

USER GUIDE FOR NETmc MARINE *DVCi-HD Video System*



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1. Introduction

The NETmc Marine **DVCi-HD Video System** is an exciting new concept in High-Definition video recording for offshore inspection and ROV / diver operations.

Current HD systems are based on broadcast studio level technology - running HD-SDI signals at over a gigabit between expensive (£1200+) connectors, requiring the latest fibre muxes, umbilicals and slipring technologies to bring a signal into the control area - where monitors and distribution all have to be upgraded to get the client what they want - inspection with an HD deliverable.

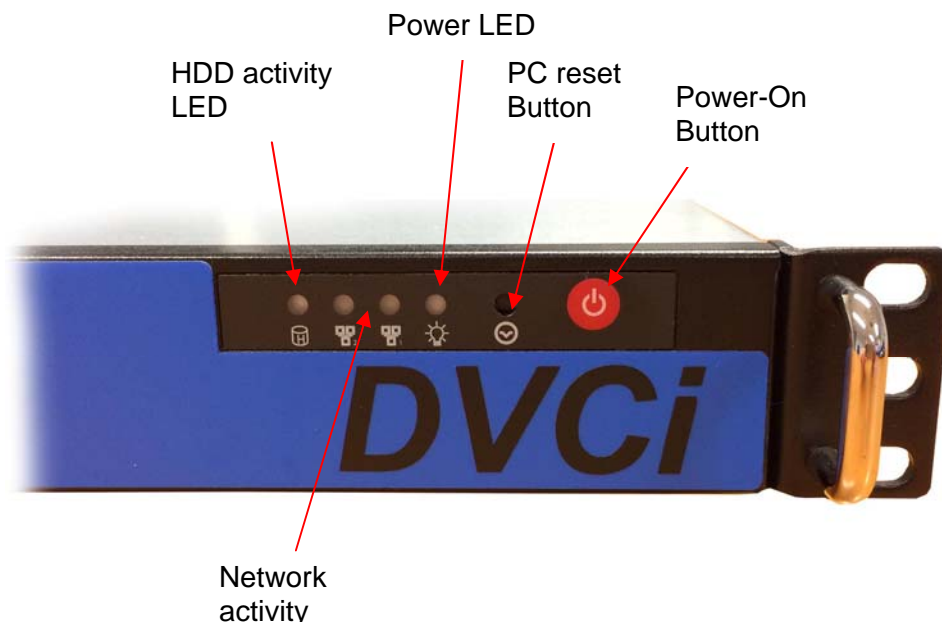
DVCi-HD comes as a complete subsea camera and topside recording system. Video is encoded subsea and sent to the topside box for control and file creation. Using the latest H264 compression, the data from the camera is so small it can be carried up a disused video coax cable.

The topside software will be familiar to users of our inspection systems - as the interface is very similar to the DVRi - and can therefore also be controlled by 3rd party inspection software.

Available in DVRiR zoom camera for larger ROVs, DVCiSR for small and micro ROVs, DVCiD for divers (belt pack and small camera) and DVCiP multi camera / pipeline system.

