



Mesh Link User Manual



MIMO Mesh Wireless System



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Document History

Version	Date	Change Summary
v1.01	21/01/2026	Thumbscrew Revision

Warranty and Support

All Visual Engineering products are supplied as standard with a 12 month 'Return to Base' warranty.

Please note: Any unauthorised product disassembly, modification or the removal of tamper proof labels will void the warranty.

In the event of a suspected product failure, users should contact the Visual Engineering support team on the telephone number +44 (0) 1206 211842 or please email us at:

support@visualengineering.co.uk

Should the fault persist or if the support team are unable to resolve the fault, it may be necessary to return the equipment.

Equipment should only be returned using the RMA (Returns Management Authorisation) process. Users should contact the support team on the above number and request an RMA number.

Safe Operating Procedures

- The equipment should be operated within the environmental limits as detailed in the Specifications section of this user manual.
- Only authorised and trained personnel should operate the equipment.
- Changes to the radio settings as described in the Mesh Radio Configuration section should only be carried out by personnel that have had the appropriate training.



Introduction

The Marine Mesh system is a high bandwidth MIMO wireless Mesh IP communications network designed for operation at sea.

It allows up to sixteen vessels to share IP traffic in a wireless Mesh network. The system can exchange any type of network traffic including video, audio and general IP data.

It is capable of a capacity of up to 87Mb/s or 44Mb/s in reduced MIMO mode, offering broadband communications to any enabled vessel. The data rate varies depending on mode of operation, the number of nodes within a system and the range between nodes. Typically with line of sight and an installation of the system's antennas at height the range between nodes can exceed 30km.

The system consists of a rugged Out Door Unit (ODU) and an In Door Unit (IDU). The two units are connected via a single 50m cat6 cable equipped with rugged environmentally sealed Amphenol connectors.

So as to assure the best possible RF performance the Mesh radio is housed within the ODU's casing with the antennas attached directly alongside. The complete assembly is then typically mounted to an outdoor mast at height.

The IDU supplies power and a network connection to the ODU, it also connects to the local Ethernet network.

The DCU connects to the IDU over a network connection and supports a HDMI output so the system's camera feeds can be displayed on a monitor via a HDMI cable.

The radios within the Mesh network are self forming, fluid and self healing, they exchange data on a single frequency, thereby simplifying spectrum management as there is no central point of control.

The Mesh radios employ the COFDM modulation scheme and therefore offer excellent RF penetration and performance in the presence of reflections and multipath inherent in marine operations.

The highly flexible Mesh topology means that data can be exchanged between nodes in a point to point or multi point fashion, if required, the range of the system can be extended by using nodes as repeaters.

The Mesh architecture makes the Marine Mesh ideal for coordinating operations such as complex maintenance, drilling, recovery and survey operations, taking place across multiple vessels. The long range of each link in the Mesh allows connected vessels to be spread across a wide area.

Monitoring and basic control of the system is achieved using the IDU screen and button interface, whilst a web interface supports extended configuration of the Mesh radio and video encoders in the system.



Mesh Networks

In Mesh networking, each node may act as an independent router, regardless of whether it is connected to another network or not. It allows for continuous connections and reconfiguration around broken or blocked paths by hopping from node to node until the destination is reached.

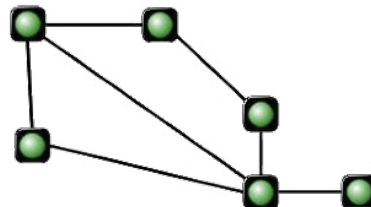
A single frequency is used for an Mesh radio network. When all nodes are connected to each other in a Mesh network it is referred to as a fully connected network.

Mesh networks are self-forming and self-healing which means that the network can still operate when a node or connection fails. This results in a network that is very reliable as there is often more than one path between a source and a destination.

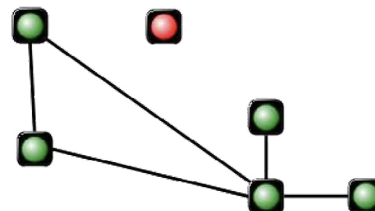
The IP Mesh network constantly assesses which nodes are in range and the best route to send data between them.

A group of nodes automatically form a network at power on. The nodes detect each others broadcast and a network is formed. If a node fails or is out of range the network will find an alternative routing path. Connectivity is thus preserved automatically.

Partially Connected Mesh Network



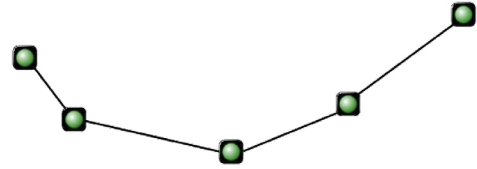
Node moves out of range but the network stays up



Mesh Topologies

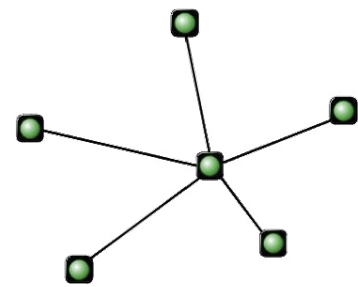
Chain Network

These nodes simply chain together to pass the information back to the observation point. This network can be maintained when mobile, with the middle nodes acting as a bidirectional relay point.



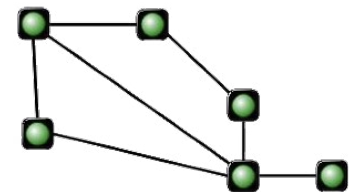
Star Network

A central node can be a relay so that all other nodes pass information back through the central unit allowing bidirectional communications to all locations.



Random Network

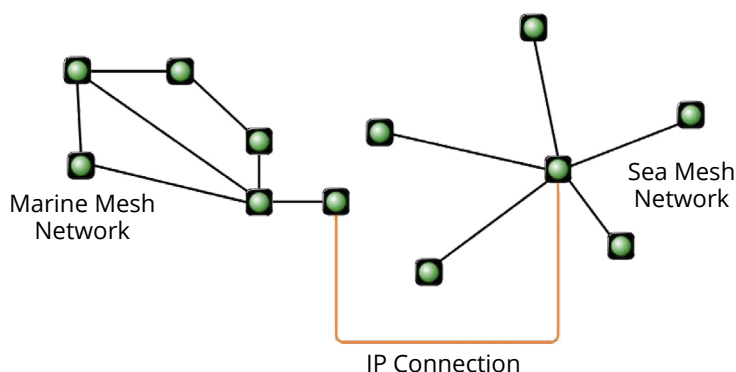
A random network is the typical scenario whereby a network evolves organically.



Combined Network - Interlinked

Many of the above topologies can be hard wire linked. If two separate networks are incompatible or operating at different frequencies, they can be combined at the IP layer as long as they belong to the same Mesh ID and share the same IP address subnet.

This system configuration is relevant when combining the Marine Mesh system with Visual Engineering's legacy Sea Mesh system. Configuration of this particular network is illustrated below and is described in the [Combining a Network](#) section.





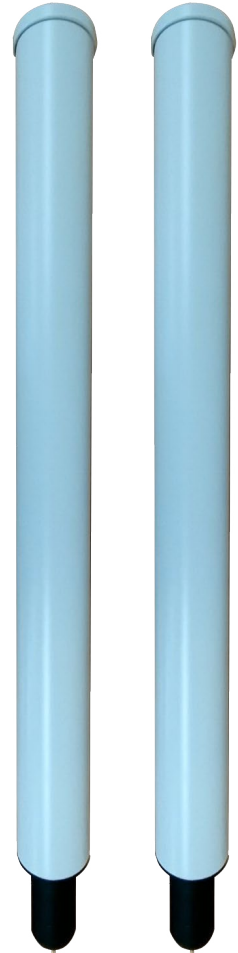
Kit Contents

Shown below are the Marine Mesh system components along with their part numbers.

