USER GUIDE FOR NETmc MARINE ***DVR***

Rev. 8.0 DVR
Firmware 1.6.76
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1. Introduction

The NETmc Marine ***DVR*** is our latest one size fits all, modular, adaptable digital video recorder.

Bringing together over 20 years of experience and innovative digital video solutions to the offshore survey and inspection sector, this product consolidates features to replace the DVRi, XOPs, 73fifty, DVRiHD and Four264.

Supplied in its base configuration as a single channel, simple video recorder, the unit can be upgraded in the field* to perform other functions as and when desired.
Functions such as – overlay, blackbox, multi video channel, clip recording, remote control, integrity management control (Coabis etc), pipeline mode (EIVA control and compatibility) are available.

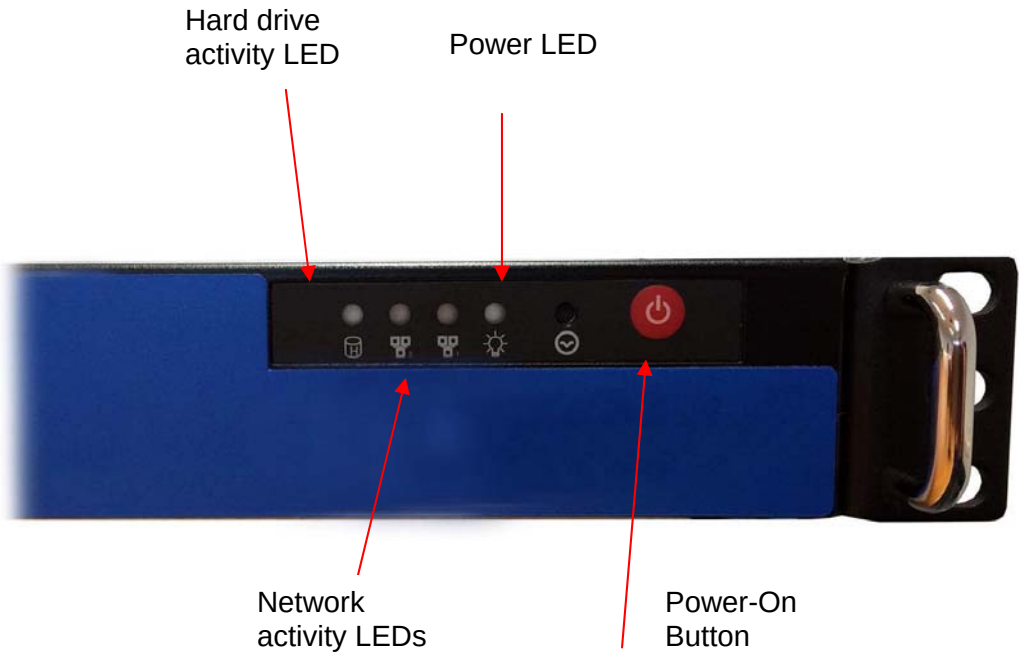
Understanding that some of these features may only be of use on certain projects, the features can be rented for set durations and activated by a license code emailed out to the field.

*some features may require return to supplier upgrades depending when purchased

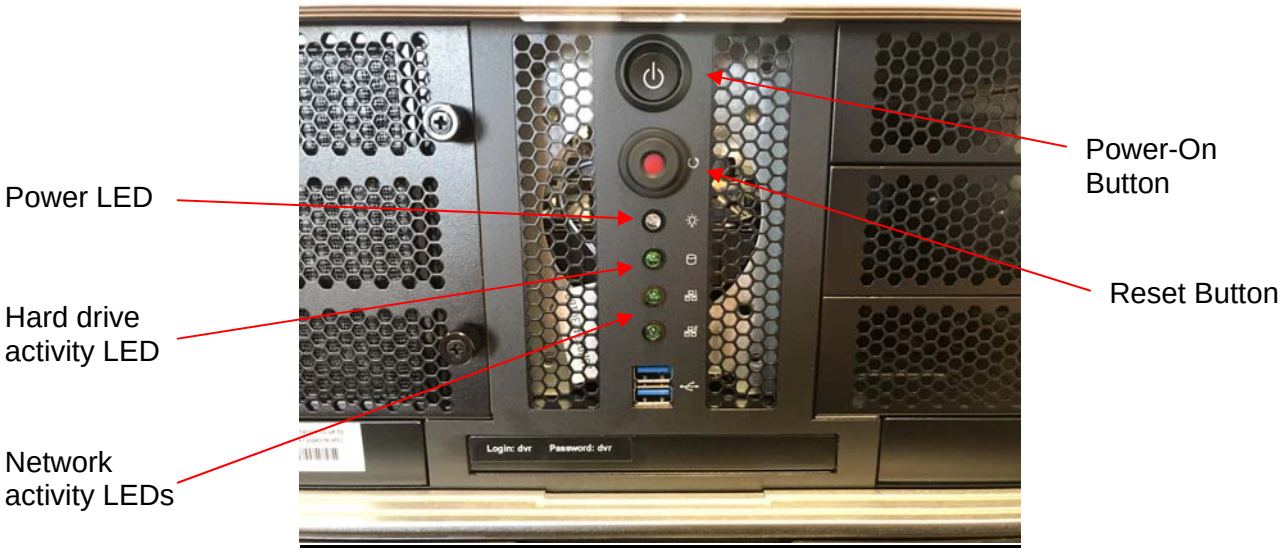
2. Hardware Description and Connections

2.1 Front of the unit

1U unit

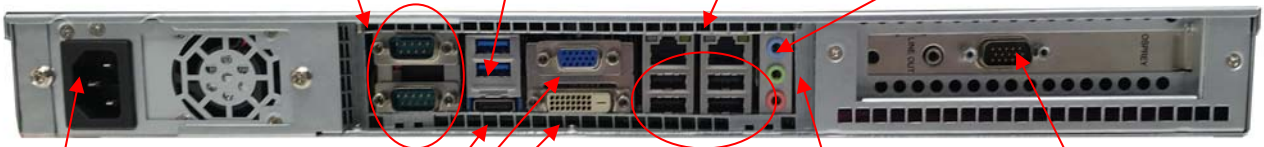


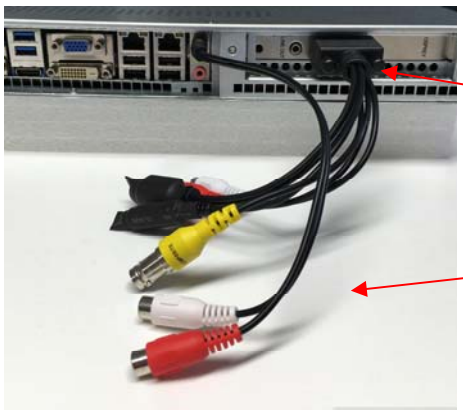
4U unit (behind door)



2.2 Back of the unit

1U Unit



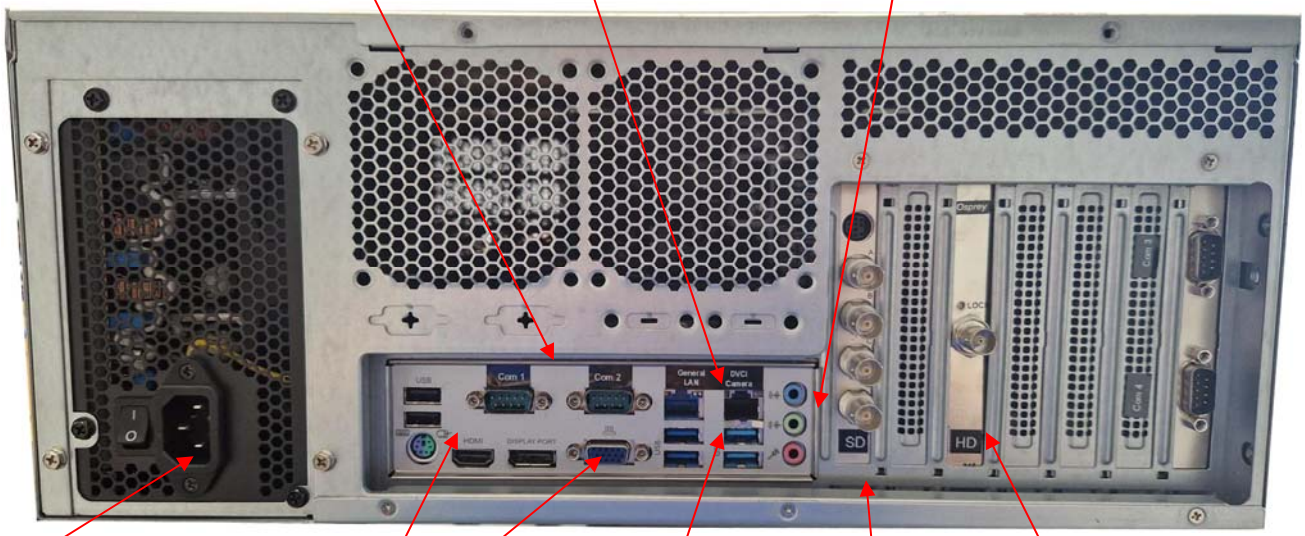


Supplied adapter installed – yellow BNC is video input

Supplied RCA adapter for audio recording

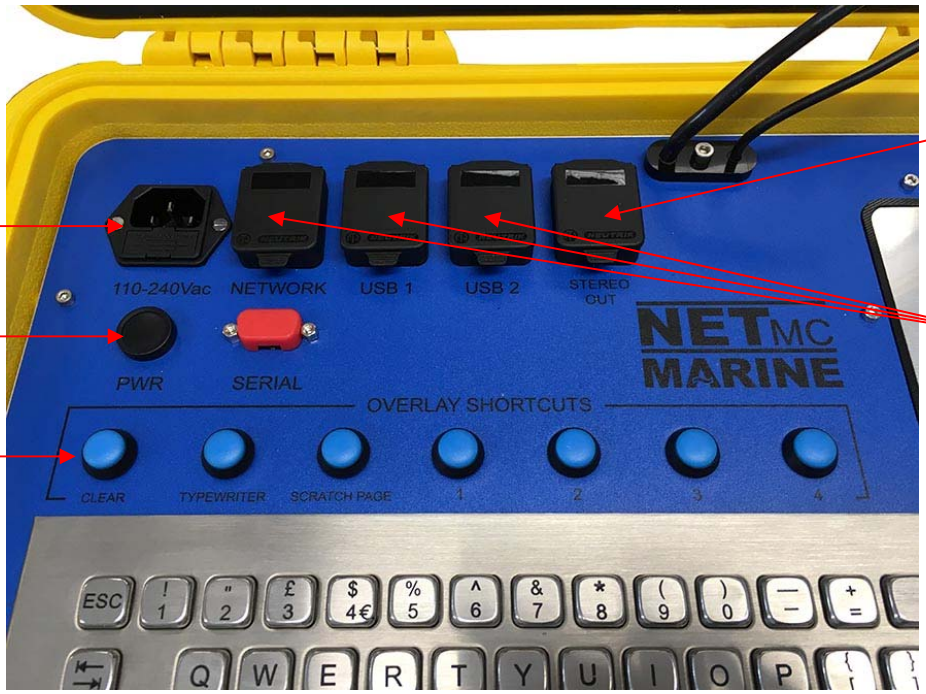
HD-SDI input (720 & 1080 support)

4U Unit



HDMI input (720 & 1080 support)

Pelicase Unit



Mains input (110/240)

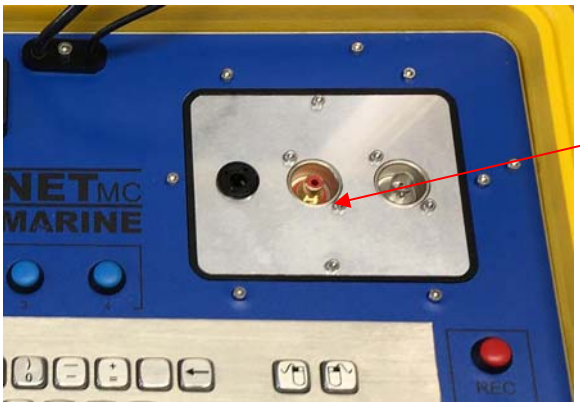
Power On

Overlay keyboard controls

PC audio out – headphones etc

PC I/O

Recording control shortcut keys – alternative to using the trackerball or mouse – ideal if wearing gloves.



Client specific I/O panel – connectors depend on ordered specification / video type etc

** as the unit is air-tight, the metal panels will act as heatsinks and will get warm during operation **

3. Set-up

It is important to plug in all video and audio connections before switching on the *DVR.*

THIS EQUIPMENT MUST BE EARTHED.

1. Mount the DVR in a suitable rack mount system.

2. Connect the power supply. **Note: this unit must be earthed**. Note (2): we highly recommend connection to a UPS (uninterruptible power supply) to prevent data loss.

3. Connect keyboard / mouse / monitor

4. Connect video / audio signals.

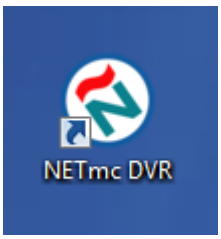
5. Power up the unit

6. Launch ***NETmc*** software from desktop icon.

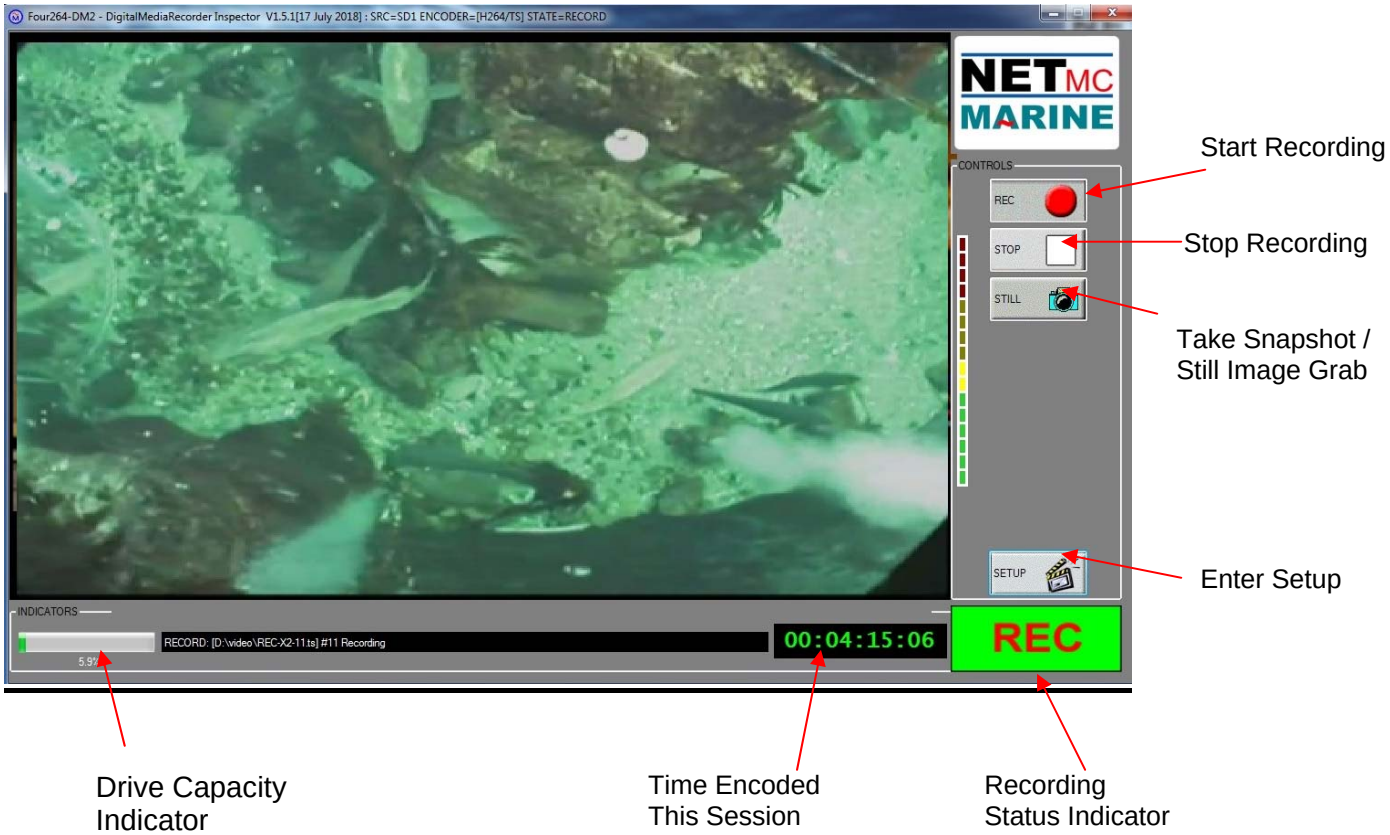
7. Live video images should be displayed on screen.

4. Operation

A shortcut on the desktop will launch the software which controls the ***DVR***



Once the program has started, the operation controls are displayed.
From here the user can start and stop recording, take still images (snapshots) and/ or video clips and enter the set-up screen.



Drive Capacity

Note that this display changes colour according to how much disk space is free:
The display is:

- Green if more than 25% of the disk is free. 
- Orange if between 10% and 25% of the disk is free
- Red if less than 10% of the disk is free. 

To start the recording, simply click on the REC button.

When recording has started, the status indicator changes to “REC” instead of “IDLE”, the REC button will become depressed and the minute counter will start to increment.

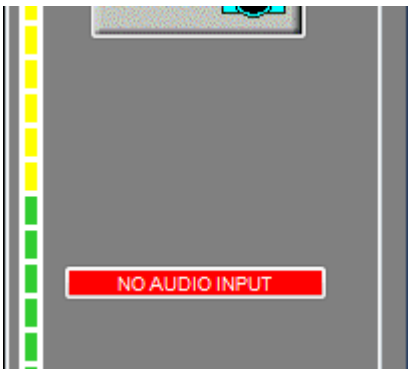
The image on the screen shows the video signal that is being input to the DVR.

Once the desired footage has been recorded, simply click on the STOP button to end recording.

At any point during the recording or preview, the image on the screen can be saved as a jpg file by clicking the STILL button.

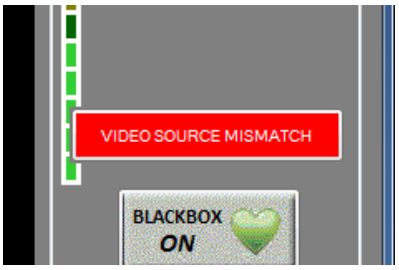
To resume logging, simply click the REC button again.
The system will automatically create a new file, automatically named as per the configuration in the SETUP page.

If audio has been lost or disconnected from the system a warning will appear on screen.



After correcting the problem click on the red warning to re-enable audio and continue. If no audio is required, no action needed.

In composite video input models, the system will auto detect PAL or NTSC. Due to the different picture size and frame rates, a switch during recording will cause replay issues – so the system will prompt the user to the format change with the a red warning message. Clicking on this message gives the user to continue on and risk file replay issues – or stop/start the recorder so a new file is started with the new format.



Pelicase units have push-button shortcuts to make the unit easier to operate while wearing gloves or in a moving environment where using the trackerball / mouse is difficult.

These buttons control the base functions of record, stop, still image grab, clip start/stop

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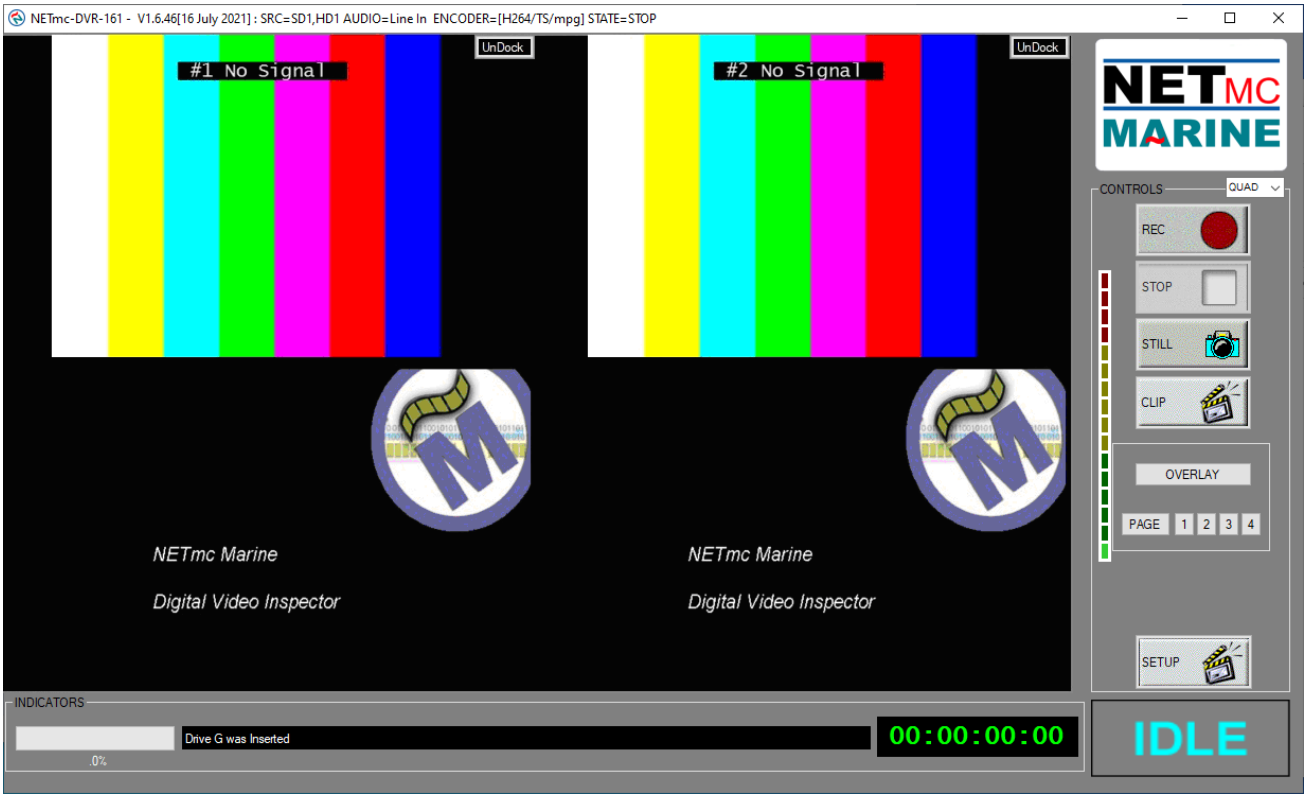
The overlay controls are also brought out to push-buttons, to clear screen, switch between saved pages and bring up the text entry box (typrewriter)

All these push-buttons (overlay and control) are only active when the NETmc recording software is the active software application.
The active application will have red shaded close (x) button in the top right corner. Clicking anywhere on an application should bring it to being the active one.

Active

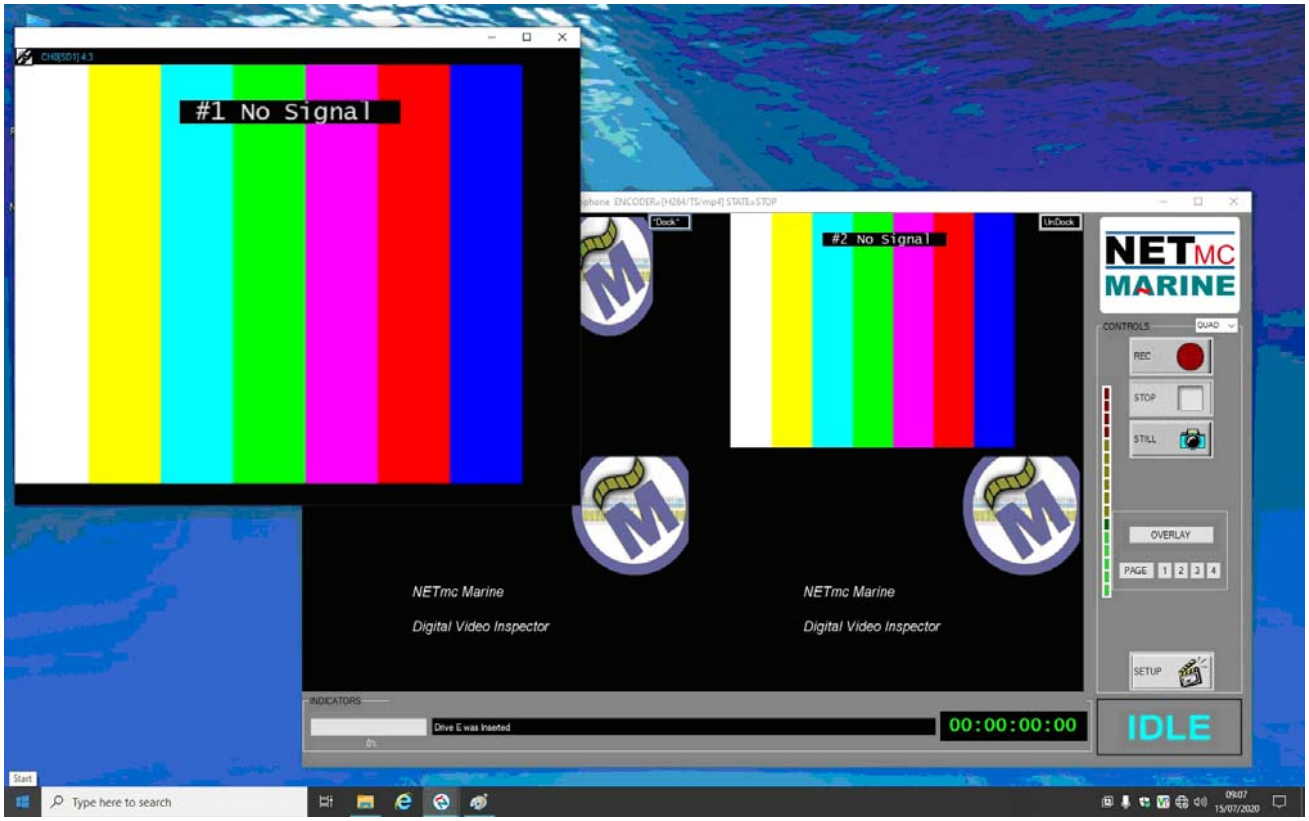

Not Active



If multi monitors are being used – it may be beneficial if one or more of the live video feeds be detached from the main software app and moved around and resized.

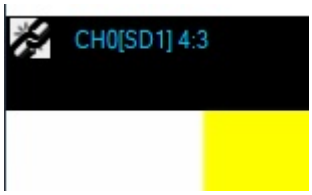
If supported / enabled, the UnDock button will be visible on each live video frame

Clicking UnDock will pull the video out so it can be moved around independently



Hitting Esc key or closing the UnDocked window will put it back where it came from in the main app.

In the top left of the UnDocked video window is some information.