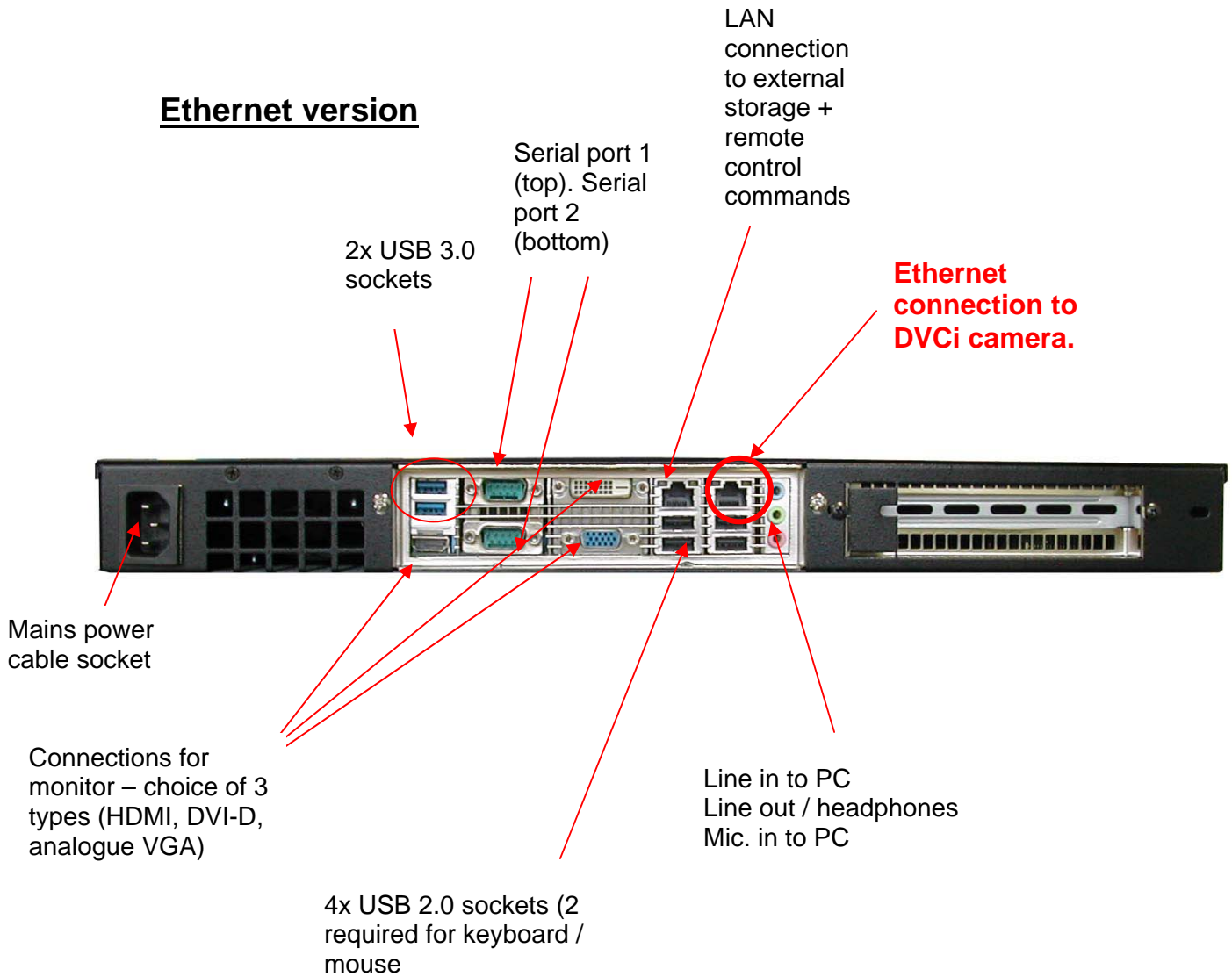
2. Hardware Description and Connections

2.1 Front of the DVCi topbox (rack mount)

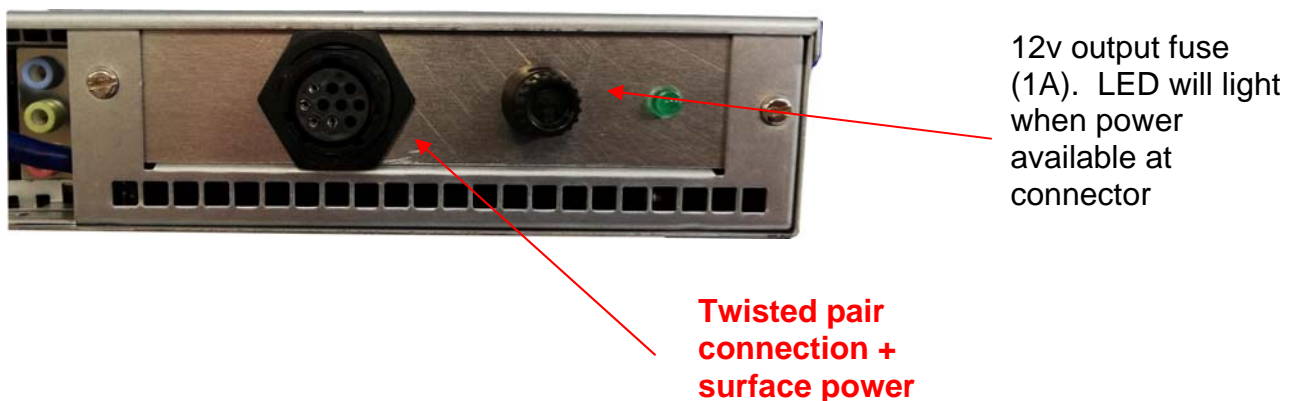
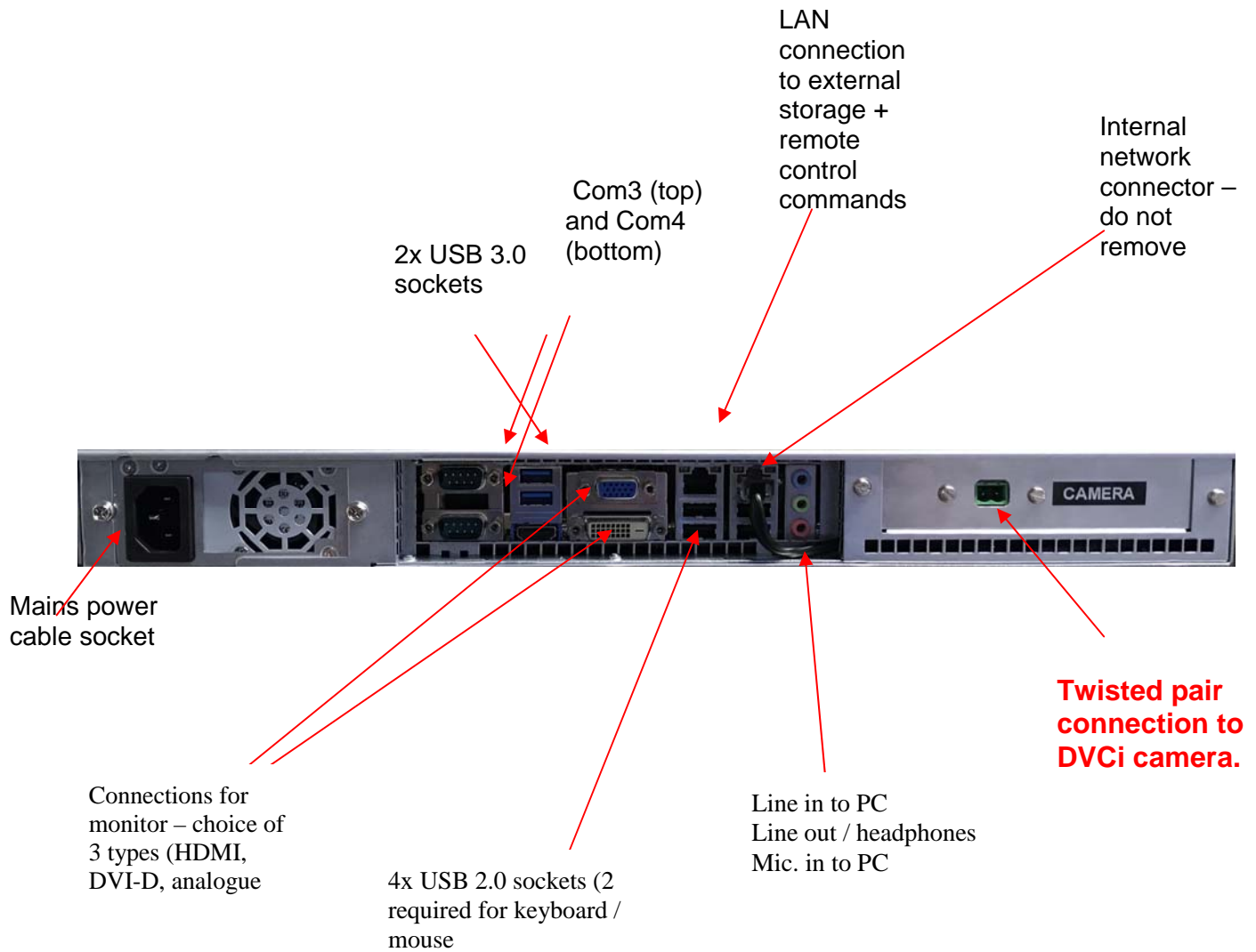


2.2 Rear of the DVCi top box (rackmount)

Ethernet version



Twisted pair version





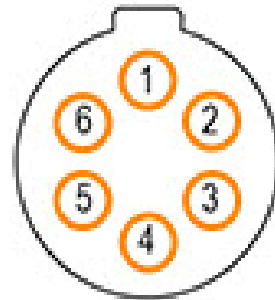
When topside connects to the camera over TWP – these LEDs will light to show the connection. NO LED = NO CONNECTION

Default setting is the middle LED – longer cables may only manage a slower speed and the lower LED will light.

