

Revision 6.1 - 2018-11-27

DVRO

User Manual



SUBC DVRO

Record, Stream, BlackBox and Overlay 4K, 3D, HD and SD Videos

SubC DVR

An advanced media management solution capable of recording multiple HD/SD video and audio feeds, video streaming over Ethernet, and obtaining video frame grabs. Video streamed over a local Ethernet connection preserves its high quality while using your existing infrastructure. If a location has an internet connection, video can be streamed live anywhere in the world.

When ensuring the fitness of your resources is a priority, the DVR works in conjunction with Asset Integrity Management solutions from EIVA and Aker Coabis.

This highly versatile solution also includes automatic splitting of extended recordings, power loss recovery, BlackBox mode, and both manual and automatic file location and naming.

SubC Overlay System

An advanced multi-video serial and graphic overlaying system. It has dynamic graphical overlays that respond to incoming serial data such as depth, altimeter, and heading. Each video can be output on its own channel as composite or HD-SDI video for easy transmission.

Built on top of the SubC DVR, the Overlay utilizes the same attractive easy-to-use interface. Overlays can be saved as templates for easy loading onto new feeds and all data is continually saved in case of power interruption.



Case Size: 19-inch 3U Rack Mount

Storage: 3x Portable Hard Drive Bays

Record Format: H.264, H.263, MPEG2

Resolution: Up to 3840 X 2160p (4K)

SD Inputs: 4 Channel Composite BNC

Serial: 4x RS232

HD Inputs: 2 or 4 Channel HD-SDI BNC with optional 4K UHD Channel

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Please read this manual carefully before setting up and using your unit. The electronic version of this document is the controlled copy. Therefore, all printed versions of this document are uncontrolled. Updated manuals and software are available by emailing info@subcimaging.com

SubC Control Ltd reserves the right to change, modify and update designs and specifications as part of their ongoing product development program.

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TECH SUPPORT & WARRANTY

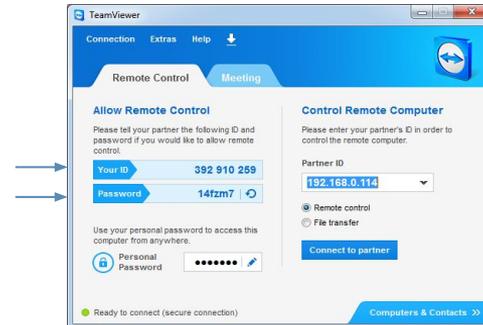
Contact Information and Remote Support

Contact tech support

Telephone	+1 (709) 702-0392
Fax	+1 (866) 571-1265
Email	support@subcimaging.com
Internet	www.subcimaging.com
Mail	SubC Control Ltd 327 Memorial Drive Clareville, NL Canada A5A 1R8

Installing TeamViewer for remote support

1. Ensure the LAN functionality in TeamViewer is enabled (go to Extras > Options > General > Incoming LAN connections). Using TeamViewer over LAN allows for much faster operation and better quality. SubC recommends using a LAN connection whenever possible.
2. You can obtain a version of the TeamViewer software from <https://www.teamviewer.com/en/download/windows/>
3. Install and open Teamviewer on your computer. You will see a window similar to the one below.
4. Make note of the Your ID and Password fields.
5. Contact SubC tech support and provide them with your codes; they now have remote access and can help with any issues that may arise.



LIMITED WARRANTY

SubC Control Ltd, hereafter referred to as SCL

SCL warrants that at the time of shipment all products shall be free from defects in material and workmanship and suitable for the purpose specified in the product literature. The unit/system warranty commences immediately from the date of customer acceptance and runs for a period of 365 days. Customer acceptance will always be deemed to have occurred within 72 hours of delivery.

Note: Any customer acceptance testing (if applicable) must be performed at either SCL premises or at one of their approved distributors unless mutually agreed in writing prior to dispatch.

Conditions: These include, but are not limited to, the following:

1. The warranty is only deemed to be valid if the equipment was sold through SCL or one of its approved distributors.
2. The equipment must have been installed and commissioned in strict accordance with approved technical standards and specifications and for the purpose that the system was designed.
3. The warranty is not transferable, except or as applies to Purchaser first then to client.
4. SCL must be notified immediately (in writing) of any suspected defect and if advised by SCL, the equipment subject to the defect shall be returned by the customer to SCL. The customer is responsible for all costs associated with shipping the unit to SCL.
5. The warranty does not cover any direct, indirect, punitive, special consequential damages or any damages whatsoever arising out of or connected with misuse of this product.

6. The warranty does not apply to defects that have been caused by failure to follow the recommended installation or maintenance procedures or defects resulting from normal wear & tear, incorrect operation, fire, water ingress, lightning damage or fluctuations in vehicles supply voltages, or from any other circumstances that may arise after delivery that is out of the control of SCL. (Note: The warranty does not apply in the event where a defect has been caused by isolation incompatibilities.)
7. The warranty does not cover the transportation of personnel or equipment and per diem allowances relating to any repair or replacement.
8. The warranty shall become invalid if the customer attempts to repair or modify the equipment without appropriate written authority being first received from SCL.
9. SCL retains the sole right to accept or reject any warranty claim.
10. Each product is carefully examined and checked before it is shipped. It should therefore be visually and operationally checked as soon as it is received. If it is damaged in any way, a claim should be filed with the courier and SCL notified of the damage.

Note: SCL reserves the right to change specifications at any time without notice and without any obligation to incorporate new features in instruments previously sold.

Note: If the instrument is not covered by warranty, or if it is determined that the fault is caused by misuse, repair costs will be billed to the customer and an estimate of the repair costs will be submitted for customer approval before the commencement of repairs.

GETTING STARTED

GETTING STARTED

Connecting the DVR

You can view media related to this product at: <http://subcimaging.com/product/subc-dvr-and-overlay-hd-sd/>

An uninterrupted power supply (UPS) is strongly recommended for all DVR installations. SubC can provide, install, and support a warranty for your UPS when purchased with our DVR.

Note: See following page for 1x 4K, 4x HD setup

1. Connect the supplied peripherals (keyboard, mouse, etc) to the USB inputs. The black USB 2.0 ports in the upper part of the **orange** area will suffice. You may wish to save the blue USB 3.0 ports for devices that can take advantage of their increased throughput.
2. Plug your monitor's video cable into the appropriate port **on the video card (red)**. From left to right: DVI-D, HDMI, or VGA.
3. Insert female end of power cord into power supply (**blue**) and plug male end into wall outlet or UPS.
4. Set rear main power switch to the I (on) position and then power on by pressing the dot switch behind the right door on the front panel. Allow Windows to boot. The DVR software will start automatically.
5. The audio inputs (**Dark Yellow**) can be used to connect a microphone in the pink port.

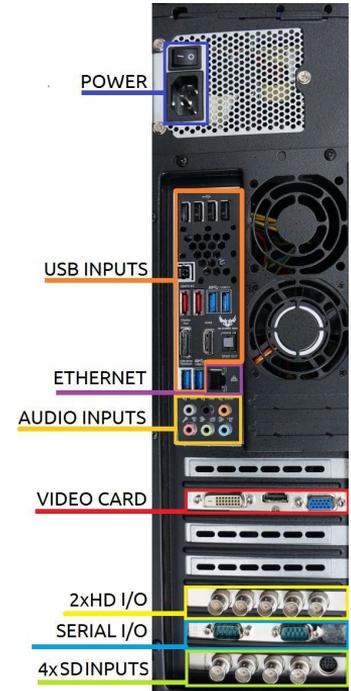
**Do not attempt to record from multiple inputs until referring to the manual.

Maximum of 4 channels of input with one of the following combinations:

- 4 Channel Composite SD in
- 2 Channel SDI HD/3D in
- 4 Channel SD Ethernet in
- 2 Channel HD Ethernet in

Maximum of 4 channels of output:

- 2 Channel SDI out (using an SDI output ties up an SDI input)
- 1 Channel HDMI out (additional USB to HDMI out available)
- 1 Channel DVI out

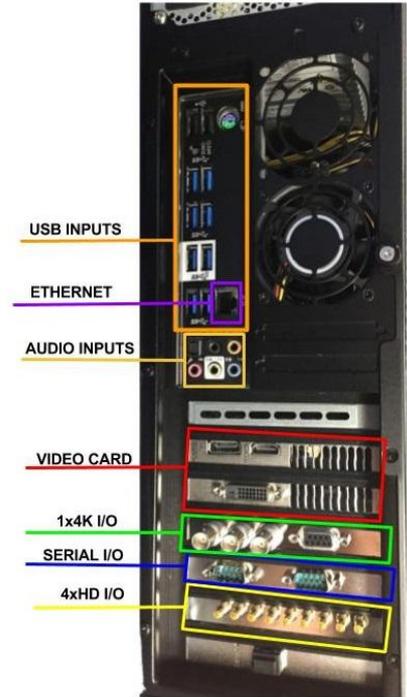


GETTING STARTED

Connecting the DVR (1x 4K, 4x HD)

1. Connect the supplied peripherals (keyboard, mouse, etc) to the USB inputs. The black USB 2.0 ports in the upper part of the **orange** area will suffice. You may wish to save the blue USB 3.0 ports for devices that can take advantage of their increased throughput.
2. Plug your monitor's video cable into the appropriate port **on the video card (red)**. From left to right: DVI-D, HDMI, or VGA.
3. Set rear main power switch to the I (on) position and then power on by pressing the dot switch behind the right door on the front panel. Allow Windows to boot. The DVR software will start automatically.
4. The audio inputs (**Dark Yellow**) can be used to connect a microphone in the pink port.

****Do not attempt to record from multiple inputs until referring to the manual.**



Maximum of 5 channels of input with one of the following combinations:

- 4 Channel SDI HD/3D in
- 1 Channel SD 4K in

Maximum of 6 channels of output:

- 4 Channel SDI out (using an SDI output ties up an SDI input)
- 1 Channel HDMI out (additional USB to HDMI out available)
- 1 Channel DVI out

SOFTWARE

DVRO - SOFTWARE

The screenshot displays the SubC DVRO v5.9.8 software interface. The central video feed shows a deep-sea environment with a red feathered organism and a white cylindrical object. The interface includes various control panels on the left and right, and a status bar at the bottom.

Video Input: HD/SD Ethernet File
Cameras: DeckLink SDI 4K 3840x2160 @ 25.00
Override: [Dropdown]
Audio Input: <No External Audio>
Audio Input Level: [Slider]
Stop

Recording - 00:00:11
Directory: R:\Dive\Videos\
File: \$(hh)\$mm\$ss
Tags: \$yyyy - Year (2016)
Recording Settings
Framegrab Settings

BlackBox - 00:00:00
Duration: 00:00:00
Trigger: OFF Record Initialize
Recording Directory: R:\Dive\Videos\Black
BlackBox Usage and Duration
Blackbox Recording Settings
Video Output
Streaming

Altimeter: 9.5m
Depth: 2557m
GPS: 2501.048 N 02141.011 E

SW | | W | 302° V | | N | | N

Overlays:
Add Text
Save Load Replicate
Hide All Show All Clear
Rectangle
Recording Times
Text - GPS
Text - Depth
Text - Altimeter
Date/Time
Logo - subc_imaging_240.png
Text - 9.5m
Text - 2557m
Text - 2501.048 N 02141.011 E
Text -
Rectangle
Text - Diagnostics
Heading
Communication Preview

Status Bar: CPU 38% RAM 95%

COMMUNICATION

Starting the DVR

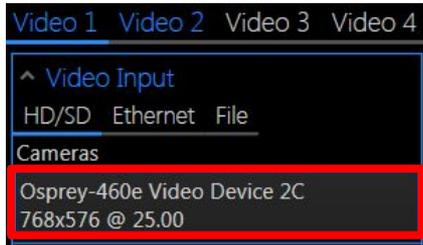
Start the DVRO. The upper-left corner of the main overlay window will look similar to what is shown in the image on the left. The number of concurrent video feed tabs (Video 1, Video 2, etc.) will vary depending on your DVR's configuration. Any video inputs that are receiving video from a connected camera will appear in the *Video Input* section in blue. Video inputs that are *not* receiving input will appear grey.