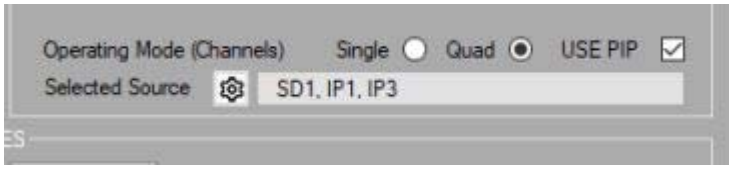


The Blue text tells you what channel and source its from and its aspect ratio

The linking icon is used to force the aspect ratio of the UnDocked video - - it might seem like a good idea to stretch out the video to match your connected monitor – but it might be distorting the detail of the image (making circles oval etc) – if it doubt – click the control in the corner and see the video jump to its correct proportions

PIP

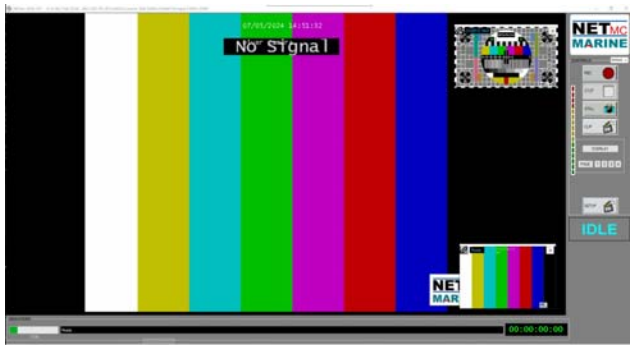
Technically probably POP rather than PIP (picture-out of – picture), sometimes (particularly in a 2 channel setup) instead of having multiple small preview images, it might have good to have 1 main image where most of the action is happening – with the other (less important) channels arranged on top.
If this has been licensed, the USE PIP tick box will appear in the setup page.



Once USE PIP has been ticked you can undock the less important channels and then change the view to single using the pull down option above the record button

The floating windows of the other channels can be arranged as you wish.

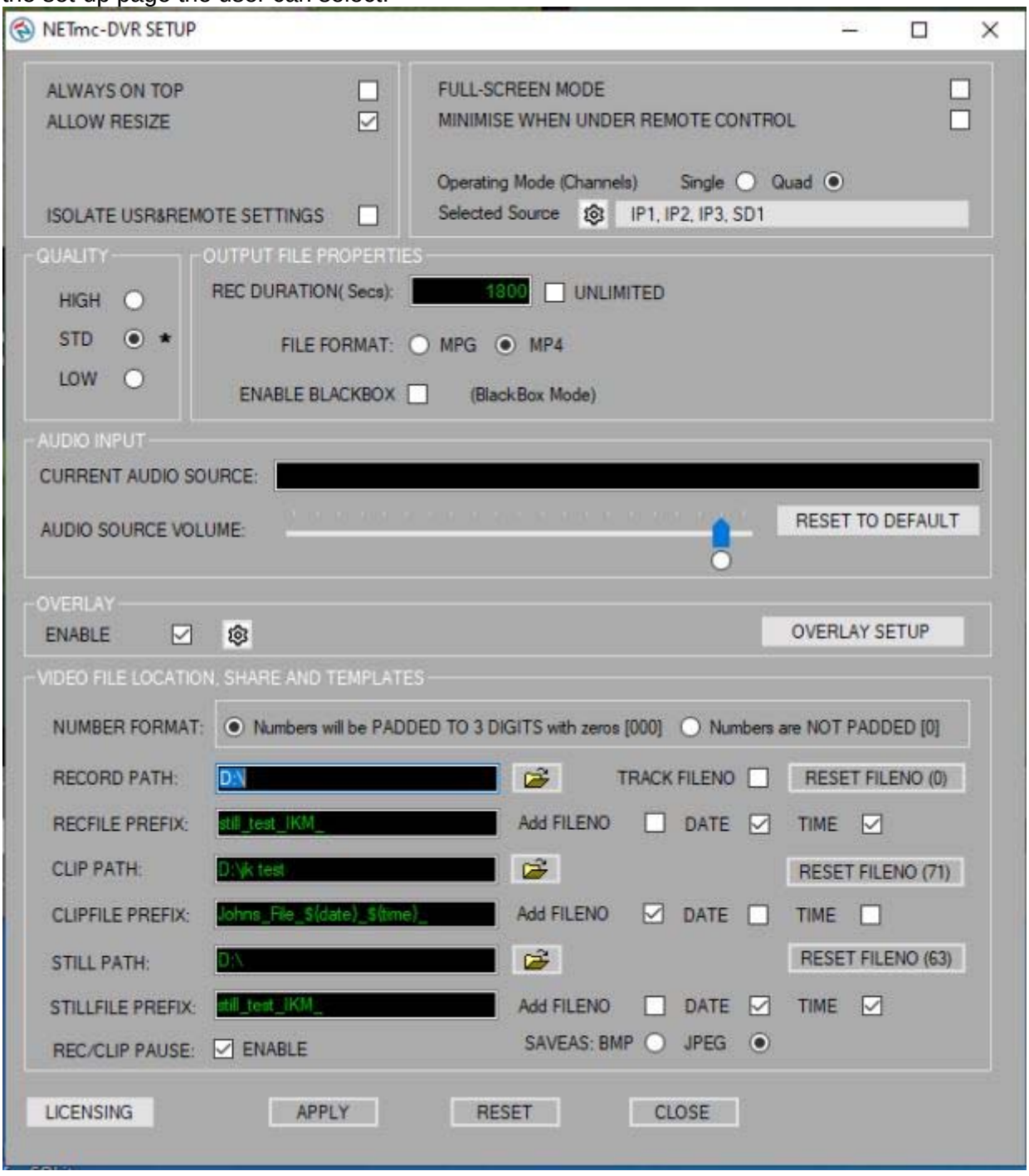
When the systems is shutdown / restarted, the positions will be remembered and restored.



5. Software Settings

Click on the Setup icon to access the set-up page.

In the set-up page the user can select:



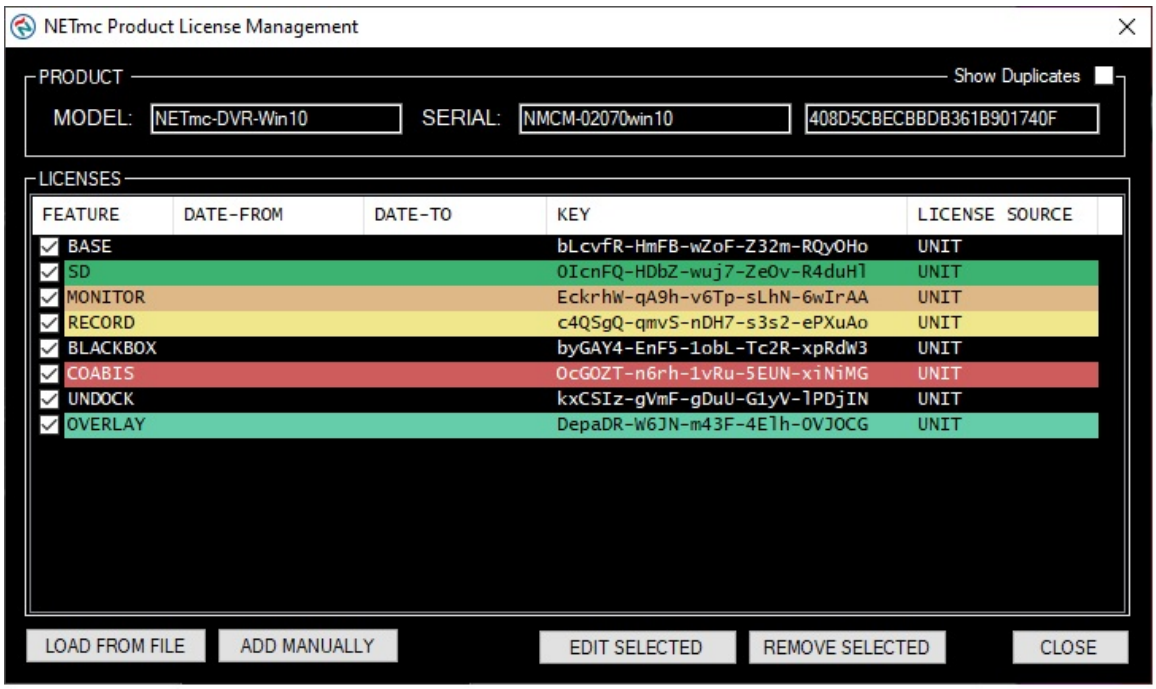
- ALWAYS ON TOP (if another window is opened it will always be behind, not covering, the DVR software)
- ALLOW RESIZE (lets the user stretch or shrink the software to fit chosen monitor)

- ISSOLATE USER & REMOTE SETTINGS (keeps 2 sets of file names and paths in memory – those get in the setup page by the user and those set remotely by 3rd party software e.g. Coabis. Can be useful is switching between manual and remote control use)
- FULL-SCREEN MODE (makes the video image the full size of the monitor, with the record controls floating on top – the option appears to have these floating controls disappear after a time and come back when the mouse is moved. Can be useful when duplicating the screen for distribution
- Operating mode (when licensed for multi channel – switches between single, quad and all sources on screen)
- Selected source (there may be more channels available then the unit is licensed for – this allows the selection of which sources to use)
- video quality (by experiment / customer specification)
- REC Duration (files are automatically cut into segments – this selects the size of segment)
- UNLIMITED (over rides the auto segment and creates one file – use with caution as big files may not be playable !)
- File Format (the DVR outputs mpeg4 so MP4 should be the default – but MPG has been included for compatibility with older systems and client requirements
- ENABLE RECORDING (if Blackbox has been licensed, this will be visible – tick the box to ensure that Blackbox recording starts as soon as the software is open)
- OVERLAY (if overlay is licensed, if can be switched on / off from here)
- OVERLAY SETUP (if overlay is licensed, the OVERLAY control and setup pages can be accessed here too)
- NUMBER FORMAT (then Add FileNo is added to the recfile, some lecagy systems expect 3 digits and some expect the minimal number of digits – e.g. starting at 0 rather than 000)
- RECORD PATH (location of where the main recording files are to be saved)
- RECFILE PREFIX (what the files should be called)
- ADD FileNO / DATE / TIME (tick to add any of these items after your prefix name – when recording manually – we recommend always adding date and time)
- TRACK FILENO (during recording, a new segment can be given a number which counts up with each new segment – enabling TRACK continues the count from where it left off – disable will start a fresh number count every time record is pressed)
- RESET FILENO (these buttons will reset the count number back to 0)
- CLIP PATH (if licensed, this is the location to save the additional video clip files which are controlled by the CLIP button on the main page)
- CLIP PREFIX (what the clip files should be called)
- ADD FileNO / DATE / TIME (tick to add any of these items after your prefix name – when recording manually – we recommend always adding date and time)
- STILL PATH (this is the location to save the video grab files)
- STILL PREFIX (what the still grab files should be called)
- ADD FileNO / DATE / TIME (tick to add any of these items after your prefix name – when recording manually – we recommend always adding date and time)
- SAVEAS BMP / JPG (sets the format of the Still image grabs – jpg are compressed which might impact on quality but will be smaller and easier to email

ALWAYS remember to apply or
the changes won't be saved.

Features and options are enabled / disabled by license. Options purchased never have to be renewed (there are no on going costs). Options can be purchased at any time and are enabled by license code.
Options can also be rented – this is also done via license code.

When a license is issued, it can be installed in the system via the ‘LICENSING’ button in the setup page.

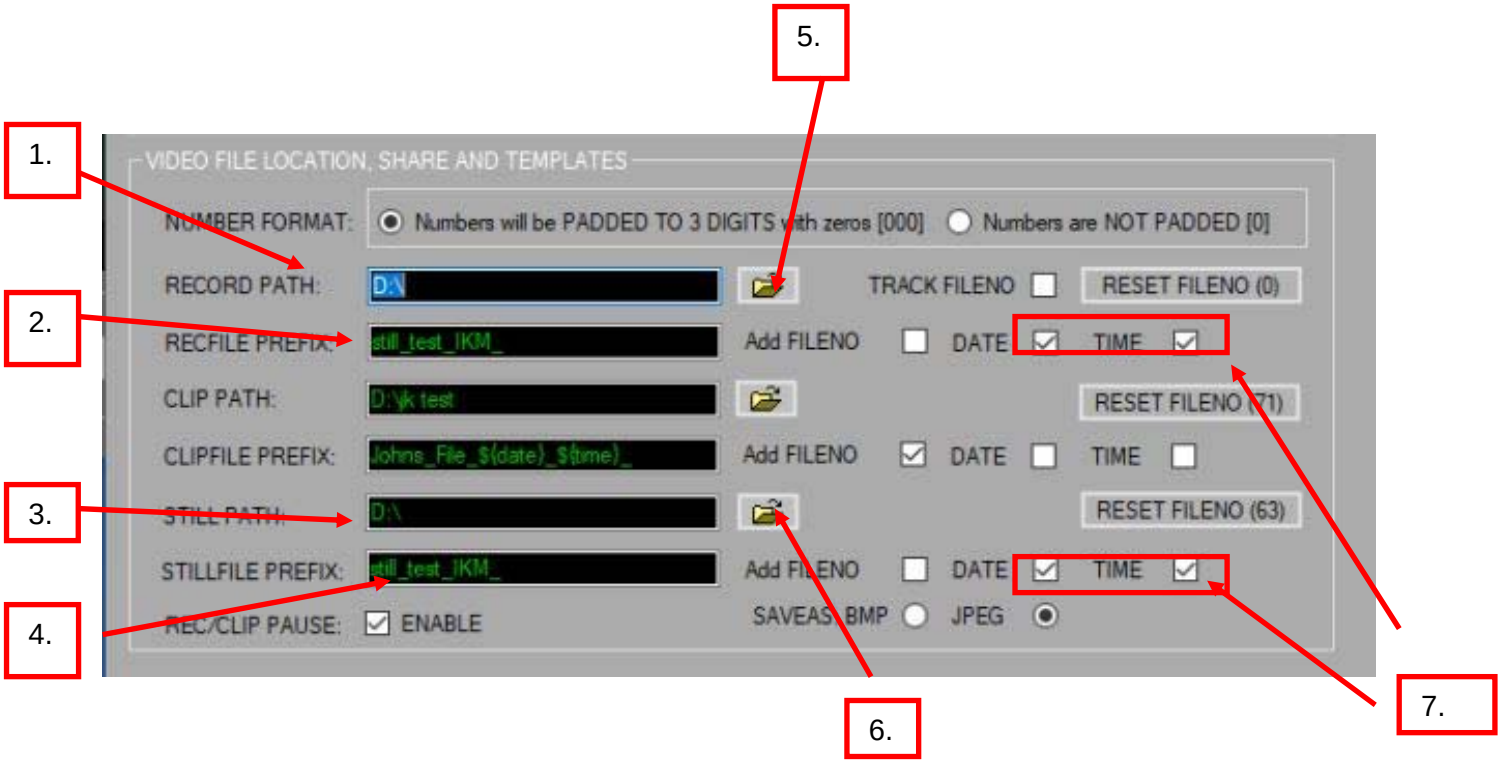


Most often, a license file will be emailed out and the ‘load from file’ option used to install that license / new feature.

6. File Save Setup

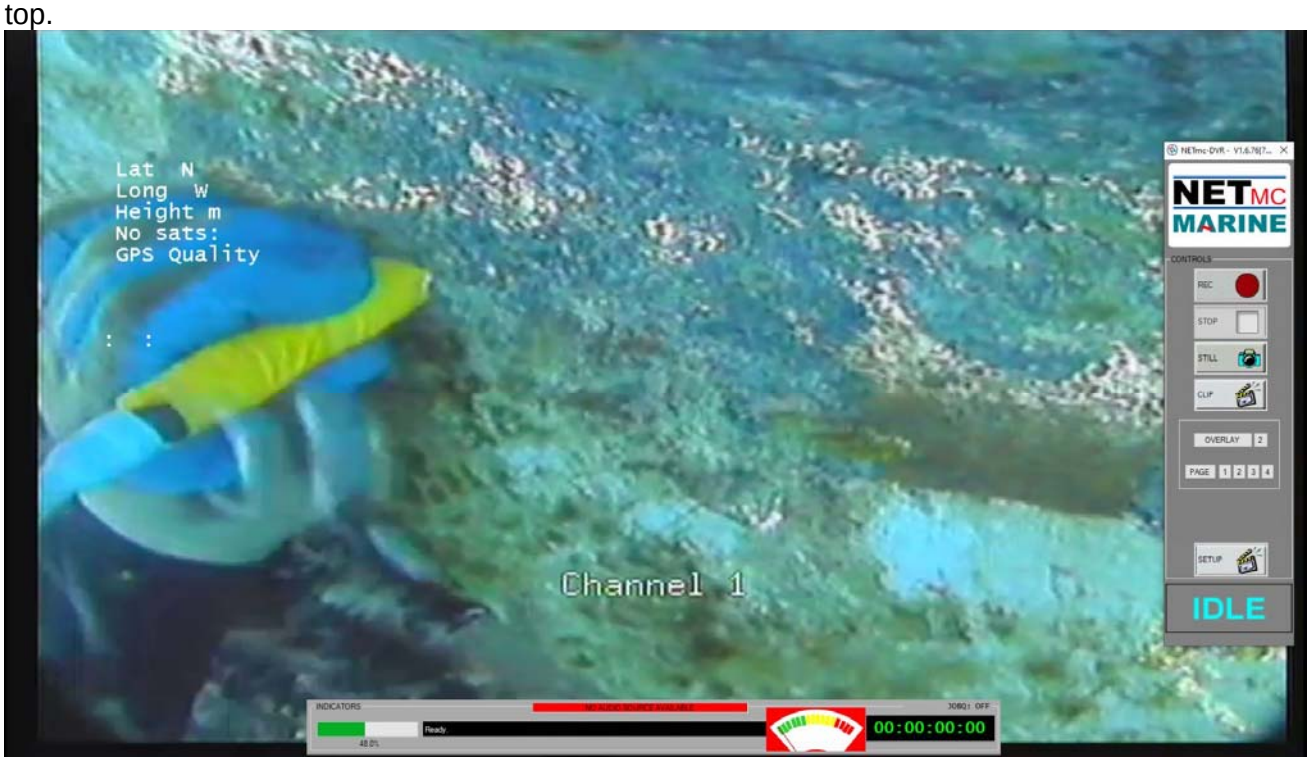
1. Location the video will be saved to.
2. Name of the video when it is saved.
3. Location the video stills/grabs will be saved to.
4. Name of the video still/grabs when they are saved.
5. Clicking this button will open a “Browse For Folder” window which will allow the user to select a file save location for recorded video.
6. Clicking this button will open a “Browse For Folder” window which will allow the user to select a file save location for still/grabs.
7. Ticking these boxes will add time/date to the file name.
   It is strongly recommended to do this as it ensures that all files will have unique names.

Example file save path: V:\Video\LiveVideo\GRABS\Client\FW1\Flange4

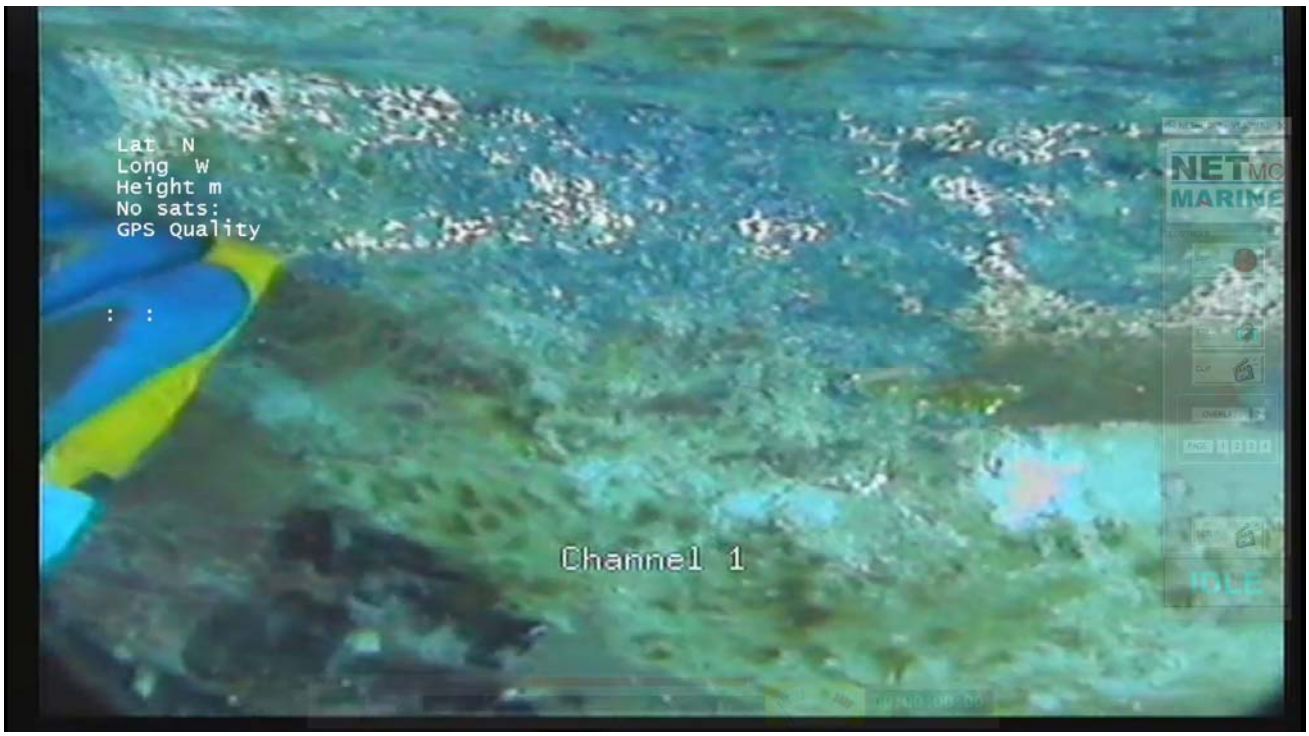


7. Full Screen

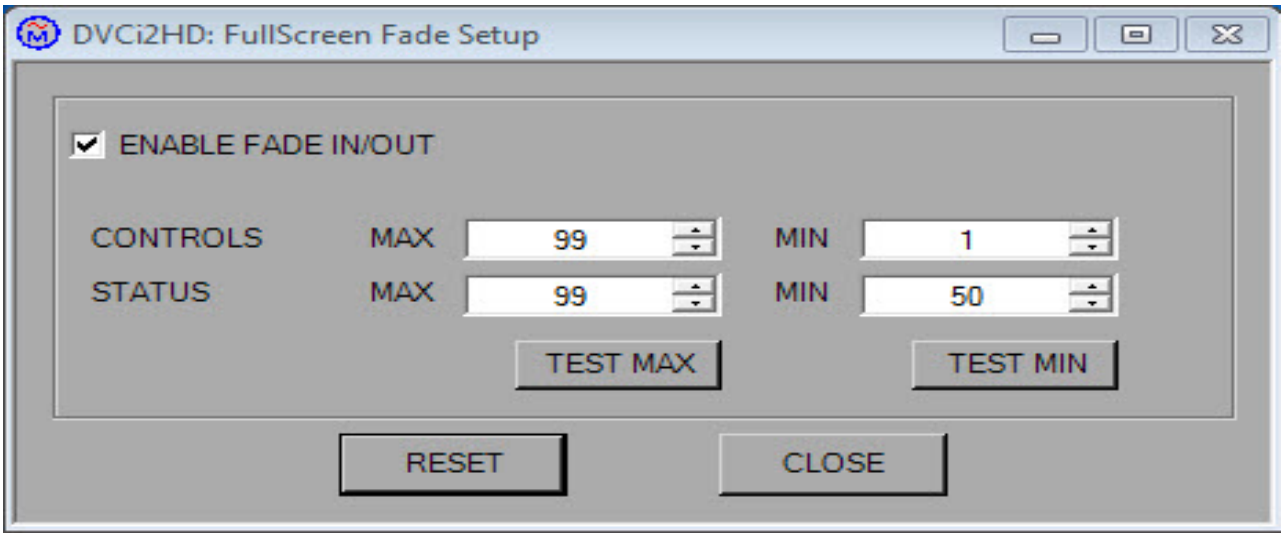
In the setup page, the user can select **FULL-SCREEN MODE**.
This displays the video in the largest possible size with the control buttons and indicators floating on top.



In full screen, the controls can be set to be more transparent when idle.



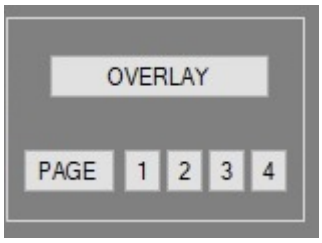
This is configured in the setup page by clicking on **SETUP FADEIN/OUT**



If the controls appear lost, use ALT + TAB to bring them back to the top.

8. Overlay

If the overlay option has been licensed, extra buttons will appear on the user interface

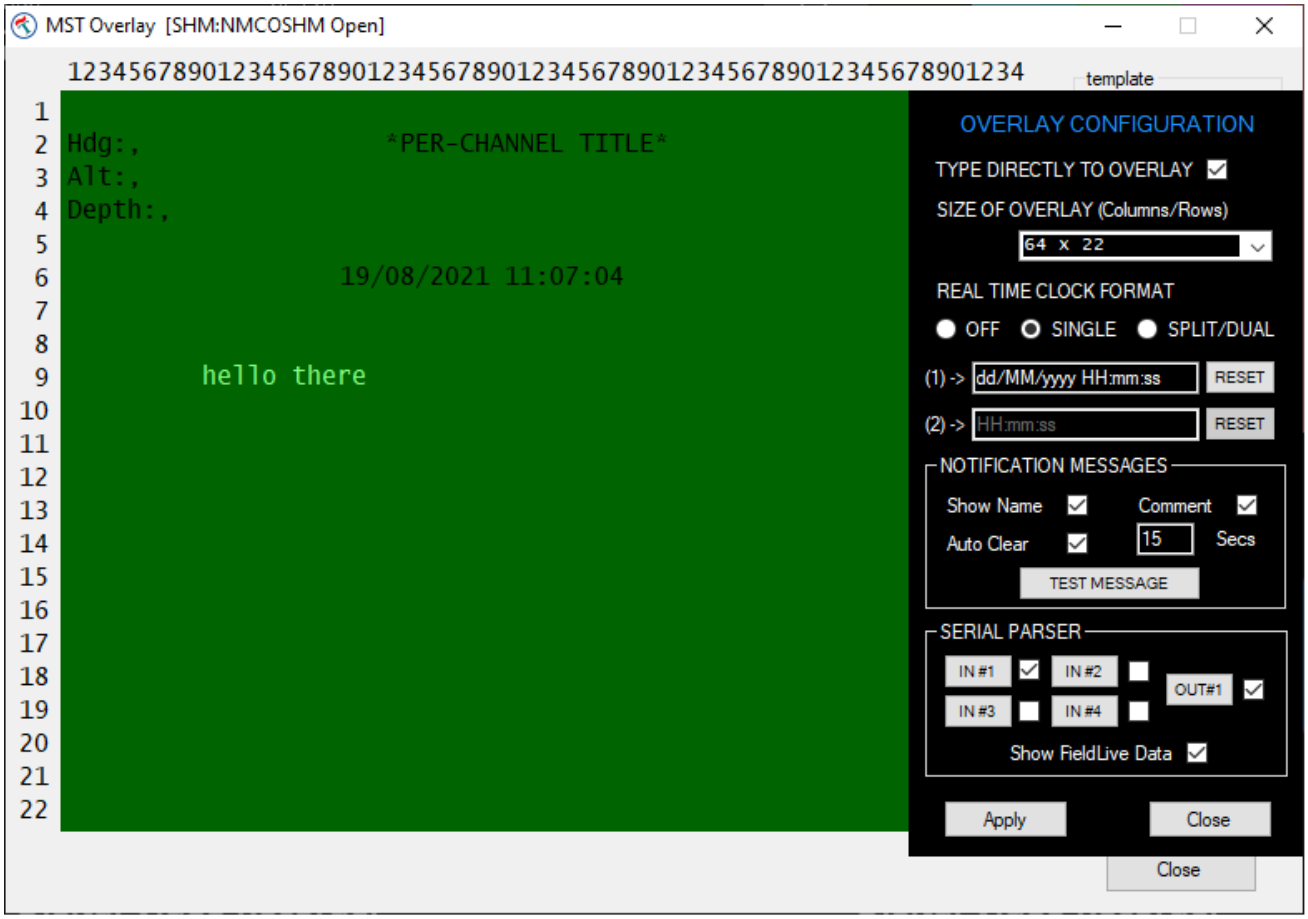


The OVERLAY option opens the interface below: allows basic overlay typing of headers and titles – as well as a locally generate date and clock.
4 saved pages can be created with different text layouts (e.g. regular running overlay, dive headers, anomaly found etc) – these can be switched between while recording by clicking 1,2,3,4 on the main software page (above).