Souriau Umbilical Connector Pin	Function
B	0v (topside test supply)
C	24v (topside test supply)
D	TWP1
E	TWP2

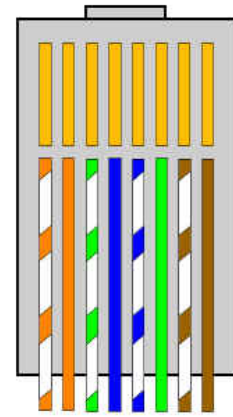
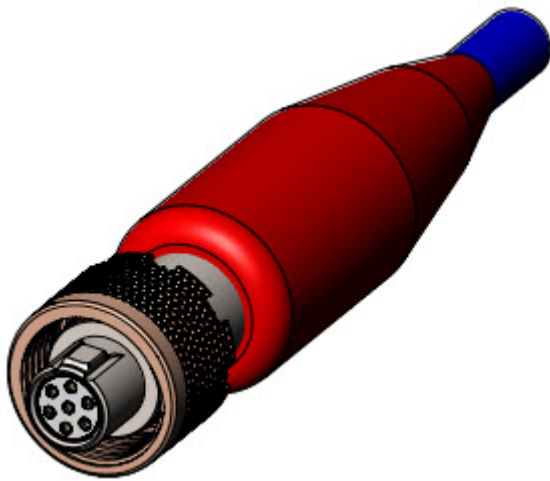
Umbilical Plug: Brand Souriau, type UTS6JC1210P, RS part 191-428
 Crimp pin : Souriau SM20WL3S25UK RS 233-2703

2.3 DVCiR camera

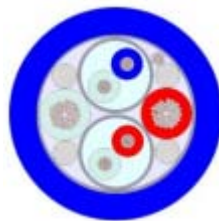


Face view of male bulkhead on camera

CONNECTOR PIN	FUNCTION
1	OV
2	OR/WH
3	OR
4	+24V
5	GRN/WH
6	GRN



Connector : CRE 'A' sized shell, PLA06F - ideally terminated in a 2 x twp + power cable (CRE13097-3)



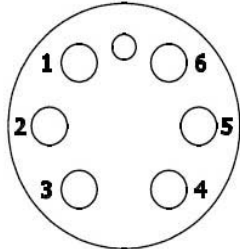
Legacy Connectors / pin-outs



Connects to Subconn DIL8F

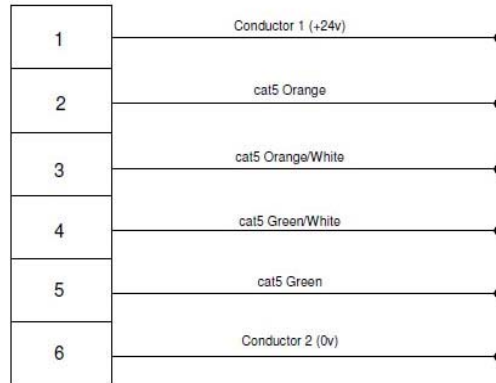


IL6-F c/w
DLSB-M



IL6-F
Face View

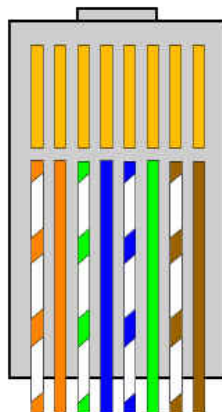
Wiring Detail



NOTE:

The LAN connector has 8 wires, designed for full gigabit networking, the **DVCi** will function with 10/100 networking, so:

CONNECTOR PIN	FUNCTION
1	+ 24v
2	OR (Rx-)
3	OR/WH (Rx+)
4	GR/WH (Tx+)
5	GREEN (Tx-)
6	0V



Using Twisted Pair converter bottle (or camera with integrated TWP):

Subconn MCIL5F

CONNECTOR PIN	FUNCTION
1	+ 24v
2	0 v
3	Twp
4	GRD
5	Twp

Bottle connected in series with camera:



Diver System

Diver belt pack has 2 connections – 1 x 4 way connector for power and datalink, 1 x 5way connector for connection to camera.



The cable to the camera is a high spec, wide bandwidth cable which can only be sourced from NETmc Marine.

The 4way cable has been wired so it's a 1:1 swap-out for many popular composite cameras:

Pin	Function
1	Twp
2	Twp
3	Camera Power + (24v)
4	Camera Power – (0v)

3. System Set-up

It is important to plug in all video connections before switching on the *DVCi-HD video system*.

THIS EQUIPMENT MUST BE EARTHED.

1. Mount the ***DVCi controller box*** 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 – THE MONITOR SHOULD BE WIDE SCREEN AND CAPABLE OF DISPLAYING 1280x720
4. Connect camera to topside by direct cable or via ROV mux/ethernet system

Power up the unit
5. Launch ***DVCi*** software from desktop icon.
6. Live video images should be displayed on screen.
7. See appendix 2 for problem solving suggestions

4. Using the software - Recording

A shortcut on the desktop will launch the software which controls the **DVCi-HD video system**.



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.

The screenshot shows the NETMC MARINE software interface. The main window displays a live video feed of an underwater scene. The interface includes a top status bar with the date and time (14/07/2016 11:52:48) and system information. A right-hand control panel contains various buttons and indicators. A bottom status bar shows drive capacity and recording time. Red arrows point from text labels to specific interface elements.