**ODU
Out Door Unit**
110-1196



**ODU Antennas
S-Band**
110-1214



**Worm-drive
hose clips**
110-2363



**Safety Bond
Cable**
110-3059



**ODU to IDU
Cat6 Cable**
110-3605



IDU
In Door Unit
110-0278



**IDU LH Rack
Bracket**
110-0924

**IDU RH Rack
Bracket**
110-0925



**IDU Module
RJ45**
110-0933

**IDU Encoder
Module CVBS**
110-0927

**IDU Encoder
Module SDI**
110-0926



**IDU Mains
Power Cord**
110-8642



**IDU to DC-DC
Module Cable**
110-3174



DC-DC Power
Supply
110-3146



24V DC Input
Cable
110-3263



DCU
Decoder Control Unit
110-4041



HDMI Cable
110-3857



Cat6 Patch
Lead
110-0110



ODU

The Out Door Unit is an environmentally sealed rugged enclosure which houses the Mesh radio.

To ensure optimal RF performance the antennas dock directly into the ODU. The complete assembly can then be mounted at height on an outdoor mast.

Mounting

Mast mounting brackets on the rear allow it to be securely mounted to an outdoor mast using the hose clips provided in the kit.

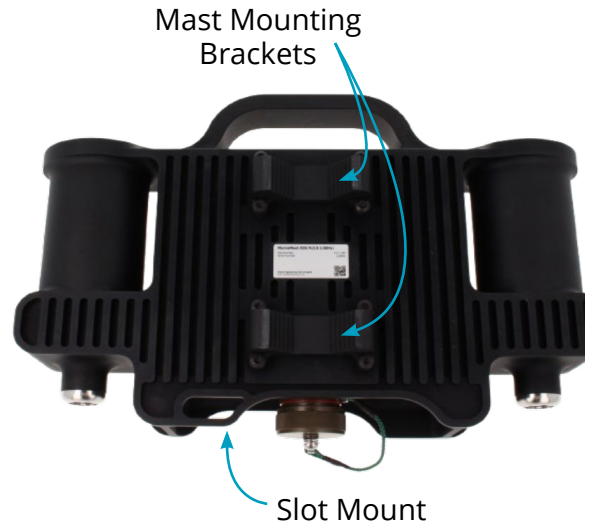
For added security, the safety bond cable should be clipped to the slot mount and secure the other end of the cable to the top of the mast.



Hose Clips



Safety bond
Cable



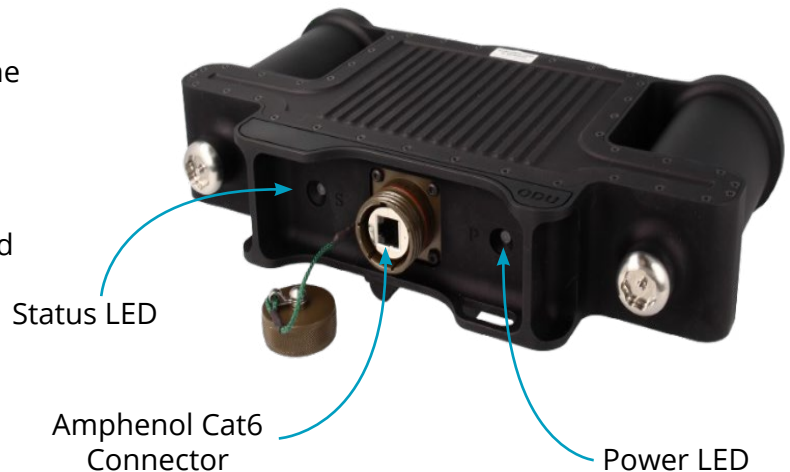
Mast Mounting
Brackets

Slot Mount

Status

There are two LEDs on the underside of the ODU so that they can be viewed when the unit is mounted at height.

The Power LED indicates the Cat6 PoE cable is supplying the ODU with power and the Status LED indicates that the radio is locked onto a Mesh network.



Status LED

Amphenol Cat6
Connector

Power LED

Power & Comms

The Amphenol connector on the underside of the ODU connects to the IDU using the Cat6 provided cable (110-3605).

This provides power to the ODU and a network connection between the two units.

⚠ The 110-1196 Outdoor Unit (ODU) must not be powered via the 110-0933 IDU Module RJ45 connection.



Amphenol Cat6
Cable Connected



IDU

The In Door Unit is a 1U enclosure designed to be installed into a standard rack mount casing using the two mounting brackets included in the kit.



The IDU provides the ODU with power and a network connection. Additionally it provides the interface to connect camera feeds into the system, display network system information and allows the user to select a preset Mesh radio Config.

A preset Mesh radio Config holds a wide range of channel parameters such as frequency, bandwidth, bit rate, etc. As such a change of the Config allows the user a simple method to adjust the system to particular requirements.

To maintain system operation in a Mesh wireless network all Nodes are required to have the same preset Config selected. If a Config is selected that has different parameters (such as Frequency) to other nodes in the Mesh the nodes will fail to form a network.



Interface Modules

The rear of the IDU supports 8 slots that support the video and network interfaces to the system.

The digital video input is supported by the SDI encoder module.

The composite analogue video input is supported by the CVBS encoder module.

The system network connection is supported by the RJ45 interface module.



The modules are loaded into the rear of the IDU as shown and are released by pressing the button above the module.

Cameras can then be connected to the module's BNC connector. Ensure the camera's video format matches the encoder settings as described in the Video Encoder Configuration sections:



- [Video Configure - SDI Module](#)
- [Video Configure - CVBS Module](#)



IDU Power

The Amphenol connector connects to the ODU using the Cat6 provided cable (Part 110-3605).

This provides power to the ODU and a network connection between the two units.



The IDU can be powered from mains using the IEC three pin plug on the rear or from 55v DC.



IDU to DC-DC Cable



Mains Power Cord

If the IDU is powered from 55v DC use the DC-DC Power supply and connect the two units with the IDU to DC-DC cable.

The DC-DC Power supply supports a 24v DC input using the 24v DC cable.



24v DC Cable Pin-out	
Red	+24v
Black	0v
Green/Yellow	Grounding



24v DC Cable



IDU Display

The IDU displays system information and the Mesh network current link status.

At initial power on the IDU retrieves network information from the Mesh radio enclosed in the ODU.

During this time the Antenna Icon and Status LED are red. The Config number, Node number, Channel Frequency and IP address fields are blank.



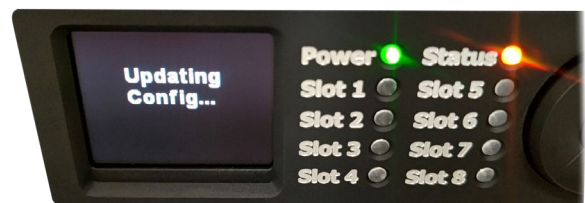
The IDU will start to display the system parameters as it receives them. As shown here the Mesh radio has been set to Config 1, Node 2, the channel Frequency is 1980 MHz and the radio's IP address is 192.169.2.1. The Mesh link is currently not locked to any other Mesh node, as such the Antenna Icon is Amber as is the Status LED.



Once the Mesh node begins communication with another Mesh node the Antenna Icon will turn green and the signal elements will animate to indicate that a Mesh network has been formed. If valid video is detected on an interface module the respective Slot LED is lit. As shown here, Slot 1 has a valid video input.



Once the IDU has received the ODU's parameters it is possible to select a new radio Config using the up/down buttons. Once the Config number is changed it will be displayed in blue. Pressing the centre OK button will send the new config to the Mesh radio. "Updating Config..." will then be displayed until all parameters have once again been received by the IDU. If the OK button is not pressed the Config change will be ignored after several seconds of inactivity.



DCU

The Decoder Control Unit allows the Marine Mesh video feeds to be viewed via the HDMI connector on the rear by connecting the HDMI Cable (110-3857) to a monitor.

To allow the DCU to access the video IP streams the Ethernet socket is required be connected to the IDU using the Cat6 Patch Lead (110-0110)

The Menu direction and OK buttons allow the user to navigate through the on-screen menu options to view system information, select video feeds and configure the DCU.