Favourite overlay setups can be loaded and saved by using the ‘select template’ and ‘SaveAs’ buttons.
CLEAR will clear the live overlay of any text
Send 2 OVL pushes any changes you have made on the green screen area to the live overlay where it may be recorded.
Page [0] is the ‘live’ base overlay page
Page [1], [2], [3], [4] are additional saved pages which can be recalled during recording

RealTime Clock tick box switches time / date on or off (shown in this example on at the top of the screen)
SETUP takes you into the setup menu
Edit Fields opens a menu which allows you to show or hide dynamic data fields which are coming in from serial strings via the parser – these can be different on each page (1,2,3,4)
Edit Labels opens a menu which allows you to add / remove / show / hide static labels (including 2 graphics)
Edit Titles opens a menu which allows you to put different titles on different video channels. If you have a multi channel recorder, the same overlay text will be displayed on all channels of the video – but it may be useful to have a unique identifier on a particular channel (e.g. Diver1, Diver2, port, centre, starbd etc)

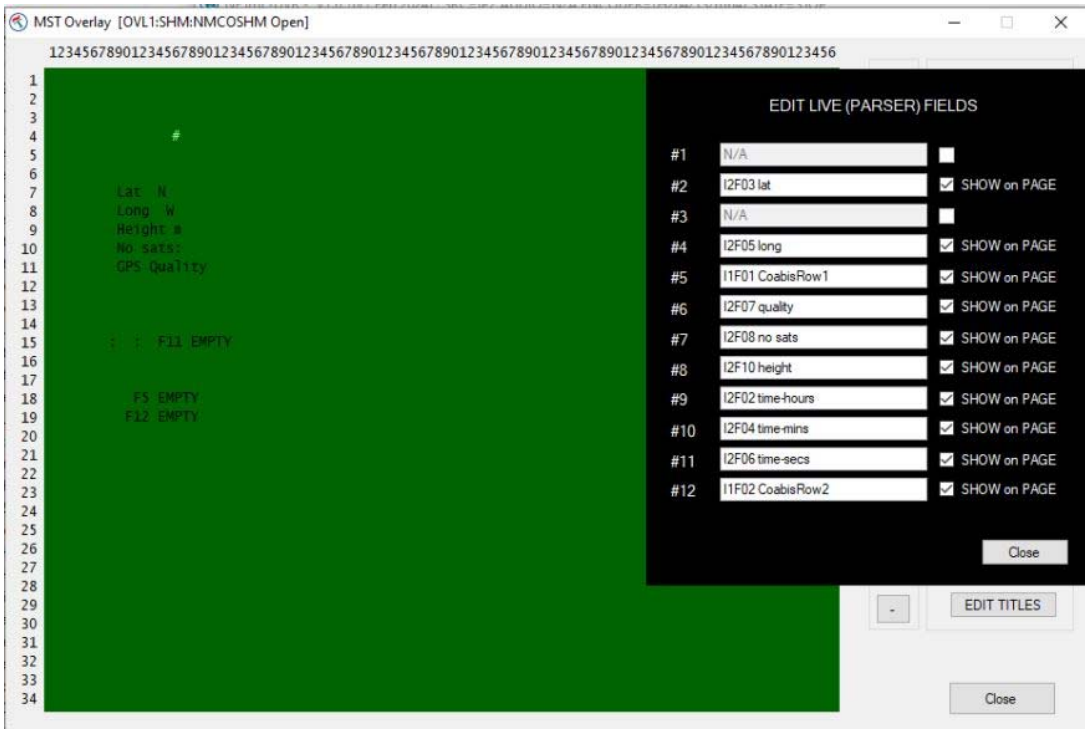
SETUP menu



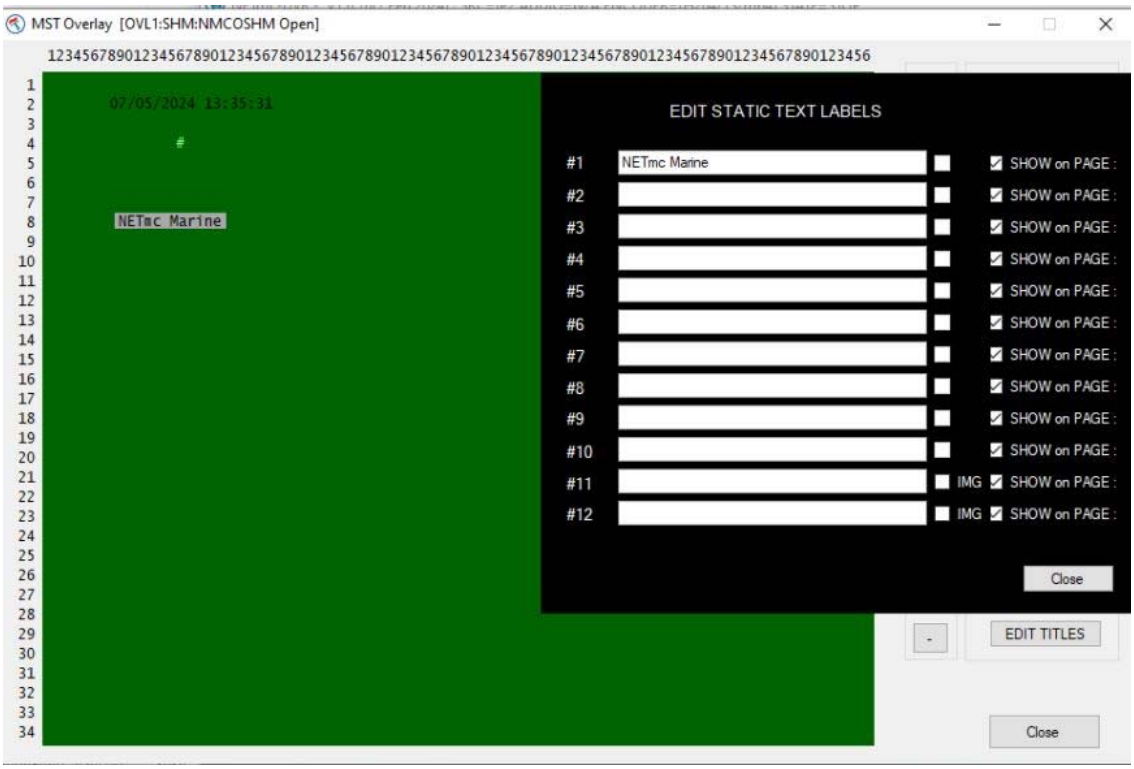
- Type Directly to Overlay (when enabled allows the user to click directly on the live video in the main DVR application and type directly on top of the video. The text will appear at the mouse click position. F2 can be pressed to clear the screen of this directly typed information)
- Size of Overlay (on screen text size will change as will the green layout box – smaller fonts will create more space and a bigger green area.
- Real Time Clock Format (allows combined or split time / date and adjustment for format e.g. USA or UK)
- Notification Messages (enables dynamic messages to be displayed from other applications such as DDL and eInspect. Clicking TEST MESSAGE shows where the messages will appear, allowing the user to drag them to the desired part of the screen

- Serial Parser (is a system for stripping data from serial string inputs and using parts of the string as overlay text. This system should be intuitive to anyone experienced in the survey industry – but a user manual is attached as an appendix)

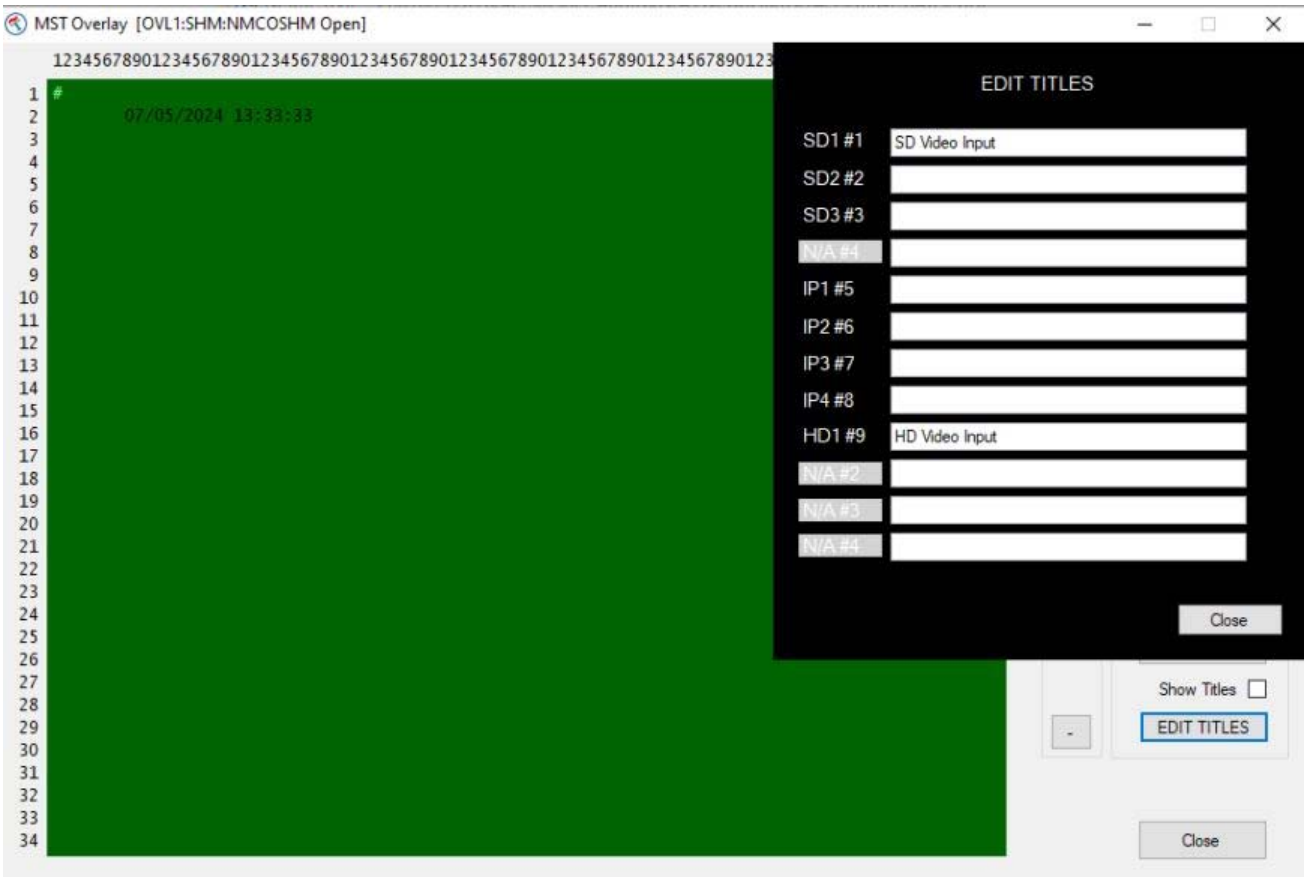
Edit Fields



Edit Labels



Edit Titles



Each video channel can be given a unique title or name – which can be displayed on screen when the ‘show titles’ box is ticked.

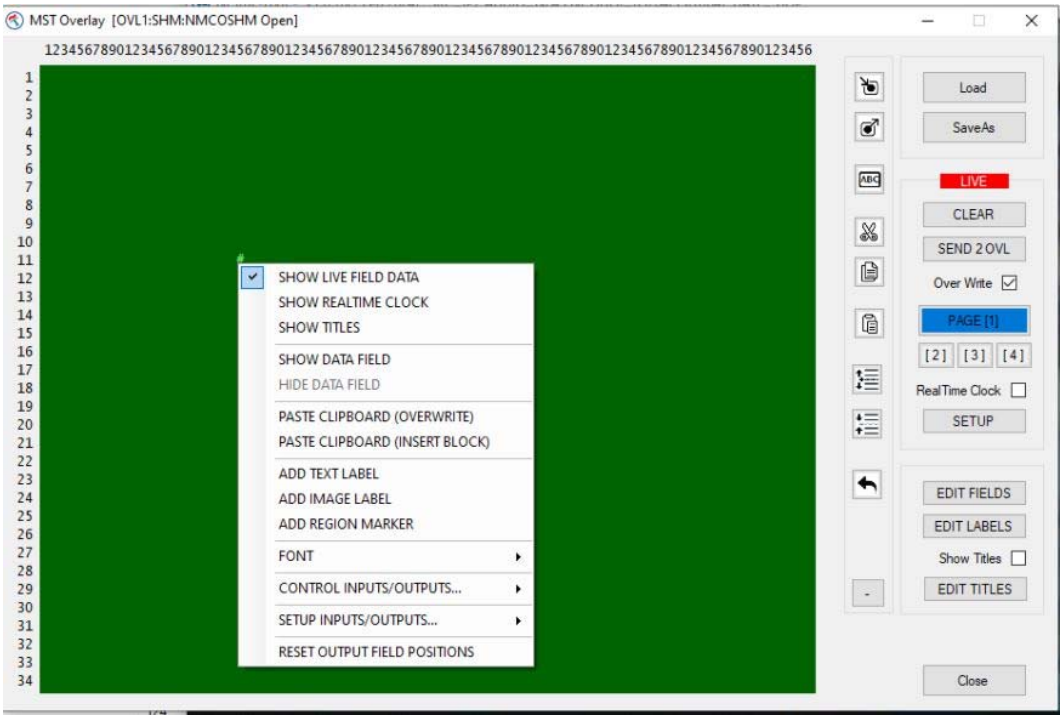
A typical examples would be :

Diving:
[1] Diver 1
[2] Diver 2
[3] Standby Diver
[4] Bell camera

Pipeline:
[1] Port
[2] Centre
[3] Starbrd
[4] Pipetracker
[5] Sonar

Etc

Right clicking on the green area gives a quick access menu to change some of the most common settings.

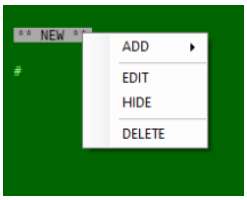


Additional static information can be added in the form of “labels”.

The DVR can add 12 static labels – 2 of which can be images (logos etc)

To add a label, right click on the green screen area and select either text or image label

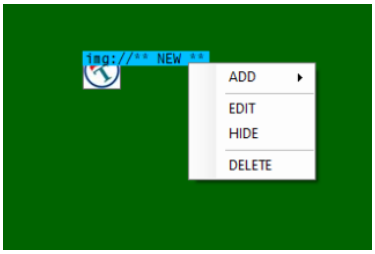
This will create a new blank label – which can be edited by right clicking on the label and selecting edit (where it can also be deleted)



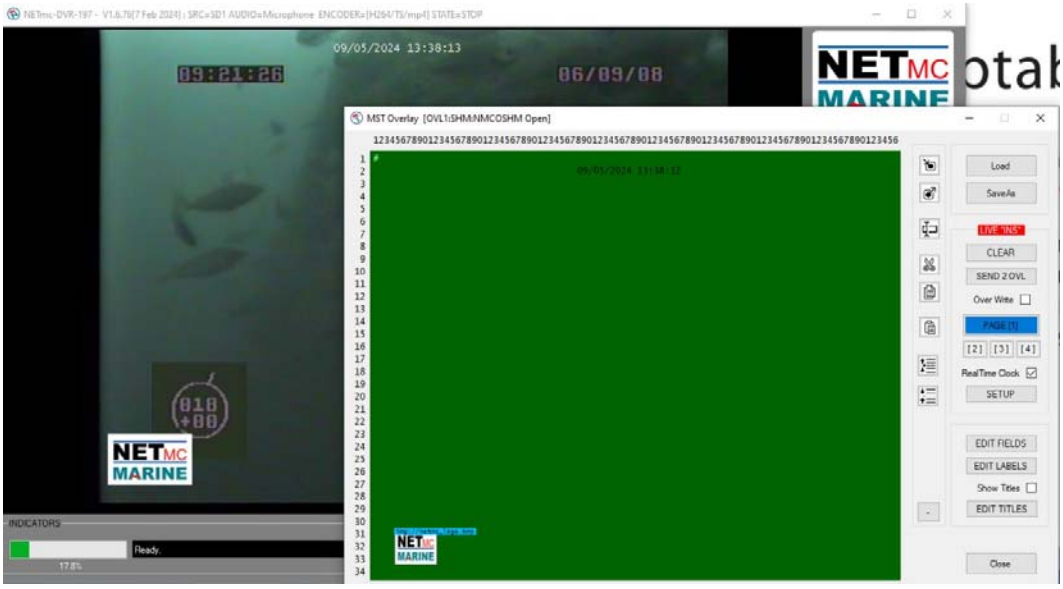
Once the content has been changed in edit, hit enter to finish the edit and commit the change.
The label can now be dragged around the green screen area to the desired position.

Inserting an image label is just the same – but you select image. Then you edit the image to tell the system what the image file name is.
If the image is in the root deploy folder (c:\dvri2) you don’t need to add a path e.g. img://marine.bmp

The img part needs to be retained (tells the system its an image)
Image needs to be a bitmap
Typical size 204x80
Dimensions need to be divisible by 4



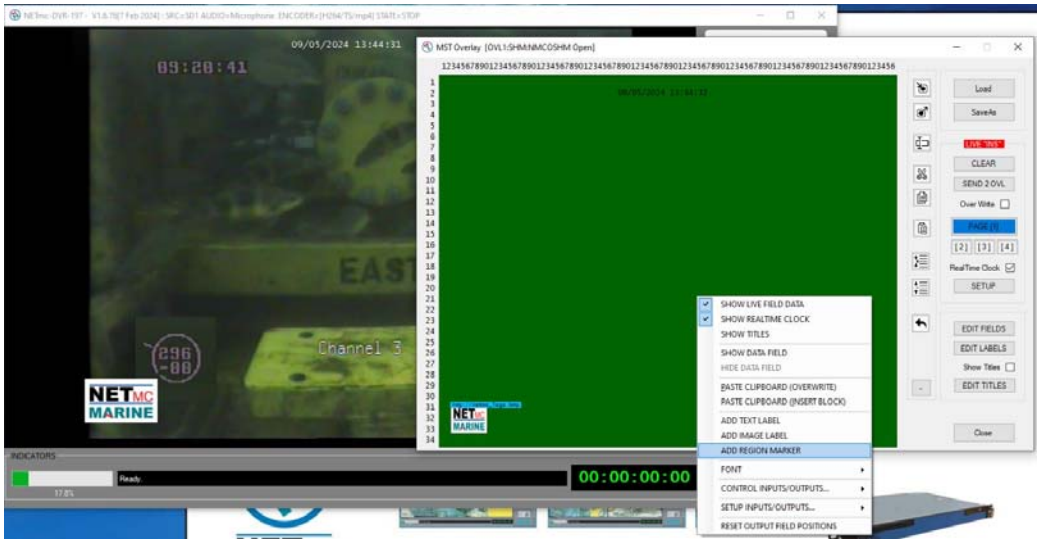
Images can then be move around the green are to the desired position



It may sometime be useful to mark an area of interest on the overlay – for example to illustrate an area of damage or leak detection.

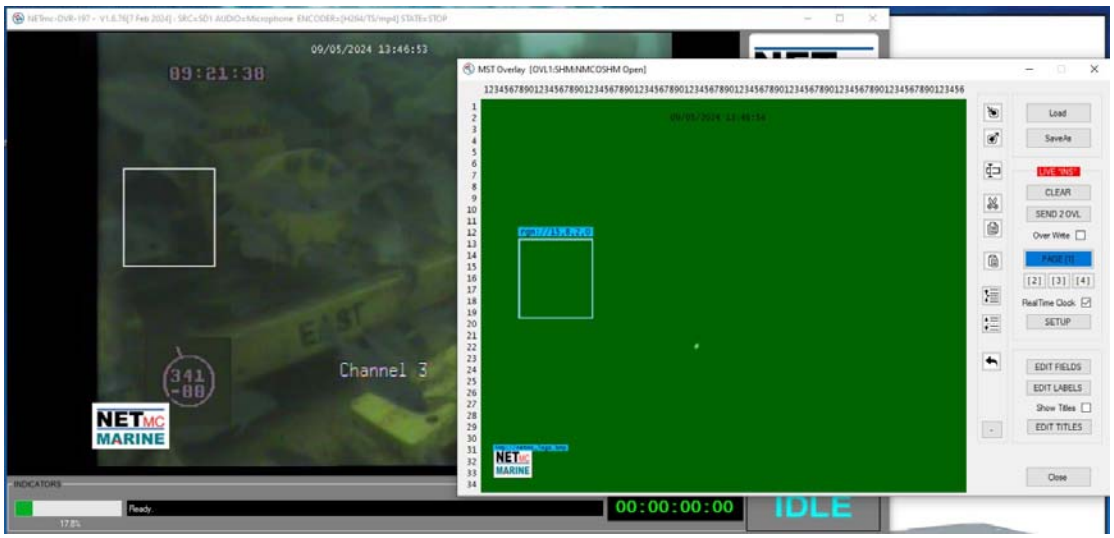
There is a function in the overlay to ADD REGION MARKER

This is found by right-clicking on the green screen and selecting that option



When the box appears, it can be edited by right clicking on the box and selecting EDIT – which changes the parameters rgn://x,y,t,i

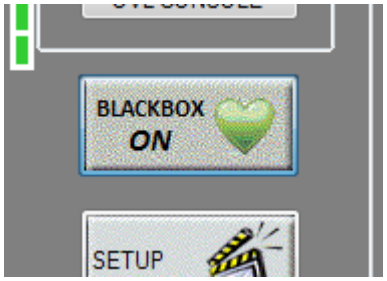
Where
x is the width of the box (max 32)
y is the height of the box (max32)
t is the thickness of the border line (max 8)
i is the interval for which the region box is displayed (in frames). 0 will leave it on until manually deleted



9. Blackbox

Blackbox can either be an additional recording function added to a unit – or just using a regular recorder for the function of Blackbox. This is typically thought of as a unit which will record for ever – over writing the oldest video in a rolling loop.
The rolling loop is created by deleting old video off using a process called Black Box Manager - which will delete the oldest file in a location, to make room for new video to be created.

If Blackbox is licensed (and enabled in the setup page) on a regular recorder, there is a notification image on the main display above the setup button.
The Blackbox runs automatically upon starting of the DVR software – green heart shows running ok



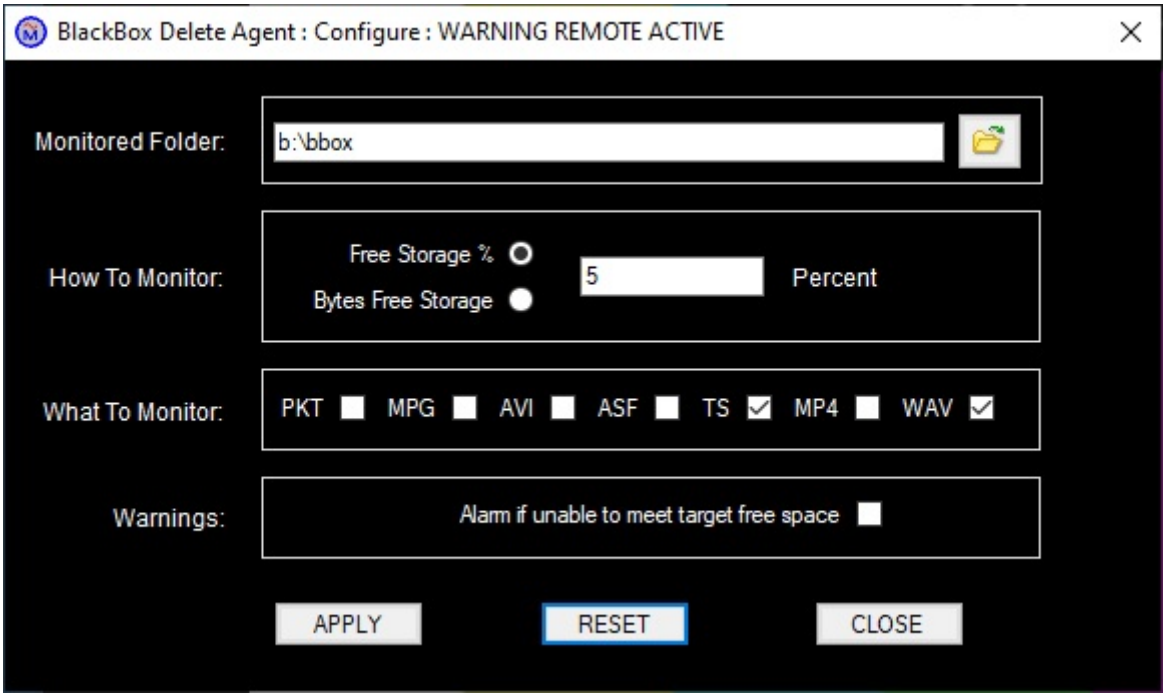
The icon will change to a red, flashing, broken heart if there is a problem

Blackbox will always record to the ‘B’ drive.
A delete agent (Blackbox icon in the taskbar) auto deletes old files to maintain a rolling recording. This is setup automatically - - but user modification can be done by right clicking on the icon (**advanced users only**)

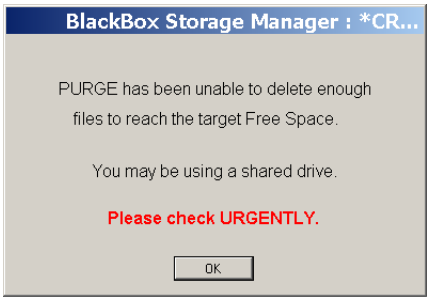
Right click black box icon located at the bottom right of the taskbar which will open the options list. Click on configure and this will open the black box storage manager.

When the delete agent stops running the Black Box Manager icon will flash red with a white cross as below

Picture below displays the Black Box Delete Agent GUI set up as default. The delete agent has file monitoring based on either percentage of free disk space or bytes of free storage. Once the free space becomes less than the monitored amount the agent will automatically delete the oldest monitored files.
We recommend running with 30% free storage



If the monitored folder has files in it that can't be automatically deleted, for example any non-video files, then the error message below will appear on screen when the agent can no longer achieve its % free target. The user should manually attempt to free up more space in the monitored folder.