Annotations and their corresponding interface elements:

- Start Recording (points to the REC button)
- Stop Recording (points to the STOP button)
- Take Snapshot / Still image grab (points to the STILL button)
- Take Video clip (points to the CLIP button)
- Focus control (points to the FOCUS MAN buttons)
- Zoom control (points to the ZOOM buttons)
- Colour / B/W filter (points to the filter buttons)
- Enter Setup (points to the SETUP button)
- Recording status indicator (points to the REC indicator light)
- Time encoded this session (points to the time display)
- Video Window (points to the main video feed area)
- Drive capacity – free space* (points to the drive capacity indicator)

* 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 RECORD 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 **DVCi-HD video system**.

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.



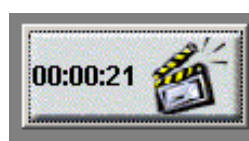
To resume logging, simply click the RECORD button again.

The system will automatically create a new file, automatically named as per the configuration in the SETUP page.

Similarly, live video clips can be taken at any point during the recording or preview by clicking the CLIP button.



The clip will continue to grow until the CLIP button is pressed again. An incrementing timer will be displayed on the button while the clip is being recorded.



The Black and white function introduces a filter to turn the colour image to black and white. This can be useful when navigating the camera.



B/W filter OFF



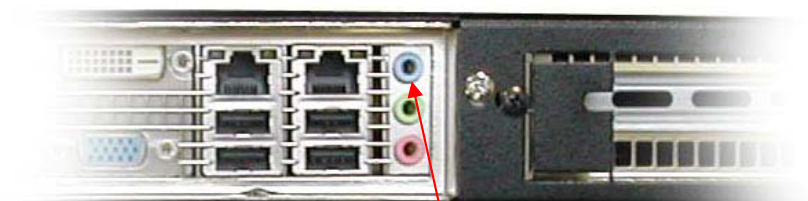
B/W filter ON



4.1 Audio Input

Use a PC-type microphone or headset to inject audio into the recordings.
Use the PC audio input controls to adjust input type and volume.

The **DVCi** will automatically record any audio input via the motherboard.



Line in to PC
Line out / headphones
Mic. in to PC

4.2 Focus Controls

The **DVCiR** defaults to manual focusing.

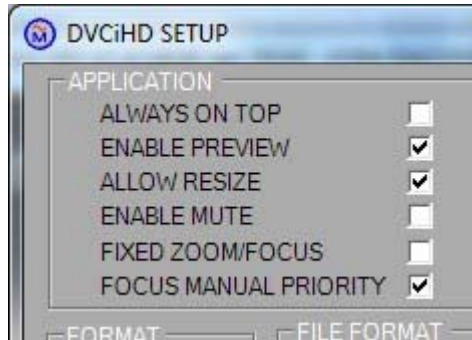


Clicking on the N (near) or F (far) buttons adjusts the focus.

For quick focus changes, clicking on and holding the mouse button down on the AF icon will autofocus to the object the camera is pointing at.

Releasing the mouse click will drop the unit back to manual focus but at the last level achieved during autofocus.

If autofocus is required (**not advisable in typical underwater applications**), untick the "focus manual priority" box in the setup page.



The user interface will now open with a slider to select between auto and manual focus.



4.3 Zoom Controls

Zoom level is adjusted by dragging the slider.

Level 0x gives a wide angle view.

Level 1x gives an equivalent view to a standard lens.

Subsequent levels give telephoto views.



Zoom / Focus is only applicable to the DVCiR - - other versions are fixed focus / zoom

4.4 HD / SD Select (option)

Systems can be ordered with an optional composite encoder built into the topside unit. This allows the local connection of a traditional composite output (PAL / NTSC) camera as backup or for special applications (low light / SIT)

If this options is not available, it will be 'greyed out', else it will be a selector which can be toggled between HD (DVCi camera) and SD (local composite signal input).

Switching can only be done when recording is paused – as the selection will change the shape, size and format of the output file – which cannot happen mid file.



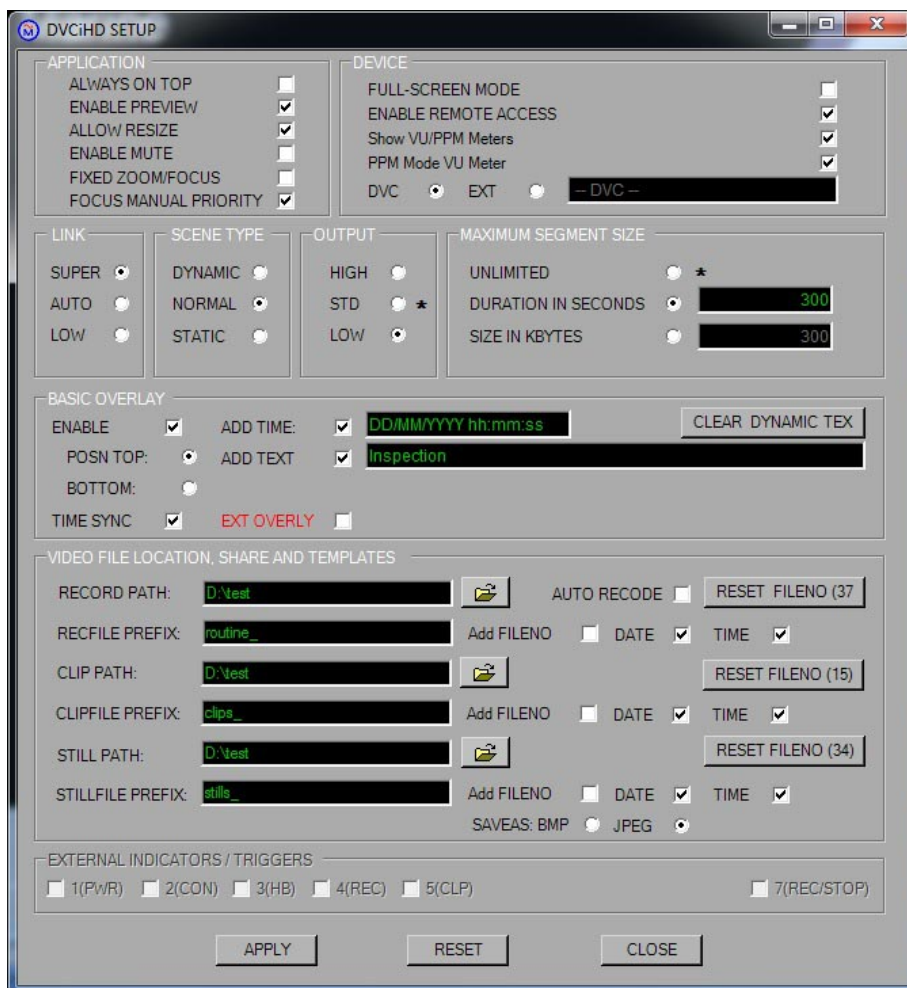
5. Software Settings

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



In the set-up page the user can select:

- video quality (by experiment / customer specification)
- where files are to be saved
- what the file names should be.