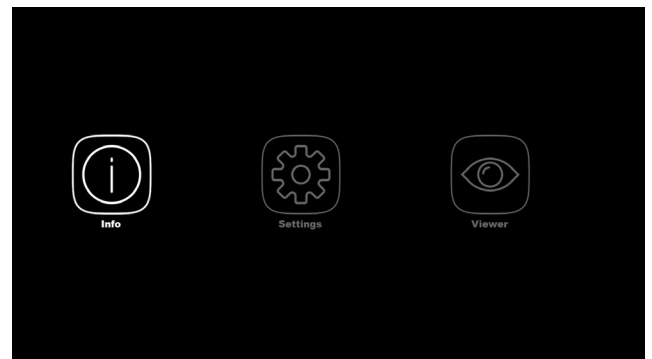


DCU Screens

Home Screen

The DCU Home Screen allows the user to select system information, configure the settings or select the video viewer.

Use the direction buttons on the front of the DCU and select the option by pressing the centre button.



Info

Parameters and statistics relative to system performance can be viewed on this page.

This information can be useful to troubleshoot system performance issues.



Settings

Select the Video, Apps or Network sub-menu to advance to the required section.



Settings - Video

Enabling QuadMode puts the video decoder viewer screen into a quad split mode.

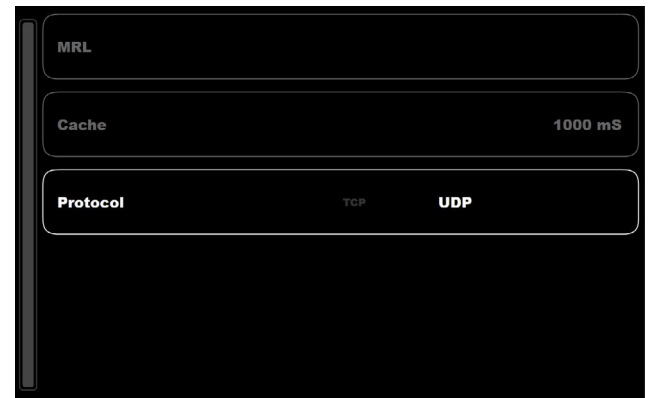
Select a Camera option to advance to a Camera Page.



Settings - Video - Camera

The Camera Page allows the MRL, Cache or Protocol parameters to be changed.

It is possible to change the camera streaming protocol between UDP and TCP. UDP carries less overhead than TCP but lacks some reliability as not all video frames are required to be received in full.



Settings - Video - Camera - MRL

Select the MRL option and use the on-screen keyboard to add the encoder's Media Resource Locator information.

This MRL is specific to each encoder in the system and is used by the DCU to initiate its video stream.



Settings - Video - Camera - Cache

The cache is the buffer size measured in mSecs, the time the DCU uses to decode a video stream.

Reducing this value will have the effect of reducing the latency of the video stream at the expense of video quality.



Settings - Apps

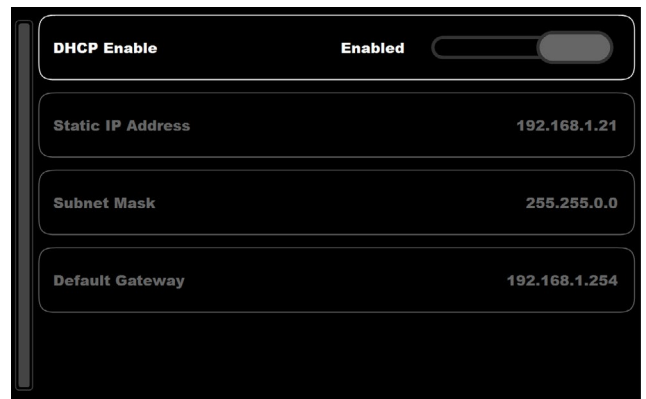
The option that is selected in Boot App selects the App that will automatically load when the DCU is powered on. In this instance the Home Screen will display at power on.



Settings - Network

Network addressing options are configurable to suit the user's requirement.

DHCP can be enabled/disabled dependant on whether an IP address is required to be dynamically allocated.



Settings - Network - Static IP Address

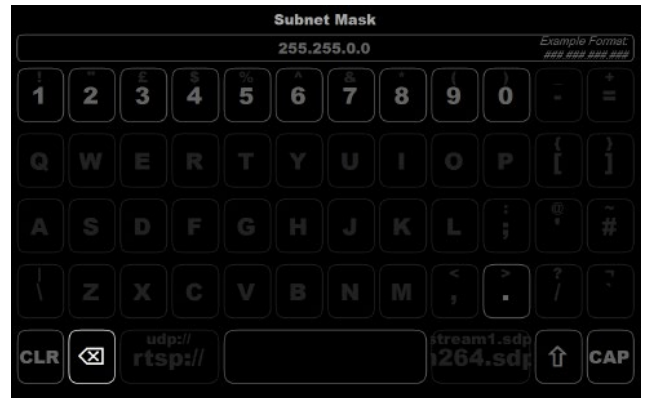
If a static IP address is required input the address using the on-screen keyboard.

Ensure the chosen IP address is within the system's IP subnet.



Settings - Network - Subnet Mask

As default the IP subnet mask is set to 255.255.0.0



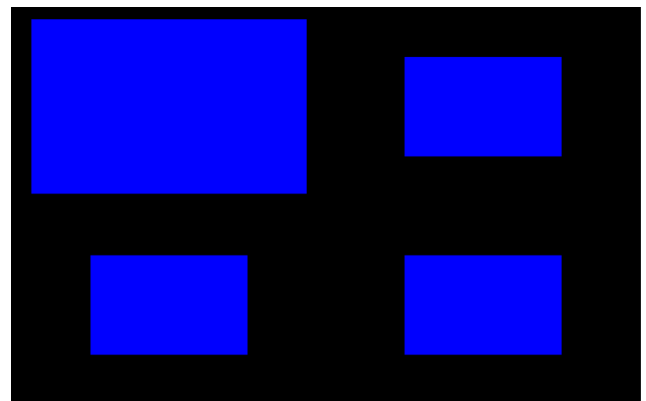
Settings - Network - Default Gateway

The Default Gateway is used as an access point to other networks. It can be edited using the on-screen keyboard.

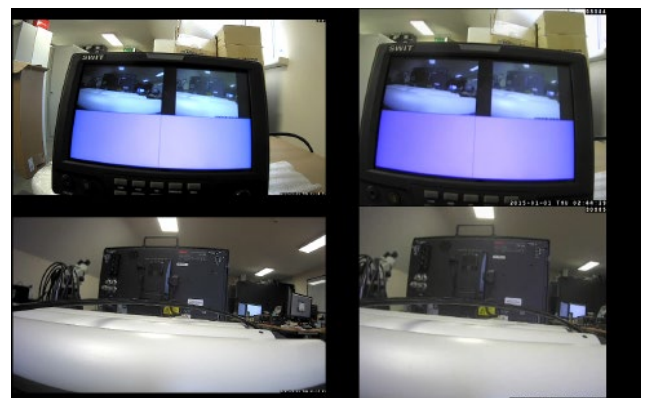


Viewer

The Viewer App displays the received video streams. If QuadMode has been enabled the Viewer will display the four video feeds as a quad split.



The Viewer will display the video feeds once they become live.



Combining a Network

Compatible radio nodes in a wireless Mesh system all operate on a single frequency to form a network.

Mesh radio nodes that are not compatible with the Marine Mesh radio nodes or Mesh radio nodes that are on a different frequency cannot be incorporated into the same wireless Mesh network.

It is possible however to combine non-compatible or off frequency systems together with a hard wired IP connection between the two networks.

This system configuration is particularly relevant when combining the Marine Mesh system with Visual Engineering's legacy Sea Mesh system.

The topology of this type of network was previously described in the section:
Combined Network -Interlinked

To form a network the network module on the rear of the Marine Mesh IDU (shown here) should be connected to the Network IP socket on the front of the SeaMesh IDU.



The Network IP connection on the front of the SeaMesh IDU.



The two systems must be configured to belong to the same Mesh ID and share the same IP address subnet. The configuration method to make these changes is covered in the section:

Mesh Radio Configuration



Default IP Addresses

The Marine Mesh is a modular system that is connected through TCP/IP, as such all modules in the system have an associated IP address, this allows each module to be specifically configured.