- To connect a video feed to a video input, click on one of the automatically detected feeds or configure one manually under the *override* tab.
- Connected feeds are shown under the *HD/SD*, *Ethernet*, and *File* tabs.
- To connect a feed, click on the device name under cameras to start feeding its video.

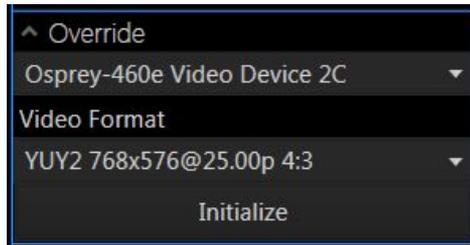
It is possible to override the input setting to any of the DVR inputs even if they are not currently receiving video. You may wish to do this if your camera is currently powered down but you plan to activate it later, or if you are troubleshooting a video connection.

- In this case, click on the *Override* tab, select your input and video format, and press *Initialize*.

Osprey-460e Video Device 2C will be feeding Video 1



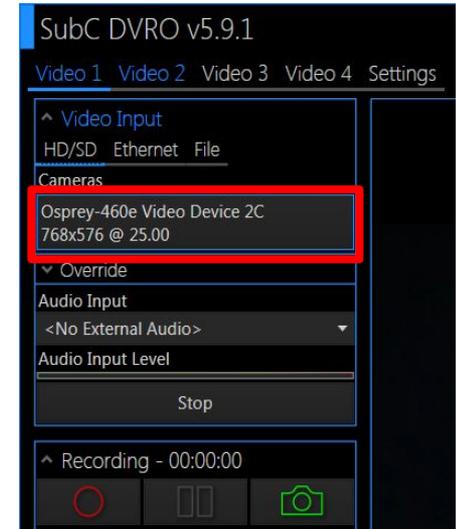
Override tab



The DVRO will launch automatically when the DVR is powered on but can also be launched from a desktop shortcut.



Main overlay window



VIDEO INPUT

HD/SD

1. Cameras

Start the live feed from the attached camera. Autodetected feeds will be disabled as long as any feed is initialized.

2. Override

Displays a list of camera inputs that can be chosen to override the autodetected devices for the current video input.

3. Video Levels

Controls the contrast, gain, brightness, and white and black levels (see page 16).

4. Video Colors

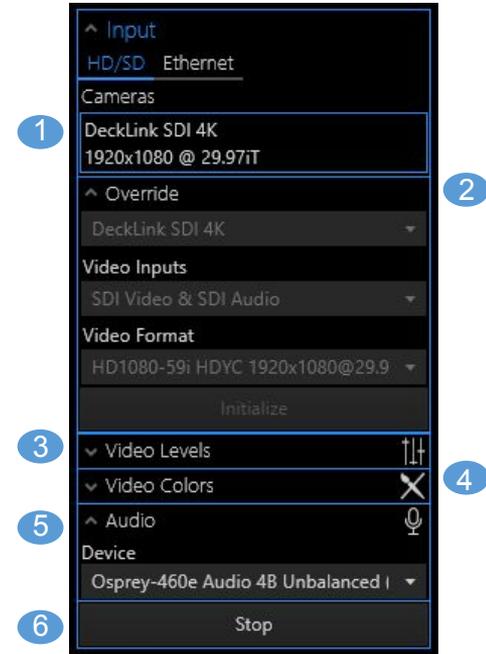
Controls the Y,U, and V levels and the Y and UV gain levels (see page 16).

5. Audio

Allows you to input from an audio device. Select an input from the available devices.

6. Stop

Will discontinue the live feed. To resume, select a camera or set up a manual override.



VIDEO INPUT

Ethernet

1. Video Input

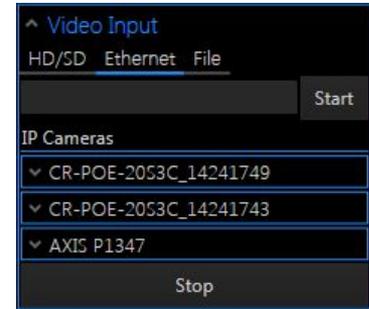
Contains the streaming address of the IP camera once the IP camera is set up.

2. IP Cameras

Enter the username and password of a device to enable cameras that are accessed through an IP Address.

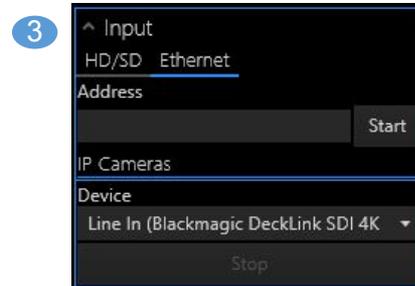
3. Device

Choose the device you wish to initialize, including devices with audio. Audio can be muted via the DVR and outside software.



1

2



3



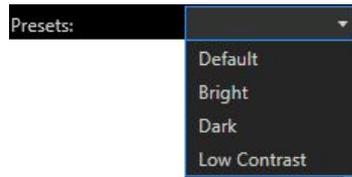
2

VIDEO INPUT

Video Levels and Colors

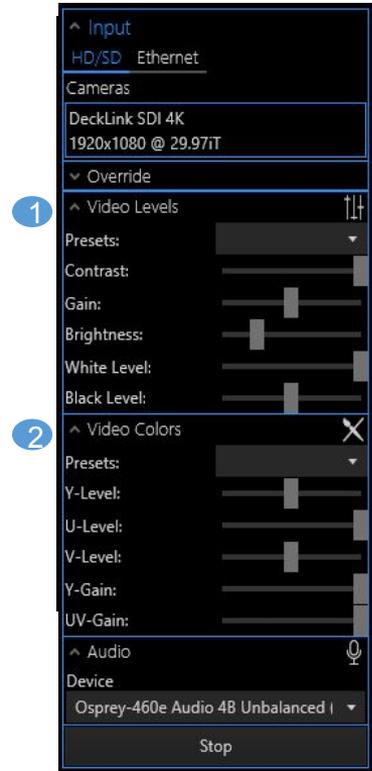
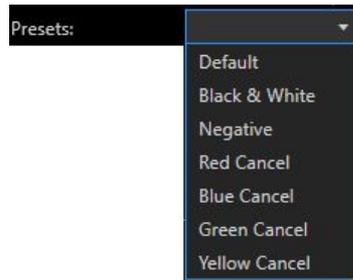
1. Video Levels

Controls the contrast, gain, and brightness levels of the current video feed as well as the white and black levels. There are built-in presets that can be chosen under the *Presets* dropdown.



2. Video Colors

Controls the Y,U, and V levels as well as the Y and UV gain levels of the current video feed. There is also a preset dropdown included within the video colors dropdown.



SOFTWARE CONTROLS

Recording and Stills

1. Record

- Press the record button to **start** recording video footage in a new file. Press the record button again to **stop** recording video footage to that file. A **red** outline will form around the viewing area when the footage is recording.
- To verify that your files are being created properly prior to recording, click the link on the lower right.

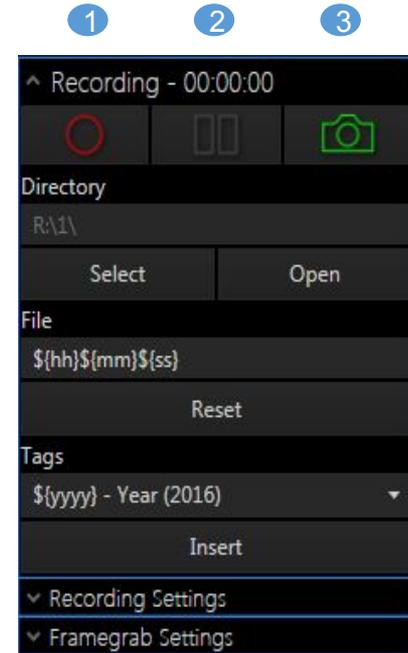


2. Pause

- Press the pause button to pause the recording, the timer overlay, and recording timer.
- The difference between pausing and stopping is that resuming from a pause will continue the recording on the same file.
- You can use the pause function to combine time-separated portions of the video feed without having to record unnecessary footage or manage numerous files.
- To resume recording, press the pause button again.

3. Take Still (frame grab)

- Press the green camera button to capture a digital still from the video and save it to the stills folder.
- By default the stills folder will be a subfolder of the folder where your video is being created.



SOFTWARE CONTROLS

Recording

4. Folder

- The location where your video is stored.
- Press the *Select* button to open a location picker.
- Press *Open* to view the location in an Explorer file browser window.

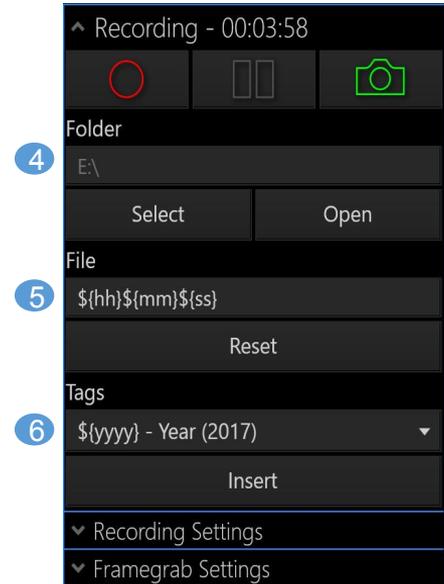
Note: Each time you hit the record button, a new video file will be recorded. When you press record again, it will end that video at which point you will be able to find that piece of footage in your files.

5. File

- The filename/template used for video filenames.
- The SubC DVRO can make use of tags to input changing variables. For example, $\${hh}$ will be the current hour that the video started to record.
- You can use the tag picker (6) to insert various tags.

6. Tags

- Insert various time elements into your video filenames, from the current second up to the current year.



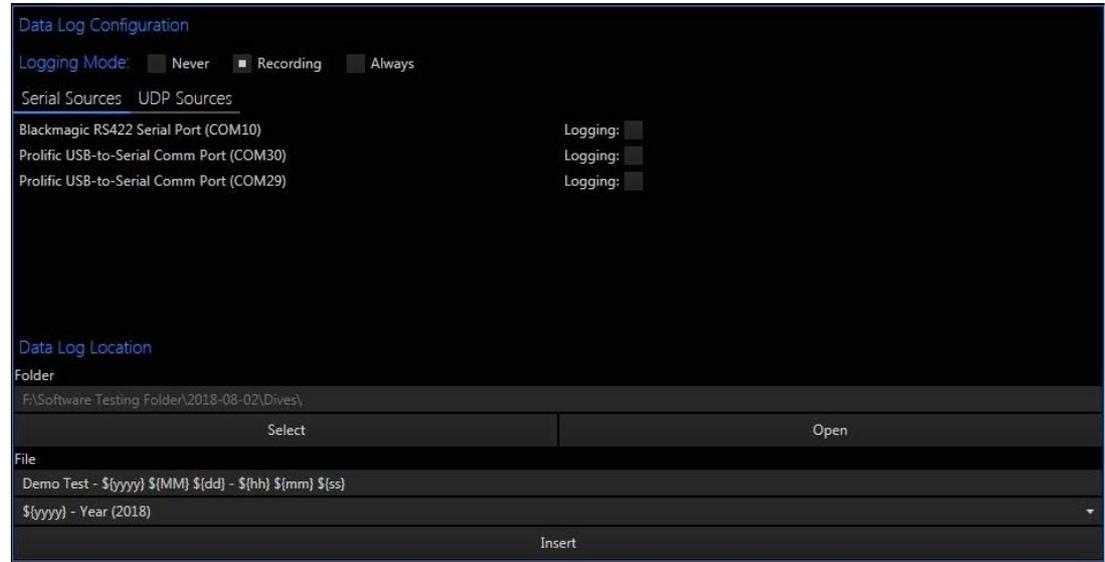
SETTINGS

Data Log Configuration

In this section of the settings panel you can set up the data logging settings.

