



Tiger Shark II

SUBSEA DIGITAL STILLS CAMERA

User Manual



Tiger Shark II - User Manual

Revision History

Rev.No	Description	Date of Rev
2.0	Issued for use	21/01/21
2.1	Added <i>Enable / disable Ethernet</i>	19/10/21

Contents

Contact	3
Safety information.....	3
Warranty	3
1 General Description	4
1.1 Regarding these Instructions for Use	4
1.2 Introduction	4
2 Technical Specification	5
3 Installation Instructions.....	6
3.1 Unpacking and testing	6
3.2 Function test	6
3.3 Mechanical Installation	6
3.4 Electrical installation.....	7
3.4.1 Camera subsea connector.....	7
3.4.2 Connection Links in the Camera system.....	7
4 Connecting the Tiger Shark Camera.....	7
4.1 Power.....	7
4.2 Signal connections.....	7
4.3 Ethernet remote control and download mode.....	8
4.4 Default Connector Pin-out	8
4.5 RS232 remote control protocol	9
4.6 Setting network IP addresses	9
4.7 Enable / disable Ethernet.....	9
5 Operational Instructions	10
5.1 Connector configuration	10
5.2 Hazards and protective measures	10
5.3 Over-temperature precautions	10
5.4 Camera Control.....	10
5.4.1 Remote Control unit.....	10
5.4.2 Remote Control Software	11
5.4.3 USB to Ethernet Hub Software.....	11
6 Using the Camera	13
6.1.1 Remote Control functions	13
6.1.2 Using the Remote-Control Software.....	13
6.2 Camera functions	14
6.3 Downloading image files from camera.....	15



Tiger Shark II - User Manual

6.3.1	Disconnecting the Camera	15
7	Maintenance.....	16
7.1	General maintenance.....	16
7.2	Service and Repair	16
7.3	Packing & Shipping	16
	Appendix 1 - Tiger Shark remote functions	17
	Appendix 2 - Interfaces	18
	The Lantern Shark Subsea Flash	19

Contact

for assistance / clarification on any of the contents of this manual, please contact:

Imenco AS

Subsea Electronics

Kophaug 3

5570 Akksdal NORWAY

Tel: +47 52 86 41 00

E-mail: electronics@imenco.com

Safety information

IMPORTANT! The Imenco Tiger Shark Subsea Camera is a technically advanced product. Please make sure to read and understand all sections of this manual before installing or operating this product. Installation of this product should only be performed by qualified personnel.

WARNING! This product contains no user serviceable parts. *Do not open, alter or disassemble this product.* Failure to comply with this warning can result in damage to equipment and void of warranty. The camera is filled with inert gas at manufacture.

WARNING! *The housing is NOT connected to any Protective Earth circuits.*

The metal housing has no electrical contact with any of the circuits inside the camera. This is to isolate the camera housing from other equipment that includes dangerous high voltage and to minimize corrosion that otherwise might be intensified by electrical contact to other nearby metal equipment or structures exposed to the sea water.

Warranty

Be sure to read and comply with **Imenco's Terms & Conditions** that the Spinner camera was sold under.

IMPORTANT: If the Tiger Shark camera is not connected to a Lantern Shark External Flash, a dummy plug must be mounted on the Flash connector of the camera.



Tiger Shark II - User Manual

1 General Description

1.1 Regarding these Instructions for Use

The intended use of these instructions is to provide and guide the operator/user of the equipment with instructions on the technical specifics of the product, how it functions, the safety aspects of its use, how to prepare, operate and maintain the product.

1.2 Introduction

The Tiger Shark Subsea Camera is a high-quality digital stills subsea camera, perfect for ROV use or as a high-resolution stand-alone camera for research purposes. Integrated RS232 over Ethernet control and download capabilities give the operator full control of all camera functions.

With a resolution of 14.1 megapixels it is ideal for zooming in and inspecting minute details. The camera also has the capability to record HD video in 720p resolution. The Tiger Shark operates at its best when used in conjunction with the Lantern Shark External Flash unit

All information in this document is provided commercial in confidence and shall not be published or disclosed, wholly or in part to any other party without Imenco's written permission.

Copyright © 2021 IMENCO. All Rights Reserved.



Tiger Shark II - User Manual

2 Technical Specification

Image format	JPEG
Image resolution, max	14.1MP - 4320 x 3240 pixels
ISO	Auto / Manually (80, 100, 200, 400, 1600)
Video format, max	720p@30fps – H.264
Internal memory	32GB SD-card std., max 128GB
Lens	5 mm – 20 mm
Aperture	f/2.8 – 5.9
Zoom	4x
Focus	Auto / Focus lock
Front Port	Fused Silica - flat
Minimum Working Distance	3 cm with Wide Angle Macro
Camera control protocols	RS232 (over Ethernet)
Standard Connector	5506-1508
3.000m version	Duplex – internal and external flash
6.000m version	Titanium –external flash only
Mass Duplex version air / water	2.8 Kg / 1.7 Kg
Mass Titanium version air / water	2.9 Kg / 1.9 Kg
Dimensions Duplex version	Ø83 x 170 (ex. Connector)
Dimensions Titanium version	Ø91 x 194 (ex. Connector)
Power input	24 VDC (18 - 36) / 10 W
Operating temperature range	0°C to +40°C



3 Installation Instructions

Make sure that **Imenco's Terms & Conditions** are followed when using this product.