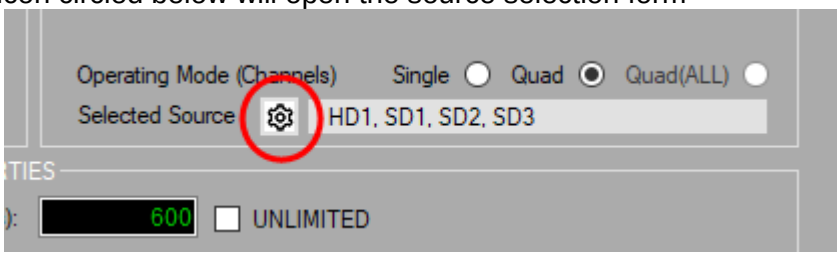


10. Multi Channel

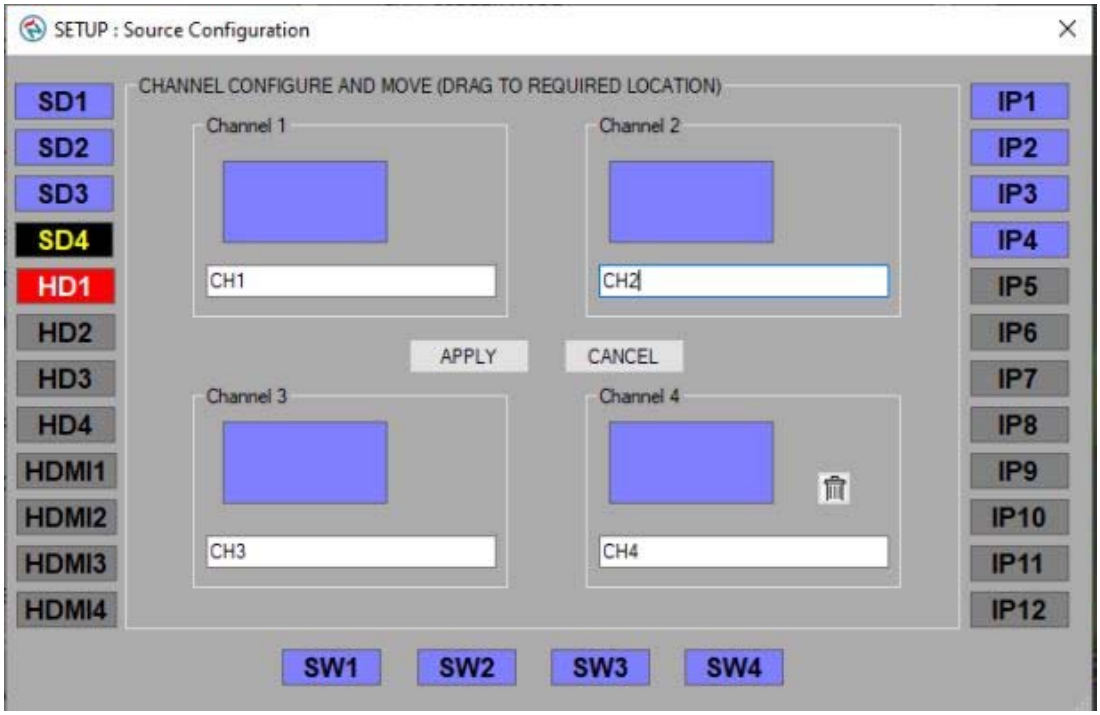
The 4U chassis version of the DVR is supplied with a 4 channel composite input card. Entry level units will only be licensed to use 1 channel – additional channels can be purchased or rented as and when required.
Unit may also be ordered with HD-SDI inputs, HDMI inputs, RTSP inputs and / or more than 4 composite inputs.

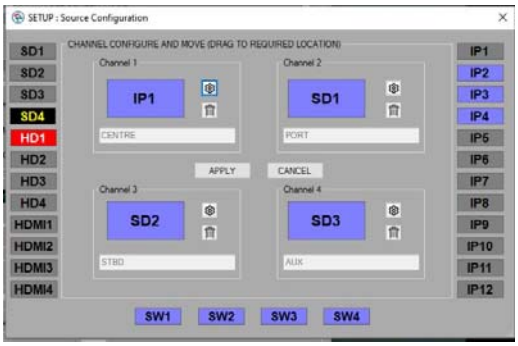
The setup page allows the user to selection between single channel mode (select which channel is being used from a pull down list of those available), quad channel mode (where 4 are chosen from a list) or Quad(all) mode (where all source signals are displayed on the live video page – allowing the user to select which ones to record – can replace a video switcher matrix)

Clicking the gear icon circled below will open the source selection form



This form will show enabled and available inputs in the column on the left highlighted in blue.
Drag and drop the available inputs to empty boxes on the right.
In below example – we have 3 SD inputs enabled, 1 additional SD hardware option available but not licensed (yellow text).
1HD input licensed but no hardware detected (red text)
4 Switchers and 4 IP inputs licensed

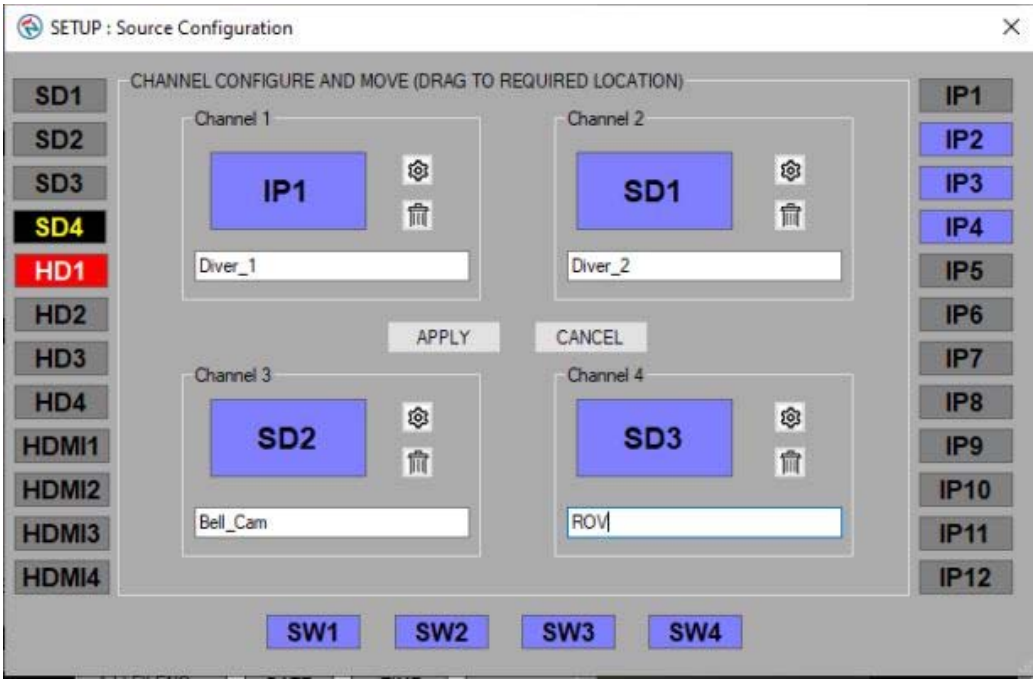




The inputs have been arranged to suit – this is of particular interest when in Pipeline mode – where the channel names are fixed (centre / port / stbd / aux) but you may wish to have the HD source as the centre and the SD sources for the other views for example.

The example below illustrates how the sources can be named to match the job – e.g. Diver1, Diver2, Bell_Cam, ROV etc These names will also form part of the recorded filename.

These names must differ from each other (form will not be applied if any 2 are alike)



Input sources and be dragged and dropped between channels – or removed by clicking the ‘trash bin’ icon.

If there are any input source options – these are available on the gear wheel icon associated with each channel.

In multi channel mode, all selected channels are recorded to the same folder and start / stop at the same time - each channel has a unique file.

Example quad screen:

11. RTSP Input

RTSP (Real Time Streaming Protocol) is a popular mechanism for delivering a video image from an encoder or camera over a network.
This can be a local network (e.g. around a room) or a wide area network (e.g. from a ship to the shore).

The stream can have viewing restrictions / permissions – and can contain any video codec, format, image size – typically the most aggressive compression is desirable so the image can be sent over a low bandwidth link.

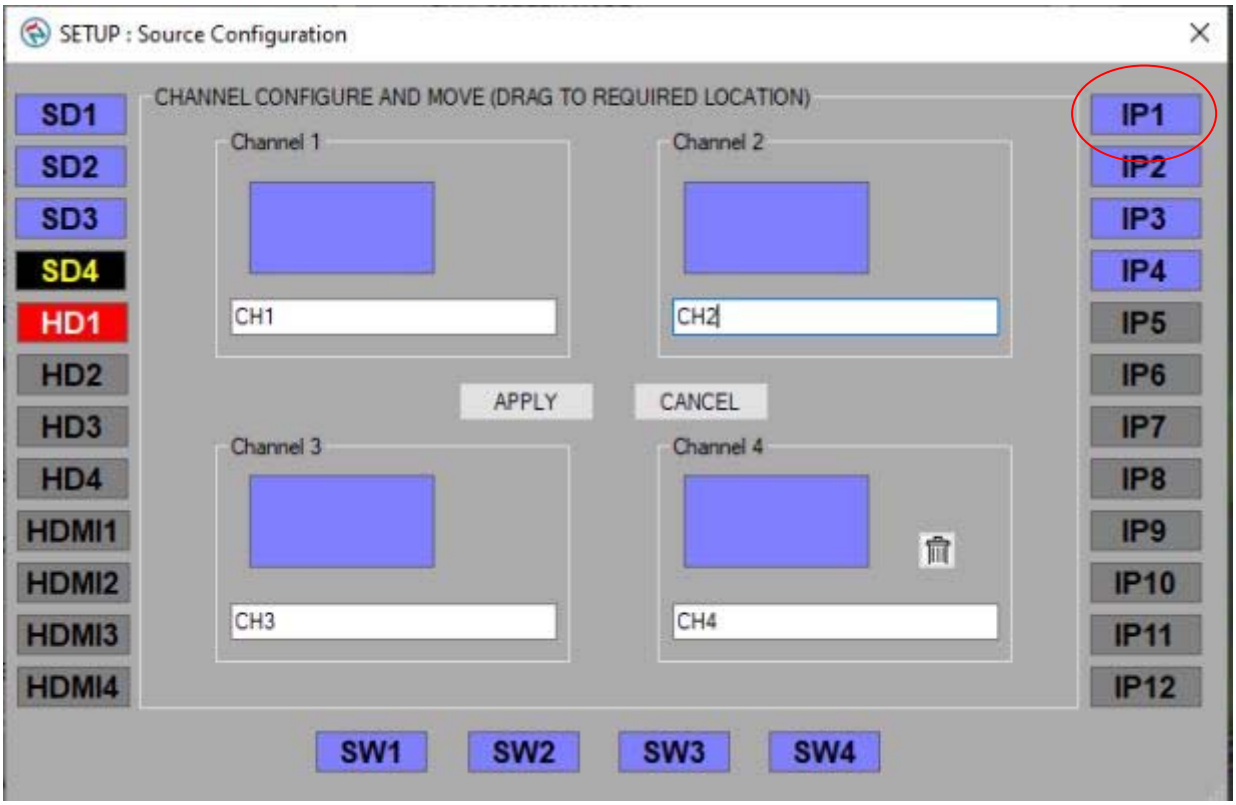
It is often considered to be a 'best effort' service – prone to glitching and image artefacts due to data loss during transmission.

It is our preference to use a hardware decider box where possible to receive the stream and output a regular video signal (composite / HDMI) as this will preserve the integrity of the DVR despite the erratic nature of the stream.

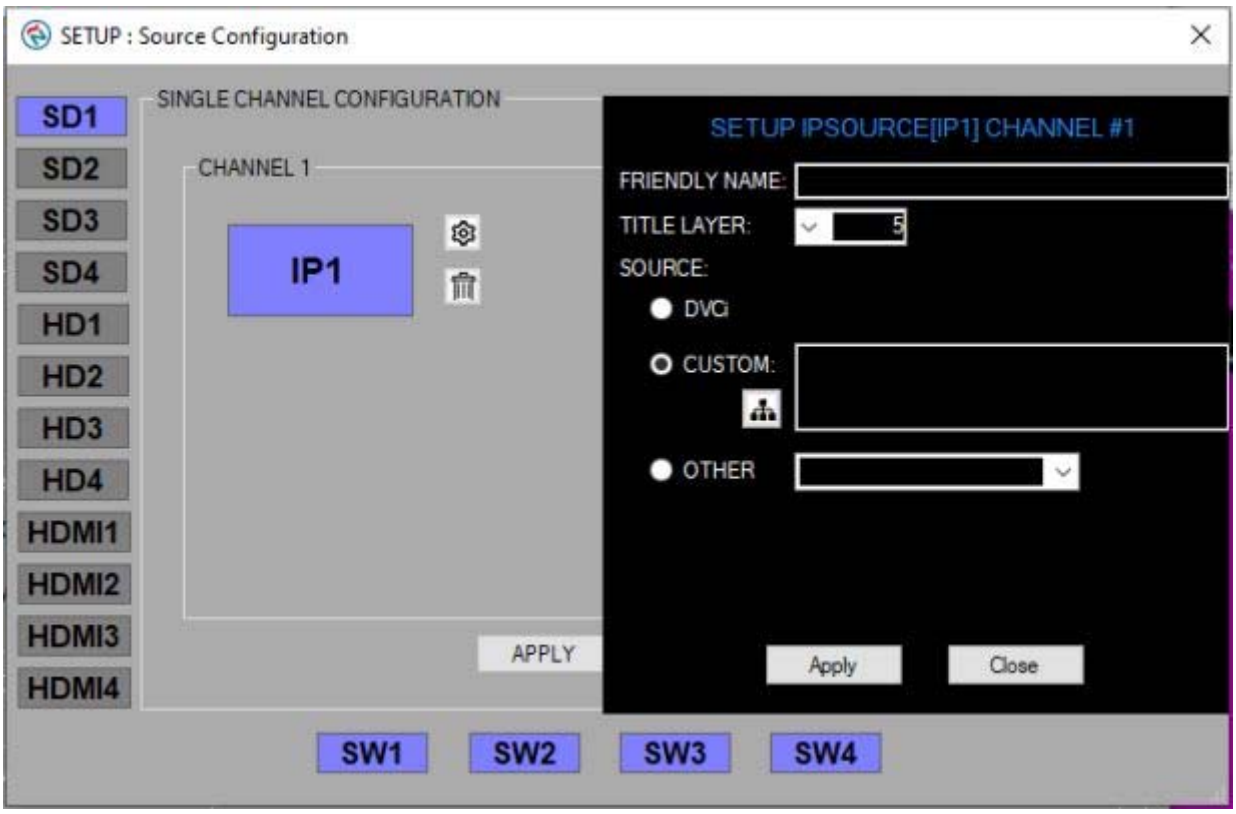
However – this may not always be possible – so we offer an RTSP input option.

The DVR is equipped with 2 LAN ports. To receive a stream, one of those ports has to be connected to the LAN which is delivering the stream – with IP and gateway settings such that the stream can be received.

If the RTSP option has been licensed, an RTSP option will appear in the source list in the setup page



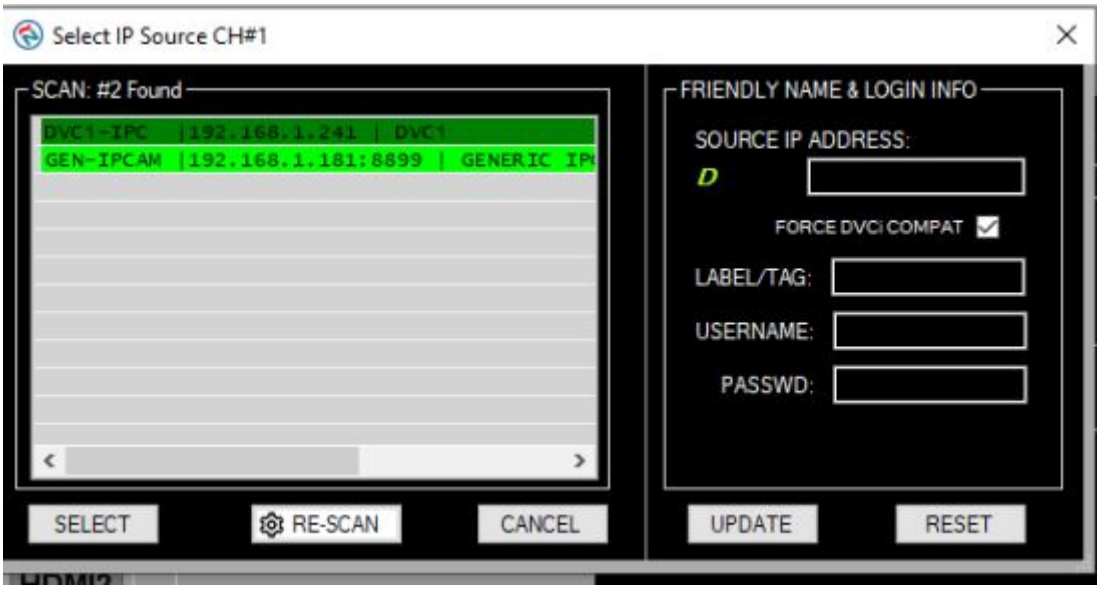
If selected (dragged into one of the available channel boxes), the settings icon will allow additional setup (in the shape of a gearwheel)



Clicking that icon will open up the parameters to configure the network stream recording

DVCi is a preconfigured stream from a NETmc devices – the custom URL box allows the insertion of the string appropriate to the camera or device you are receiving the stream from.

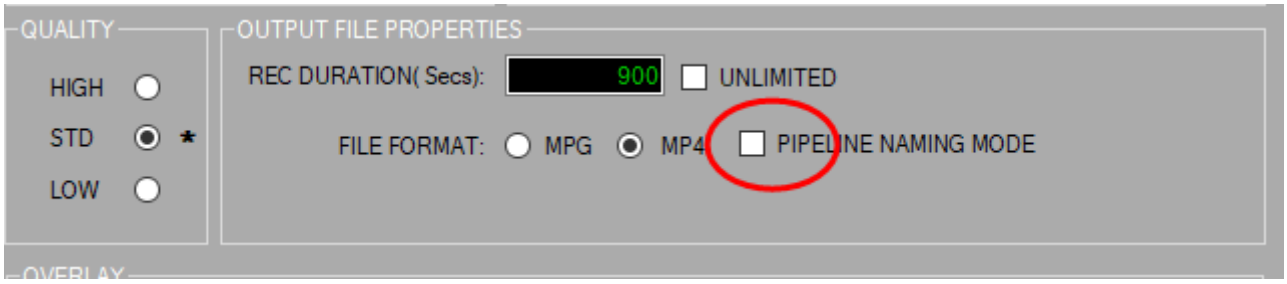
If you have a connected compliant camera which you are unsure as to its output stream, you can click the network scan button  to search for devices



Click the found item on the left & select (add username / password if required) and update

12. Pipeline Mode

If the pipeline mode option has been licensed, there will be an additional tick box in the setup page (this will not appear when in Single mode)



Ticking the box will synchronise the multiple video images and ensure that the output filename conform to the format:

2017-0710-103917-000-UserInputFileName-CENTRE
2017-0710-103917-000-UserInputFileName-STB
2017-0710-103917-000-UserInputFileName-PORT
2017-0710-103917-000-UserInputFileName-AUX

This will allow them to be scanned and imported into various survey eventing and processing packages (e.g. NaviModel)

(see appendix 5 for EIVA system setup guide)

13. Multi Input Dynamic switcher

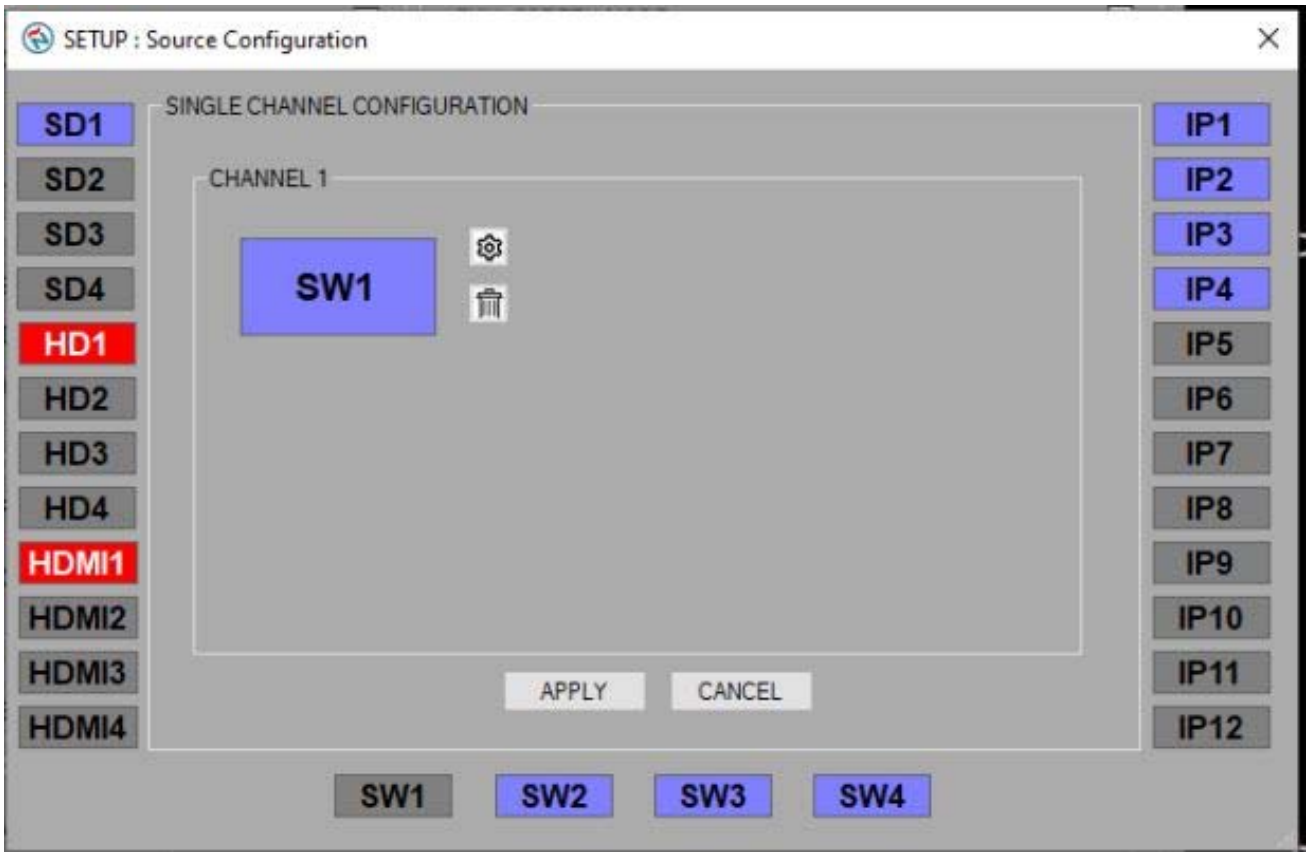
Back in the day, all video signal were the same – composite analogue.
But now we have SD analogue, High def HD-SDI, HDMI and network video streams which could contain anything.

This makes the old video switcher boxes redundant and leave users struggling to move between sources during a recording.

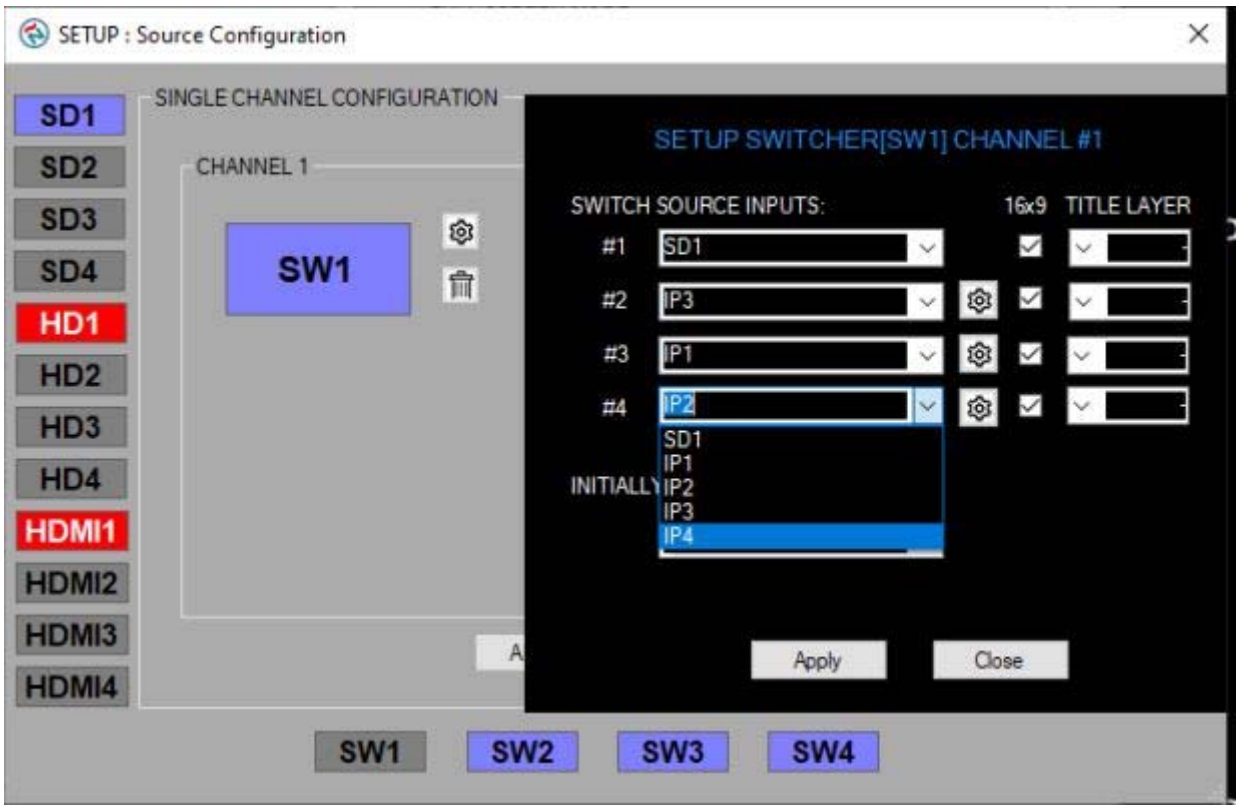
Fortunately, NETmc have solved the problem with its multi input switcher system.
When enabled, this allows the user to record a single file and dynamically switch between different sources which can be different formats or resolutions on the fly without having to stop or reconfigure.

This is ideal when doing inspection work, where the initial approach to an object may be via sonar or wide angle SIT camera, then switching to HD colour zoom for the actual fly around.

To configure this option, in the setup page, select one of the SW inputs from the bottom of the page



Then click on the setup gearwheel beside the switch to setup which sources you want to switch between.



The system allows a choice of 4 inputs to be setup from the pull-downs above.
These are then presented to the user in the main recording video as 4 selector buttons.

