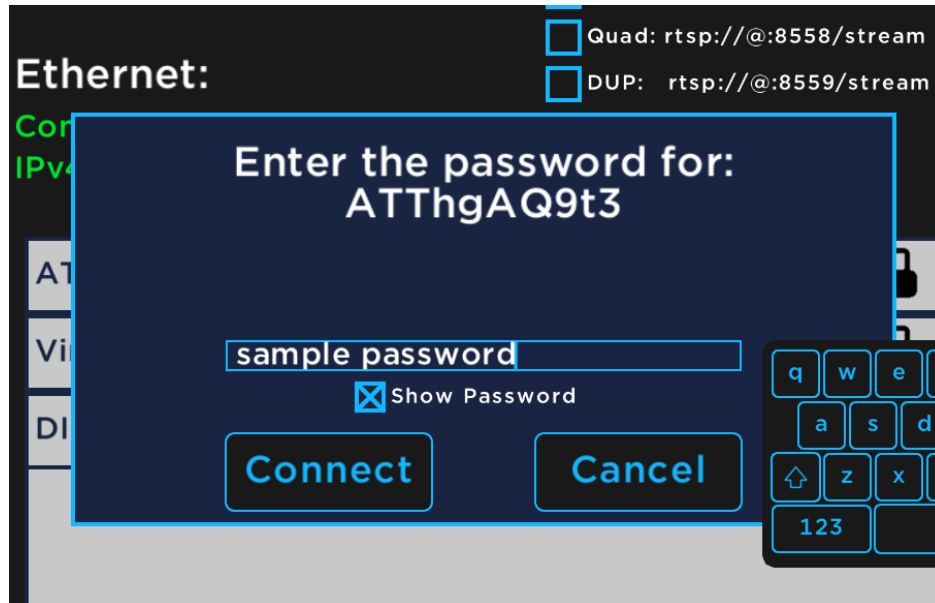


The top left of the screen shows the current, active network connections of the DVR. Under “Current Wi-Fi Network”, it will show the name of the network, the signal quality on a scale of 0-70, and the IPv4 address on the network. The signal quality will be either red, for a very low signal, orange for moderate signal strength, or green for a strong signal. Under Ethernet, it will show whether there is a valid wired network connection for the DVR. It will also show the IPv4 address on the wired network.

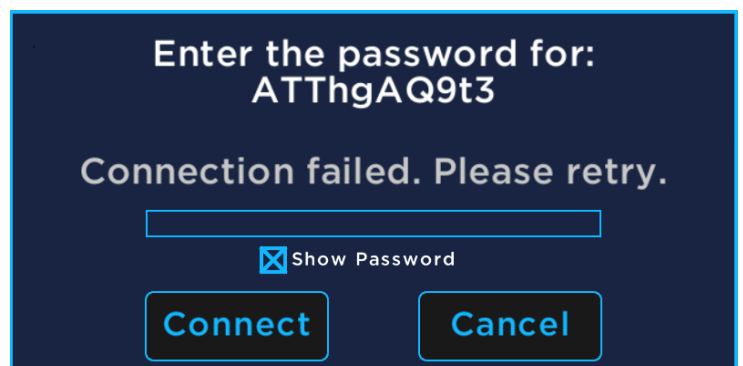
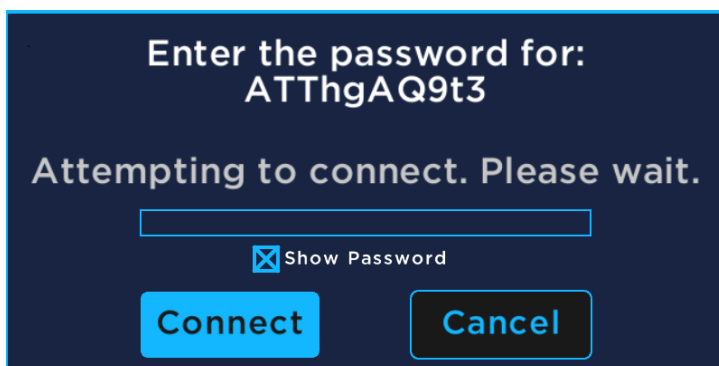
The top right of the screen allows you to configure and start RTSP stream for viewing on the local network. The checkboxes allow you to select which channels you would like to stream. Each channel will start a separate RTSP stream. The address for the stream is shown on the end of the channel with the ‘@’ symbol being a stand in for the IP address of the DVR. For example, if channel one is selected, the stream will use the address “rtsp://192.168.1.74:8554/stream”. You can begin or end the selected streams by pressing the “Stream” button.