At the top are controls to choose the **Logging Mode**:

- **Never** - Records no data
- **Recording** - Records only data that was gathered while the DVR is recording video
- **Always** - Records all data that comes in at all times



SETTINGS

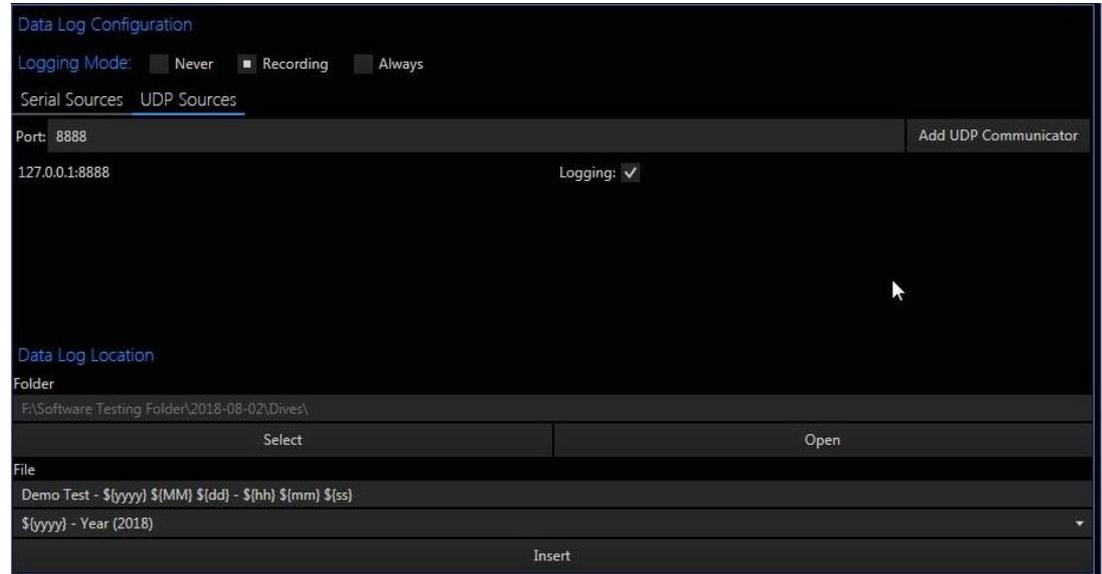
Data Log Configuration

Serial Sources: All detected serial connections are listed. Any that are checked for *Logging* will record the data to the file, others will be ignored.

UDP Sources: A box for inputting the port. All ports listed are recorded while all ports unchecked are removed from the list.

Data Log Location: For the Presenter to correctly detect the data, the data should be in the same directory as the dive or video opened.

It can be recorded directly there or copied later freely.



SETTINGS

Recording

1. Encoder

H.264 - Offers very good quality at a low bitrate, reducing the burden of storage and transmission. The processor in the graphics card will be used to accelerate the processing.

H.264 is available only on video tab 1 as it is computationally intensive.

H.263 - A low bitrate compressed format to reduce the burden of storage and transmission. Originally designed for video conferencing.

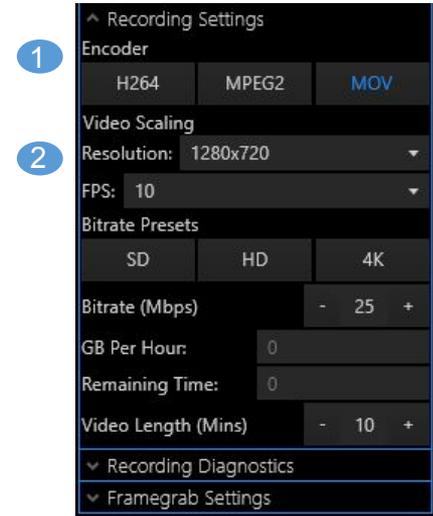
H.263 is available only on video tabs 2 through 6

MPEG2 - Offers good quality but is less efficient for storage and transmission. However, due to the simpler compression methods it also doesn't use as much processing power.

MOV - Is a MPEG4 format that allows for compatibility across many platforms and works particularly well with the Macintosh operating system.

2. Video Scaling

Select your resolution and frames per second (FPS)



SETTINGS

Recording

3. Bitrate (Mbps)

Set the desired video quality by selecting how many millions of bits (megabits) per second to record. You can set a custom bitrate or use one of the three *Bitrate Presets*:

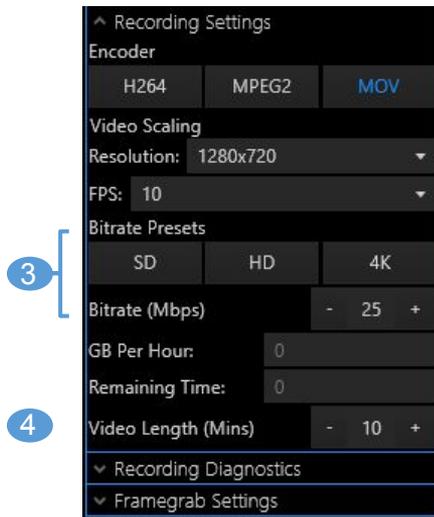
SD - Encode video at 5Mbps (suitable for SD recording or for highly compressed HD).

HD - Encode at 25Mbps (suitable for most HD applications).

4K - Encode at 100Mbps (used for maximum quality situations where objects are moving quickly). Most video compression takes advantage of sameness from frame to frame and can break down when details are rapidly shifting.

4. Video Length (Mins)

Set a limit on how long each individual video file can be. For example, during continuous recording, if *Video Length* is set to 10 minutes the program will start a new video file every 10 minutes, thus distributing the continually recorded footage among different files.



SETTINGS

Frame Grab

1. Sync with Recording

- When this option is checked, frame grab images will save in the same folder as the recordings.

2. Folder/Stills Subfolder

- The folder location where your stills are stored.
- Click *Select* to browse for a folder.
- In the *Stills Subfolder*, enter a folder name to save frame grabs.
- Click *Open* to view the captured stills in an Explorer file browser window.

3. File

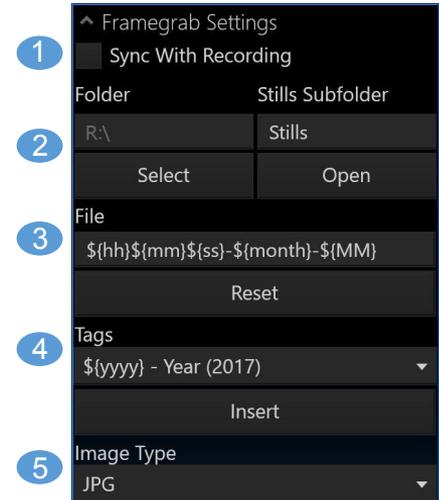
- The filename template used for frame grab filenames.
- The SubC DVRO can make use of tags to input changing variables. For example, $\${hh}$ will be the current hour that the frame grab was taken.
- You can use the tag picker (4) to insert various tags.

4. Tags

- Insert various time elements into your frame grab filenames, from the current second up to the current year.

5. Image type

- Select the image file type to save file as.



SETTINGS

Filename Tags

When setting the name of the video file, there are a collection of special tag characters you can use to reflect changing variables:

Tag List

Current Year:	<code>\${year}</code> , <code>\${yyyy}</code> , <code>\${YYYY}</code> <code>\${yy}</code> , <code>\${YY}</code>	4-digit year 2-digit year
Current Month	<code>\${mon}</code> , <code>\${MM}</code> , <code>\${month}</code>	
Current Day	<code>\${day}</code> , <code>\${dd}</code> , <code>\${DD}</code>	
Current Hour	<code>\${hr}</code> , <code>\${hh}</code> , <code>\${hour}</code>	
Current Minutes	<code>\${min}</code> , <code>\${mm}</code> , <code>\${minute}</code>	
Current Seconds	<code>\${sec}</code> , <code>\${ss}</code> , <code>\${second}</code>	

Examples

<i>Filename Template Entered</i>	<i>Resulting Filename</i>
Date <code>\${year}-\${month}-\${day}</code> -- Time <code>\${hour}:\${min}:\${sec}</code>	Date 2017-05-01 -- Time 09:31:01
<code>\${year}-\${month}-\${day} - \${hh}.\${mm}.\${ss}</code>	2016-11-18 - 10.37.16
<code>\${YY}_\${MM}_\${DD} \${hh}_\${mm}_\${ss}</code>	16_01_01 09_02_08
<code>\${YYYY}\${MM}\${DD}\${hh}\${mm}\${ss}</code>	20170602101445

BLACKBOX

Settings

BlackBox

Can be used to record continuous video in a separate folder than the regular dive footage.

- It will continue recording, even when regular recording is paused.
- It can be configured to start recording before regular recording begins and after it finishes by using the *Initialize* option.

1. Trigger

This specifies the event which triggers the BlackBox to begin recording.

Off - Causes BlackBox to **not** record continuously to a BlackBox file.

Record - Starts continuous recording to BlackBox file during regular recording.

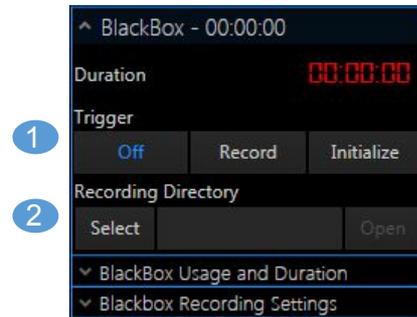
Initialize - Begins recording as soon as the video feed is established and continues until the feed is stopped.

2. Recording Directory

- Click *Select* to choose the folder in which your BlackBox footage will be recorded and stored.
- Click *Open* to view the contents of your BlackBox recording folder.

BlackBox Usage and Duration: See following page.

BlackBox Recording Settings: See Settings Recording (Page 20)



Usage and Duration

1. Convert Black Box to Lower Quality

- Select to have your files take up less space.

2. Max Usage (GB)

- You can limit the recording space to a particular number of gigabytes by increasing or decreasing *Max Usage (GB)*. This will ensure the BlackBox recording doesn't occupy all of the available space on your drive.
- Alternatively, if you want to use all of the available space, simply press the *All* button.

3. Min Usage (GB)

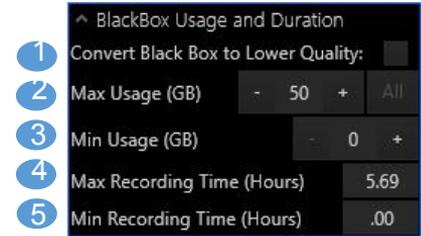
- Sets the minimum amount of gigabytes allocated for use by the BlackBox.
- Attempting to record with less than the minimum disk space available will present a **warning** and the BlackBox will not record.
- It will also not delete its records down past this minimum when it attempts to recover disk space.

4. Max Recording Time (Hours)

- The maximum time the BlackBox will record according to the setting of *Max Usage (GB)* and your BlackBox recording settings. **This value cannot be changed manually.**
- You can adjust it by increasing or decreasing *Max Usage (GB)*.

5. Min Recording Time (Hours)

- The minimum time the BlackBox will be cleared to when it recovers disk space.
- You can adjust it by increasing or decreasing *Min Usage (GB)*.



EIVA COMPATIBILITY

EIVA NaviModel

The DVRO can work in conjunction with EIVA NaviModel for 2D, 3D and 4D modelling and visualization.

DVRO videos can be imported into EIVA NaviModel software as long as the formatting is: "yyyymmddHHmmssfff@camera.mp4"



REVIEWING VIDEO

REVIEWING MODE

Video Output

The SubC DVRO has the ability to output the processed video with overlays from each video feed independently. You can output both HD and SD.

1. Video Output

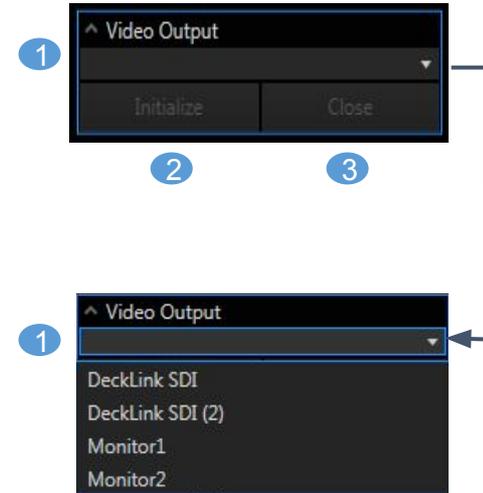
The output device selection allows you to output video. The inputs and outputs are linked together; however, you cannot input and output on the same device. For example, if you are capturing video on Decklink SDI, you cannot output on Decklink SDI, you would need to output on Decklink SDI (2).