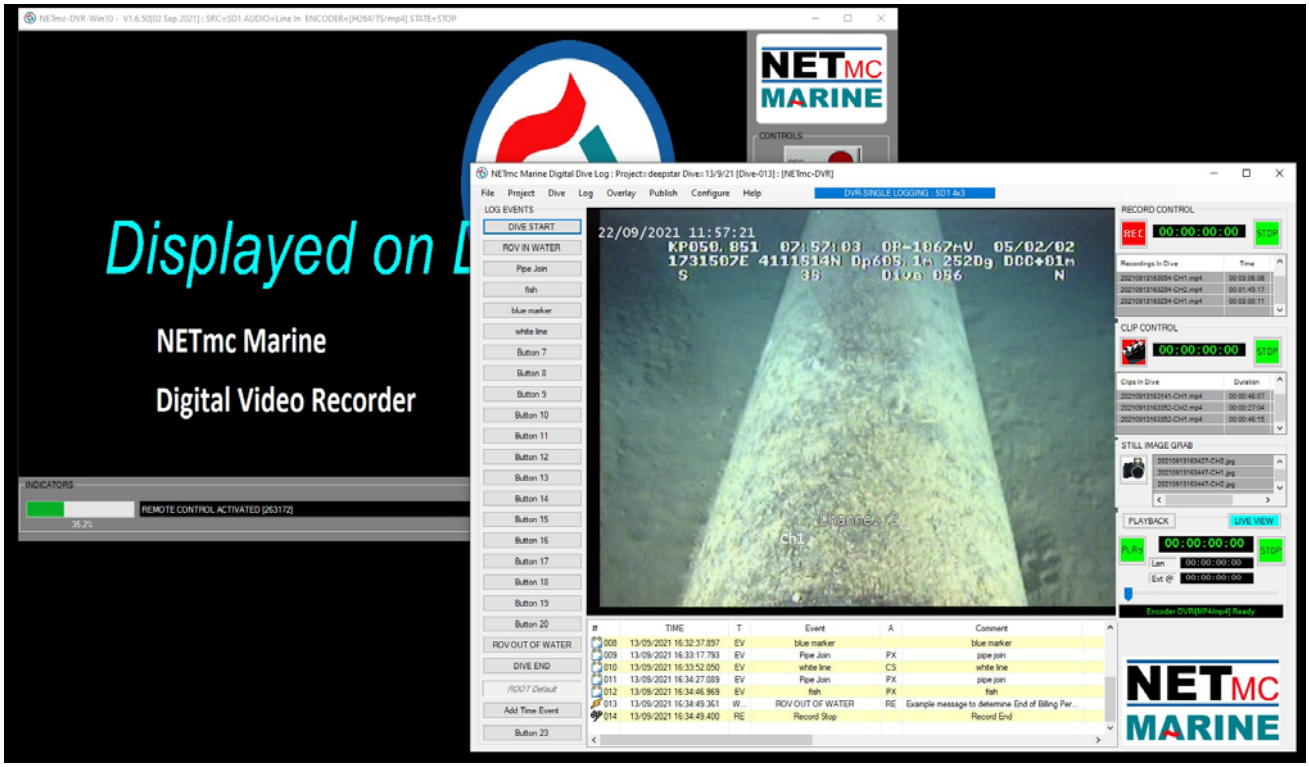
14. DDL

If the DDL option has been license, this sits on top of the DVR software, taking over the recoding controls and controlling the file naming and storage locations.

The regular DVR software has to be running first before DDL is opened

DDL will take the live image from the DVR software (or the top left channel of a multi channel DVR)

Once DDL has the video control, the regular DVR window can be ignored or minimized (but must stay active)



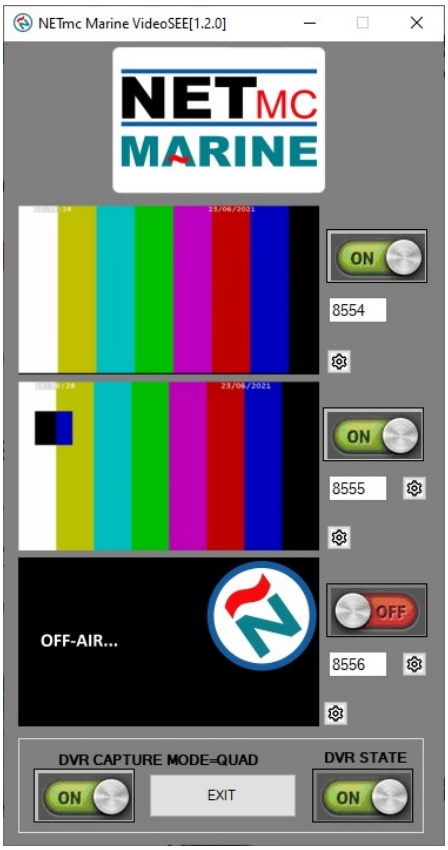
15. Streaming output - VideoSEE

If the option has been licensed and installed – the DVR is able to output a streamed version of any and all of its video signal inputs.
This can be an ideal way of distributing the video image, complete with overlay, around the vessel or even to the shore or to a streaming service like youtube.

We recommend using VLC video viewer as a simple way of viewing a stream.

VideoSEE is launched as a separate application – via the desktop icon

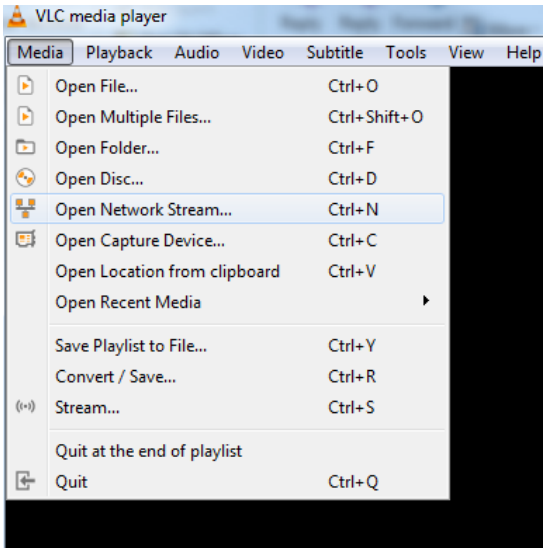
When the app opens, it will sync to the number of sources licensed on the DVR
In this example – the DVR was licensed for 3 inputs – but only 2 were configured



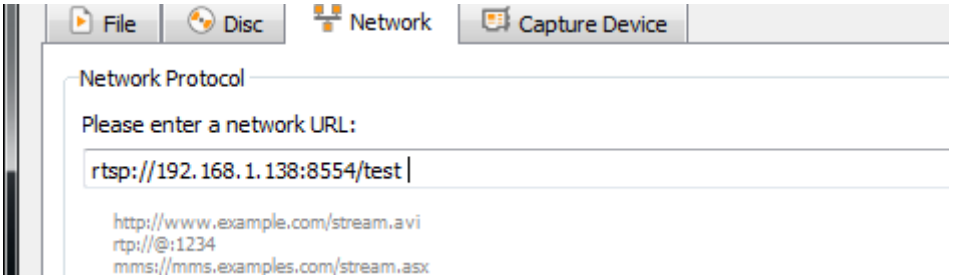
To view the stream remotely – VLC needs to know the IP address of where the stream is coming from and what port number it is on (about like selecting a channel).
The IP will be the address of the DVR on your network – set manually or via DHCP.
The ports can be whatever you like – but in this example, they are 8554, 8555 and 8556.

The string to be opened is:
rtsp://IP-of-DVR:port/test

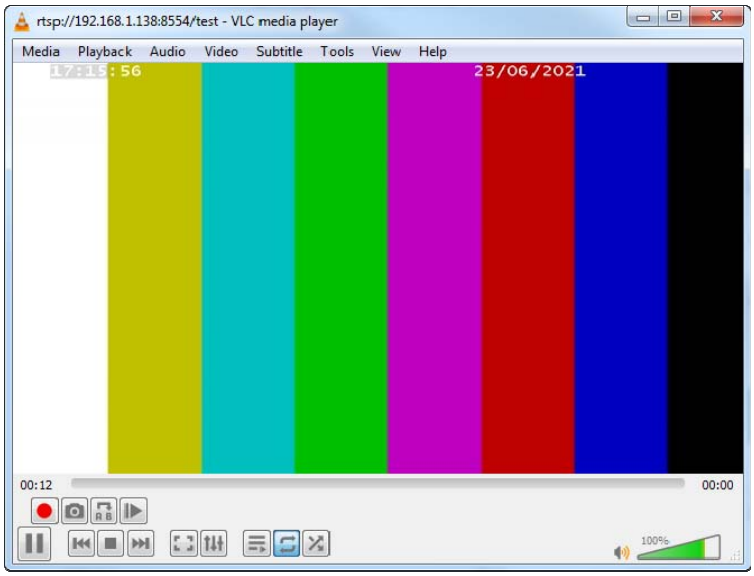
so in VLC, select ‘Open Network Stream’ from the Media pulldown



Then enter the IP and port – in this example, the IP of the DVR is 192.168.1.138 and we’ll use the top stream on port 8554



Click play and the media player will open with the stream running



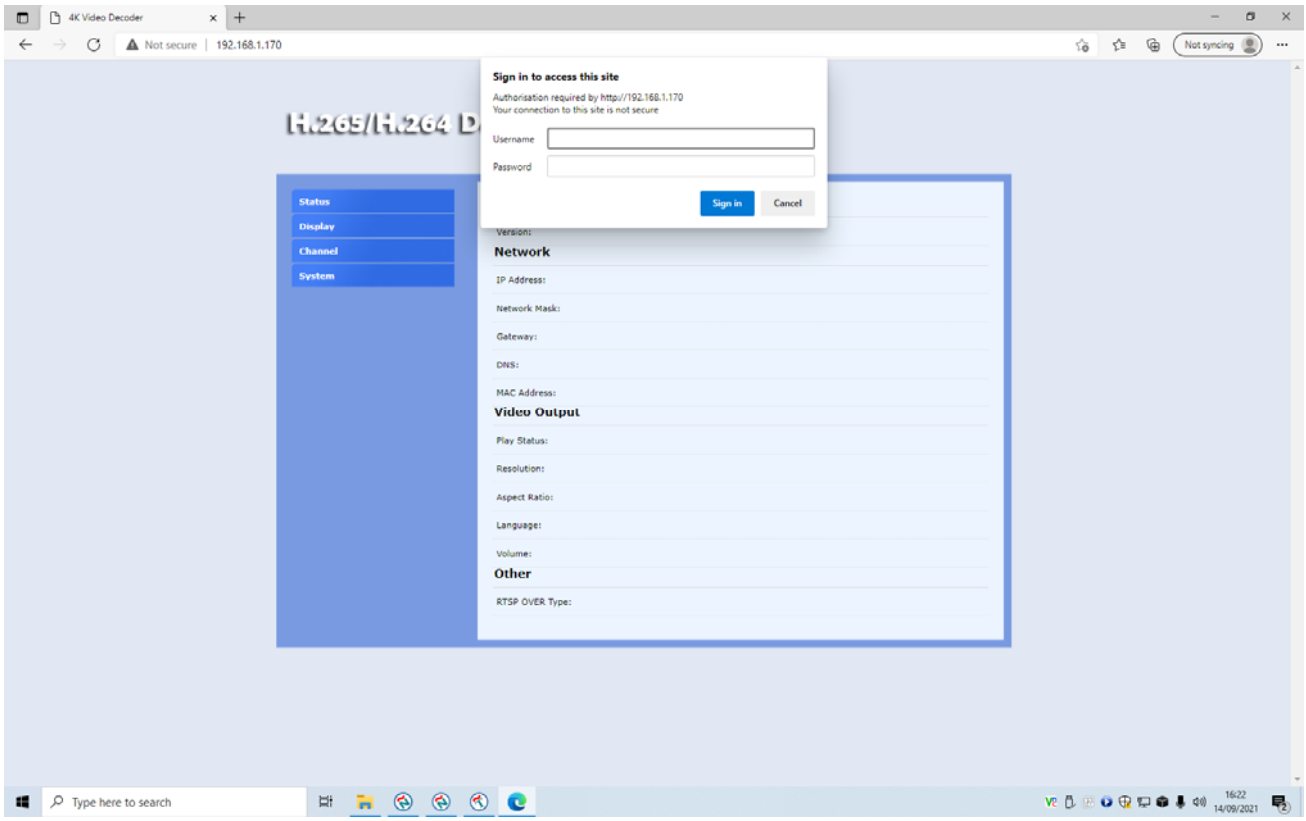
Multiple clients can open multiple connections to different ports (or video sources).
Each new client will add CPU load to the DVR – so spec of unit might limit amount of simultaneous client connections.

As an alternative to the software player – a hardware decoder could be used to view the RTSP stream on a monitor / TV via HDMI connection.

This is a typical unit we have used

This unit comes pre-set to an IP of 192.168.1.170 – with user and passwords of admin

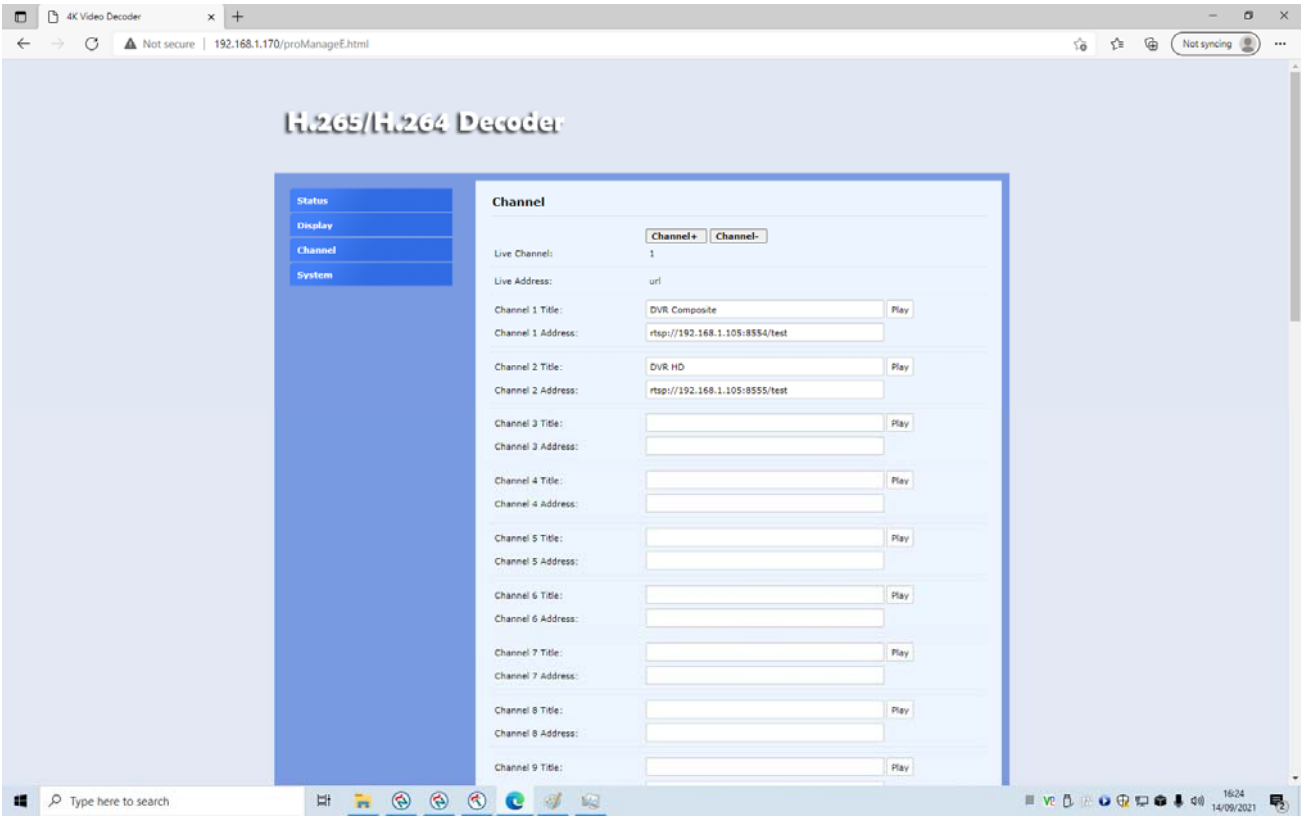
If your network is in a different IP range, you will need to setup a machine on a temporary 192.168.1.xxx with a browser which can open the local webpage to 192.168.1.170



The IP range can be changed from the System menu

The RTSP decode settings are changed in the Channel menu

2 channels have been setup.
In this example, the IP address of the DVR was 192.168.1.105 and videoSEE was set to use ports 8554 and 8555 (** if the DVR is setup differently, this will need to be updated in the decoder **).



The infra-red remote control can be used to switch between programmed channels

16. How to contact NETmc Marine Support

Should any problems occur with your ***DVR*** that are not addressed by this manual please contact our Support Team:

Email: support@netmcmarine.co.uk.

Tel: +44 1771 644001

Should your support requirement be outside office hours, please send an email which will be forwarded to one of the support engineers. Make sure you include the specific model and serial number of the equipment in question.

Although we cannot guarantee 24/7 availability, we endeavour to respond as quickly as possible to any query – regardless of when the support call is made.

Notes:

1. Whilst every effort has been made to ensure that the information contained in this manual is accurate, no liability can be accepted for errors and omissions.

2. Should this product be modified in any way by anyone other than a qualified NETmc Marine employee, then NETmc Marine cannot be held liable for any consequences.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense.

Appendix 1

Technical Specifications

Power Requirements	85-264 Vac, 50-60 Hz
Power Consumption	120 w
Operating Temperature	10 - 35 Degrees
Non-operating Temperature	-10 - 60 Degrees
Operating Humidity	5-95% RH non-condensing
Non-operating Humidity	5-95% RH non-condensing
Operating Shock	65G, 2ms
Non-operating Shock	250G, 2ms
Operating Altitude	-305m – 3,050m
Non-operating Altitude	-305m – 12.200m
Operating Vibration	Linear 20-300Hz, 0.75G (0 to peak) Random 10-300 Hz, 0.004g2/Hz
Non-operating Vibration	Low frequency 5-20 Hz, 0.195 inches (double amplitude) High frequency 10-300Hz, 5.0G (0 to peak)
Dimensions	482mm (W) x 44mm (H) x 365mm (D) (1U rack-mount chassis)
Weight	7 kg
Network Support	10/100/1000 Base T x 2
Video Input (depending on purchased options)	Composite (BNC) PAL / NTSC (auto select) HD-SDI (720 and 1080 supported) HDMI (720 and 1080 supported) RTSP
Video Rate	MPEG4 1-3 Mbps
Audio	Analog stereo line / mic input via motherboard
Internal hard drive	1TB for video storage (+ OS on SSD)
External connections	USB 2.0 (1 front, 4 rear) USB 3.0 (2 rear) VGA, DVI, HDMI, Audio out

Storage and shipping

After overnight road freight the units should be left at room temperature for 24 hours before powering on.

After air freighting the units should be left at room temperature for 48 hours before powering on.

Appendix 2

Overlay Serial Parser

Parsing is the term used to describe the action of ingesting, understanding and using selected parts of information.

The NETmc DVR can pull in data via serial and network and display that data on the overlay by treating it as either RAW DATA or in retro compatibility mode as a Taylor-Lann emulator.

Most string as considered as RAW DATA (example below) but some serial outputs were specifically designed for use with an old hardware overlay unit (Taylor-Lann / C-systems etc) which consisted of the text you wanted to display interwoven with hidden controls codes to "home curser", "clear screen" etc.
While there is an overlap in functionality, we recommend only using the Taylor-Lann emulation mode on the DVR when you know the string you are sending it was specifically designed for an old overlay – for all other application, RAW DATA is best.

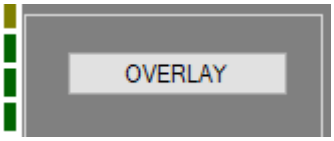
A typical example is to hook in a serial string being output from an ROV. The string will typically start with a token (like $) with separate parts of the information separated (by a comma , or space) – ending with another token (typically a CRLF – carriage return, line feed)

The NETmc DVR comes with an integrated parser system to let the user input these strings and select parts to be displayed on the overlay where they can positioned, prefixed and suffixed.

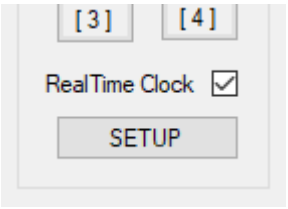
e.g: a string may come from the ROV @ 9600 baud
$PCI,321.33,150.56,2,5,7,1,CRLF

We would refer to the ROV instruction manual to decode the string and find out that:
$PCI is the start token
Between the first set of comas, 321.33 is the heading
150.56 is the depth
The other numbers are ROV variables we don't care about.

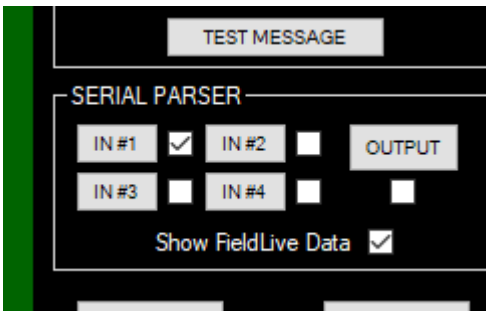
To set this up – open the overlay control panel by clicking the 'Overlay' button on the main software interface.



Then when the overlay control page opens, click setup

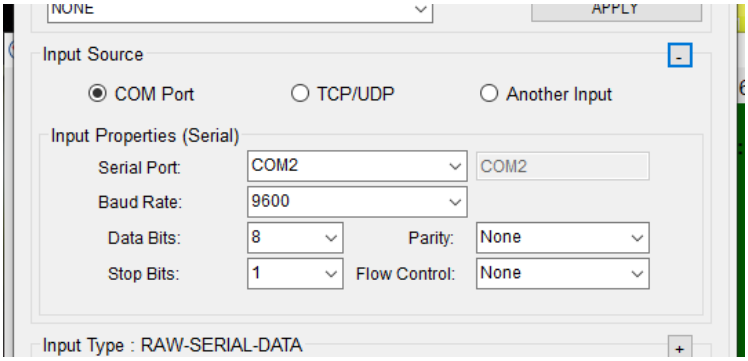


And the select the Parser input you wish to use – there are 4 available – we will use IN#1 in this example

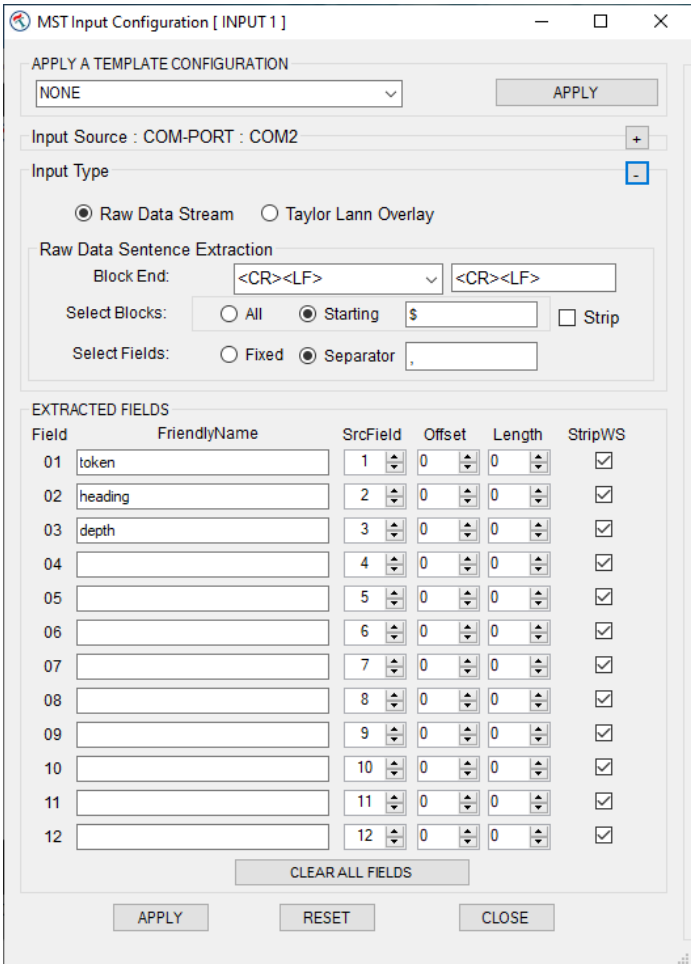


Clicking the IN#1 button open the Configuration page for Input 1

Expanding the Input Source section by clicking on the +, we have selected the com port the data is coming in on and what baud rate etc it was sent with



The parsing is now setup by expanding the input type section and telling the system what the string starts with ($ in this case), what separates the items (, in this case) and what terminates the string (CRLF in this case)

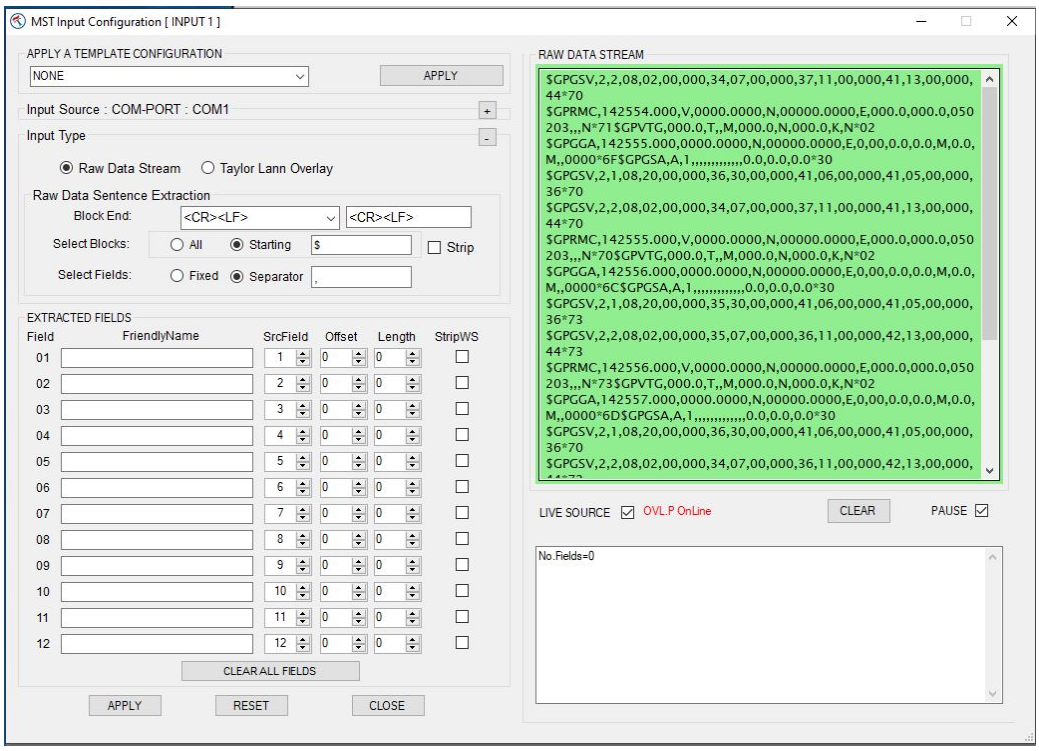


We have named the first 3 parsed parts of the string as token, heading and depth. The item can only be used if it is named. Token is probably of no use and is only named here as an example – and would be ignored in proper use.