The bottom half of the menu is reserved for the available networks. Each line is a different network and will display the network name, detected signal strength in bars, and whether the network is password protected. If you are currently connected to a network, a green check mark will appear next to the signal strength. If a network is password protected, a lock icon will appear (pictured above), and if the network is not password protected, the icon will open instead.

To connect to a network, simply click on the box with the desired network name. If it is password protected, a text box will appear, allowing you to enter the network password.

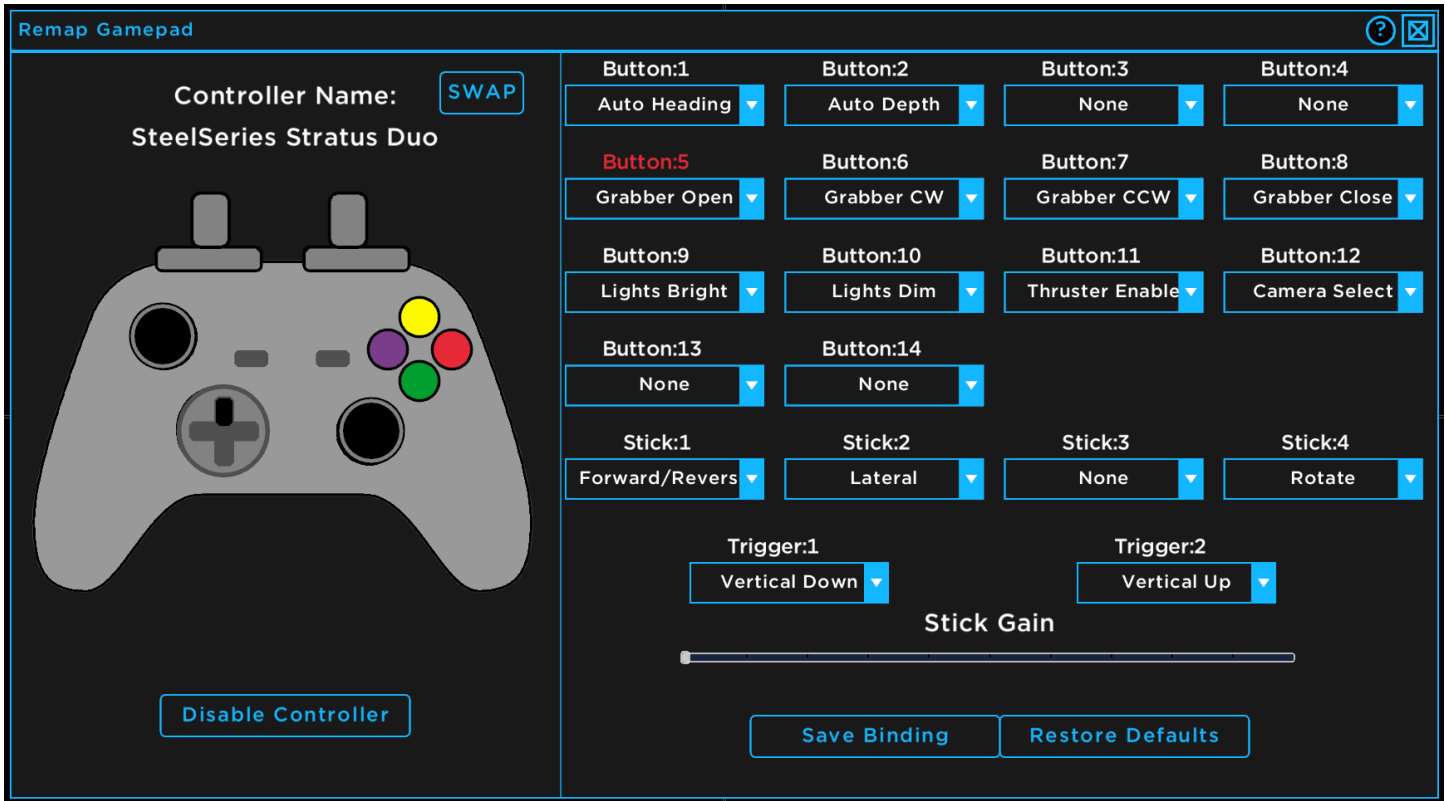


To enter the network password, click on the box and begin typing. By default, the text will be hidden while entering the network password. You can change this by checking the “Show Password” checkbox below the text entry box. After verifying the password is correct, click on the “Connect” button. The DVR will then attempt to connect to the network using the credentials you provided (bottom left image). If it connects successfully, the popup will disappear, and a check mark will appear next to the network name in the Network Options Menu (top image). If it fails, a warning will appear on the popup box prompting you to double check the password and try again (bottom right image).



3.4.5 Controller Options Menu

The Controller Options Menu allows you to enable and configure a USB controller to control the ROV.