A description of some of the parameters in the set-up screen is given below:

Application:

Always on top

Keeps the video recorder display on top of any other windows that may be open.

Enable Preview

Automatically starts the live video on start-up

Device:

Enable Remote Access Allows network control

Link:

Optimal video quality is related to the connection between the camera and the topside. If in doubt, use AUTO. Super requires a high quality link but will give the biggest image possible (1080).

Scene Type:

Best results will be gained by matching camera settings to the scene being recorded. If the camera is on a fixed mount (tripod etc) and is view a slow change scene, select STATIC. If there is bad visibility and lots of movement, use DYNAMIC. If a mix or in doubt, use NORMAL.

Output:

Most users will select STD. If you need small files, or the link to the camera is struggling (jerky video, lost picture etc) select LOW. For optimal quality use HIGH – but it might be outwith and ability of the link to the camera and might make the video worse. Try a different LINK option.

Maximum Segment Size:

Each section of video recorded can be broken down into discreet video clips to aid reviewing and managing the files. These sizes of each clip can be set by time or volume of data. Should you wish to be able to download a file to a certain type of media e.g. a floppy disc, then you would select file size as the controlling factor and set the size to fit your disc.

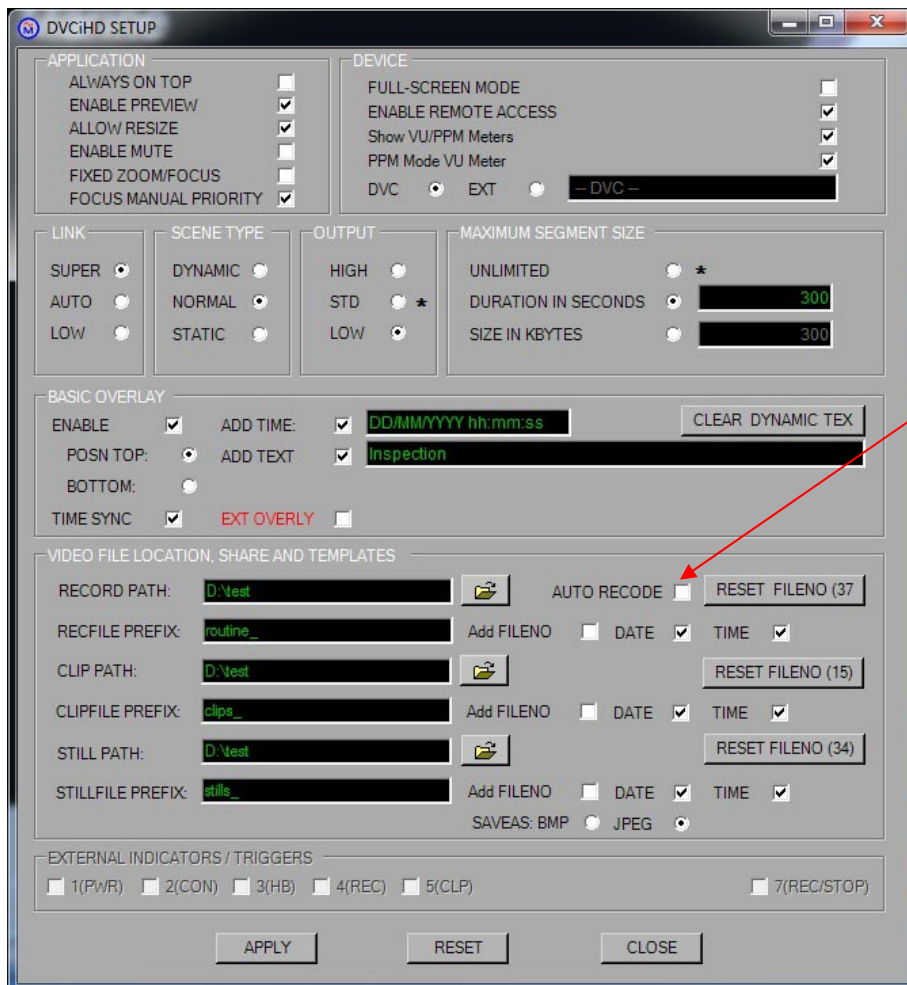
If on the other hand you wish to store the video by time then select that option and put in the number of seconds you want the file to be.

The size of file chosen will depend very much on the project in hand, but should probably be no less than 5 minutes; otherwise the number of files recorded may become excessive and difficult to manage.

Video File Location, Share and Templates:

<i>Record Path</i>	This is the location that your video files will be stored. The default location is "D\Routine"
<i>Recfile Prefix</i>	Adds a chosen name or auto variable to the video file. Select "?" for a list of auto name options.
<i>Add FILENO</i>	Adds an incrementing file number to each file created.
<i>Date</i>	Adds the current date to the file name
<i>Time</i>	Adds the current time to the file name
Reset FILENO	Reset sequential numbers to zero (currently 26 in the example shown)
<i>Clip Path</i>	Select the location where video clips will be stored. The default location is "D\Clips"
<i>Clip Path Prefix</i>	Add a chosen name/prefix to video clips.
<i>Add FILENO, date, time</i>	Adds an incrementing number, current date and current time to the file name for video clips.
Reset FILENO	Reset sequential numbers to zero (currently 2 in the example shown)
<i>Still Path</i>	Select the location where still image grabs will be stored. The default location is "D\Stills"
<i>Still File Prefix</i>	Add a chosen name/name to still image grabs.
<i>Add FILENO, date, time</i>	Adds an incrementing number, current date and current time to the file name for video grabs
Reset FILENO	Reset sequential numbers to zero (currently 7 in the example shown.)