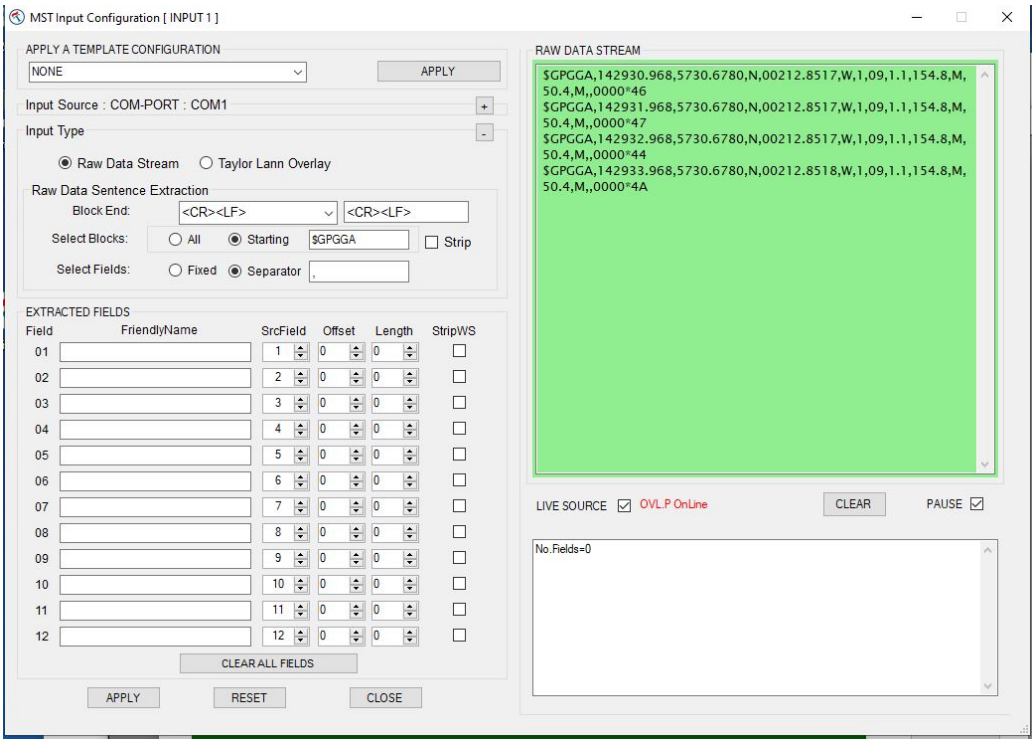
Live Terminal Window

To aid string detection and parsing, we have implemented a live data window – so you don't need to use hyperterminal / realterm etc to get a look at the string.

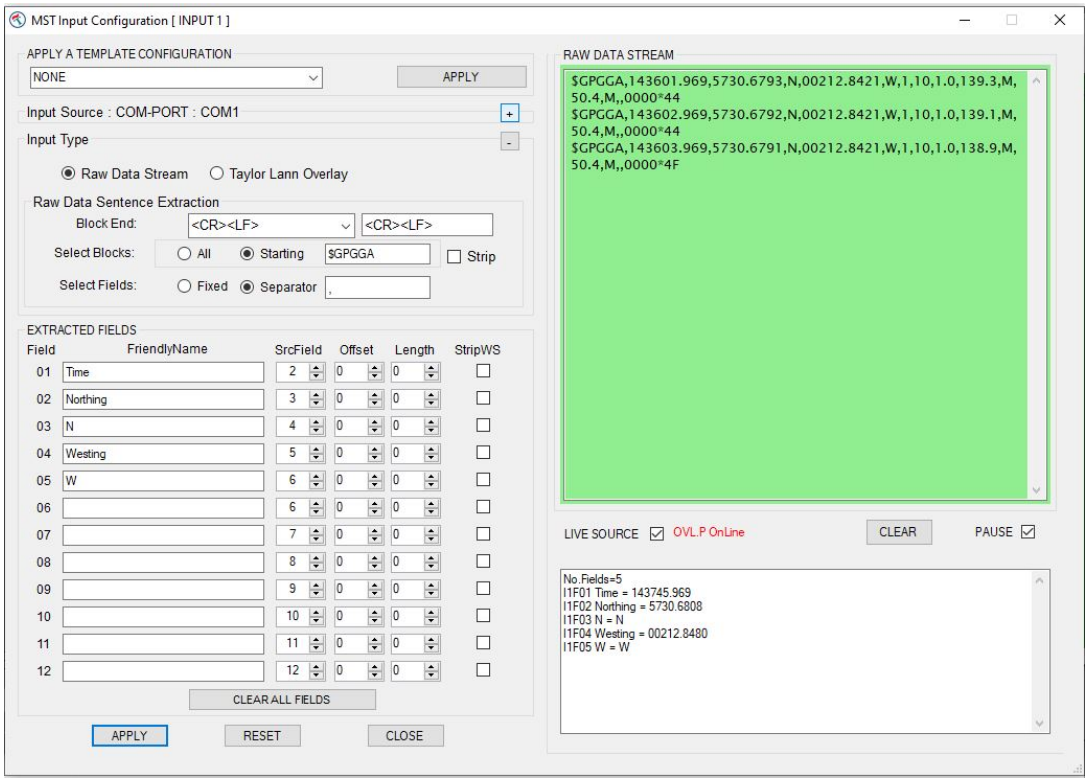
This is presented on the right hand side of the input configuration page



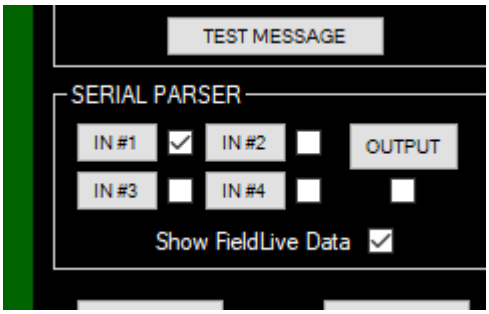
In above example, the parsing is set to look for any string which starts with $ - but there are a few, so changing the search to restrict to only $GGA



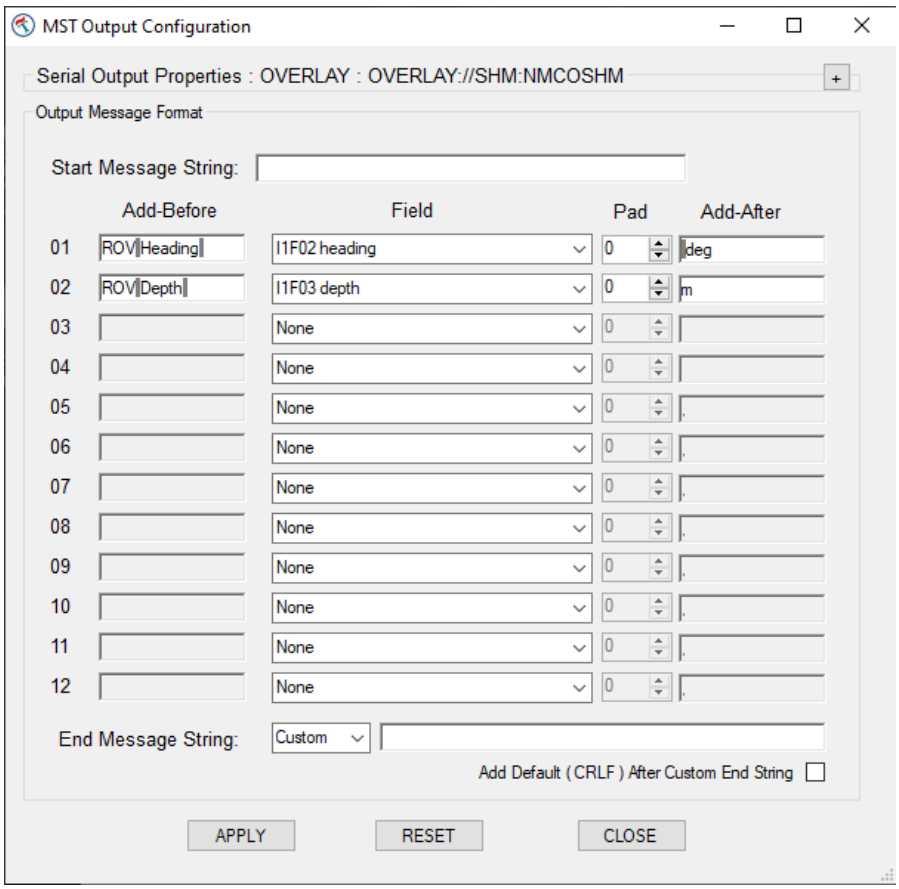
As the parsing is being configured and items are given friendly names and their places in the string are chosen, the box bottom right will start to fill up with the parsed fields – in real time.



With the input set and applied, the output now needs to be configured.



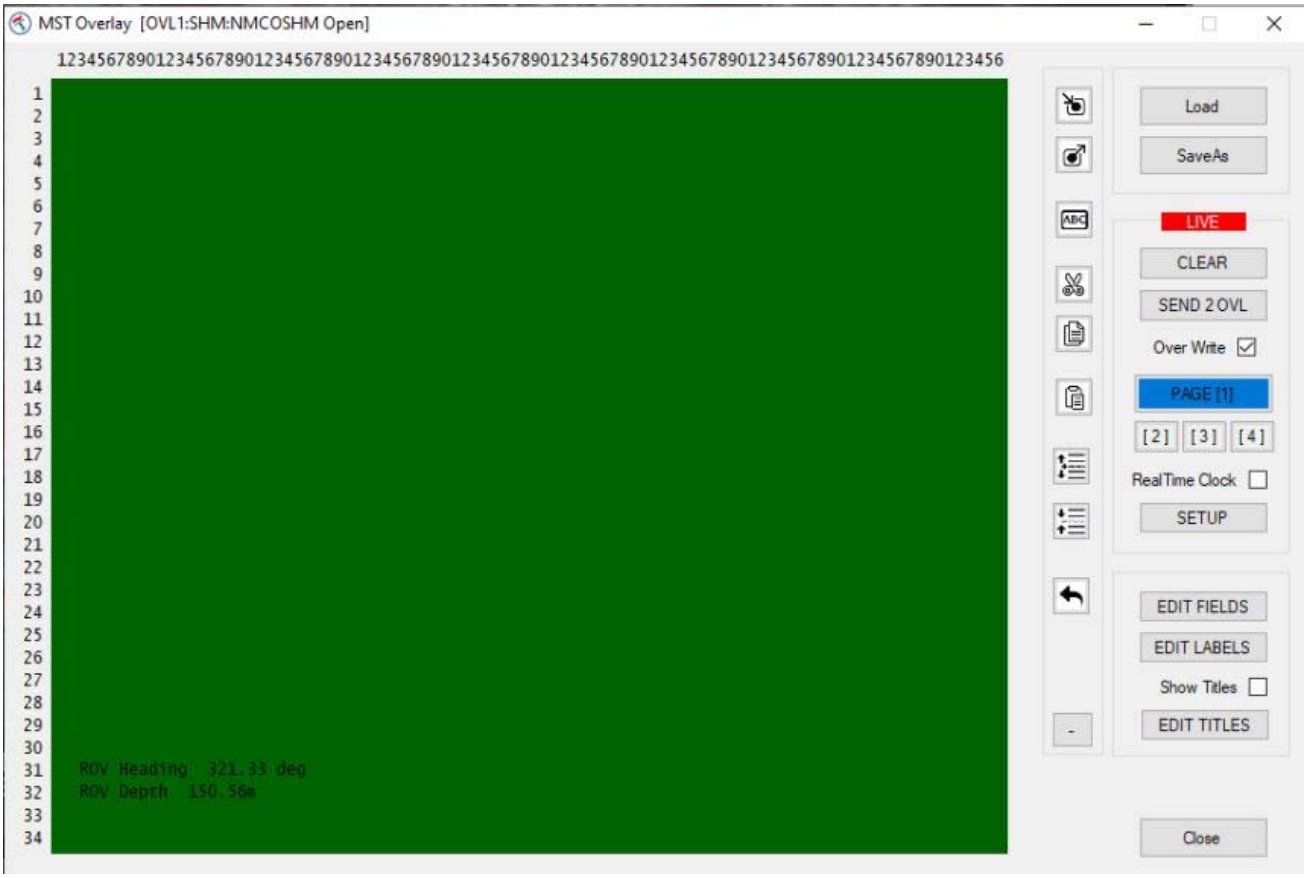
Click the OUTPUT button and the output configuration page will open



The middle column is a pull down system – click on the downward arrow on the right and you will be presented with a list of all available fields taken from everything which has been setup across all 4 inputs. In this example, we only had one input in use and we selected the 2nd and 3rd fields which had friendly names of heading and depth.

We have prefixed with “ROV Depth “ and suffixed with “m”

Now when we return to the main overlay screen – the items that we have parsed are not displayed on the green preview screen – where they can be dragged / dropped around to page to wherever you wish to see them overlaid.



Appendix 3

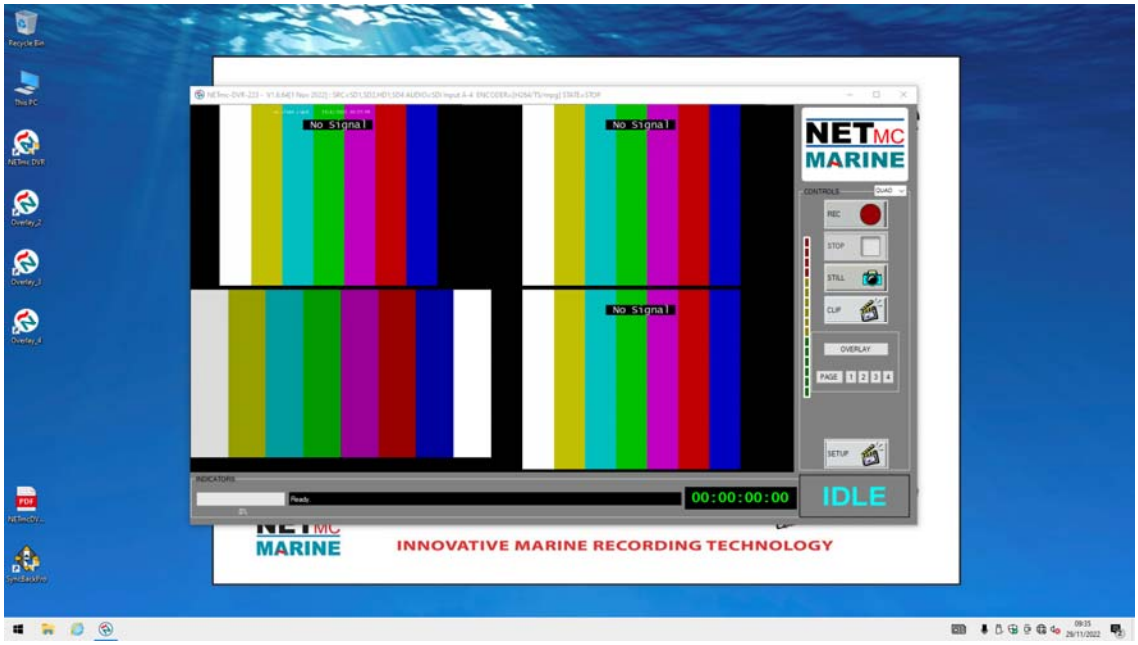
Advanced Overlay (multi layer)

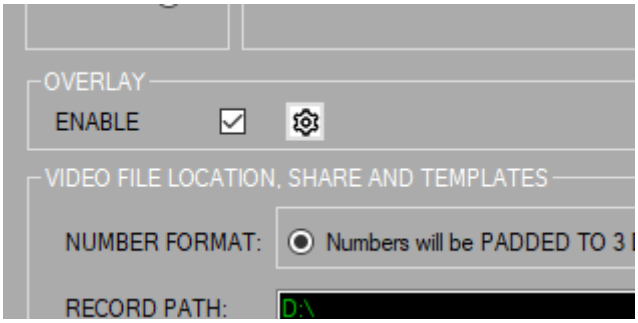
In normal operation, the DVR has 1 set of overlay data, which is sent to all video channels (with the exception of the unique channel title which is unique to each channel)

There is a licensable option (advanced overlay) which allows the user to configure different overlay setups and data for each video channel (input).
It is set as a licensable option as it adds considerable complexity to the system and is only recommended for advanced users.

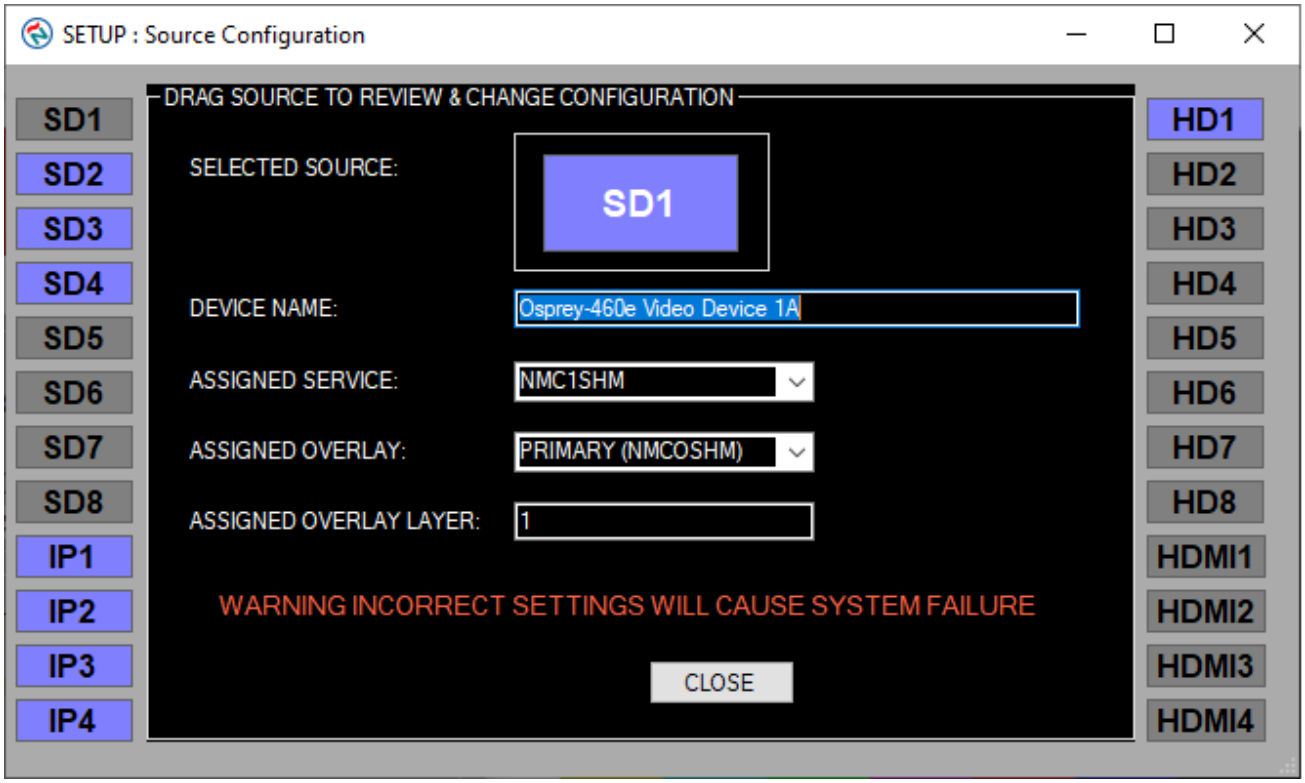
In this example – the user has a 4 input DVR (3 SD + 1 HD) and would like each recorded channel to have totally different overlays – this different labels, logos and parsed data – each being fed from a different serial port – so the multi overlay option was enabled.

With this option enabled, there are now additional overlay icons on the desktop – and in the setup page, there is an additional setup gearwheel icon beside overlay.





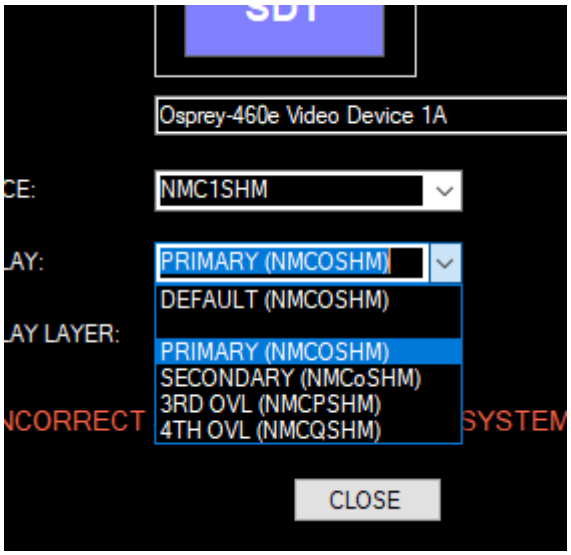
Clicking the setup gearwheel in the overlay section opens up an advanced settings window – where relationships between video and overlays can be setup.



This control allows the user to set which overlay layer is assigned to which input source.
The default has all sources set to the “PRIMARY” – but the user can select each of their inputs (by dragging the input from the edge of the window into the central selected source box and then assigned it a different overlay – or leave it sharing the same overlay as other sources.

For example – it may be useful to have all SD sources share the same overlay but have the HD sources setup differently.
Or sources from diving cameras setup differently from sources from ROV cameras on a multi input DVR.

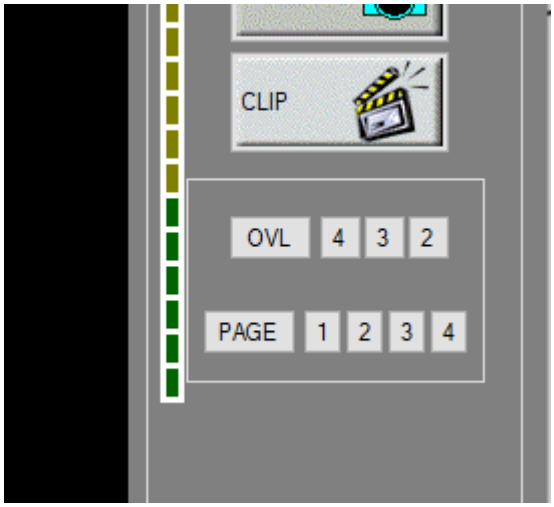
When the source has been selected, it ASSINGNED OVERLAY selection offers a pull-down of available alternatives.



Once applied, these additional overlay are ready for use.

Double click the desktop icon for the additional overlay page – starting with Overlay_2 if you had added a 2nd unique overlay, overlay_3 if you have added a further unique overlay etc (only open what you require to minimise confusion)

Minimise any extra windows – and you will see that the main DVR window now has extra numbered buttons next to the overlay button (now abbreviated to OVL)



OVL opens the ‘green screen’ setup for the primary overlay, 2 opens the secondary one etc.

Each of these ‘green screen’ setup pages can be unique – with different text, logos, labels, locations, choice of clock, parsed serial data etc

Below was can see all the ‘green screen’ windows open with unique content and that content reflected into the recorded channel

Appendix 4

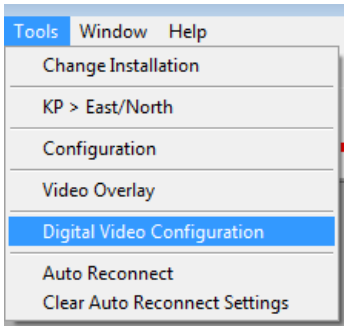
Coabis Interfacing

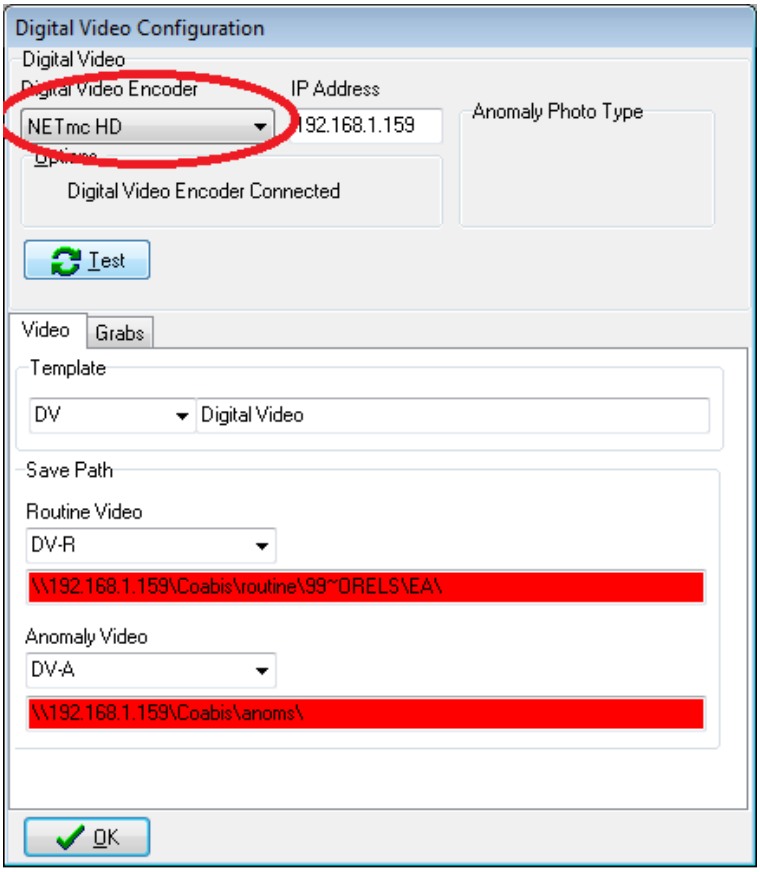
To connect with Coabis (or other 3rd party inspection tools) – the appropriate license must be installed. (see license manager in section 5)

If not already installed, a license can be purchased or rented to enable the feature for the duration of a job or project.

If the license has been enabled, ensure the DVR and Coabis machine are on the same network and network IP address range.

In Coabis site, from the Tools menu, select Digital Video Configuration. From the pulldown, select NETmc HD as the recorder type, enter the IP address of the DVR and click test.



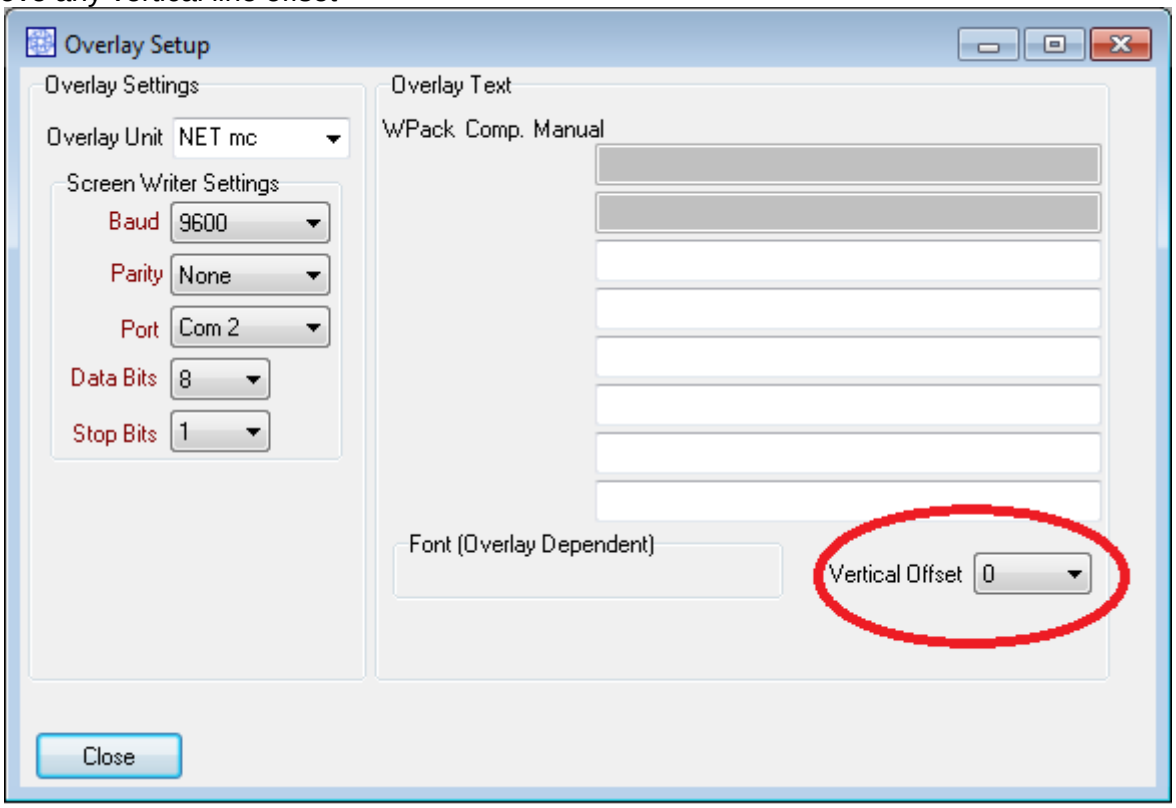


(sharing / storage paths need to be configured in above example)

If the DVR is being used for overlay (of Coabis component ident / workpack) then an appropriate license must be installed for that too.