If a USB controller is detected, the name of the controller will be displayed on the top left side of the Controller Options menu. If there are multiple USB controllers detected, you can press the ‘SWAP’ button at the top of the menu to cycle through the active controller. The controller icon on the left side will mirror the inputs of the actual controller. Buttons will turn black on the controller icon when the corresponding button is pressed on the real controller, and the label for the button will turn red. For example, in the above photo the UP DPAD button is pressed on a real controller named “SteelSeries Stratus Duo”. The UP DPAD button on the icon is highlighted black and the “Button:5” label is red on the right side. The button in this example is mapped to “Grabber Open”.

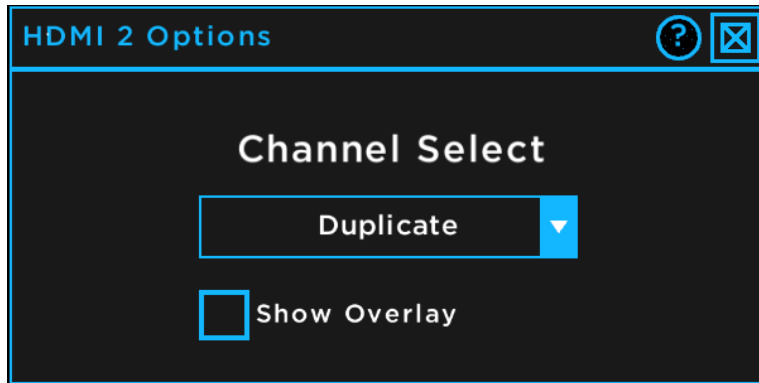
The mappings can also be changed on this menu. Each button or stick can be assigned to an ROV function. To change a button’s mapping, first identify the button number by pressing the button on the real controller, and look for the label that turns red. Next, click on the dropdown menu under that number, and select the function that you want. Then, press the “Save Bindings” button at the bottom of the menu. You can also reset all buttons to their default functions by pressing the “Restore Defaults” button.

To use the controller to control the ROV, you must press the “Enable Controller” button, otherwise the controller will not work.

After enabling the controller, a slider labeled “Stick Gain” will appear at the bottom of this screen. This slider replaces the “Stick Gain” knob on the ROV hand controller and functions the same.