NOTE: IT IS IMPORTANT TO CLICK APPLY SO THAT ANY CHANGES ARE SAVED.



After a routine recording has completed a file, the system will automatically recode that file with maximum compression to achieve the smallest file size possible. A sub folder called 'orig' will be created in the storage area with the original media being copied there in case it is required at a later date. If the file cannot be compressed any more, the original file will remain in the original storage area.

6. Overlay

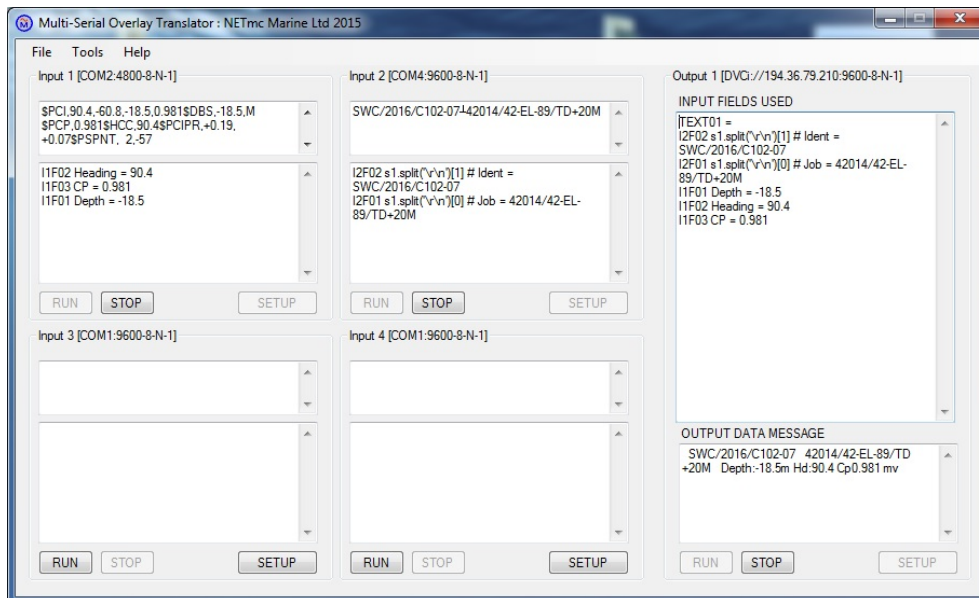
The DVCi system has an integrated overlay system which writes along the top line of the video display:



The overlay text is configured from the setup page. Time / date and free text can be added



If dynamic data and data which has to be taken from multiple serial ports of lifted from a section of a serial string, the 'Parser' software should be used.



See Appendix 3 for more details

7. Video Distribution

DVCi systems are designed to provide HD video in a cost effective way or within an environment which wouldn't be able to carry a regular HD camera.
(e.g. for divers or rovs without fibre umbilicals)

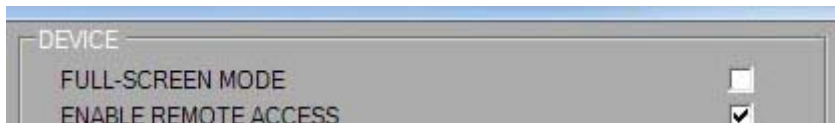
So distributing the video has to be handled differently.

The most efficient route at the moment is to replicate the computer display and share that with other users.

The topside can output to multiple monitors – one of which could be a converter box which could take the VGA or DVi and convert it to HDMI, SDI or down scale to composite – where it could be fed into an existing low def distribution system.

Such a down scale will mean the remote viewers are not seeing HD- but it will give them an idea of whats going on. Review of the recorded footage will be the best way for multiple user to share in the high def experience.

If the system is setup as 'Full screen mode' – the video picture will fill the entire screen area – so replicating the monitor image will appear like it's a raw camera feed.



The user menus are hidden in this mode until the mouse is moved.

The level of fade out transparency can be adjusted in the setup page.

8. How to contact NETmc Marine Support

Should any problems occur with your *Four263 DVR* that are not addressed by this manual please contact our Support Team:

Email: support@netmcmarine.co.uk.

Tel: +44 1771 644001

Should your call be outside office hours, please leave a message on the answering machine, which will be forwarded to one of the support engineers. 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 own expense.

Appendix 1 Technical Specifications

DVCi Topbox

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, 0.004g ² /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	8.65kg (topside and camera)
Network Support	10/100/1000 Base T
Video Rate	MPEG4 1-3 Mbps
Audio	Analog stereo line input / PC mic
Internal hard drive	500GB
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.