Below describes the factory IP network default settings. System maintainers should keep a careful track of any changes made away from these default settings.

Radio Modules, Encoders & Decoders

- 192.169.X.OYZ
- X = System Number (1-255)
- Y = Module Type (0=Mesh Radio, 1=Encoder, 2=Decoder)
- Z = Module Number (1-9)

Mesh ID

- Mesh ID = 40

Node ID

- Node ID = System Number

Example

System Number 3 with 3x Encoders & 2x Decoders:

- Mesh ID = 40
- Node ID = 3
- Mesh Radio IP Address = 192.169.3.001
- Encoder 1 IP Address = 192.169.3.011
- Encoder 2 IP Address = 192.169.3.012
- Encoder 3 IP Address = 192.169.3.013
- Decoder 1 IP Address = 192.169.3.021
- Decoder 2 IP Address = 192.169.3.022

If the link cannot be established to find the IP address of a module in the system it may be necessary to use a search tool such as the Node Finder Application. It may be necessary to contact Visual Engineering for support in this instance:

support@visualengineering.co.uk

Mesh Radio Configuration

The following web browser control interface is not required for normal operation. Web browser control of the Mesh radio should only be undertaken by experienced personnel wishing to achieve the following:

- Switch the operating mode
- Change the system frequency
- Change system IP addresses
- Change the Mesh ID
- Change the encryption key
- Understand the RF performance of the system better



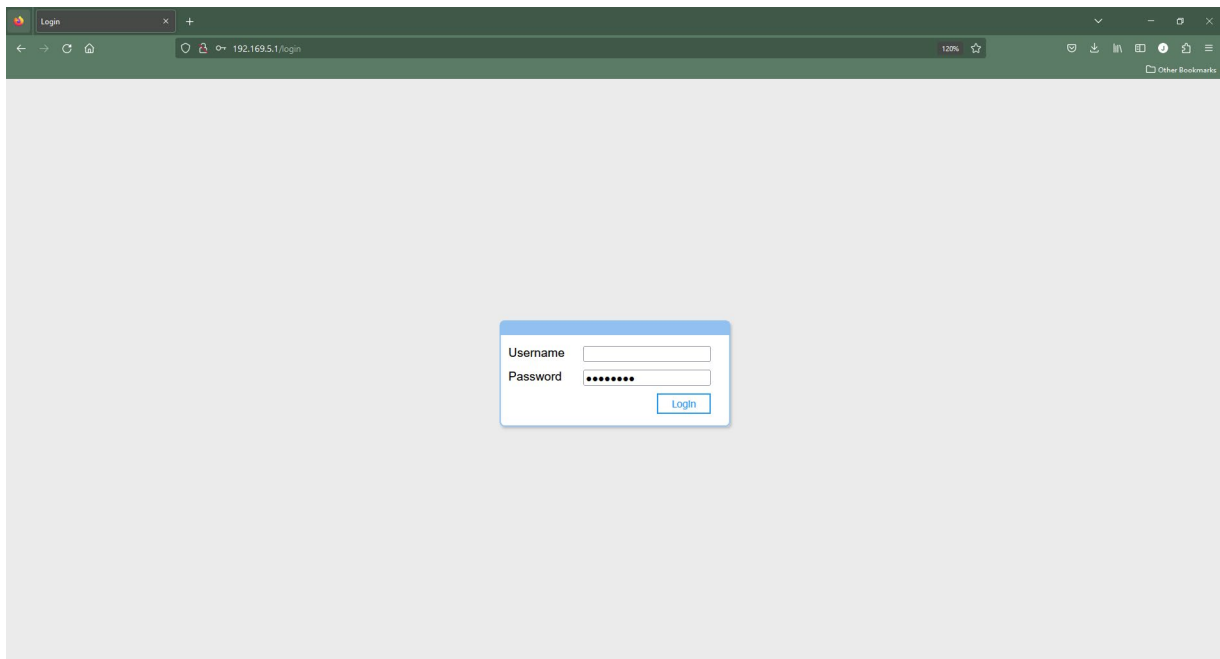
Maintainers should be very careful when using this interface because it is entirely possible to make changes that will leave the system inoperable, requiring the system to be returned to base for repair.



Accessing the Web Interface

- Power up the ODU
- Open a web browser on a PC
- Type the IP address of the Mesh radio e.g. 192.169.3.001 into the address bar
- The web browser will then open a **Login Prompt**

Login authentication is required to connect to the Mesh radio configuration pages. By default the user name should be left blank and the password is **Eastwood**

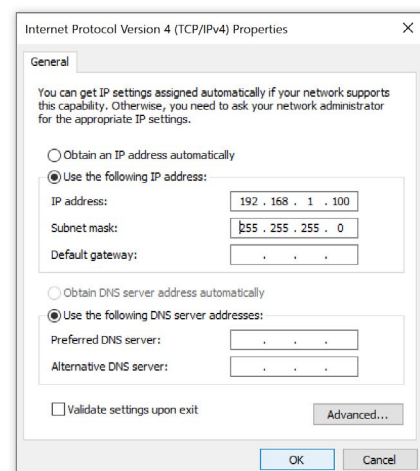
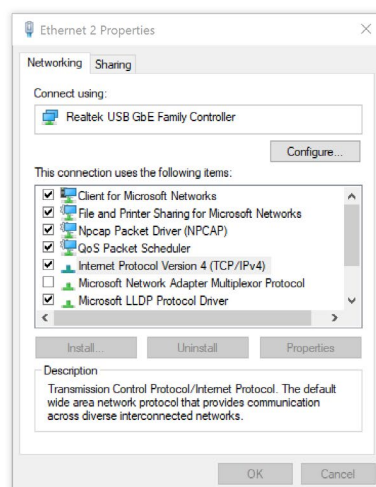
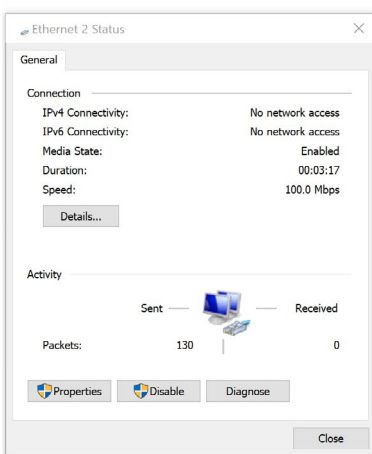
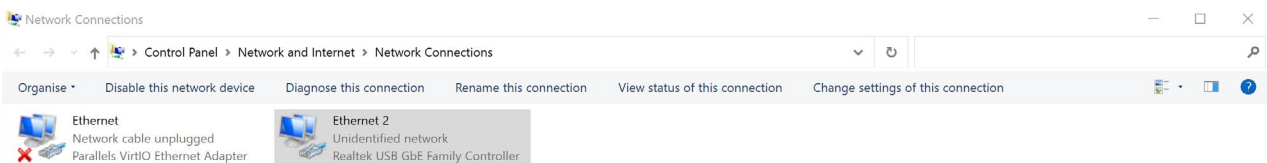
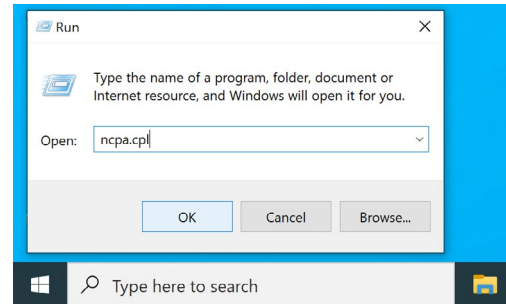


If a connection cannot be established with the login page it may be that the controlling PC is not on the same IP subnet as the radio. The following section describes how to set the PC to a specific IP address.

PC IP Address Configuration

For a direct Ethernet connection between the Mesh radio and a PC, it may be necessary to configure the PC's network adapter to use a static IP address, as described below.