2. Initialize

Allows you to start outputting video on the selected device. The DVR will remember if you were outputting when it closes down and will automatically begin outputting once the software is loaded again.

3. Close

Allows you to stop the output. The DVR will **not** start outputting automatically once it's initialized again.



REVIEWING MODE

LAN Streaming

To stream across your local area network (LAN)

1. Initialize the stream

- ****Do not change the streaming address.**
- Set the bitrate to use while streaming (keep in mind the limitations of the network hardware the video will be streaming on).
- Click the *Initialize* button.

2. Enter the IP address in your browser

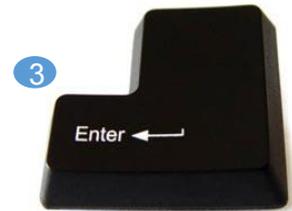
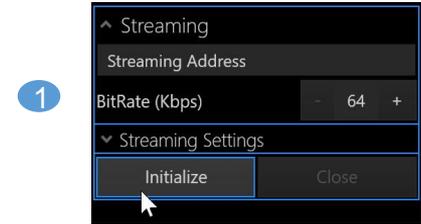
- To view the streamed video from your browser, enter the IP address of the DVRO unit into the address bar of your internet browser (e.g. Mozilla Firefox, Google Chrome, Microsoft Edge).

3. Browse

- Press *Enter* to browse to the given address. You should now see your video playing.

To stream across the world wide web (WAN)

- Change the streaming address to the WAN IP address of the remote computer running media server software.
- Follow that server's documentation for how to connect to media streaming from it.

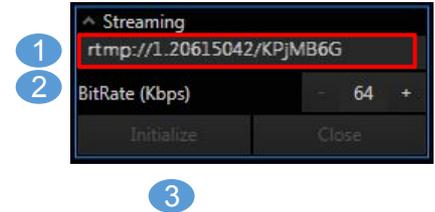


REVIEWING VIDEO

WWW Streaming - Configuration

The SubC DVRO allows you to stream your live video feeds to the internet via a monthly subscription provided by SubC Control. You can also stream across your local area network allowing every linked computer to view the operation.

Once your subscription is ready, you will be provided with a [RTMP URL](#) and a [Stream Key](#). **Note that these are DVR settings; this URL is not the one you will be providing to your viewers. (See next page.)**



1. In the [Streaming](#) address box, enter both the RTMP URL and the Stream Key, separated by a forward slash (/). For example, if the RTMP address is [rtmp://1.20615042](#) and the stream Key is [KPjMB6G](#), enter [rtmp://1.20615042/KPjMB6G](#).
2. Select the appropriate [Bitrate \(Kbps\)](#) for the streaming video quality you wish to achieve. (See chart below for recommendations.) Take into account the bandwidth capabilities of your network.
3. Click [Initialize](#) to begin the stream.

Resolution	Recommended Bitrate (Kbps)		
	High motion events	Low motion events	General applications
HD 1920x1080	4096	3000	4096
HD 1280x720	3000	1500	2560
SD 720x576	1000	750	1000

REVIEWING VIDEO

WWW Streaming - Display

Once the steps from the previous page have been followed, the SubC DVR will be streaming to an internet server so that anyone in the world can view the operation in near real time, provided of course that the DVR itself is connected to the internet.

To view your stream, open your internet browser and go to your assigned streaming URL:
<http://www.subcontrol.com/streaming/yourcompanyname>. Other computers on the internet will also be able to access the stream.

Make sure the bitrate setting on the DVR (see previous page) is appropriate for the bandwidth of your network and internet connection. The stream should not use more than **half** the available upstream bandwidth. For example, if your upstream bandwidth is 2000 kbps, you should stream no more than 1000 kbps.

You should now see the live video streaming from the SubC DVR.

DVR OVERLAY

Overlay 4K, 3D, HD, and SD videos with information and graphics.

OVERLAY MANAGEMENT

WWW Streaming - Display

Add, save, load, hide, and show your overlays here. Videos must be initialized in order to see the effects of their overlays.

1. Add - Allows you to add a new custom overlay of your choice. Select the type from the dropdown menu (2). **Overlays are added first, then configured.**

2. Overlay Types - This dropdown menu displays a list of available overlays. Add the selected overlay by pressing the *Add* button (1). Multiple overlays of the same type may be chosen.

3. Save - Saves all overlays that have been created and stores them in a file to be reused in the future.

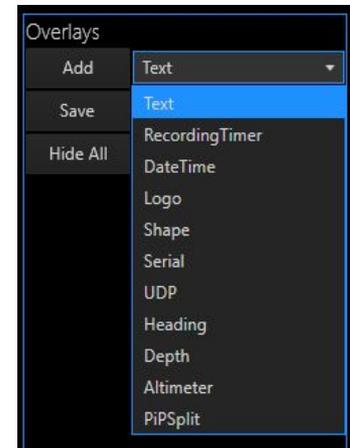
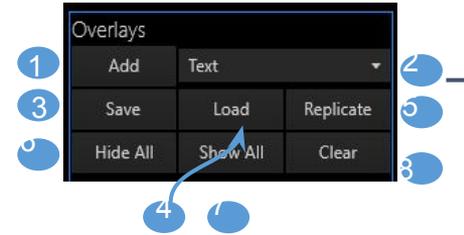
4. Load - Loads overlays that have been previously saved.

5. Replicate - The overlays displayed in the current active video input will be displayed in all initialized video inputs.

6. Hide All - Suppresses all overlays on the current video input, allowing you to suspend the application of your overlays without deleting them (e.g. to take a frame grab of your unadorned video feed).

7. Show All - Reapplies the overlays that were suspended with Hide All (6).

8. Clear - **Deletes all overlays** for the current video. Be aware that any unsaved overlays **will be lost** when choosing this option.



OVERLAYS

STATIC OVERLAYS

Text

1. Text Overlay

Type the text you wish to display over your footage.

2. Display Format

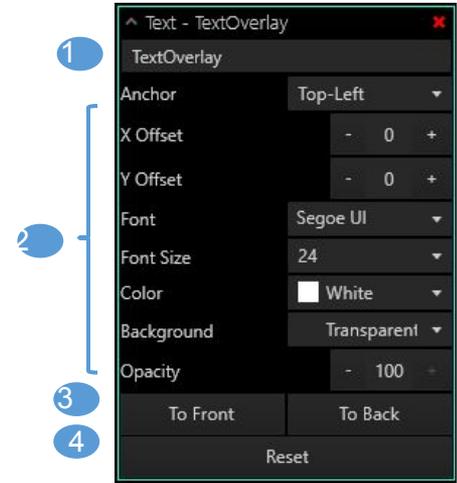
With this group of settings, you can further customize how your text overlay will look and its position on the screen. See **Appearance and Positioning Options** for details.

3. To Front/To Back

Send the overlay to the front or back of the back-to-front-ordering. Overlays closer to the front of the order cover up those closer to the back of the order. For example, you can use this positioning to easily place custom text on top of a custom graphical background.

4. Reset

Clears all settings preset in the current overlay.



Typical appearance:



STATIC OVERLAYS

Shapes

The **Shape Overlay** allows you to place a shape on the video. Several varieties of shapes are available, including rectangles and ellipses. Among other things, these can be used to supply a uniform background to a group of other overlays or used to cover up specific segments of a video when recording from an unvarying position.

1. Shape

Select the shape you wish to use.

2. Width/Height

Select the width and height of your shape. It will stay snapped to your anchor point.

3. Fill Color

Select the color to fill the area of the shape.

4. Border Color/Thickness

Select the color and thickness of the border around the shape. The border is drawn towards the inside from the edge. For no border, set thickness to 0 or negative.

5. Display Format

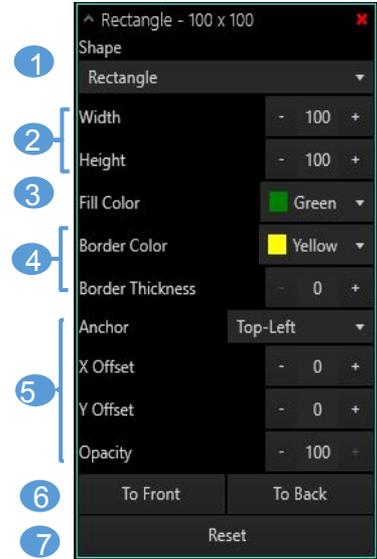
Further customize how your shape overlay looks and its position on the screen. See **Appearance and Positioning Options** for details.

6. To Front/To Back

Send the overlay to the front or back of the back-to-front-ordering. Overlays closer to the front of the order cover up those closer to the back of the order.

7. Reset

Clears all settings preset in the current overlay.



Examples:



STATIC OVERLAYS

Logo

1. Browse

Select your desired logo/image file.

2. Display Format

With this group of settings, you can further customize how your logo overlay looks and its position on the screen. See **Appearance and Positioning Options** for details.

3. Scale

Uniformly shrink or enlarge the image.

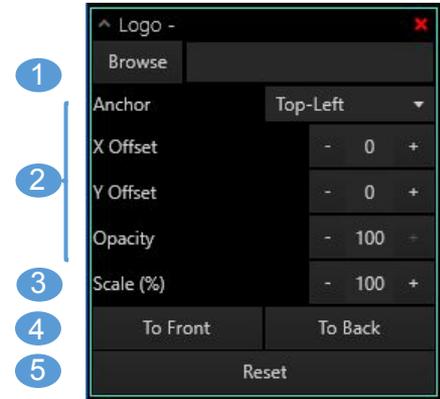
Note: certain types of images may appear blurry or pixelated when enlarged.

4. To Front/To Back

Send the overlay to the front or back of the back-to-front-ordering. Overlays closer to the front of the order cover up those closer to the back of the order. For example, you can use this positioning to easily place a logo behind dynamic text.

5. Reset

Clears all settings preset in the current overlay.



Typical appearance:



AUTOMATIC OVERLAYS

Date and Time

1. Date and Time

Date: Check this box to show the date on your footage.

Time: Check this box to show the time on your footage.

If desired, modify `yyyy/MM/dd` and `HH:mm:ss` to your preferred date and time format. The clock is that of the DVR and can be adjusted via the clock on the Windows taskbar.

2. Display Format

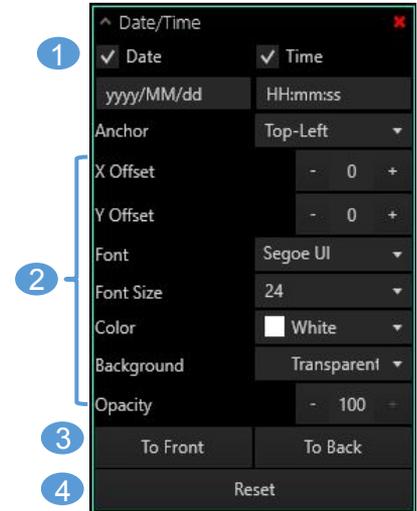
With this group of settings, you can further customize how your date/time overlay looks and its position on the screen. See **Appearance and Positioning Options** for details.

3. To Front/To Back

Send the overlay to the front or back of the back-to-front-ordering. Overlays closer to the front of the order cover up those closer to the back of the order. For example, you can use this positioning to easily place the current time on top of a custom graphical background.

4. Reset

Clears all settings preset in the current overlay.



Typical appearance:

2016/03/07 14:58:36

AUTOMATIC OVERLAYS

Recording Time

1. Recording Timer

Starts a timer that will be shown on your footage that will run for the duration of the recording and will stop when the recording ends. The timer shows hours, minutes, and seconds.

2. Display Format

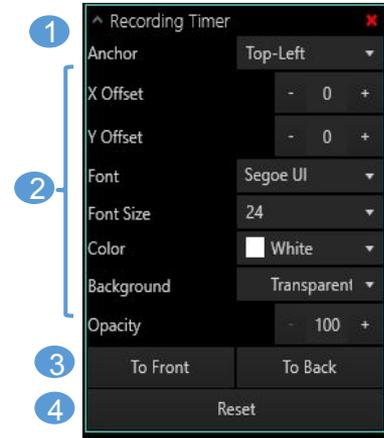
With this group of settings, you can further customize how your timer overlay looks and its position on the screen. See **Appearance and Positioning Options** for details.