3.4.6 HDMI Options Menu

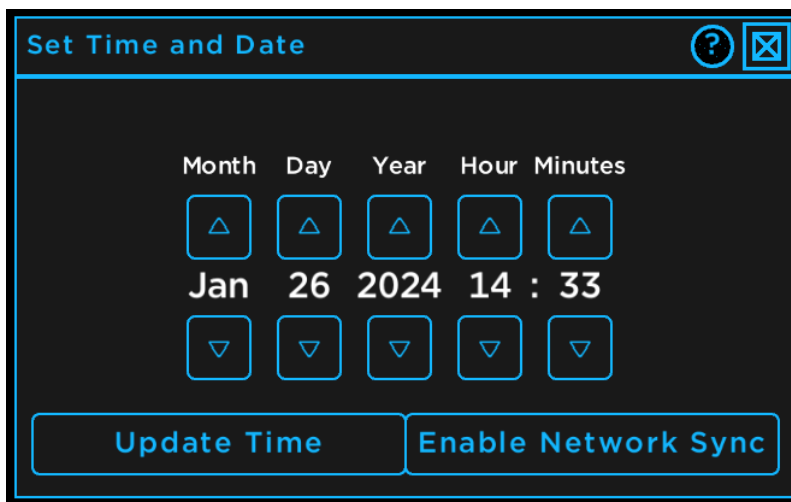
The HDMI Options Menu allows you to select what is displayed on a second monitor if one is connected.



The second monitor must be plugged in when the DVR is powered on for this menu to work. You can display any camera channel, all four camera channels, or duplicate anything that is on the first monitor by selecting it in the dropdown menu. You can also toggle whether there is an overlay on displayed on the second monitor with the checkbox.

3.4.7 Time and Date Menu

The Time and Date Menu allows you to manually set the time and date of the DVR or fetch the current time and date from the internet.



You can cycle through the desired time and date by pressing the up and down arrows above and below the displayed time. To save the desired time, you must press the "Update Time" button before closing the window. If you are connected to the internet, you can also get the real current time based on your location. Simply press the "Enable Network Sync" button to fetch the time.

3.5 Update Options Menu

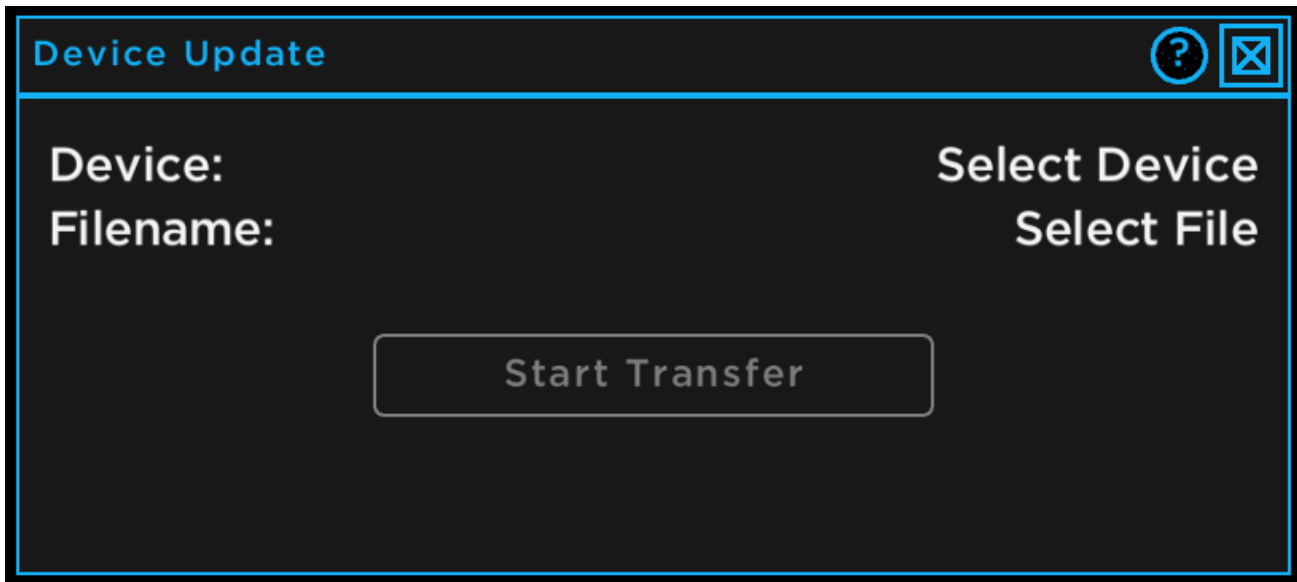


The Update Options Menu allows you to update the DVR with a USB drive or over the internet, send manual commands to devices, update an ROV device, save the DVR settings, and check the current firmware version of the DVR.