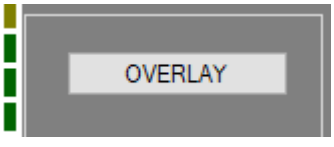
Link the serial port on the Coabis computer to one of the serial ports on the back of the DVR unit.

From the Coabis site Tools menu, select Overlay
Select NETmc from the pull down – select a Port number to match the one being used on the Coabis PC
Remove any vertical line offset

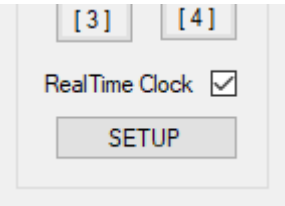


Now the overlay system in the DVR must be setup to accept the incoming string from Coabis. The Coabis output for NETmc was designed to work with a Taylor Lann serial overlay unit – so it is missing some parameters which would normally make inputting a serial string easy (for example – there is no clear start or end character in the string)

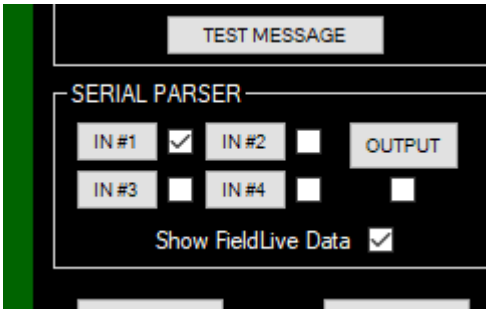
To set this up – open the overlay control panel by clicking the 'Overlay' button on the main software interface.



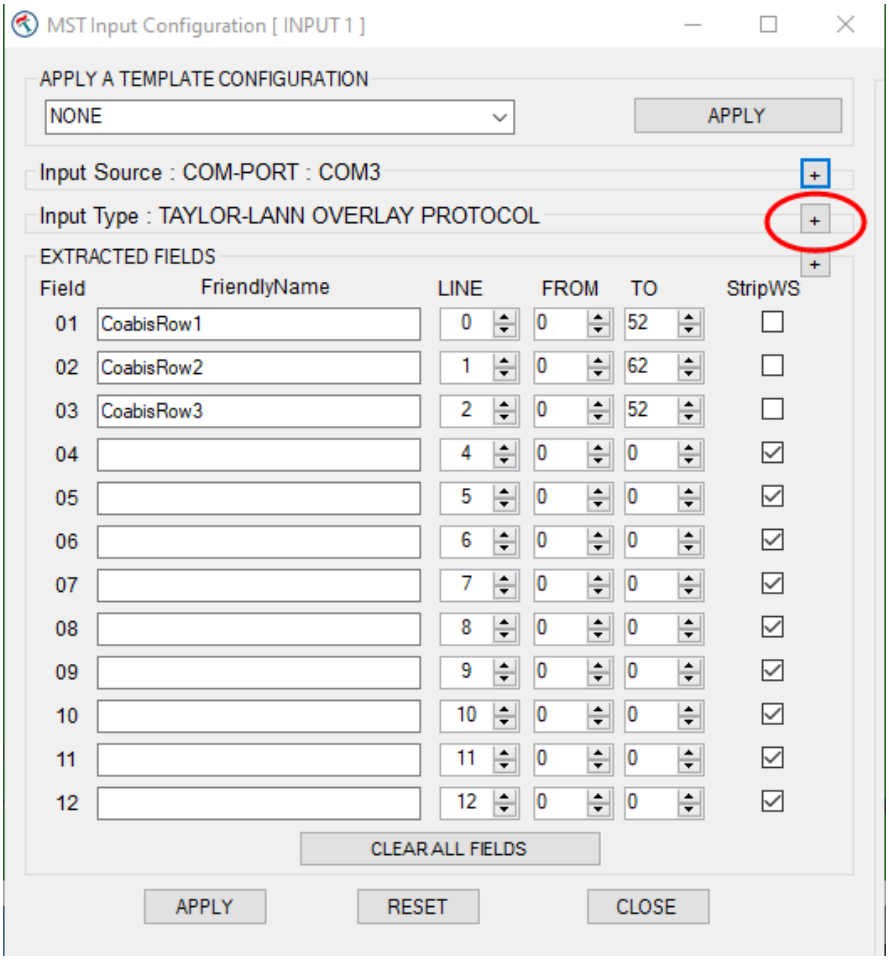
Then when the overlay control page opens, click setup



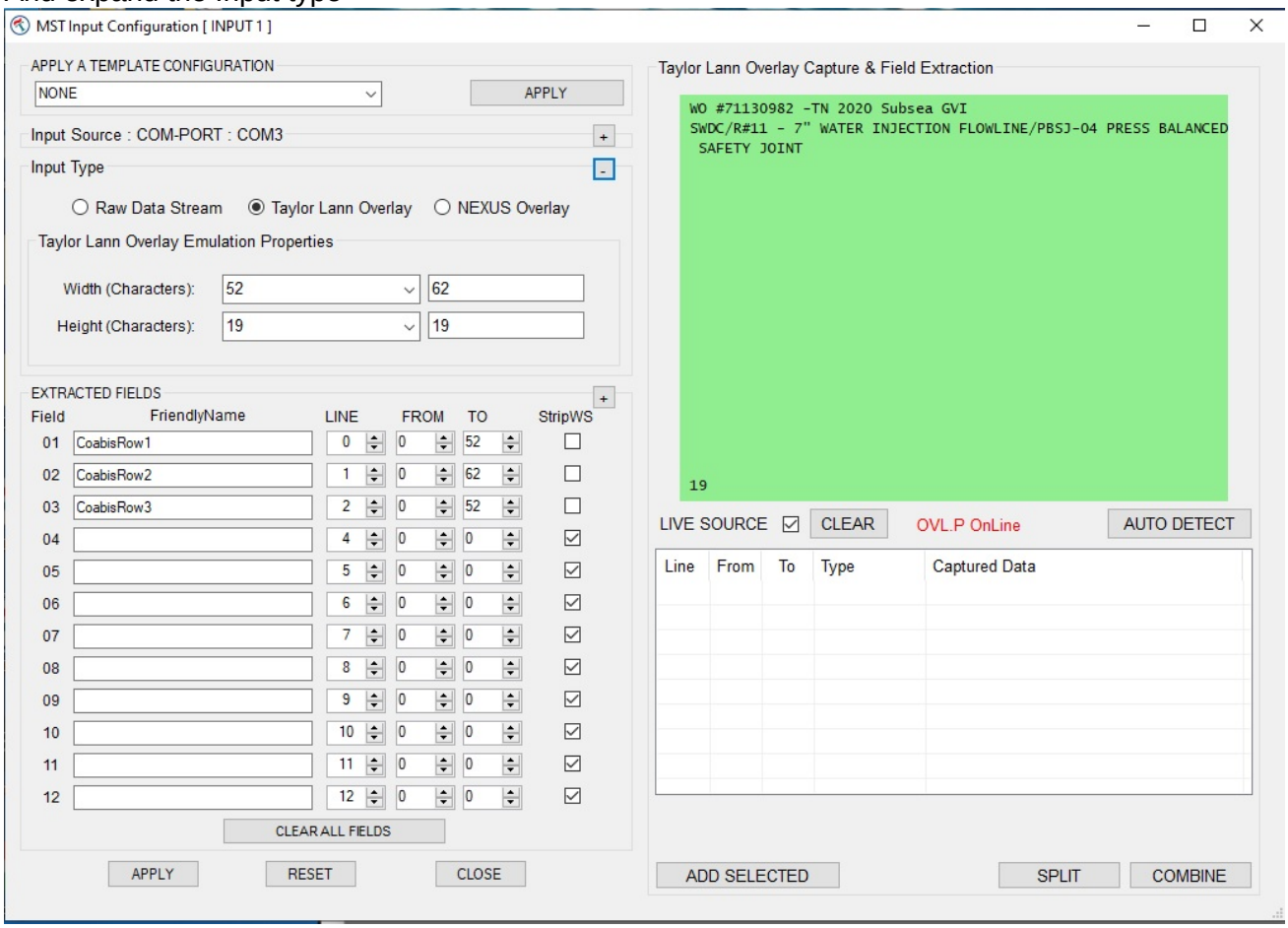
And the select the Parser input you wish to use – there are 4 available – we will use IN#1 in this example



Click on IN#1



And expand the Input type

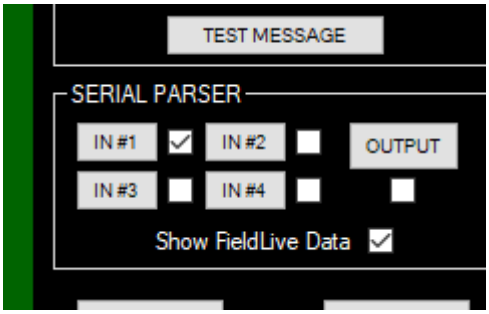


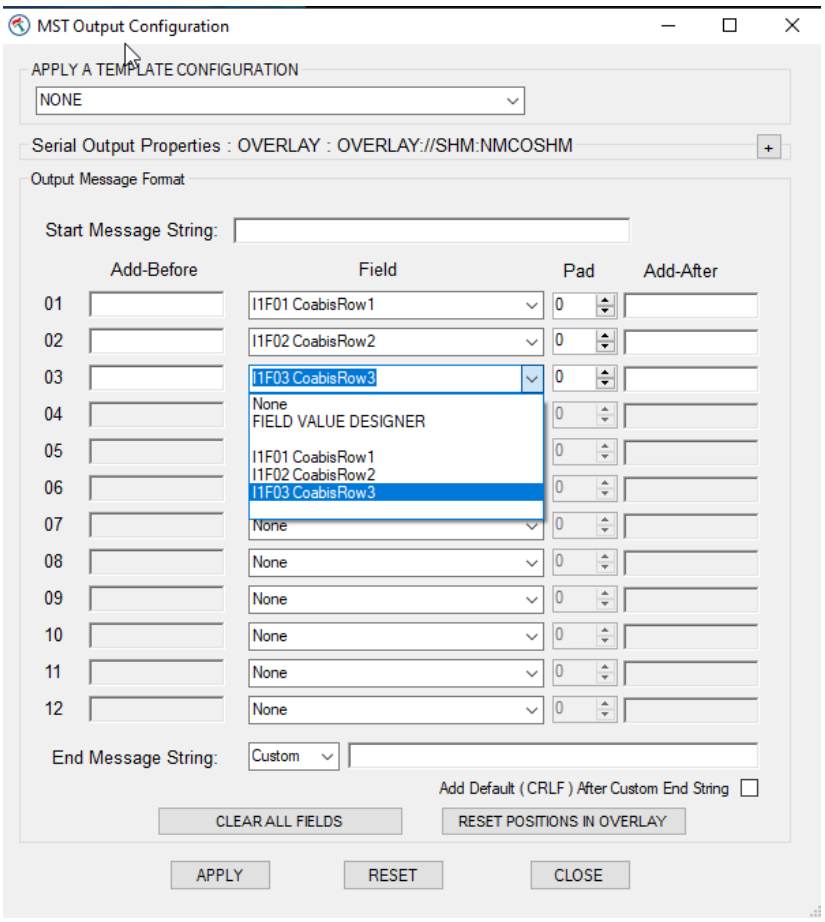
Select Taylor Lann Overlay from the input type selection on the left

Ensure Live Source is ticked and have Coabis send a string to the DVR

The string will appear in the light green box – which is the same size as a Taylor Lann overlay would expect. In this example, it is 2 rows of text, but in the second row is longer than the screen and will wrap round.
This means that 3 rows are required to encapsulate all the information – clicking AUTO DETECT will automatically populate the Extracted fields section (bottom left) – and the user can give them logical friendly-names, in this case CoabisRow1 / 2 / 3

No return to the setup menu and configure the Output

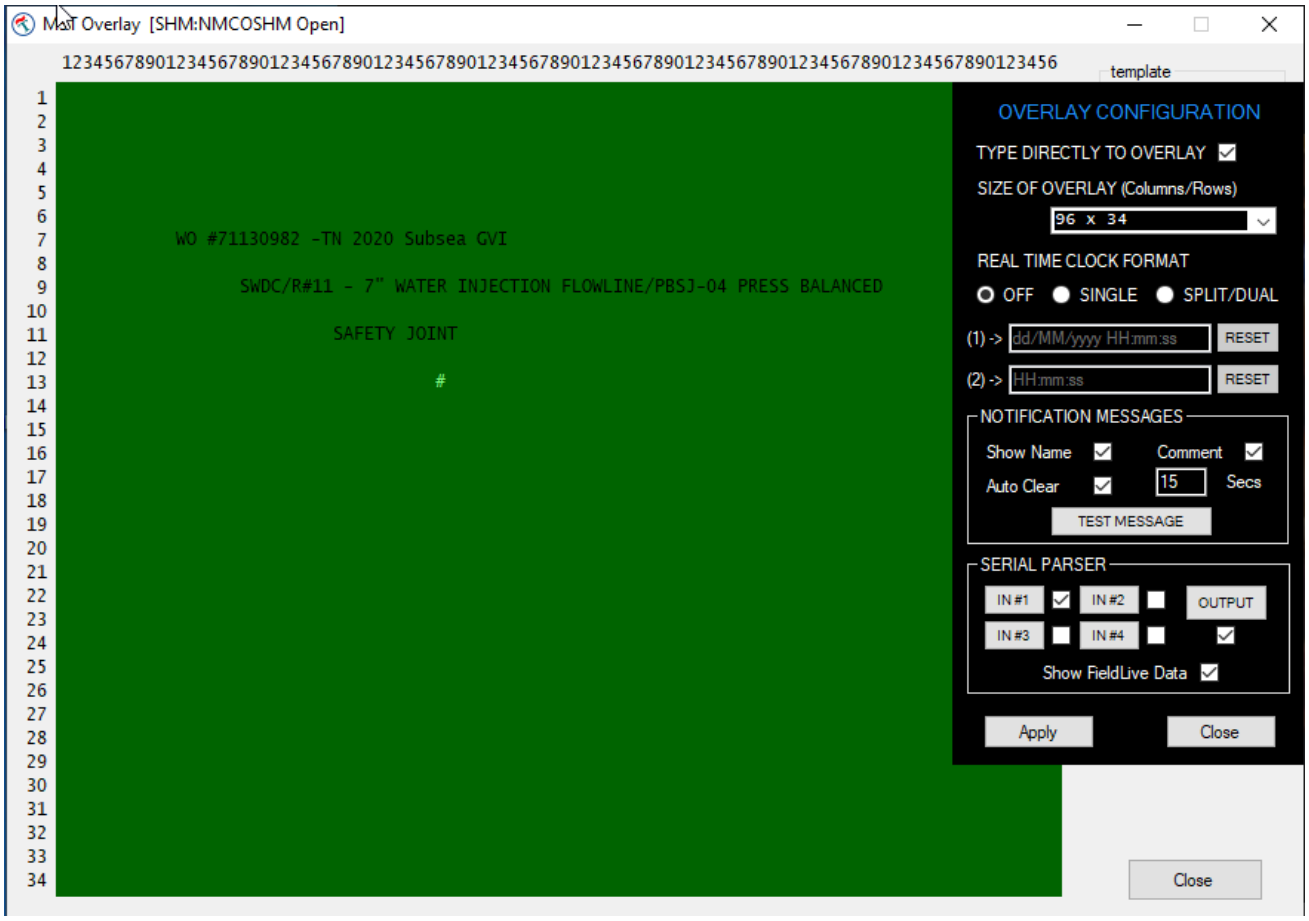




From the field pulldown, select all the configured fields from the friendly names they were given

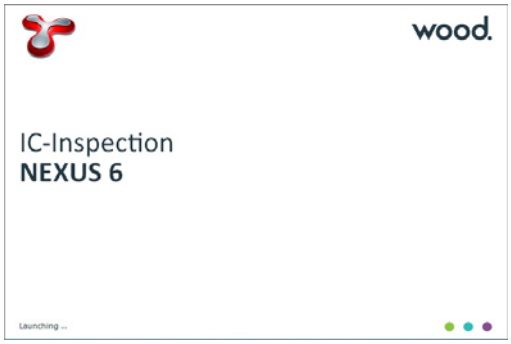
Apply and the field should appear on the main overlay green screen area where they can be slid around to the desired positions.

Ticking the “show fieldlive data” will swap the place holder names for the real data – which will update live if the incoming string changes



Appendix 5

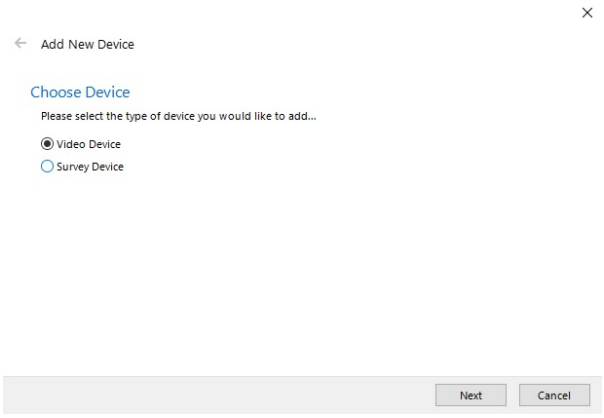
Nexus Interfacing



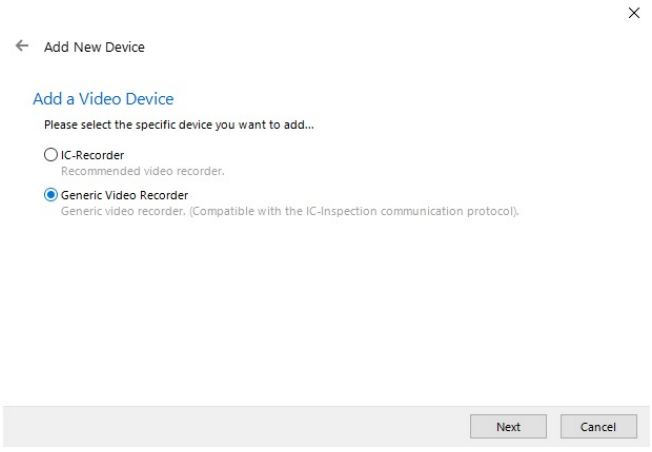
NEXUS 6 and beyond uses a different mechanism to control DVRs – based in a proprietary NEXUS interface.

The DVR must have the NEXUS option licensed and be on the same network as the NEXUS workstation.

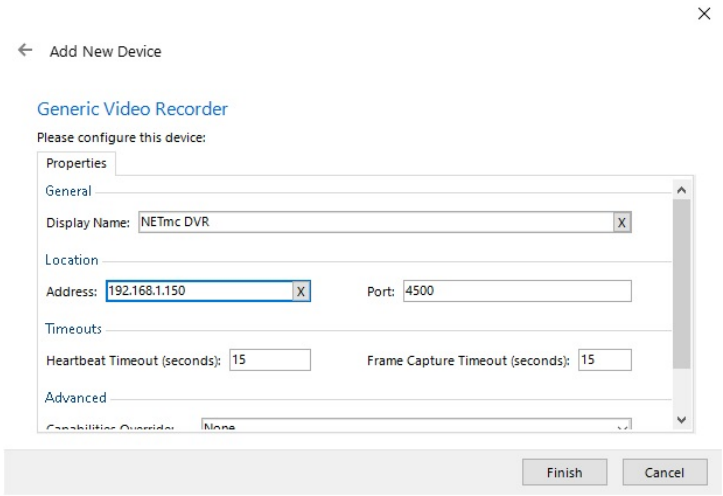
Within NEXUS, add a new Video device



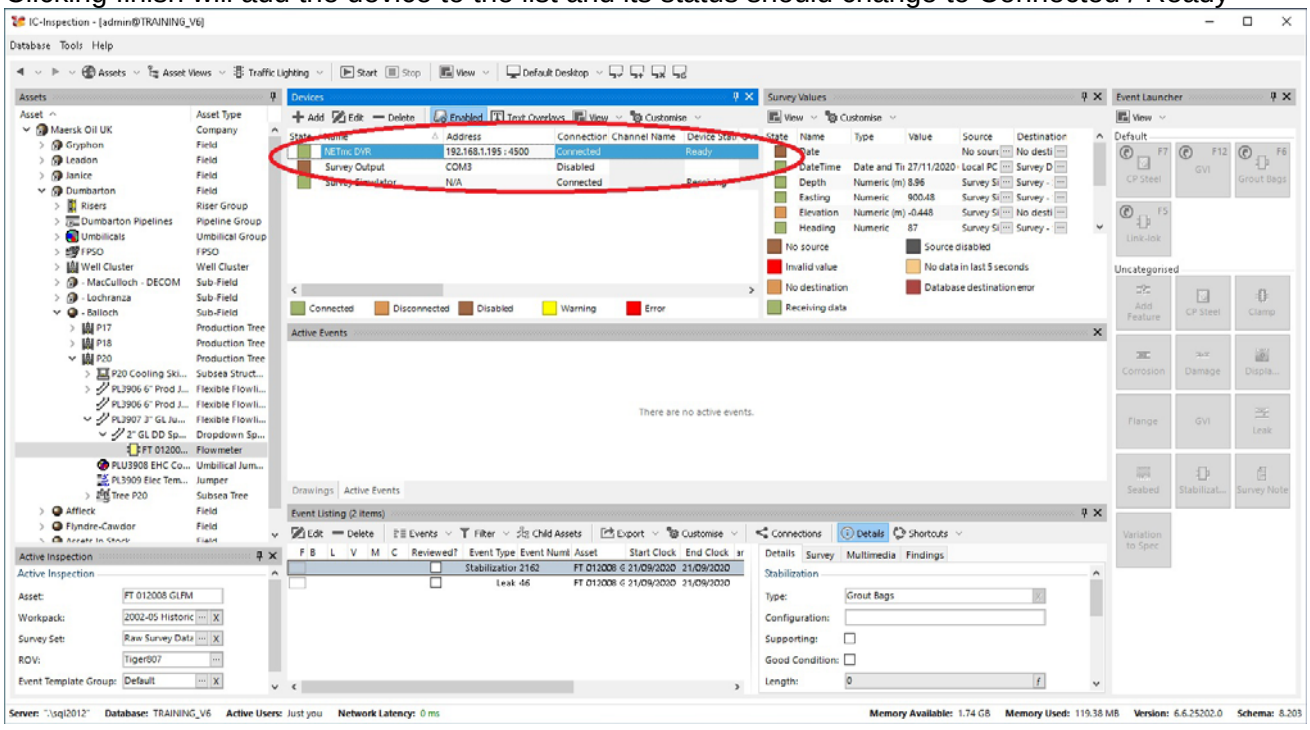
And select Generic Video Recorder



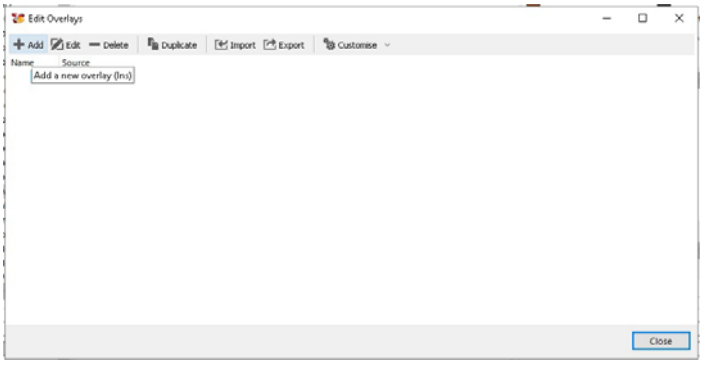
Within the Generic Video Recorder setup box, give the device a friendly name (NETmc DVR in this example) and input the IP address of the DVR.
The port should be left at 4500



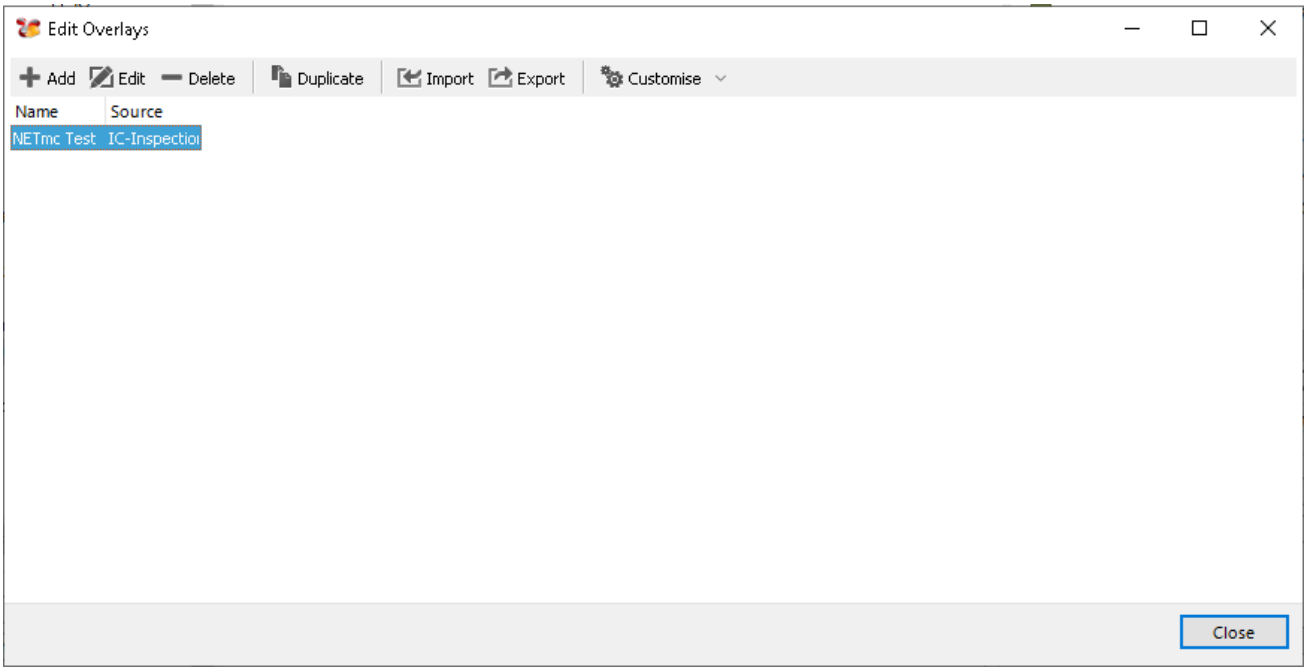
Clicking finish will add the device to the list and its status should change to Connected / Ready