3. To Front/To Back

Send the overlay to the front or back of the back-to-front-ordering. Overlays closer to the front of the order cover up those closer to the back of the order. For example, you can use this positioning to easily place dynamic text on top of a custom graphical background.

4. Reset

Clears all settings preset in the current overlay.



Typical appearance:

02:28:17

DYNAMIC OVERLAYS

Serial Data

The **Serial Overlay** allows you to take in RS232 serial data from a GPS, depth sensor, or any other similar source.

1. COM Port

Choose the COM port to listen to. Typically, this is the same as the COM port of the connected camera.

2. Header or Expression To Match

Header: Enter the header/label under which your device transmits the desired information. After selecting the COM port, check the *Communication Preview* panel to identify your header from the stream.

Expression: Use this setting to match the incoming data with a regular expression. Regular expressions can match complex patterns and can be used to provide more customizable data overlays. *(SubC can help you find a suitable regular expression if you provide us with a sample data set and an example of what you want to display)*

3. Format

See **Output Formatting**. For expression matching SubC can provide you with the format to match your data

4. Display Format

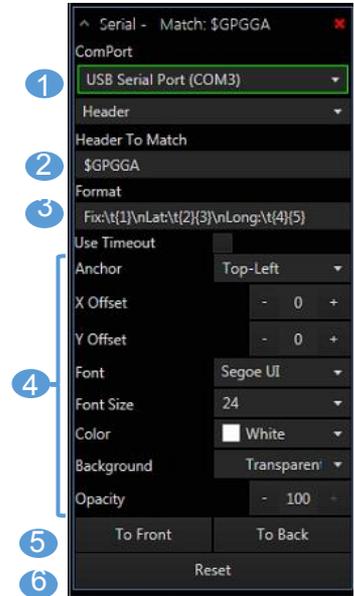
With this group of settings, you can further customize how your serial overlay looks and its position on the screen. See **Appearance and Positioning Options** for details.

5. To Front/To Back

Send the overlay to the front or back of the back-to-front-ordering. Overlays closer to the front of the order cover up those closer to the back of the order. For example, you can use this positioning to easily place dynamic text on top of a custom graphical background.

6. Reset

Clears all settings preset in the current overlay.



Typical appearance:



DYNAMIC OVERLAYS

UDP Data

The **UDP Overlay** allows you to include overlay data from your network encoded in UDP (User Datagram Protocol) messages.

1. Port

Select the port number at which to listen for UDP messages.

2. Header To Match

Enter the header/label under which your device transmits the desired information. In this example, we want the NMEI location sentence \$GPGGA.

3. Format

Enter the cells containing the data you wish to display. The header cell is 0. The header cell and the subsequent data cells are separated by commas and increase in number from left to right (header is 0, 1st data cell is 1, 2nd data cell is 2, etc.) In this example, we are displaying latitude and longitude from \$GPGGA (in degree and decimal minute form). The line begins with \$GPGGA,123519,4807.038,N,01131.000,E, so we enter 2,3,4,5.

4. Display Format

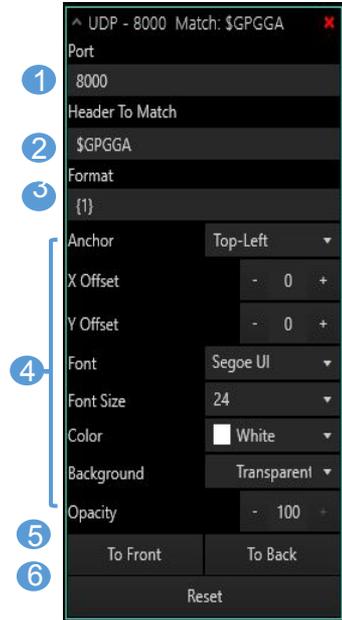
With this group of settings, you can further customize how your UDP overlay looks and its position on the screen. See **Appearance and Positioning Options** for details.

5. To Front/To Back

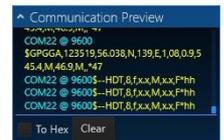
Send the overlay to the front or back of the back-to-front-ordering. Overlays closer to the front of the order cover up those closer to the back of the order. For example, you can use this positioning to easily place dynamic text on top of a custom graphical background.

6. Reset

Clears all settings preset in the current overlay.



Typical appearance:



DYNAMIC OVERLAYS

Altimeter

The Altimeter Overlay adds a histogram of your altitude while displaying your current altitude.

1. COM Port

Choose the COM port to listen to. Typically this is the same as the COM port of the connected camera.

2. Coloring Target Area & Target Area Color Settings

Specify the coloring of the middle circle and the backing colors for the inner and outer areas of the compass rose (optional).

3. Display Format

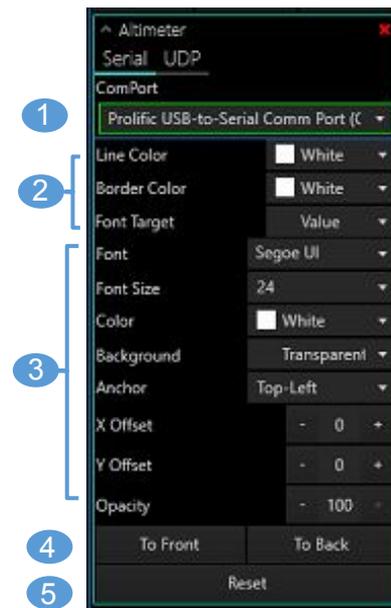
With this group of settings, you can further customize your heading overlay's appearance and position. Including the font, border and offset. See **Appearance and Positioning Options** for details.

4. To Front/To Back

Send the overlay to the front or back of the back-to-front-ordering. Overlays closer to the front of the order cover up those closer to the back of the order. For example, you can use this positioning to easily place dynamic text on top of a graphical background.

5. Reset

Clears all the settings preset in the current overlay.



Typical appearance:



DYNAMIC OVERLAYS

Depth

The Depth Overlay displays a histogram of your depth, with minimum/maximum bounds¹, along with your current depth reading at the top right of the overlay.

1. COM Port

Choose the COM port to listen to. Typically, this is the same as the COM port of the connected camera.

2. Display Format

With this group of settings, you can further customize how your depth overlay looks and its position on the screen. See **Appearance and Positioning Options** for details.

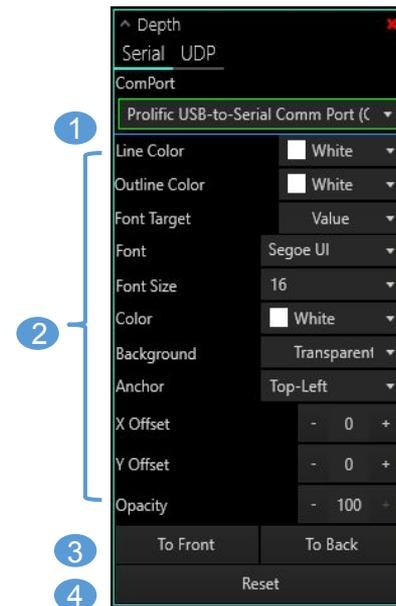
3. To Front/To Back

Send the overlay to the front or back of the back-to-front-ordering. Overlays closer to the front of the order cover up those closer to the back of the order. For example, you can use this positioning to easily place dynamic text on top of a custom graphical background.

4. Reset

Clears all settings preset in the current overlay.

1 - These begin at 0m and 100m respectively and adjust to fit the shallowest and deepest points of your measured depth.



Typical appearance:



DYNAMIC OVERLAYS

Heading

The Heading Overlay adds a rotating compass rose with your preset heading numerically displayed.

1. Heading

Your camera's preset heading is displayed here. Degrees increase clockwise from North (0°), through to East (90°), South (180°), etc.

2. COM Port

Choose the COM port to listen to. Typically this is the same as the COM port of the connected camera.

3. Show Turn Counter

Check this box to include showing turns on the header overlay.

4. Scale and Position Offset

Adjust the size of the overlay as it appears on the video, as well as the X and Y offset.

5. Coloring Target Area & Target Area Color Settings

Specify the coloring of the middle circle and the backing colors for the inner and outer areas of the compass rose. Details will display below.

6. Font Target

Specify the font and text color of the central heading value and the individual compass letters. Details will display below (7).

7. Font Customization

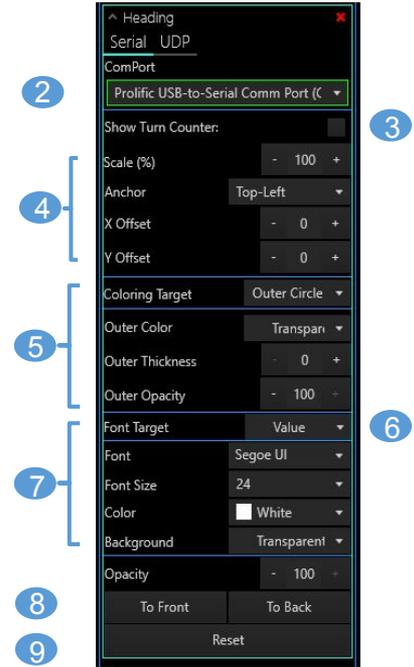
In this section you can customize the font, size, color and transparency. See **Appearance and Positioning Options** for details.

8. To Front/To Back

Send the overlay to the front or back of the back-to-front-ordering. Overlays closer to the front of the order cover up those closer to the back of the order. For example, you can use this positioning to easily place dynamic text on top of a custom graphical background.

9. Reset

Clears all settings preset in the current overlay.



Typical appearance:



DYNAMIC OVERLAYS

Picture-in-Picture/Splitscreen

The Picture-in-Picture (PiP) and Splitscreen features allow two videos to be combined into a single presentation. Any overlays present in the source video will be included in its representation on the destination video.

1. Select Mode

Select either the Picture-in-Picture (PiP) or Splitscreen checkbox.

2. Video

Select source video to be inserted.

3. Enforce AR (Aspect Ratio)

Ensures video is represented in its natural proportions while in Picture-in-Picture/Splitscreen mode.

4. PiP Size and Positioning

Adjust the horizontal (X Offset) and vertical (Y Offset) positions relative to the center and the video size.

5. Splitscreen Orientation

Select the type of split and where the inserted video will appear relative to the split.

6. Split At

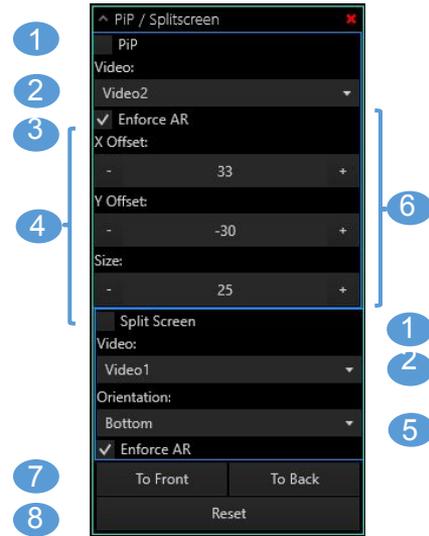
Adjust the proportion of the width or height at which the screen split occurs.

7. To Front/To Back

Send the overlay to the front or back of the back-to-front-ordering. Overlays closer to the front of the order cover up those closer to the back of the order. **These settings do not apply to Splitscreen.**

8. Reset

Clears all settings preset in the current overlay.



Typical appearance:



OUTPUT FORMATTING

Serial and UDP Data

1. Header To Match

Enter the header tag you would like to extract data from.

Examples: \$GPGGA, \$HDA, \$ATL, etc.

2. Format

Enter the format you would like to display on screen. You can use **regular text** and embed data with **{cell of information}**, and you can use `\n` for a new line, and `\t` for a horizontal tab.