1. Open the Run app. (Press and hold Windows Key (W) on the keyboard, then press the "R" key)
2. Type the command "ncpa.cpl", then click OK.
3. Right click on the network adapter where the Marine Mesh system is connected to, then click "Properties". (If there are multiple adapters, the correct one can be identified by disconnecting the Ethernet cable, one of the adapters should now show "Network cable unplugged" upon reconnection it should eventually change to "Unidentified Network", this is the one connected to the system)
4. In the window that pops up, select "Internet Protocol Version 4 (TCP/IPv4)" then click "Properties".
5. Another window will now pop up, select "Use the following IP Address" and enter an IP Address on the same subnet as the system.
6. Click OK and Close

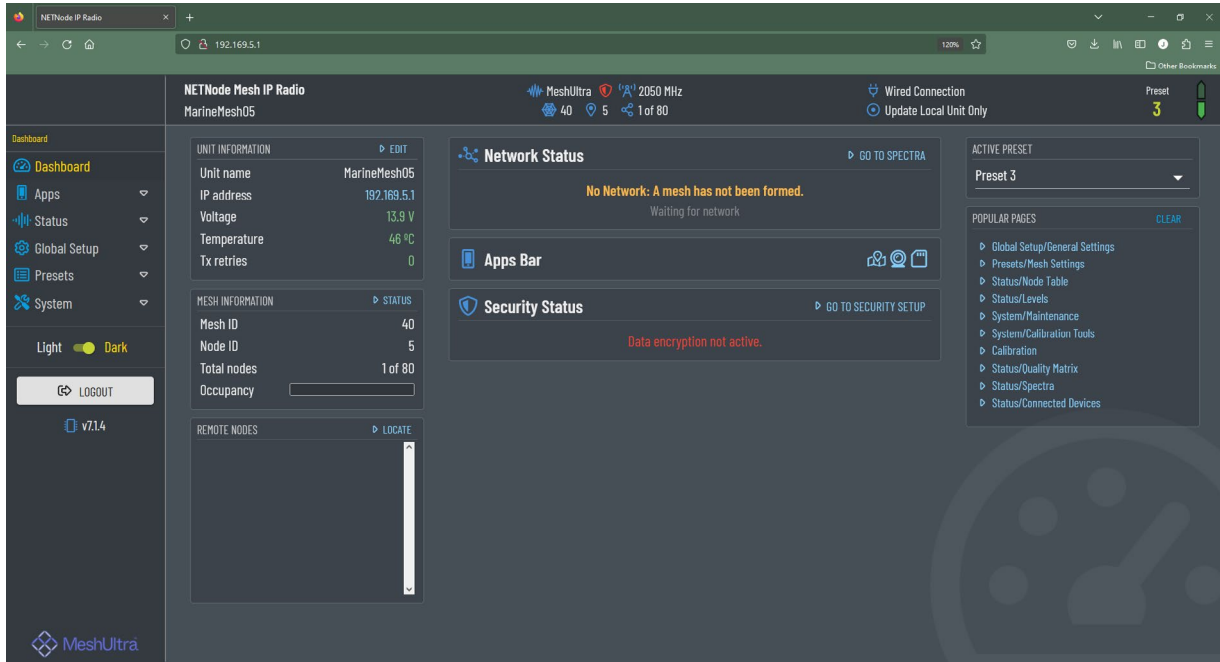


To re-configure to the original settings where the PC's IP address is obtained automatically follow the steps above except in step 5 select "Obtain an IP address automatically"



Dashboard

The Dashboard is a summary page which can be referred to during operation. The blue text icons are hyper-links which lead to pages where parameters can be viewed in closer detail or edited.

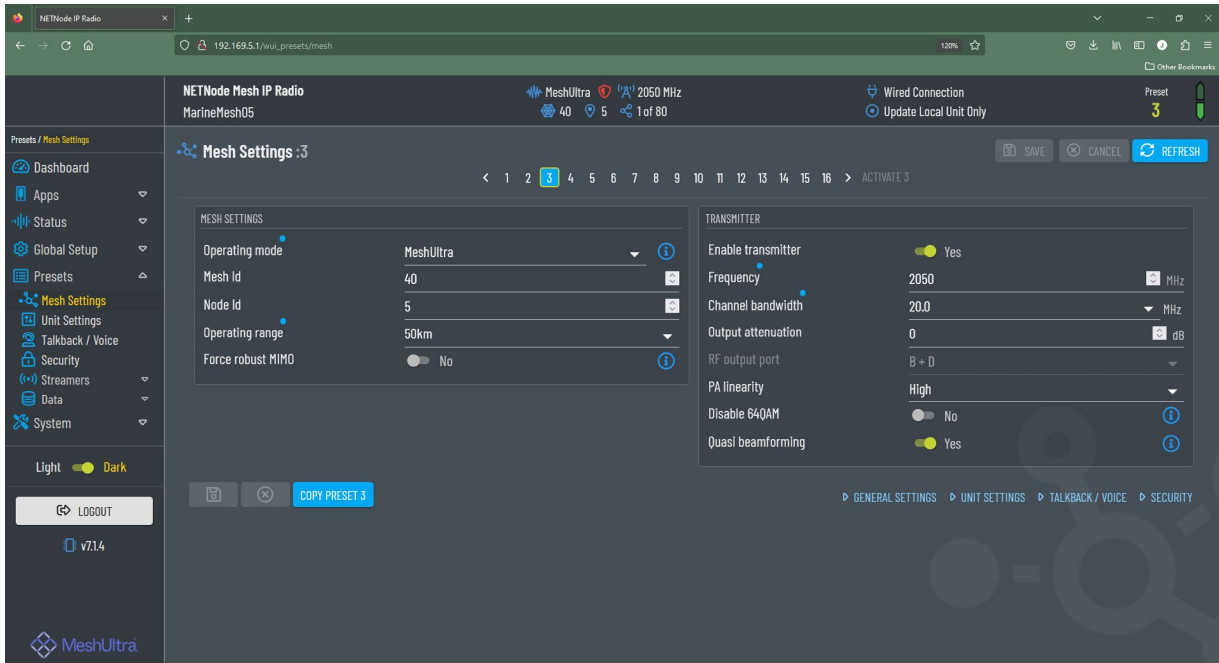


Colour-coded Voltage and Temperature measurements can be monitored on the Dashboard. If the voltage is out-of-range, the colour will turn red, and the unit is at risk of shut-down. Temperature colours are explained in the table below.

Colour	Temperature	Description
Green	Less than 80°C	Operating temperature is satisfactory.
Orange	Greater than 80°C Less than 90°C	Video encoding may be disabled. CAUTION: Take immediate action to reduce the operating temperature.
Red	Greater than 90°C	RF power may be disabled. WARNING: Damage to internal components may occur. Switch off the device, allow to cool and take action to reduce the operating temperature.

Key Mesh Settings

Settings marked with a blue dot must match for all units in a Mesh network, failure to do so will result in an unstable network.