DVCi Camera

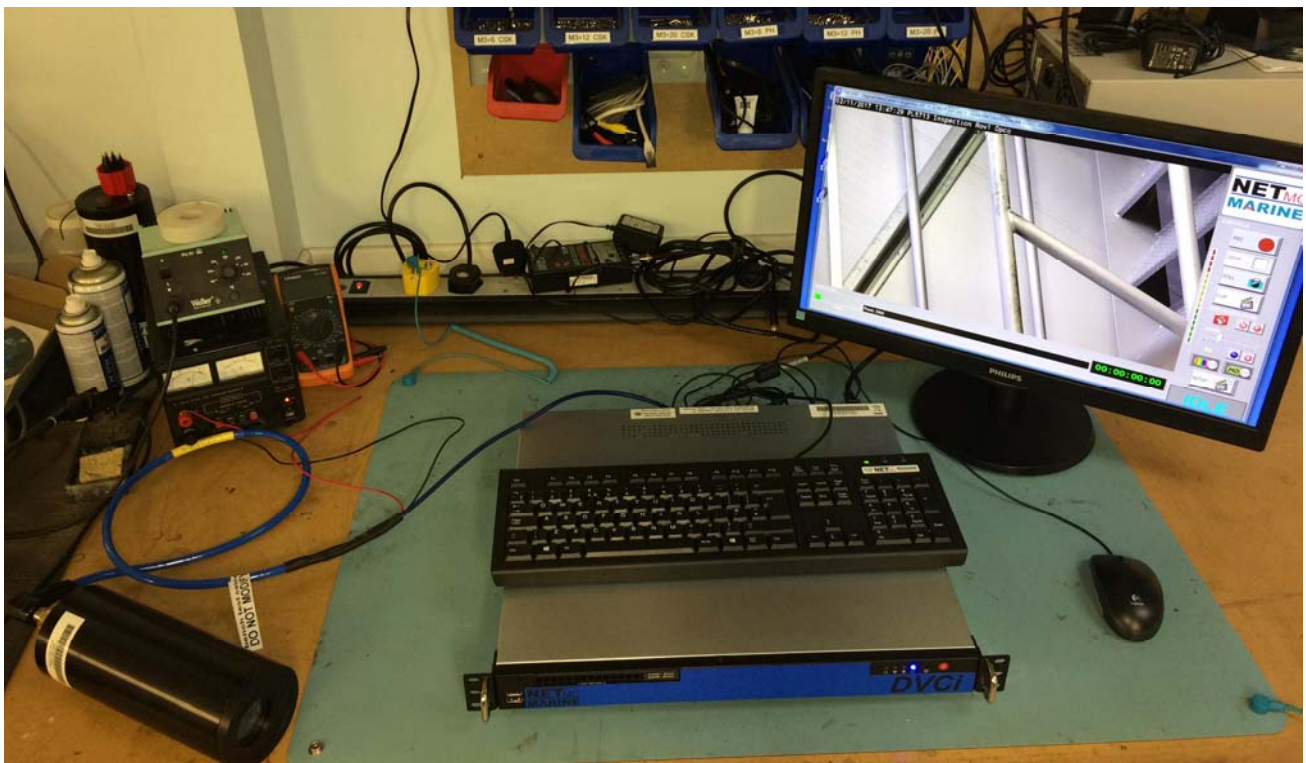
Power Requirements	18 to 36 V DC
Power Consumption	10W
Dimensions	86mm diameter, 225mm long excluding connector
Weight	In Air: 2.0kg In Water: 0.8kg
HD video output	Ethernet / Twisted copper pair
Sensor type	1/3-type CMOS
Optical zoom	10x optical zoom
Focus Control	10mm to 800mm (zoom)

Appendix 2 Fault Finding / Quick start (Ethernet)

Each DVCi system (rental or purchase) is supplied with a bench test cable.



This is a short cable to link the camera directly to the topside unit and allows the connection of 24v (from a bench supply) to power the camera. This should be preserved for testing and another cable used for the underwater splice into the vehicle. (additional cable can be ordered from NETmc Marine)



If there are any concerns about the operation of the camera – a bench test as above should be the first thing to do to restore a level of confidence.

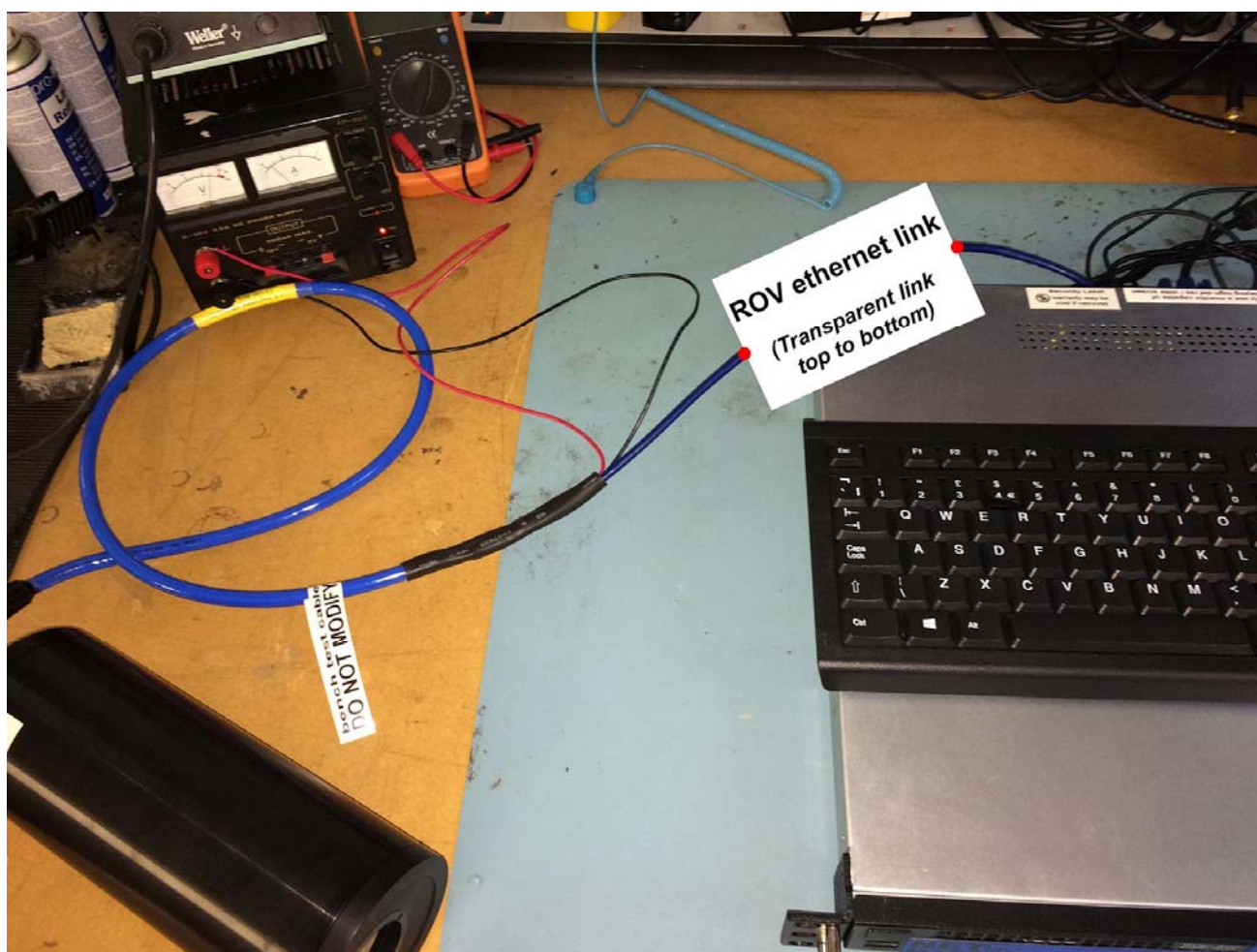
This is also the first thing to do when receiving the DVCi system to prove that its all in working order prior to installing on the ROV.