Example

Input: \$GPGGA,123519,34850.038,N,34933.000,E

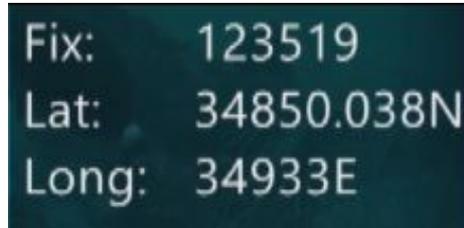
Format: Fix:\t{1}\nLat:\t{2}{3}\nLong:\t{4}{5}

Output:

Fix: 123519

Lat: 34850.038N

Long: 34933.000E



The DVRO can also perform operations on serial data. For example, if depth data came in as feet it can be converted to meters using the following string:

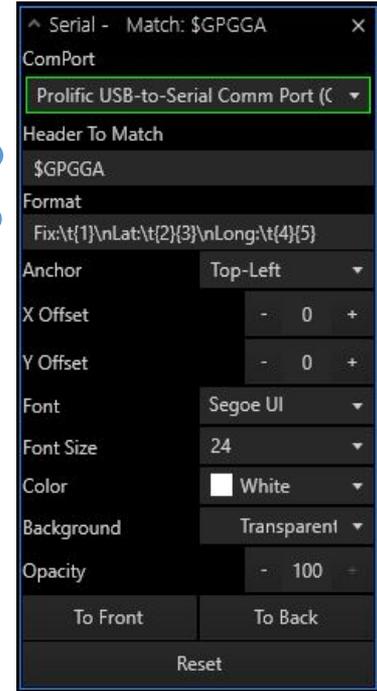
Input String

\$--DBS,123,F

Format

[{1}*0.3048]m

- 1
- 2



OUTPUT FORMATTING

Appearance and Positioning

1. Anchor: Select the region where you would like the overlay to appear (top-left, center, bottom-right, etc).

2. X Offset: Allows you to move your overlay whatever distance to the left or right that you wish, and is measured from your anchor point (1). A greater X Offset means a greater distance rightward. Offsets can be negative.

3. Y Offset: Allows you to move your overlay whatever distance up or down that you wish, and is measured from your anchor point (1). A greater Y Offset means a greater distance upward. Offsets can be negative.

4. Font: Choose the font you would like to use for overlays that employ text (Text, Date/Time, etc.)

5. Font Size: Select the font size.

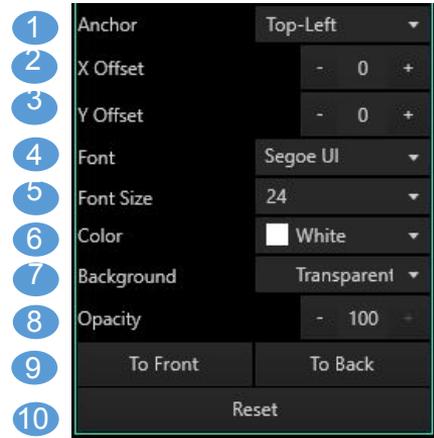
6. Color: Select the color of the text.

7. Background: Select a color to display behind your text. To have text without a background select transparent.

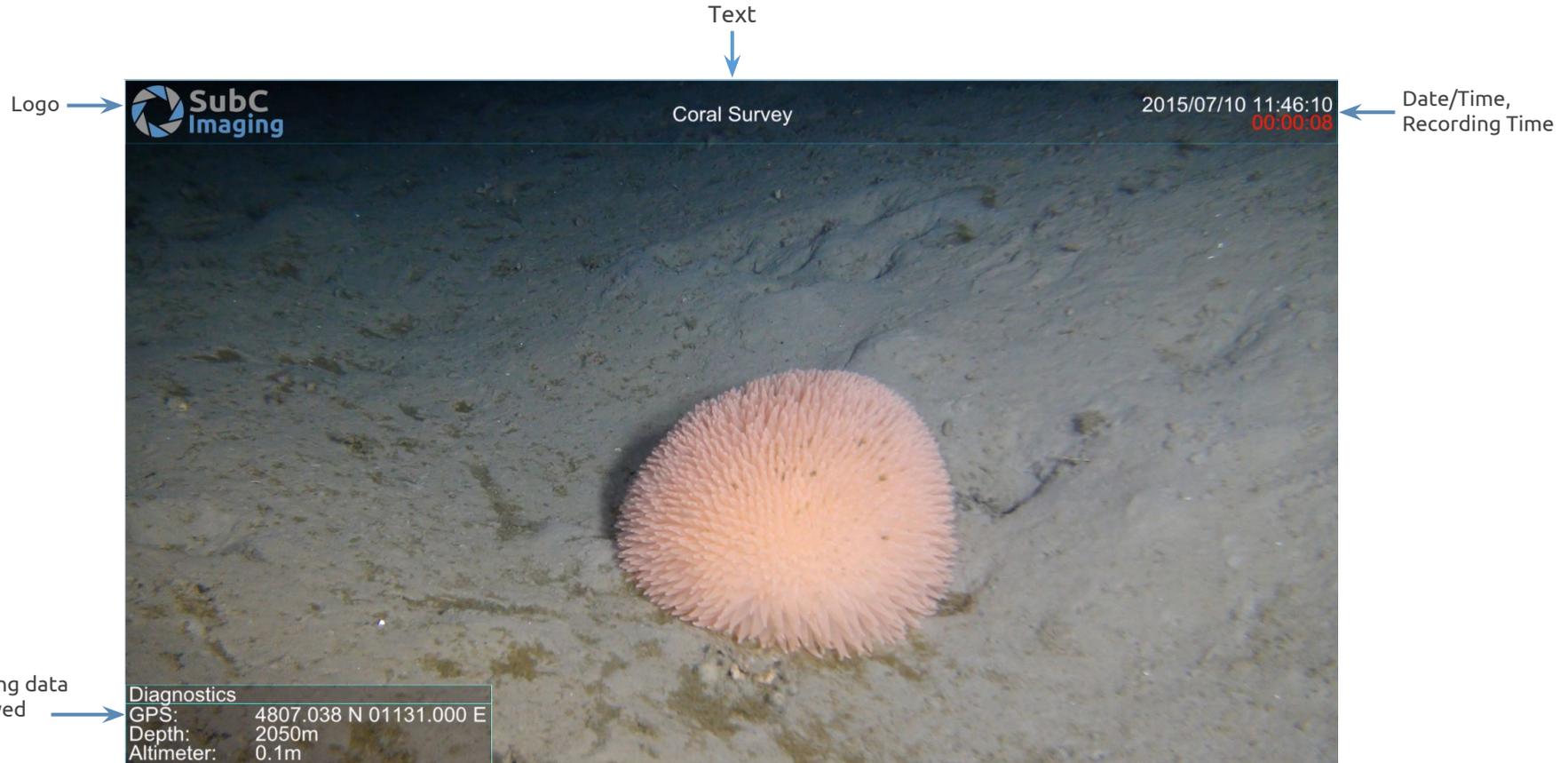
8. Opacity: Allows you to choose how transparent the whole overlay will be. Higher values equal greater solidity.

9. To Front/To Back: Send the overlay to the front or back of the back-to-front-ordering. Overlays closer to the front of the order cover up those closer to the back of the order. For example, you can use this positioning to easily place dynamic text on top of a custom graphical background.

10. Reset: Clears all settings preset in the current overlay.

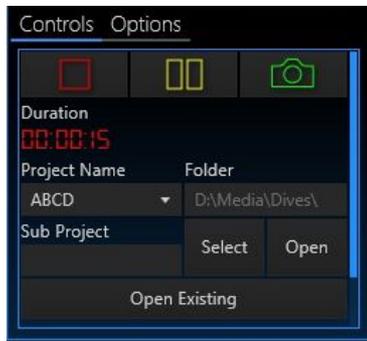


OVERLAYS IN ACTION



DIVE LOG

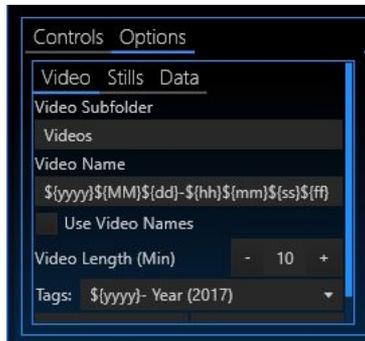
Controls and Settings



Controls: Start a new dive by defining a new *Project Name*.

Once the dive is finished (and recording stopped), the **Playback Button** will become active and you will be able to replay the videos of your dive.

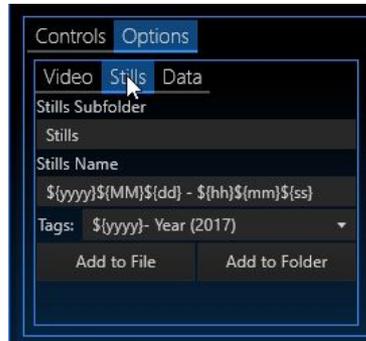
Open Existing: Open an existing dive and select it from the open file dialog.



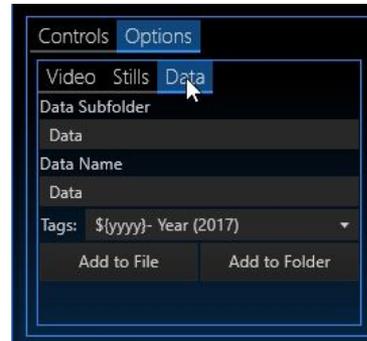
Video: Set the filename and location for video files recorded by the dive logger.

Use Videos Names: Check this box if you wish to use the filenames and locations as configured in the individual video tabs.

Video Length: The duration of the video before it gets split into another file.



Stills: Set the filename and location for stills files captured by the dive logger.



Data: Set the filename and location for logging serial or UDP data.

DIVE LOG

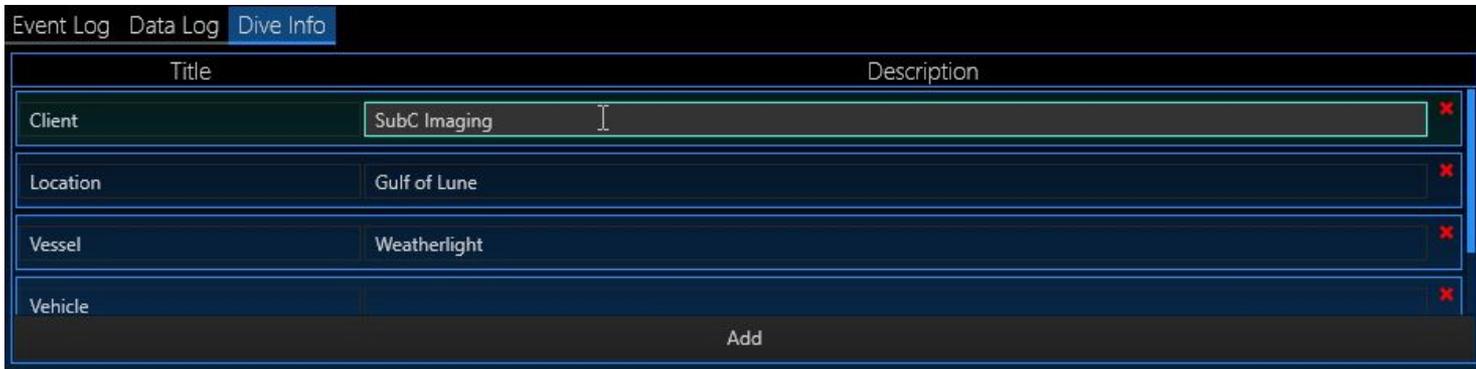
Events and Dive Log Information



The screenshot shows the 'Event Log' tab in the software interface. On the left, there is a 'Controls' panel with a 'Duration' display showing '00:00:15', a 'Project Name' dropdown set to 'ABCD', and a 'Folder' dropdown set to 'D:\Media\Dives\'. Below these are 'Sub Project', 'Select', and 'Open' buttons, and an 'Open Existing' button. The main area displays a table with the following data:

Title	Description	Date/Time
Fish	Spotted a Fish	2017-11-02 10:38:04 AM
Coral	Spotted Coral	2017-11-02 10:38:06 AM
Fish	Spotted a Fish	2017-11-02 10:38:07 AM
ROV Stopped	ROV Stopped here	2017-11-02 10:38:09 AM

Event Log: Events that have been logged are displayed. Date/Time are automatically added.