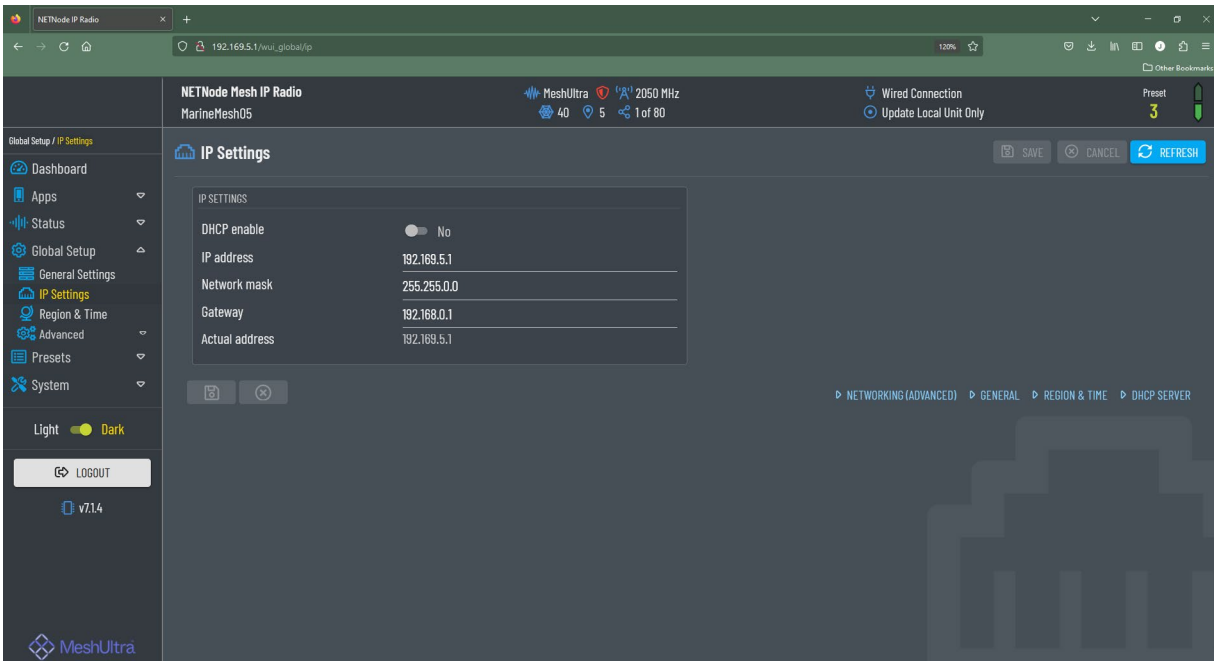


Parameter	Description
Enable transmitter	If set to Yes, the RF power is enabled.
Frequency	The centre frequency of operation. This must be the same for all units in the Mesh network and within the bandwidth of the product variant.
Channel bandwidth	The bandwidth for the COFDM waveform. Lower bandwidths provide greater range at the expense of data throughput.
Output attenuation	The level of attenuation that can be applied to the output.
Mesh Id	The Mesh ID must be the same for all units in a network. It tells the unit which Mesh network it belongs to, must be set to a non-zero value.
Node Id	The Node ID must be unique for each unit in a network. Node ID conflicts will resolve automatically once at least two nodes have been formed into a Mesh network.
Operating range	A larger range allows the Mesh network to operate over a bigger distance at the expense of bitrate.



IP Settings

The Mesh radio IP Settings page allows basic IP settings to be changed.



Parameter	Description
DHCP enable	If set to Yes, the IP address is automatically allocated by a DHCP server and all other IP settings are greyed out. If set to No, the remaining IP settings will have to be entered manually.
IP address	If the radio is not automatically acquiring its IP address through a DHCP server then a fixed IP address needs to be assigned to the unit.
Network mask	The network mask divides a network into smaller more efficient subnets.
Gateway	A gateway is an access point to another network. The gateway address is usually a router interface to send IP packets out of the local network.
Actual address	This is the IP address that has been allocated to the node.



Video Encoder Configuration

PC Connection

Once an encoder is powered in the IDU it is possible to view its video and configure its parameters over an IP connection to a PC.

Using a web browser it's possible to configure the encoders parameters such as resolution, bit rate, and network settings, once saved all configuration changes will be retained.

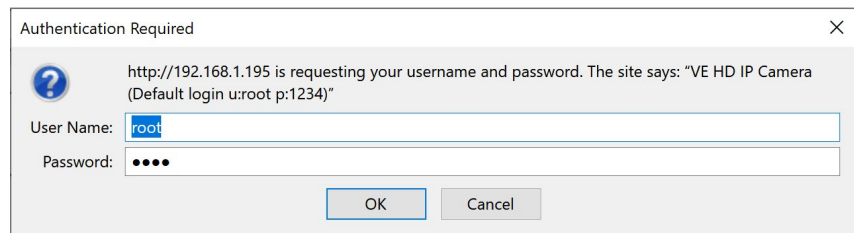
Browse to the encoder's web page by typing the encoder's IP address into the web browser address bar.

Login

On trying to establish a connection the user will be prompted for the User Name and Password, enter the following details:

Default **User Name** is:
root

Default **Password** is:
1234

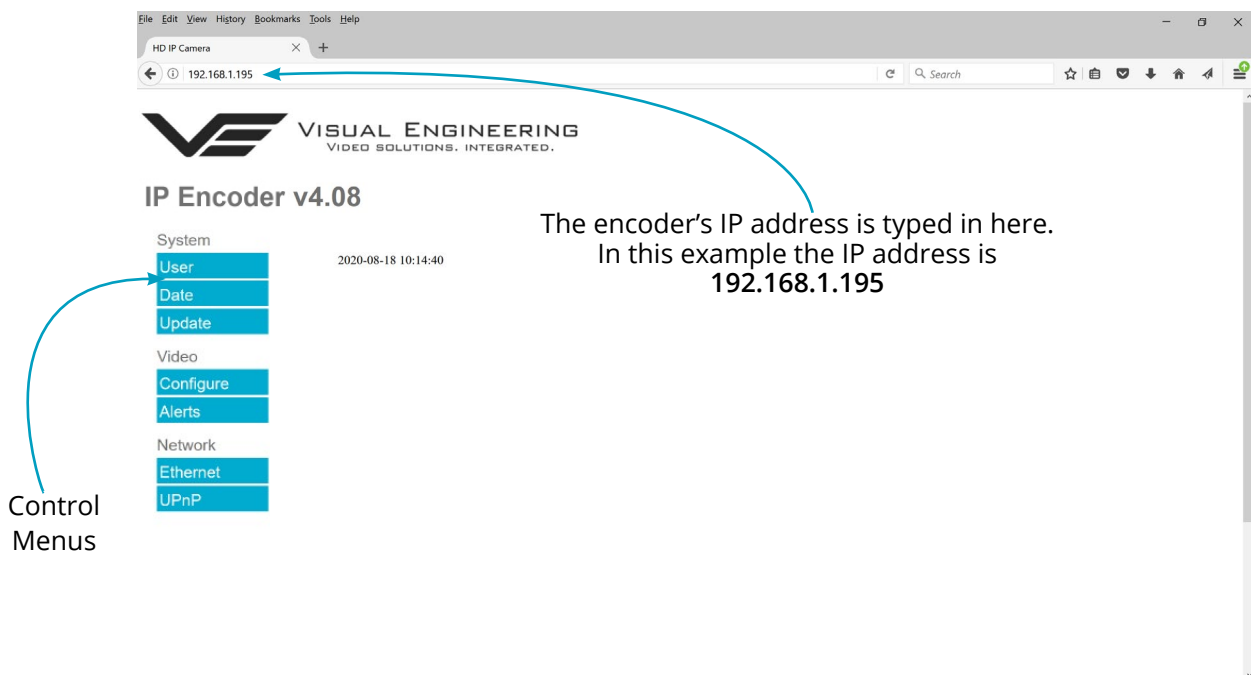


Web Browser Control

The primary mechanism for configuring the encoder is its web browser interface.

The example screen below shows what is to be expected once a valid connection between the PC and encoder has been established by typing the encoder's IP address into the web browser address bar. In this example the address is **192.168.1.195**

On the left side of the screen are the Control Menus which allow the user to configure various settings in the encoder. The functions of these menus are described in the following sections.



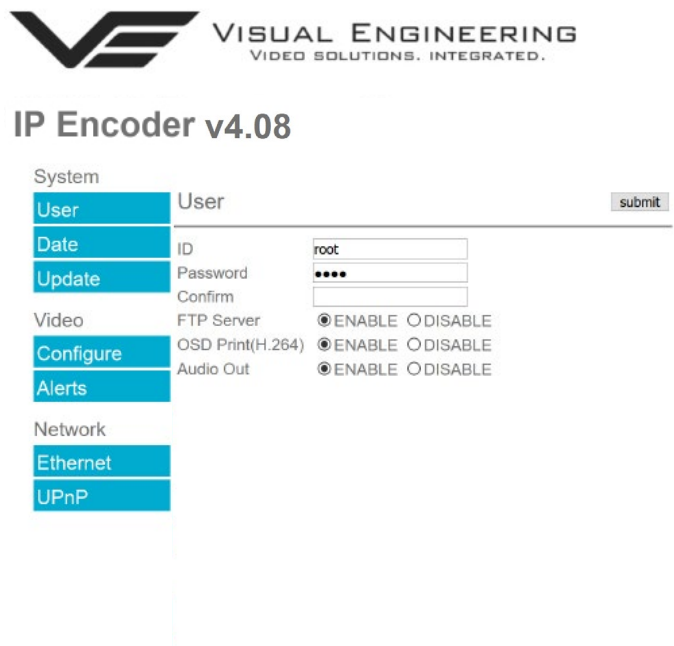
User Menu

The user menu page allows users to configure the user ID and password of the encoder. It is necessary to confirm the password to change it.