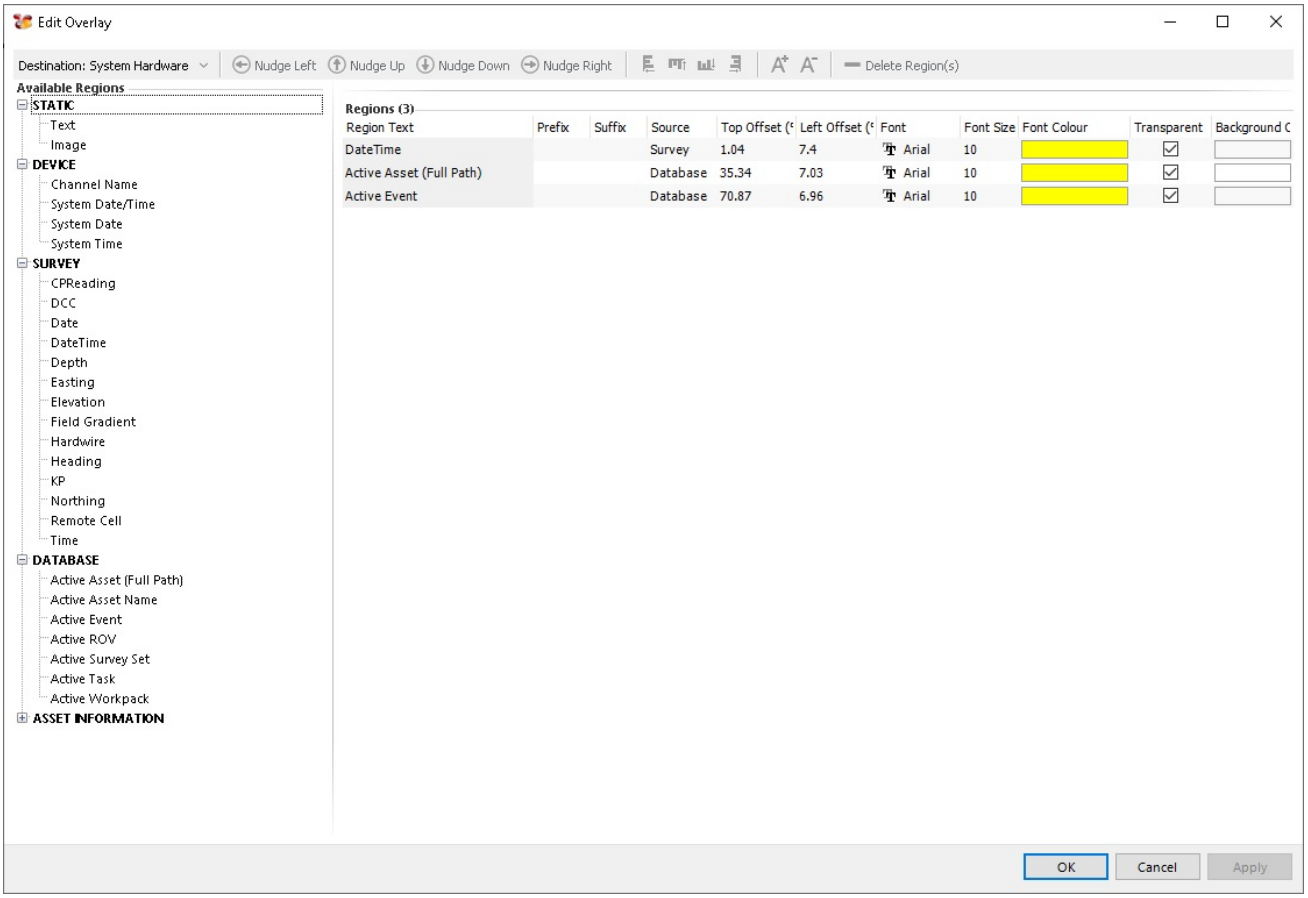
To send overlay text from NEXUS to the DVR, click the Text Overlays option at the top of the device window



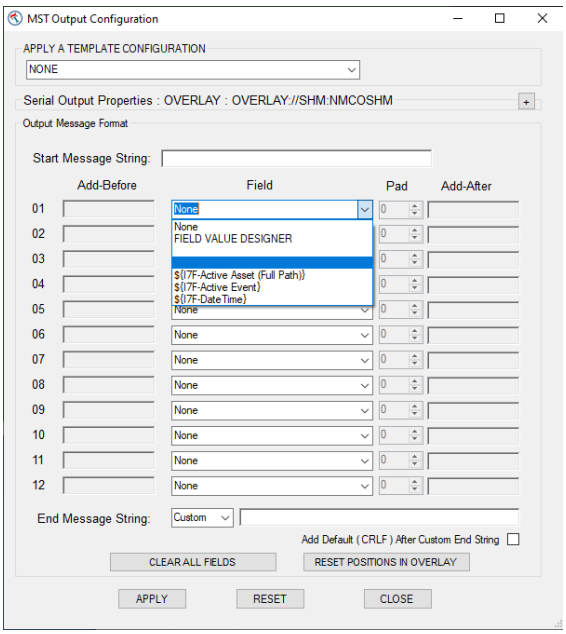
Click the ADD option and give the newly defined overlay output a name (NETmc Test in this example)



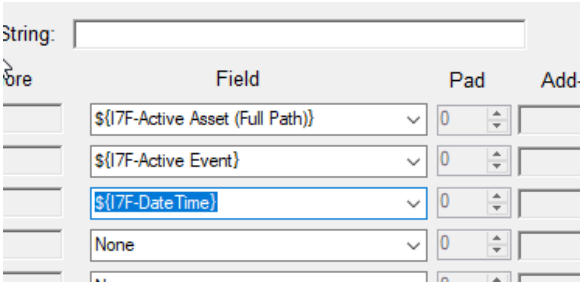
Then double click on that name (or click edit) to bring up the variable section window.



Bring items from the left of the page to the right to send them to the DVR as overlay text



The DVR will pull these NEXUS variables directly into the output configuration of the overlay where they are selectable from the field pull down.
Create a new entry for NEXUS fields you want to use



Once applied, they will appear on the green screen where they can be dragged to desired position

Appendix 6

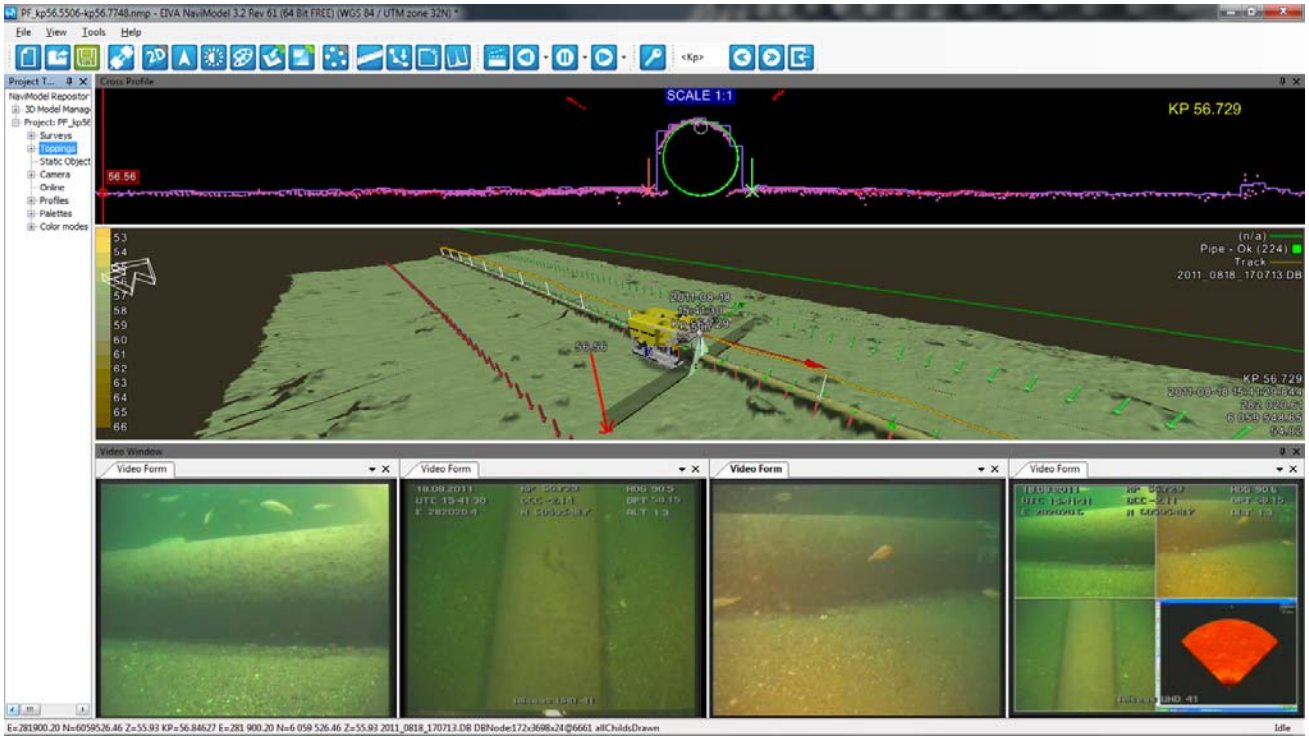
Eiva Interfacing

Is it very simple to configure the DVR for integration with EIVA survey software.

Online EIVA (NaviPac) can be used to start / stop the DVR along with survey start / stop – but the main requirements are:

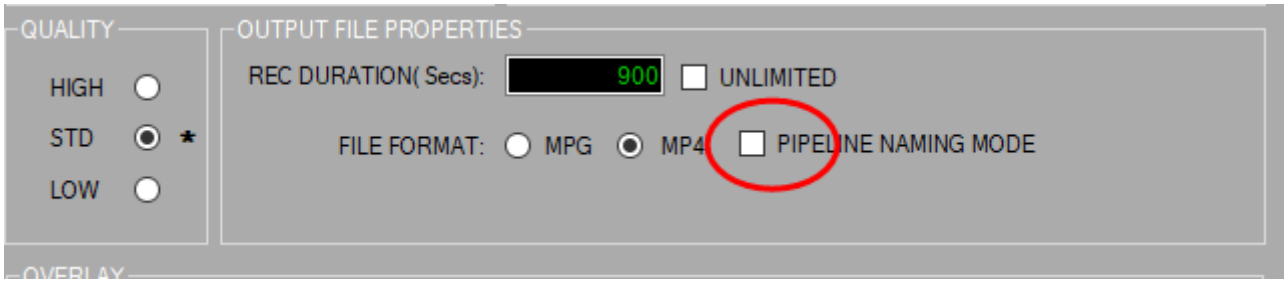
- Ensure the DVR is pipeline enabled and is in Pipeline mode
- Ensure the DVR has its clock synchronised with that of the EIVA main logging workstation

As long as the files have the correct time / date stamp in their file name – EIVA offline editing and replay tools (NaviModel) will be able to open the video files and synchronise with events and other data.



Setting DVR into Pipeline mode:

If the pipeline mode option has been licensed, there will be an additional tick box in the setup page which does not appear when in single channel mode. (refer to section 11 in this manual)

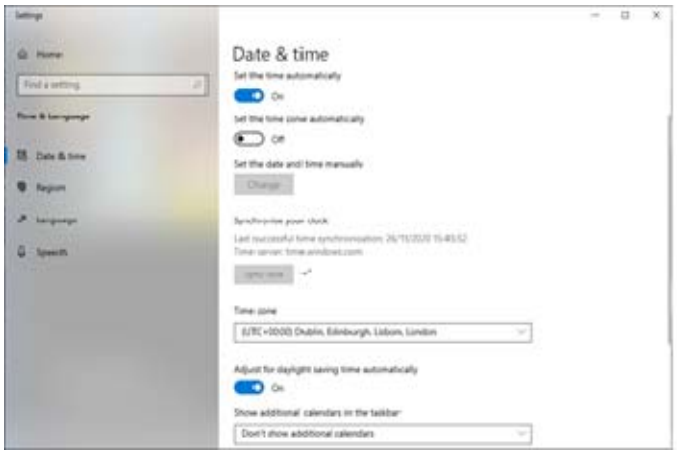


Ticking the box, circled in RED, will synchronise the multiple video images and ensure that the output filename conform to the following format:

2017-0710-103917-000-UserInputFileName-CENTRE
2017-0710-103917-000-UserInputFileName-STB
2017-0710-103917-000-UserInputFileName-PORT
2017-0710-103917-000-UserInputFileName-AUX

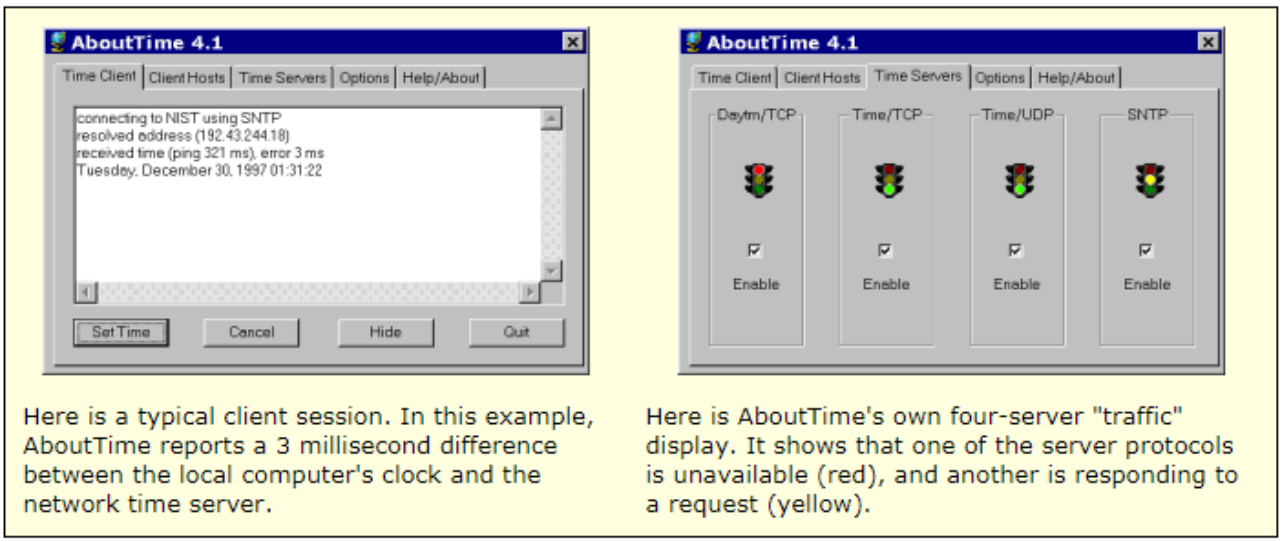
This will allow them to be scanned and imported into various survey eventing and processing packages (e.g. NaviModel). There are many ways to do with this – depending on what kind of network you have onboard your vessel; here are three options:

1. Clock sync with NAV time / NaviPac PC
   If you're PCs have internet access – they can both be synced by windows time clocks.



2. If the NaviPac workstation is synchronised to GPS time already (via serial GPS input), it can be made the NTPS (network time protocol server) using MS Windows tools

3. Use a 3rd party utility such as about time (https://arachnoid.com/abouttime/)

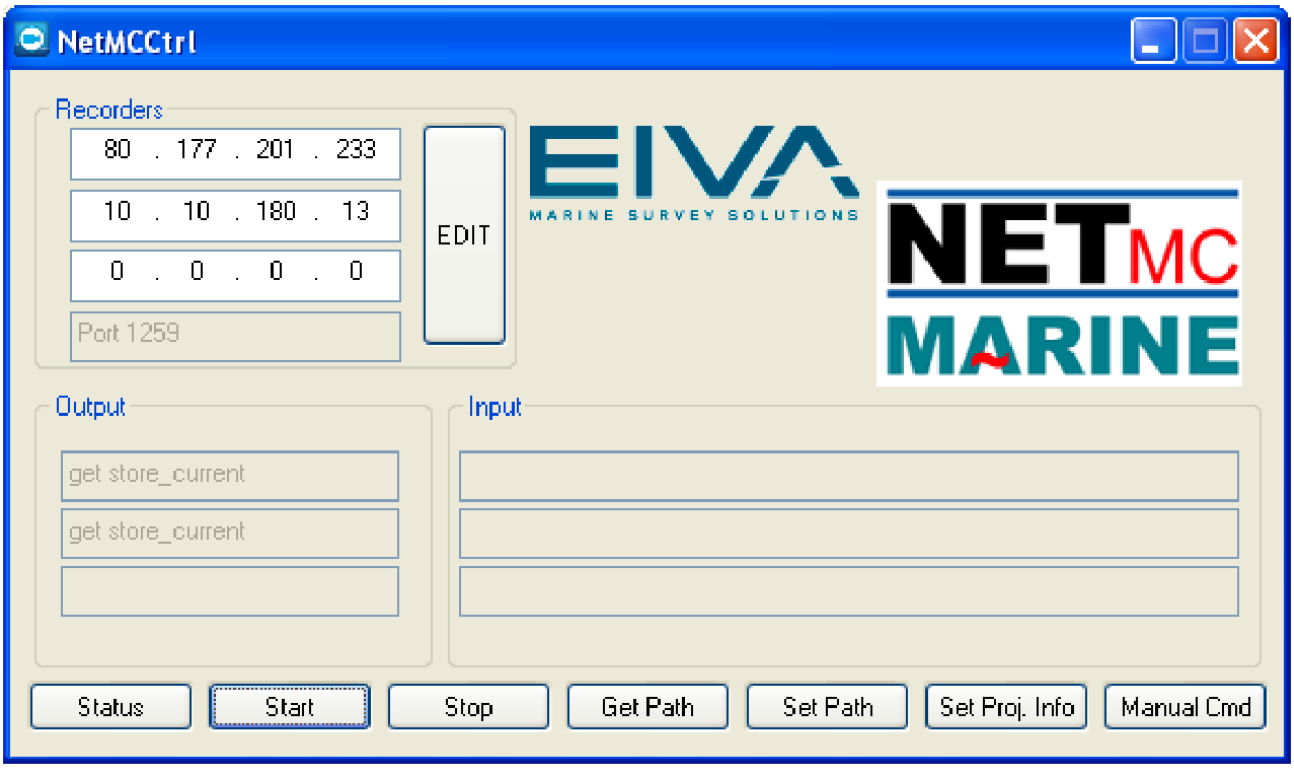


Here is a typical client session. In this example, AboutTime reports a 3 millisecond difference between the local computer's clock and the network time server.

Here is AboutTime's own four-server "traffic" display. It shows that one of the server protocols is unavailable (red), and another is responding to a request (yellow).

Remote control (start / stop) from EIVA

Within the EIVA deploy folder is a tool called NETmc Video Control, this allows you start / stop the DVR recording automatically when the survey starts / stops. However, it should be noted that it is not essential to automate file start/stop, as NaviModel will find the point in the video based on time – not when it was started – though it is a useful tool to prevent the DVR being unnecessarily left recording, filling up the drive space.



Originally designed to control up to three recorders, the NETmc Video Control is most commonly used now to control just one multi-channel recorder.
Simply edit the list of recorders (top left) and add the IP address of your DVR in there. The buttons along the bottom let you test the system by starting / stopping and asking for status etc.

Once successfully tested, the app can be minimised but should be left running in the background – where NaviPac will instigate the control automatically.

Video files can be stored in any location – as long as the location is visible to the DVR when recording and EIVA when replaying. Often this is just the storage drive on the DVR – but if you have a central network storage device (server or NAS) you may wish to direct the video there.

At the point of replay – EIVA will audit the folder of video files and build a time based dataset which it will use to load up the correct video frames as you navigate the survey data and events.

Appendix 7

MSDS – Material Safety Data Sheet

Couriers and freight companies are increasingly concerned about transporting good which may contain batteries.
Our DVR units only contain a small coin size battery for clock backup – similar to the type of battery found in a watch or calculator. (CR2032)

Panasonic

Lithium Battery
Ref. No. CCRE-PSDS-01
Effective Date: Jan. 1, 2021

This product is a consumer product which is used in a hermetically sealed state. So, it is not an object of the SDS system. This document is provided to customers as reference information for the safe handling of the product. The information and recommendations set forth are made in good faith and are believed to be accurate at the date of preparation. Panasonic Corporation makes no warranty expressed or implied.

PRODUCT SAFETY DATA SHEET

1 Chemical product and company identification

Name of Product	:	Manganese dioxide lithium battery
Name of Company	:	Panasonic Corporation
Address	:	1-1 Matsushita-cho, Moriguchi-city, Osaka, 570-8511, Japan
Emergency Contact	:	+81-6-6994-4560 (Working hours) +81-6-6991-1141 (Holiday)

2 Hazards identification

GHS Classification	:	Not applicable
Toxicity	:	Vapor generated from burning batteries, may irritate eyes, skin and throat.
Hazard	:	Electrolyte and lithium metal are inflammable. Risk of explosion by fire if batteries are disposed in fire or heated above 100 degrees C. Stacking or jumbling batteries may cause external short circuits, heat generation, fire or explosion.

3 Composition/information of ingredients

Component	Material	CAS No.	Content (%)
Positive electrode	Manganese dioxide	1313-13-9	12 - 50
Negative electrode	Lithium metal	7439-93-2	0.5 - 6
Electrolyte	1,2-dimethoxyethane	110-71-4	1.5 - 3.5
	Lithium Perchlorate	7791-03-9	0.2 - 0.7
	Organic electrolyte	-	2.5 - 7
Others (Steel or Plastic parts)	Steel	7439-89-6, 7440-47-3	30 - 85
	Polypropylene	9003-07-0	0.5 - 10

Lithium content per cell

Model Number	Lithium content(g)	Model Number	Lithium content(g)	Model Number	Lithium content(g)	Model Number	Lithium content(g)
CR1025	0.008	CR2012	0.02	CR2330	0.08	CR2412	0.03
CR1216	0.008	CR2016	0.03	CR2354	0.17	CR2430	0.09
CR1220	0.01	CR2025	0.05			CR2450	0.18
CR1612	0.01	CR2032	0.07			CR2450A	0.16
CR1616	0.02	CR2032A	0.06			CR2477	0.29
CR1620	0.02	CR2032B	0.06			CR3032	0.15
CR1632	0.04	CR2050A	0.10				
CR1632A	0.04	CR2050B2	0.10				

4 First aid measures (in case of electrolyte leakage from the battery)

Eye contact	:	Flush the eyes with plenty of clean water for at least 15 minutes immediately, without rubbing. Get immediate medical treatment. If appropriate procedures are not taken, this may cause eye injury.
Skin contact	:	Wash the affected area under tepid running water using a mild soap. If appropriates procedures are not taken, this may cause sores on the skin. Get medical attention if irritation develops or persists.
Inhalation	:	Remove to fresh air immediately. Get medical treatment immediately.

5 Firefighting measures

Fire extinguishing agent	:	Alcohol-resistant foam and dry sand are effective.
Extinguishing method	:	Be sure on the windward to extinguish the fire, since vapor may make eyes, nose and throat irritate, Wear the respiratory protection equipment in some cases.

6 Accidental release measures (in case of electrolyte leakage from the battery)

Take up with absorbent cloth, treat cloth as inflammable.
Move the battery away from the fire.

7 Handling and storage

Handling	:	When packing the batteries, do not allow battery terminals to contact each other, or contact with other metals. Be sure to pack batteries by providing partitions in the packaging box, or in a separate plastic bag so that the single batteries are not mixed together. Use strong material for packaging boxes so that they will not be damaged by vibration, impact, dropping and stacking during their transportation. Do not short-circuit, recharge, deform, throw into fire or disassemble. Do not mix different type of batteries. Do not solder directly onto batteries. Insert the battery correctly in electrical equipment.
Storage	:	Do not let water penetrate into packaging boxes during their storage and transportation. Do not store the battery in places of the high temperature or under direct sunlight. Please also avoid the places of high humidity. Be sure not to expose the battery to condensation, rain or frozen condition

8. Exposure controls and personal protection

Acceptable concentration : Not specified about Lithium Battery.
Facilities : Nothing in particular.

Protective Equipment (in case of electrolyte leakage from the battery)
Respiratory Protection : For most condition no respiratory protection.
Hand Protection : Safety gloves.
Eye Protection : Safety goggle

9. Physical and chemical properties

Appearance : Coin shape
Nominal Voltage : 3 V

10. Stability and reactivity

Since batteries utilize a chemical reaction they are actually considered a chemical product.
As such, battery performance will deteriorate over time even if stored for a long period of time without being used. In addition, the various usage conditions such as discharge, ambient temperature, etc. are not maintained within the specified ranges the life expectancy of the battery may be shortened or the device in which the battery is used may be damaged by electrolyte leakage.

11. Toxicological information

Swallowing can lead to chemical bums, perforation of soft tissue, and death. Severe bums can occur within 2 hours of ingestion. Seek medical attention immediately.

12. Ecological information

In case of the worn out battery was disposed in land, the battery case may be corroded, and leak electrolyte. However, there is no environmental impact information.
Mercury (Hg), Cadmium (Cd) and Lead (Pb) are not used in cell.

13. Disposal considerations

When the battery is worn out, dispose of it under the ordinance of each local government.

14. Transport information

Handling

During the transportation of a large amount of batteries by ship, trailer or railway, do not leave them in the places of high temperatures and do not allow them to be exposed to condensation.
During the transportation do not allow packages to be dropped or damaged.

UN Number, UN Class : UN3090, Class9 (for the Air transport by PI968 Section IA or IB)

: Exemption (for the Marine transport and the Air transport by Section II of PI 968, 969 or 970)
Even though the cells are classified as lithium metal batteries (UN3090 or UN3091), they are not subject to some requirements of Dangerous Goods Regulations because they meet the following:

1. for cells, the lithium content is not more than 0.3g ;
2. each cell is of the type proven to meet the requirements of each test

in the UN Manual of Tests and Criteria, PartⅢ, sub-section 38.3 ;
3. each cell is manufactured in ISO9001 certified factory ;
4. the test summary is available from ;
https://industrial.panasonic.com/ww/downloads/battery-test-summary

Please refer to the following reference information about concrete ways of transportation. Actual content of packaging label and shipping documents varies by shipping companies. Make sure to confirm in advance with your shipping company.

Information of reference

	Reference	Packing Instruction(PI)/ Special provision(SP)	Note
Air transport	IATA DGR	PI 968 Section Ⅰ A	Cells, Cargo Aircraft only; Net quantity per package Max. 35kg
		PI 968 Section Ⅰ B	Cells, Cargo Aircraft only; net quantity per package Max. 2.5kg
		PI 968 Section Ⅱ	Cells, Cargo Aircraft only, not more than one package in any single consignment; net quantity per package Max. 2.5kg
		PI 969 Section Ⅱ	Cells packed with equipment
		PI 970 Section Ⅱ	Cells contained in equipment, button cell batteries
Marine transport	IMDG Code	SP 188	

15. Regulatory information

- IATA Dangerous Goods Regulations Edition 62 (IATA DGR)
- IMO International Maritime Dangerous Goods Code 2018 Edition (IMDG Code)
- UN Recommendations on the Transportation of Dangerous Goods, Model Regulations
- UN Recommendations on the Transportation of Dangerous Goods, Manual of Tests and Criteria
- EU Battery Directive(2006/66/EC, 2013/56/EU)
- Regulation (EC) No. 1907/2006 on the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)
- State of California Regulations - Best management practices for Perchlorate Materials
- Act on Preventing Environmental Pollution of Mercury (Japan)

16. Other information

This PSDS is provided to customers as reference information in order to handle batteries safely.
It is necessary for the customer to take appropriate measures depending on the actual situation such as the individual handling, based on this information.

In California only, packages that contain CR lithium coin cells and the Owners/Operating Instructions of products that contain CR lithium coin cells must include the following statement: "Perchlorate Material - special handling may apply,
See http://www.dtsc.ca.gov/hazardouswaste/perchlorate".
The effective date for this Perchlorate label is July 1, 2006 for non-consumer products and January 1, 2007 for consumer products.

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END OF DOCUMENT