The screenshot shows the 'Dive Info' tab in the software interface. It features a form with the following fields:

Title	Description
Client	SubC Imaging
Location	Gulf of Lune
Vessel	Weatherlight
Vehicle	

At the bottom of the form is an 'Add' button.

Dive Info: Allows you to enter details about the dive, such as location, vessel, and vehicle.

You can also add your own fields.

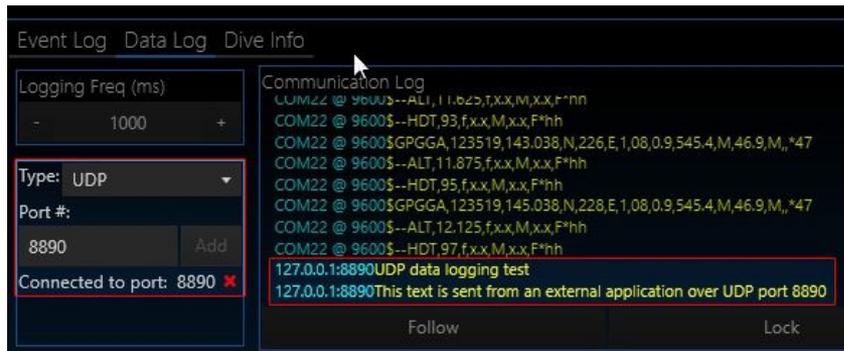
Data Log: Serial and UDP

Serial



- Under the *Data Log* tab, select *Serial* under the *Type* dropdown.
- Start a new connection by choosing one of the *Available Ports* and a *Logging Frequency* (The default value is 1000ms).
- Click the *record* button to begin the communication log. The *Communication Log* displays data information that is produced from the connected port during recording.

UDP



Displays live UDP data that can be logged concurrently with serial data.

- Under the *Data Log* tab, select *UDP* under the *Type* dropdown.
- Enter the *port number* that the data is coming in on.
- Click the *record* button to begin the communication log. The *Communication Log* displays data information that is produced from the connected port during recording.

Events

The **Events** system allows you to quickly mark special occurrences in your dives. For example, you can use an event to mark sightings of particular species or damaged equipment.

While the footage is being recorded and an event type is registered, you can simply press the corresponding button to register each occurrence in the dive. This action will capture the measurements associated with the event (e.g. depth). These values, together with the date and time, will be added to the *Events Log*.

You can save your event types for reuse on subsequent dives.

1. Add Event: A new window will open where you can enter a title and description for the event. Click *OK* to create your event.

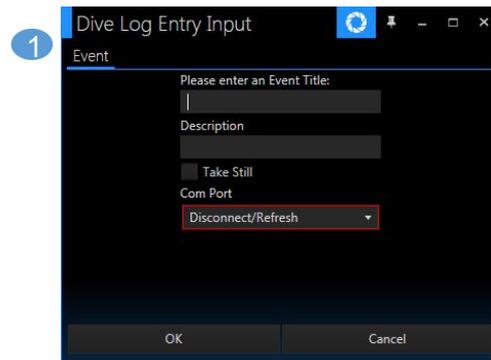
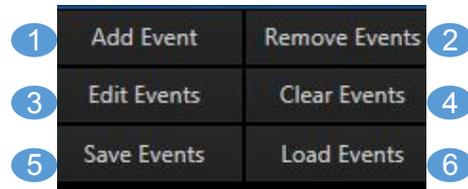
2. Remove Events: Remove a single event type that has been created in the dive log.

3. Edit Event: Edit a single event type that has been created in the dive log.

4. Clear Events: Clear *all* event types that have been created in the dive log.

5. Save Events: Save the event types that have been created to a file for reuse on other dives.

6. Load Events: Choose previously saved event types for reuse.



EVENTS LOGGER IN ACTION

The screenshot displays the Events Logger software interface. The top portion features a large video feed showing two yellow fish swimming in dark water. To the right of the video is a vertical menu with buttons for 'Add Event', 'Remove Events', 'Edit Events', 'Clear Events', 'Save Events', and 'Load Events'. Below these are pre-defined event categories: 'CORAL', 'STRUCTURAL FISSURE', 'CRAB', 'DEPTH', and 'FISH'. A bracket on the right side of this menu points to the text 'Pre-defined events. Click to register each occurrence'. The bottom portion of the interface is a 'Dive Log' table with columns for Title, Description, Date/Time, Anomaly, Data, and Delete. A bracket on the left side of this table points to the text 'Detailed list of event occurrences'.

Title	Description	Date/Time	Anomaly	Data	Delete
CRAB		6/22/2016 9:41:46 AM	<input type="checkbox"/>		×
CRAB		6/22/2016 9:41:46 AM	<input type="checkbox"/>		×
DEPTH		6/22/2016 9:41:49 AM	<input type="checkbox"/>		×
CORAL		6/22/2016 9:41:53 AM	<input type="checkbox"/>		×
STRUCTURAL FISSURE		6/22/2016 9:41:56 AM	<input type="checkbox"/>		×
FISH		6/22/2016 9:41:58 AM	<input type="checkbox"/>		×

Pre-defined events.
Click to register
each occurrence

Detailed list of
event occurrences

DIVE LOG

Output to Folder Structure

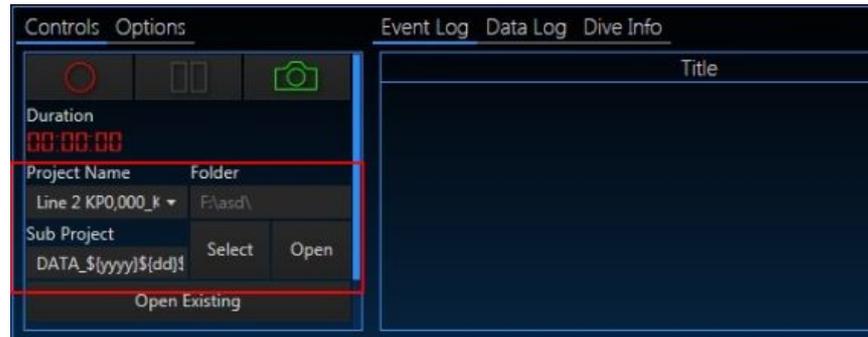
Under the **Controls** tab, set the *Project Name*, *Folder* and *Sub Project Name*

Auto Updating timestamps can be included by adding tags such as `${yyyy}` for year and `${ss}` for seconds.

Select: opens a new window where you can then choose a folder to save in

Open: opens the selected folder in windows Explorer

Open Existing: opens a new window where you can open a dive that has already been recorded, view events and add new video/data to it



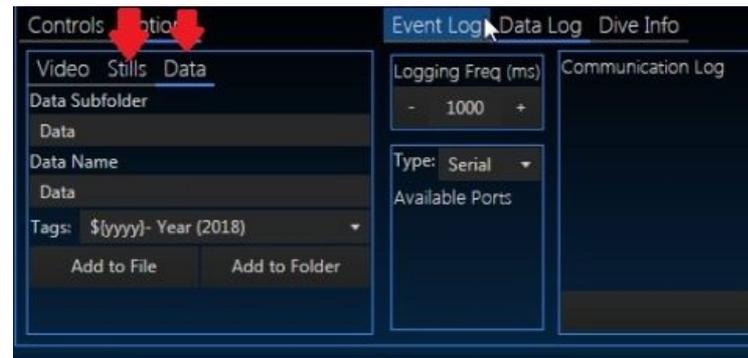
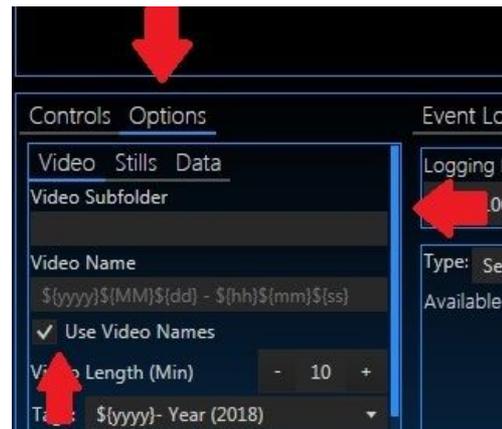
DIVE LOG

Output to Folder Structure

Under the **Options** tab, choose the *Video Subfolder*. If left blank, it will use the same folder that was selected under the *Controls* tab.

Select the *Use Video Names* checkbox.

Repeat for *Stills* and *Data*, if required.



DIVE LOG

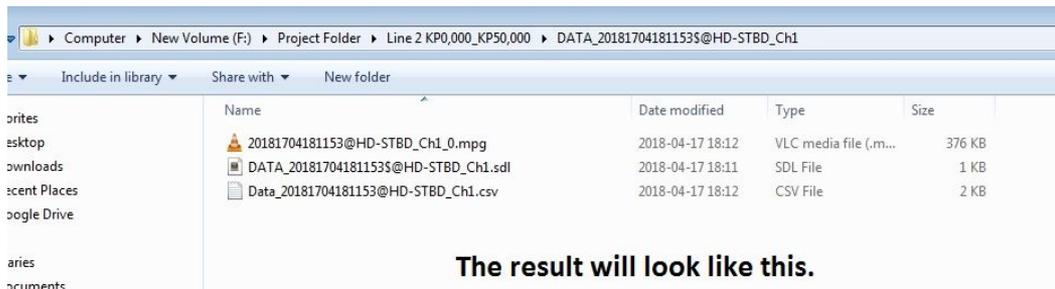
Output to Folder Structure

Go to the **Video** tab on the top of the screen

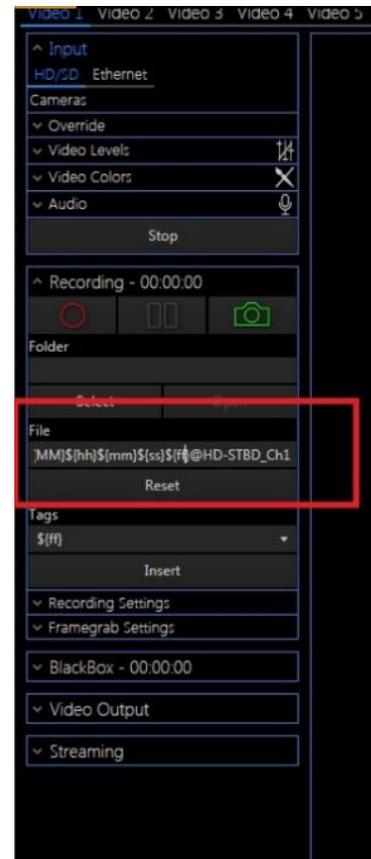
Under *File*, configure the file names as needed

Tags (eg. $\${fff}$) can be used to include automatically updating timestamps

Repeat for each video tab in use



The result will look like this.



REMOTE CONTROL

REMOTE CONTROL

Serial Configuration - Inspection Management Software

The DVRO can also accept direct commands from leading Inspection Management Software. It will need to be configured in advance so that it can listen for the appropriate commands via its network ports.

Setting up the built-in Remote Control

Click the **Settings** tab along the top row of tabs where video feeds are selected.

The DVR Settings window will appear:

- **Serial Port - COMXX:** A header will display a menu for each COM Port on the computer.
- **Baud Rate:** The transmission rate. If the sender and receiver have different Baud's it won't work.
- **Wait for terminator:** Select this box to ignore the *Master Timeout* and *Data Timeout* and wait until whatever string of characters is in the *Terminator* box to show up.
- **Master timeout:** Set to how many milliseconds to wait between messages coming in until the command is finished.
- **Data timeout:** Set to how many milliseconds to wait before the message is considered finished.
- **DTR and RTS:** Options on the serial ports.



DVR Settings Window

REMOTE CONTROL

Remote Configuration - Inspection Management Software

Choose how you would like to receive messages - Serial or Ethernet.

Under the [Remote Configuration](#) section, select either [Serial](#) or [UDP](#) from the dropdown menu.

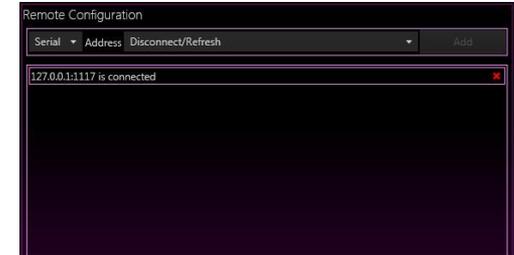
- For Serial control: Select a COM port from the next dropdown. then click [Add](#).
- For UDP control: Enter a port number into the next field and click [Add](#).