There is also the option to enable/disable the following:

- FTP Server Connection
- OSD (On Screen Display)
- Audio Out

Changes are only enabled when the **submit** button is pressed.





Date Menu

The date menu page allows the user to synchronise the encoder time to an SNTP server. In this instance it is necessary to have the PC connected to a network.

If a network connection is not available it is possible to synchronise the encoder to the PC time by ticking the "Sync Camera to PC Time" check box and pressing the **submit** button.

The "UTC Offset" can be altered to align the encoder time with the local time zone. Changes are only enabled when the **submit** button is pressed.

To align the encoder to the actual PC time the "UTC Offset" should be made same as the value displayed in the "PC UTC Offset" field.



IP Encoder v4.08

System		
User	Date	<input type="button" value="submit"/>
Date	SNTP Server	0.uk.pool.ntp.org
Update	Camera Time	2020-08-18 10:14:51
	PC Time	2020-08-18 10:14:51
Video	UpTime	18492 Days 08:14:51
Configure	UTC Offset	2
Alerts	PC UTC Offset	2
	Sync Camera to PC Time	<input type="checkbox"/>
Network		
Ethernet		
UPnP		

Tick this box and press **submit** to sync the encoder to the PC time

Update Menu

It is possible to update the firmware of the encoder. There are three steps to updating the firmware, as shown on the right.

! Only update the encoder with files that have been approved by Visual Engineering. **!**
Use of other files will render the encoder inoperable.



IP Encoder v4.08

System		
User	Update	
Date	Firmware Download	<input type="button" value="Browse..."/> No file selected. <input type="button" value="Submit"/>
Update		
Video		<input type="button" value="Restore Defaults"/>
Configure		
Alerts		<input type="button" value="Reset"/>

3. Submit the file

1. Select the Update tab

2. Browse to the file

Following a **Submit** the encoder will update the firmware and display the following text:
Programming in Progress...Do not remove power
Wait until the web page clears this text before trying to move away from the current web page or powering off the encoder. Updates typically take approx 3 minutes to complete.

! **Important:** To fully ensure the upgrade has finished it is advised to refresh the web page and check the banner displays "IP Encoder v4.09" or the encoder starts to once again stream video before switching off the power.
It is advised that following a firmware update that the **Restore Defaults** button is pressed, this will revert the encoder back to a default start state. The IP address of the encoder will **revert** to its **default IP address of 192.168.1.195**

Pressing the **Reset** button will completely re-start the encoder.



Video Configure - SDI Module

This is the Video Configuration Page particular to the SDI encoder module.

The encoder supports two encoding formats, H.264 and MJPEG. The choice of the format is initiated by the user when the video stream is started.

To initiate a H.264 stream from an encoder with an IP address of 192.168.1.195 the URL is:
rtsp://192.168.1.195/h264

To initiate an MJPEG stream from an encoder with an IP address of 192.168.1.195 the URL is:
rtsp://192.168.1.195/jpeg

It is possible to change the Encoder Type to any one of the following options:

- HD IP Camera
- PAL Input
- NTSC Input
- Guardian Node
- SWZ HD Camera
- LVDS Input 25Hz
- LVDS Input 29.97Hz
- SDI Input 25Hz
- SDI Input 29.97Hz

Changing the Encoder Type between SDI Input 25Hz and SDI Input 29,97Hz and then pressing the **submit** button will display the message on the web page as shown here.

Once the message clears the encoder will be set to the new format.

Ensure the connected video camera matches the Encoder Type.



IP Encoder v4.08

System

User Video Configure submit

Date	Source	SDI
Update	Resolution	1920 x 1080
	Max FPS	25 FPS
	Encoder Type	SDI Input 25Hz

Video

Configure RTSP Port (1 to 65535)

Alerts

Input Resolution 1080p/25 720p/25

Network

Ethernet	H.264 Resolution	<input type="text" value="1920 x 1080"/>
UPnP	H.264 Quality	<input type="text" value="30"/> (0 to 51)
	H.264 IDR Frame	<input type="text" value="25"/> (1 to 1800)
	H.264 FPS	<input type="text" value="25fps"/>
	Bitrate Control	<input checked="" type="radio"/> Constant Bitrate <input type="radio"/> Constant Quality
	H.264 Bitrate	<input type="text" value="6Mbit/s"/>

	M-JPEG Resolution	<input type="text" value="800 x 450"/>
	M-JPEG Quality	<input type="text" value="30"/> (0 to 63)
	M-JPEG FPS	<input type="text" value="25fps"/>
	Bitrate Control	<input checked="" type="radio"/> Constant Bitrate <input type="radio"/> Constant Quality
	M-JPEG Bitrate	<input type="text" value="6Mbit"/>

SDI Input 25Hz and SDI Input 29.97Hz are the only two valid Encoder Types for this device.



Switch between the two types of input to match the connected video camera.



IP Encoder v4.08

System

User	Changing encoder type...
Date	Ensure hardware matches!
Update	

Video

Configure



Video Configure - CVBS Module

This is the Video Configuration Page particular to the CVBS encoder module.

The encoder supports two encoding formats, H.264 and MJPEG. The choice of the format is initiated by the user when the video stream is started.

To initiate a H.264 stream from an encoder with an IP address of 192.168.1.195 the URL is:
rtsp://192.168.1.195/h264

To initiate an MJPEG stream from an encoder with an IP address of 192.168.1.195 the URL is:
rtsp://192.168.1.195/jpeg

It is possible to change the Encoder Type to any one of the following options:

- HD IP Camera
- PAL Input
- NTSC Input
- Guardian Node
- SWZ HD Camera
- LVDS Input 25Hz
- LVDS Input 29.97Hz
- SDI Input 25Hz
- SDI Input 29.97

Changing the Encoder Type between PAL and NTSC and then pressing the **submit** button will display the message on the web page as shown here.

Once the message clears the encoder will be set to the new format.

Ensure the connected video camera matches the Encoder Type.



CVBS IP Encoder v4.08

System	
User	Video Configure submit
Date	Decoder Type PAL
Update	Resolution 720 x 576
	Max FPS 50
Video	Encoder Type <input type="text" value="PAL Input"/>
Configure	RTSP Port <input type="text" value="554"/> (1 to 65535)
Alerts	H.264 Resolution <input type="text" value="Full Resolution"/>
Recording	H.264 Quality <input type="text" value="30"/> (0 to 51)
	H.264 IDR Frame <input type="text" value="25"/> (1 to 1800)
WiFi	H.264 FPS <input type="text" value="50fps"/>
AP Mode	Bitrate Control <input checked="" type="radio"/> Constant Bitrate <input type="radio"/> Constant Quality
STA Mode	H.264 Bitrate <input type="text" value="4Mbit/s"/>
Network	M-JPEG Resolution <input type="text" value="Full Resolution"/>
Ethernet	M-JPEG Quality <input type="text" value="30"/> (0 to 63)
UPnP	M-JPEG FPS <input type="text" value="25fps"/>
	Bitrate Control <input checked="" type="radio"/> Constant Bitrate <input type="radio"/> Constant Quality
	M-JPEG Bitrate <input type="text" value="8Mbit"/>

PAL Input and NTSC Input are the only two valid Encoder Types for this device.

Switch between the two types of input to match the connected video camera.



CVBS IP Encoder v4.08

System	
User	Changing encoder type...
Date	Ensure hardware matches!
Update	
Video	
Configure	



Video Page Parameters

RTSP Port

The port number the IP video stream will be transmitted on, this has the default port number 554, which can be configured to another port number as required.