3.5.1 Update ROV Device Menu

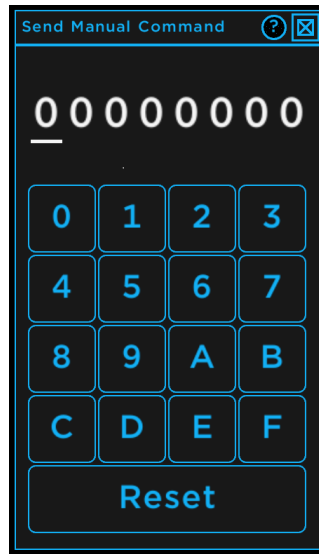
The “Update ROV Device” button will open a menu that allows you to update a specific device inside the ROV.



You must select an ROV device by clicking on the “Select Device” text. This will open a list of all detected devices. Click on the device you would like to open. This will close the list and come back to the above menu. You must then select the update file from a connected USB drive. Ensure you only use update files provided directly by Outland Technology as the use of an unofficial update file can cause permanent damage to the ROV system. After both are selected, click the “Start Transfer” button and wait for the update to complete. You must power cycle the system after a completed update.

3.5.2 Manual Command Menu

Pressing the ‘Send Manual Command’ button will open a menu allowing you to send manual commands.

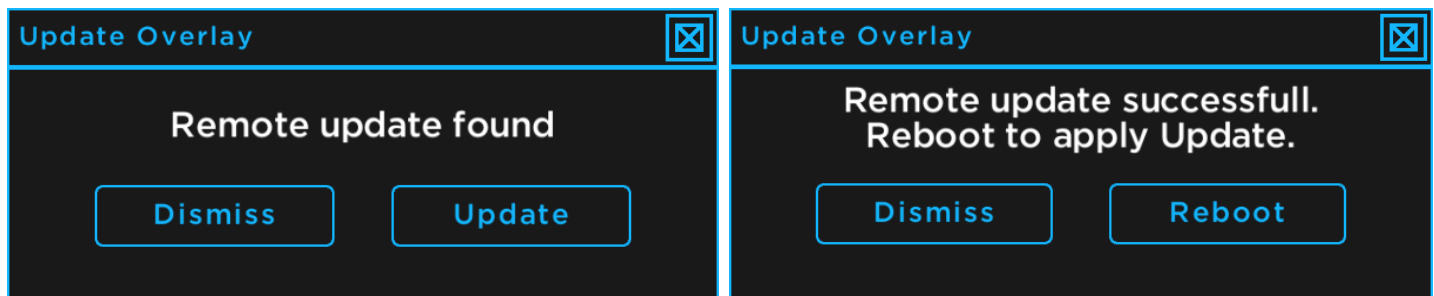


Warning: These commands are codes that can affect various settings of connected devices. This screen should never be used without the explicit instructions of an Outland employee, as these commands can cause permanent damage to your system.

3.5.3 Update DVR Options

There are two ways to update the firmware of the DVR; with a USB and files provided by the Outland website, or with over the air updates. For a USB update, check the [website](#) for instructions.

Over the air updates are NOT automatic. To check if there is an update available for your system, first connect your DVR to the internet using the Network Options Menu ([section 3.4.4](#)), then click the ‘Check for DVR Updates’ button. If an update is available, a popup will appear asking if you would like to update your system.



If you do want to update, click the ‘Update’ button to begin the download (left image). It will begin downloading the update and when it is ready, a new menu will pop up asking you if you would like to apply the update (right image). Press the ‘Reboot’ button and the DVR will update then reboot.

3.5.4 Save Overlay Config

The 'Save Overlay Config' button will save the system settings and configuration. This is also done automatically every 30 seconds.

3.5.5 DVR Firmware Number

The bottom of the Update Options Menu shows the firmware version of the DVR. In the above image, the version is 1.1.4