To *clear/disable* a port, click the red **x**.

The DVR is now ready for remote control. You can issue commands through the protocol you have selected.

Please ensure that:

- Any video and still capture paths specified in your inspection software correspond to feasible paths on the DVR and not a read-only location (e.g. not an optical drive)
- The drive letter is valid (a letter being used by one of the storage devices on the DVR)
- That there is sufficient free space on the drive. Individual folders, however, will be created without issue if it happens that they don't already exist on the DVR file system.



DVR Remote Control Settings

REMOTE CONTROL

Commands

Command	Function
update_status	Return the status of the DVR
start_recording	Start recording. This will start recording Video 1
stop_recording	Stop recording all videos
take_still	Take a frame grab of all initialized videos
take_still c:\stilldir\still.jpg	Take a frame grab with the name and directory specified for Video 1
save recording_path	Sets the record path of Video 1
load recording_path	Get the current record path for Video 1
save recording_prefix	Sets the prefix of the recorded Video 1 file
load recording_prefix	Return the filename of the recorded Video 1 file
anom start_recording C:\Anom\anom1	Start recording an anomaly video with a specified path
Anom stop_recording	Stop recording anomaly video
Anom update_status	Anomaly recording status

MISCELLANEOUS

STORAGE

Storage

The SubC DVRO is available with a wide range of on-board storage options, featuring various high-capacity magnetic drives intended for your video files. The operating system drive is a Solid State Drive in all configurations.

Rack mount DVR

3x 3.5 inch Swap Bays*, up to 24 Terabytes on-board storage

* These allow the drives to be exchanged via the front panel without having to open the DVR case and void the warranty.

IMPORTANT! The DVR must be powered down before changing drives.



RAID

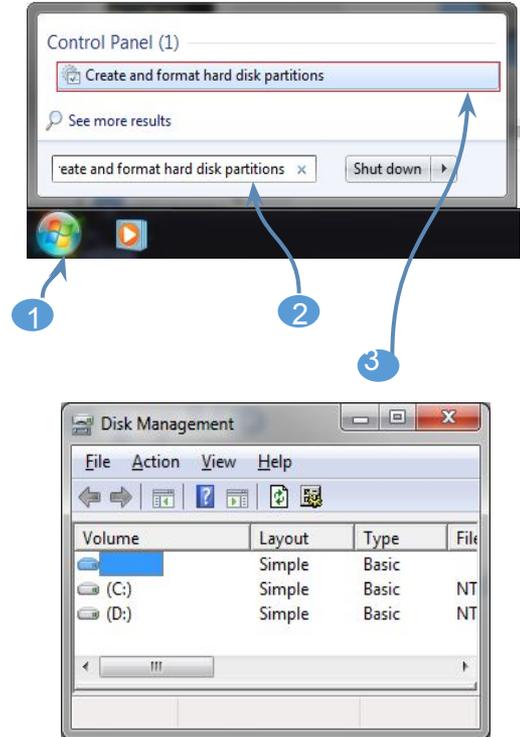
Configuration

RAID stands for Redundant Array of Independent Disks and refers to any technology that combines multiple physical disk drive components into a single logical unit for the purposes of data redundancy and recovery.

You can set up your video recording drives to mirror each other for redundancy. This halves the overall capacity, but if one of the drives fail you can recover your recordings in full from the other drive, replace the failed drive, and resume recording.*

1. Press the *Windows Start* button.
2. Type **create and format hard disk partitions** into the *Search Programs and Files* text box. Alternatively, you can type **disk management** as that is the name of the utility.
3. Select *Create and format hard disk partitions* from the search results to open *Disk Management*.
4. Any freshly-installed drives will be greyed out. Right-click on one and select *New Mirrored Volume*.
5. Follow the instructions and choose the second drive as the mirror.
6. Accepting defaults, press *Next* as needed.
7. Leave the *Disk Management* program running until the drives turn **red**.

* For detailed information about recovering from a disk failure in a RAID configuration, contact your system administrator.



DATA VALIDATION

Drift Monitor

Drift Monitor

The DVR employs a special algorithm to detect when your video file may be compromised and you have lost footage as a result. The DVR will alert the user when the difference between the expected recorded length and actual recorded length increases beyond the set threshold. This is set to 5% by default, which means you will be alerted if you lose more than 3 seconds for every 60 recorded.

1. Max Drift

The maximum amount of footage you determine to be acceptable loss. The minimum acceptable loss is 1%, or 36 seconds for every hour.

2. Time to wait

Set the interval after which the algorithm engages. Monitoring **cannot begin immediately** because even an extremely small difference (in absolute terms) on a very small number can trigger the alert. For example, if the expected length is 100ms and the actual file is 50ms, that would register as 50% loss. The **recording needs to stabilize** for at least a few seconds before it can start monitoring.

3. Show Warning / Stop Recording on Max Drift

Uncheck *Show Warning* if you do not want to receive a popup warning message when drift percentage goes over the maximum threshold.

By default, the DVR stops recording when loss above the threshold is detected. You will be warned if you uncheck the box that the **recording will not stop if a problem is detected**. This should only be used in extreme circumstances, such as if your drive has degraded and you have no spare but still need to record as best you can.

4. Drift

Current measured difference between expected recorded length and actual recorded length.

The screenshot shows the 'Recording Diagnostics' menu with the following settings and status:

- 1. Max Drift (%): 10
- 2. Time to wait (Seconds): 30
- 3. Show Warning:
- 4. Stop Recording on Max Drift:
- Drift: 19.9 (highlighted in red)
- Seconds Lost: 6
- Total Drift: 0.1

Bottleneck Monitor

To mitigate data loss, the DVR monitors the video write buffer. If it increases beyond the set threshold, data will be lost. This is an indication that the drive may be too slow based on the bitrate, or that other programs are accessing the drive and consuming the data throughput. For best results, use the video drives only for recording video.

Drift Monitor

What is the Drift Monitor?

See previous page (**Data validation**)

Will I lose footage during recording and not be alerted?

No. The monitor runs as you record and will alert you and, by default, stop recording as soon as there is a problem.

That sounds intrusive, I don't care if I lose a few seconds here and there.

The drift monitor is configurable from the *Recording Diagnostics* panel in the *Recording Settings* section. You can configure it to have greater tolerance before issuing an alert and even to continue recording in spite of any alerts. Please refer to the **previous section** for configuration settings.

Why am I losing video?

We have traced this anomaly to several causes, but one of the most frequent reasons is that the drive is too slow to record at the selected bit rate. This may be due to the drive being old, or having many files already on the drive, both of which can impact performance. If you're accessing the drive through the Windows file browser while recording, it can also slow the drive's throughput to unacceptable levels.

Storage Device

How can I speed up my drive?

- Reformat the drive.
- Don't access the drive while recording.
- Don't copy anything to or from the drive while recording.
- Consider purchasing a **SubC Certified Drive**.

What is a SubC Certified Drive?

These high-performance drives have been tested by SubC and are capable of simultaneous recording of up to 2x HD feeds *and* 2x SD feeds indefinitely. Contact SubC for more information.

Why can't I set my Max Drift to 0%? I don't want to lose any data!

Timers cannot be perfectly accurate and so a base level of tolerance needs to be built in to minimize false positives (being alerted to a problem when there isn't one). You shouldn't actually lose any data unless your hard drive is degraded or overtaxed (e.g. trying to record too many high-bitrate feeds at once, or trying to copy a file when recording).

Can I record to a flash drive?

It depends on the performance characteristics of the particular flash drive. You can record to a flash drive but you may need to reduce the bitrate. Flash drives are generally not ideal for continuous large-scale rewriting.

Overview

Standard-Performance Configurations

1x Ethernet HD / SD

- 1 channel in (HD or SD, via Ethernet)¹
- 1 channel out (VGA or HDMI or DVI)²

1x SD

- 1 channel in (SD, via Composite or Ethernet)¹
- 1 channel out (VGA or HDMI or DVI)²
- Requires additional 3-week lead time. Please contact your dealer in advance

1x HD

- 1 channel in (HD, via HD-SDI or Ethernet)^{1,3}
- 2 channels out (1x HD-SDI, plus VGA or HDMI or DVI)^{2,9}

4x Ethernet 2x HD

- 4 channels in (up to 2x HD or up to 4x SD, via Ethernet)^{1,4}
- 1 channel out (VGA or HDMI or DVI)²

4x SD

- 4 channels in (4x SD, via Composite or Ethernet)¹
- 1 channel out (VGA or HDMI or DVI)²

4x SD and 2x HD / 3D

- 4 channels in (HD/3D via HD-SDI or Ethernet, SD via Composite or Ethernet)^{1,5}
- 3 channels out (2x HD-SDI, 1x HDMI)⁹
- Our default configuration, units are held in stock for rapid deployment

High-Performance Configurations

4x Ethernet 4x HD

- Higher-performance hardware
- 4 channels in (4x of HD and/or SD, via Ethernet)^{1,6}
- 1 channel out (VGA or HDMI or DVI)²

4x HD/3D I/O

- Higher-performance hardware
- 4 channels in (4x of HD and/or 3D, via HD-SDI or Ethernet)^{1,3,7}
- 5 channels out (4x HD-SDI, 1x HDMI)⁹

4x SD and 4x HD / 3D

- Higher-performance hardware
- 4 channels in (4x HD/3D via HD-SDI or Ethernet, 4x SD via Composite or Ethernet)^{1,8}
- 5 channels out (4x HD-SDI, 1x HDMI)⁹
- Storage: 2x 512GB solid-state drives in RAID 1 (mirrored) configuration

Important considerations:

1. Capture from Ethernet cameras requires switch or other network topology.
2. Additional output(s) available using USB to HDMI adapter(s). Sold separately.
3. Can also capture from SD camera(s) over Ethernet. Subject to input channel maximum.
4. Supports 2x HD plus 2x SD, or 1x HD plus 3x SD, or 4x SD.
5. Supports 2x of HD and/or 3D (2 of a type, or 1 of each type) plus 2x SD, or 1x HD or 3D (1 of a type) plus 3x SD, or 4x SD.
6. Up to 4 channels total with any combination of HD and SD channels permitted.
7. Up to 4 channels total with any combination of HD and 3D channels permitted.
8. Up to 4 channels total with any combination of HD, 3D, and SD channels permitted.
9. SDI outputs correspond to SDI inputs and are non-overlayable.

Overview

4K Configurations

4x SD, 1x 4K

- Higher-Performance Hardware
- 4 channels in (1x 4K / HD / 3D via 6G-SDI, up to 4x SD via Composite or Ethernet)^{10, 14, 15}
- 2 channels out (1x 6G-SDI, 1x HDMI)¹²
- Storage: 2x 512GB solid-state drives in RAID 1 (mirrored) configuration

4x SD, 1x 4K and 4x HD / 3D

- Higher-Performance Hardware
- 4 channels in (1x 4K via 6G-SDI, up to 4x HD / 3D via HD-SDI or Ethernet, up to 4x SD via Composite or Ethernet)^{11, 15}
- 5 channels out (1x 6G-SDI, 4x HD-SDI, 1x HDMI)¹²
- Storage: 2x 512GB solid-state drives in RAID 1 (mirrored) configuration

4x SD and 2x 4K / HD / 3D

- Higher-Performance Hardware
- 4 channels in (up to 2x 4K / HD / 3D via 6G-SDI, up to 4x SD via Composite or Ethernet)^{13, 14, 15}
- 3 channels out (2x 6G-SDI, 1x HDMI)¹²
- Storage: 2x 512GB solid-state drives in RAID 1 (mirrored) configuration

Important considerations:

10. Using the 4K channel limits concurrent SD channels to 3.
11. Up to 4 channels total with any combination of HD, 3D, and SD channels, can include 1 4K channel.
12. SDI outputs correspond to SDI inputs and are non-overlayable.
13. Up to 4 channels total.
14. Can also capture from HD cameras over Ethernet. Subject to input channel maximum.
15. Capture from Ethernet cameras requires switch or other network topology.