When installing the system on the ROV, the short cat5 ethernet cable is essentially being replaced by the ROVs umbilical and associated systems – with the camera being powered subsea by the ROV.

This will typically be a fibreoptic umbilical connected to a multiplexor (mux) unit which has Ethernet capability or via a fibre to Ethernet media converter on a dedicated fibre (or one which has been split using wdm/cwmm type technology).

The camera system uses little bandwidth (15mbps max) but it must have a real-time link.

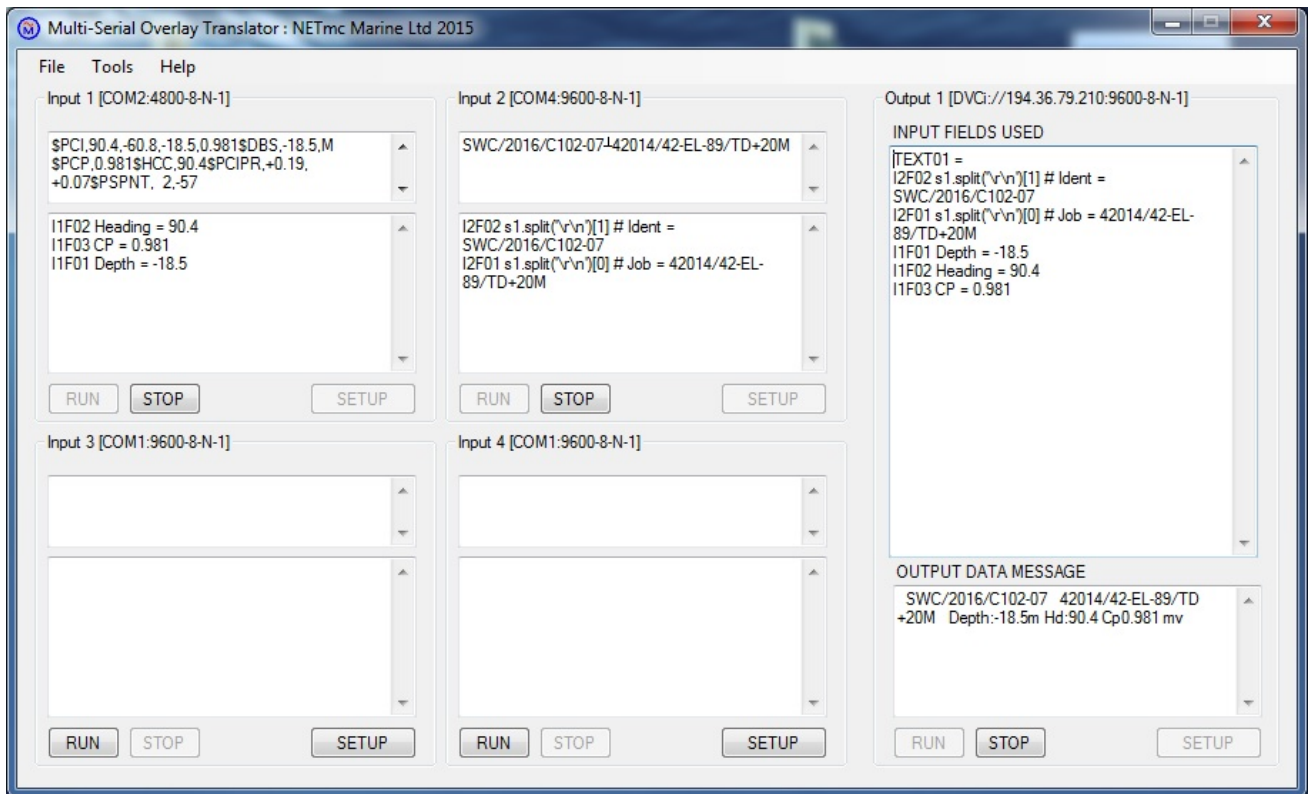
If the mux cards delay traffic, there could be issues with the 'live' viewing of the video, which will ultimately cause system instability.



Appendix 3 Parser software

Parsing is the process to taking in a data string – understanding it and making use of selective parts of it. This is often very useful when creating video overlays with dynamic survey or vehicle data. A string from an ROV may have lots of information in it – but only a small amount (heading / depth etc) is required on screen.

NETmc Marine have developed and supplied a software package to cater for this.



The parser software can accept up to 4 serial inputs and can select parts from all 4 strings, which are can be brought together into a single output.

This output can be another serial string (for on pass to some other equipment) or string intended for a videoTXT overlay or a DVCi camera overlay.

The parser is designed to be user friendly – but does require some basic appreciation of serial ports and survey / roV data strings.

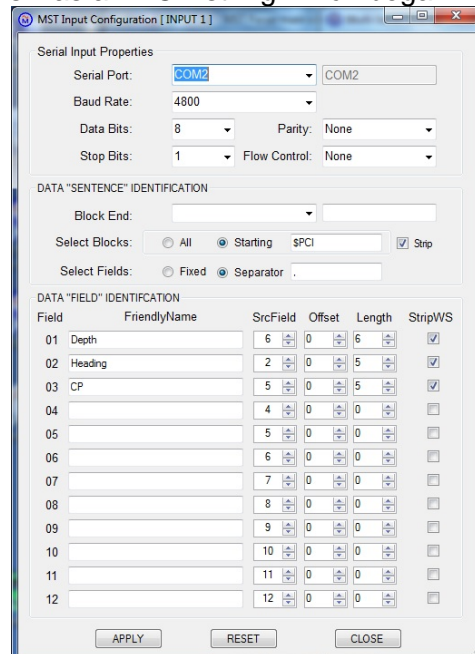
The general rule is if you don't understand – you're probably not the person for the job – as the variable nature of strings and why you might want to work with them makes an instruction manual almost impossible to write.

Some tips however may be useful:

Each input and output section has as run / stop button. Each needs to be started separately and has to be running to be working.

Each section has a live screen to show what is coming in and what your selections have yielded.

Typical input setup: this was an ROV string which began with \$PCI



When outputting the screen to the DVCi camera, DVCiHD should be the selected output port and the IP address of the camera should be entered as DVCi://194.36.79.210