Input Resolution

The input resolution should be adjusted to match the SDI input stream.

The encoder has two fundamental modes of operation:

- **Constant Bitrate.** This will output a constant bit rate IP video stream, as set in the Bitrate field.
- **Constant Quality.** In this mode the bit rate is varied in a effort to maintain a constant quality. The target quality is set using a number between 0 to 51, the lower the number the higher the quality, this is set in the quality field. Amendments to this value are only allowed when the constant quality mode is enabled. In this mode the 'ceiling' bit rate is controlled by the value set in the Bitrate field, the encoder will attempt to limit the maximum bit rate to this value.

H.264 Resolution

The maximum resolution is 1920x1080, users can select lower resolutions if there is restricted bandwidth available.

H.264 FPS (frames Per Second)

The maximum frame rate is 25fps or 30fps, users may choose to select lower frame rates, thereby reducing the bandwidth required.

H.264 IDR Frame changes to the I frame interval balances the stream's quality against latency, the lower the number the lower the latency. Lower latency however can incur picture degradation due to the effect of limiting the decoder buffer.

Video Frame Preview

It is possible to view a single still image from the connected camera via a web browser using the following URL format:

<http://192.168.1.195/still.jpg>

The above URL is applicable when the encoder is set to its default IP address.



Ethernet Menu

Network parameters can be set on the encoder by selecting the Ethernet menu.

The encoder can operate with a fixed IP address, or can be allocated an IP address from the network, these modes are controlled using the DHCP enable/disable.

Users should press the **submit** button to enable changes.



IP Encoder v4.08

System

User Ethernet submit

Date IP Address

Update Subnet Mask

Default Gateway

Video Primary DNS Server

Configure Secondary DNS Server

Alerts Use DHCP Server ENABLE DISABLE

Network HTTP Ports

Ethernet

UPnP

HTTP Ports

The default HTTP port of the encoder is 80.

Selecting one of the five options as shown in the drop down box on the right will set the HTTP port number.

Moving the encoder's HTTP port number should only be carried out by personnel confident of keeping a track on what settings have been applied to the encoder.

Setting a new IP address and new HTTP port simultaneously should be avoided.

Following changes.....users should press the **submit** button to enable changes.



IP Encoder v4.08

System

User Ethernet submit

Date IP Address

Update Subnet Mask

Default Gateway

Video Primary DNS Server

Configure Secondary DNS Server

Alerts Use DHCP Server ENABLE DISABLE

Network HTTP Ports

Ethernet

UPnP



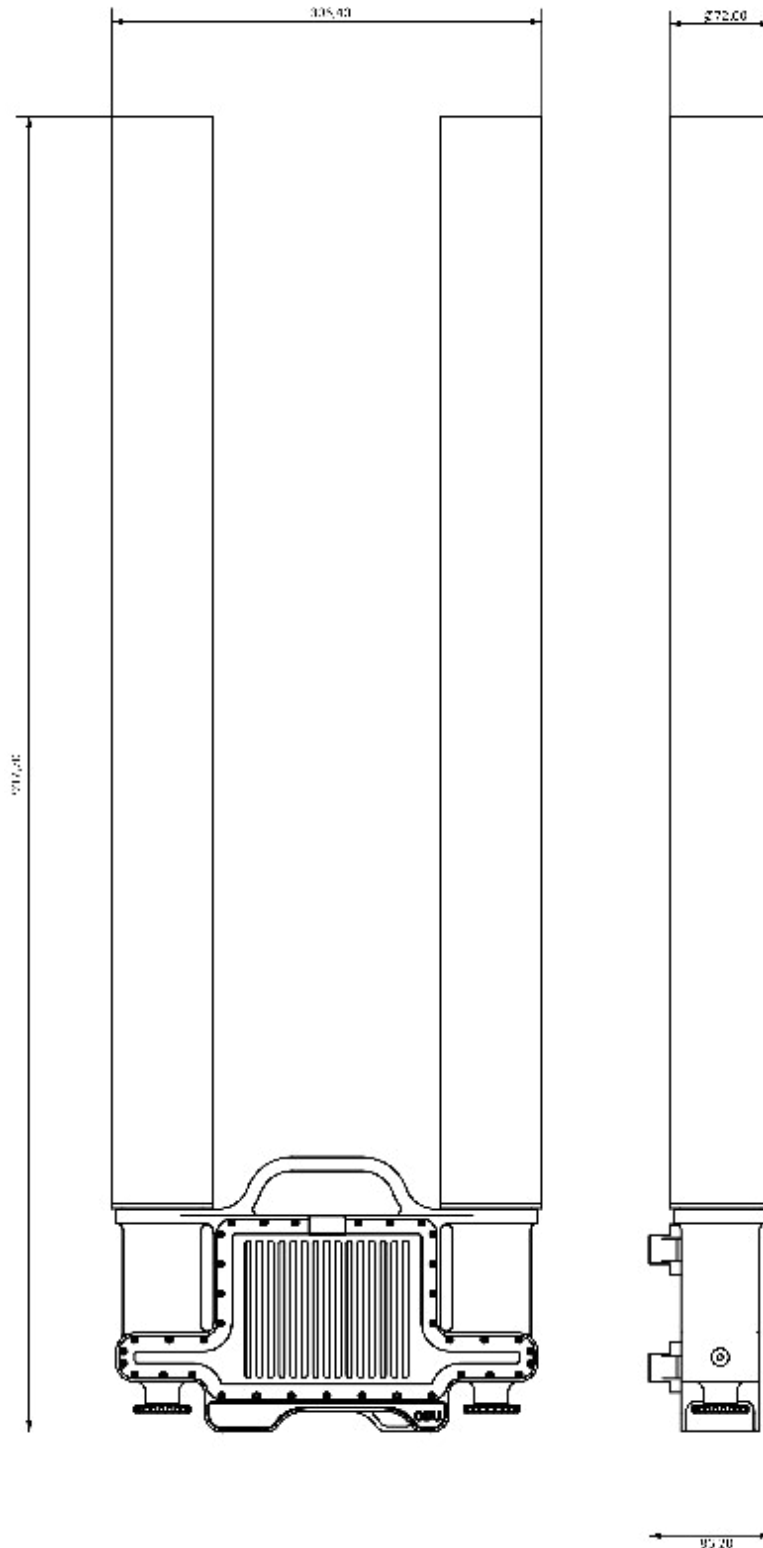
Specifications

Specifications			
RF Frequency	S-Band, C-Band	Encryption	DES or AES128, AES256 (Optional)
Tuning step size	125kHz	Cable Connection	Amphenol Cat6
Output power	+37dBm per channel in 0.25dB step (10W total)	Ethernet Connection	RJ45
Bandwidth	1.25, 1.5, 1.75, 2.5, 3.0, 3.5, 5.0, 6.0, 7.0, 8.0, 10.0MHz (video and IP Mesh) 12.0, 14.0, 16.0, 20.0MHz (IP Mesh only)	SDI Video Inputs	1080p/25 @ 25 Hz 1080p/25 @ 29.97Hz 720p/25 @ 25 Hz 720p/25 @ 29.97Hz
Max Mesh capacity	87Mbps Full MIMO 44Mbps Reduced MIMO	Composite Video Inputs	PAL, NTSC
Modulation	COFDM 360 Carrier Modulation	Camera Interface	BNC
Carrier Modulation	BPSK/QPSK/ 16QAM/64QAM (adaptive)	IDU Input Voltage	24v DC 240v AC
Max Number of Nodes	16	ODU Power	PoE
Range	>30km LOS	System Configuration	Web Interface
FEC rate	FEC1/2, FEC2/3 (adaptive)	Temperature	-20 to +50°C
Receive Sensitivity	-98dBm (BW 2.5MHz/QPSK 1/2)	Environmental	IP67
IP Video Streaming	RTSP, RTP over TCP or UDP	Housings	Aluminium
Video Encoding	H.264 & MJPEG @30fps	ODU with Antennas Dimensions	86 x 306 x 938 mm



Dimensions

ODU with S-Band
Antennas



Dimensions in mm

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Product specifications subject
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