Important;

This manual applies for connecting the Tiger Shark Subsea Camera to a Windows 10 computer (Tiger Shark Subsea Camera II). Check the QC document for Camera version.

3.1 Unpacking and testing

Before start using the camera, check that the following items have been included in your Tiger Shark Camera shipment.

Contact Imenco or your local dealer if anything is damaged or missing.

- Tiger Shark Subsea Camera unit
- Tiger Shark Interface box
- Tiger Shark Remote control
- Power cable / Ethernet cable / RS232 cable (serial cable)
- USB memory stick with drivers, software & manuals

3.2 Function test

Make sure your new product is working as intended. Imenco cannot be held liable for any loss or inconvenience caused using a faulty product.

A preliminary test should be performed prior to full-scale installation. This is to familiarize the users with control functions and to verify that the system is fully operational after shipment.

Use the supplied test cable and connect the system on a bench according to Appendix 2, (p18)

You should also test the "video out" and the ROV connection.

3.3 Mechanical Installation

Installation of this product should only be performed by qualified personnel.

Do not open the camera when carrying out the installation.

Mount the camera on a secure and vibration free surface and strap the cable for stress relief to the supporting structure.

The camera should be electrically isolated from the mounting base in order to minimize any corrosion current between the Camera and surrounding metal structures.



Tiger Shark II - User Manual

3.4 Electrical installation

IMPORTANT!

- Installation of this product should only be performed by qualified personnel.
- Verify that the connector pin assignments match with the system where the camera is being installed. Mind the connector pin numbers and wire colors as necessary.
- Do not connect/disconnect the subsea connector when the power is ON.

3.4.1 Camera subsea connector

The Tiger Shark Subsea Camera can be supplied with alternative connector configurations. Please refer to supplied QC for your specific camera.

3.4.2 Connection Links in the Camera system

The following must be verified before installation:

- RS232 link for camera control functions
- Ethernet link for picture download and optional control functions
- Power source 18 - 36V DC, 2.0A
- Composite video link

4 Connecting the Tiger Shark Camera

4.1 Power

The camera is powered by a DC voltage applied to two power connector pins. The circuit includes reverse polarity protection, but the polarity must be correct for the camera to power up.

The camera housing is not connected to any pin in the subsea connector or any terminal of the electrical circuits inside the camera.

IMPORTANT! *The camera housing is not connected to Protective Earth*

4.2 Signal connections

Interface box

Connect all units to the interface box as shown in Appendix 2, (p18). Power must also be connected on the rear side of the interface box.



4.3 Ethernet remote control and download mode

This mode allows you to control the camera remotely and copy image files from the camera storage to a computer via an Ethernet connection. The following procedures will guide you through the software and driver installation process

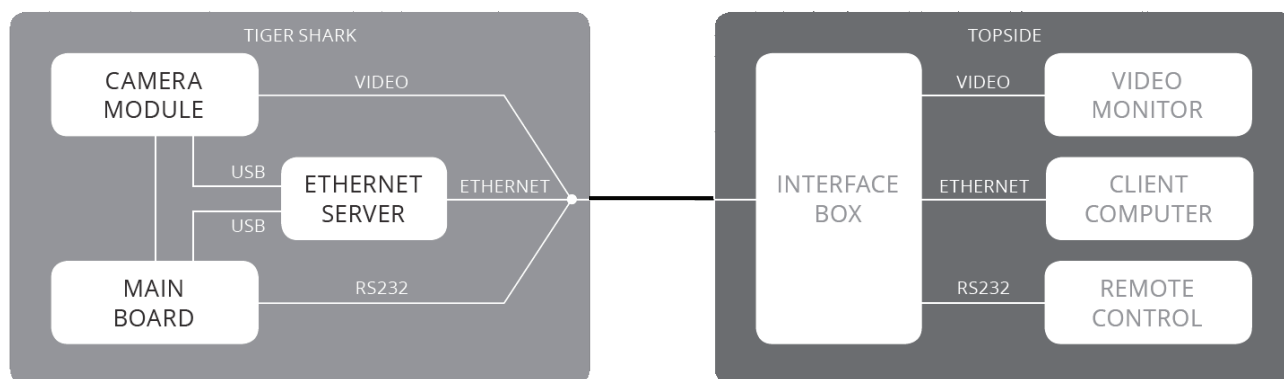
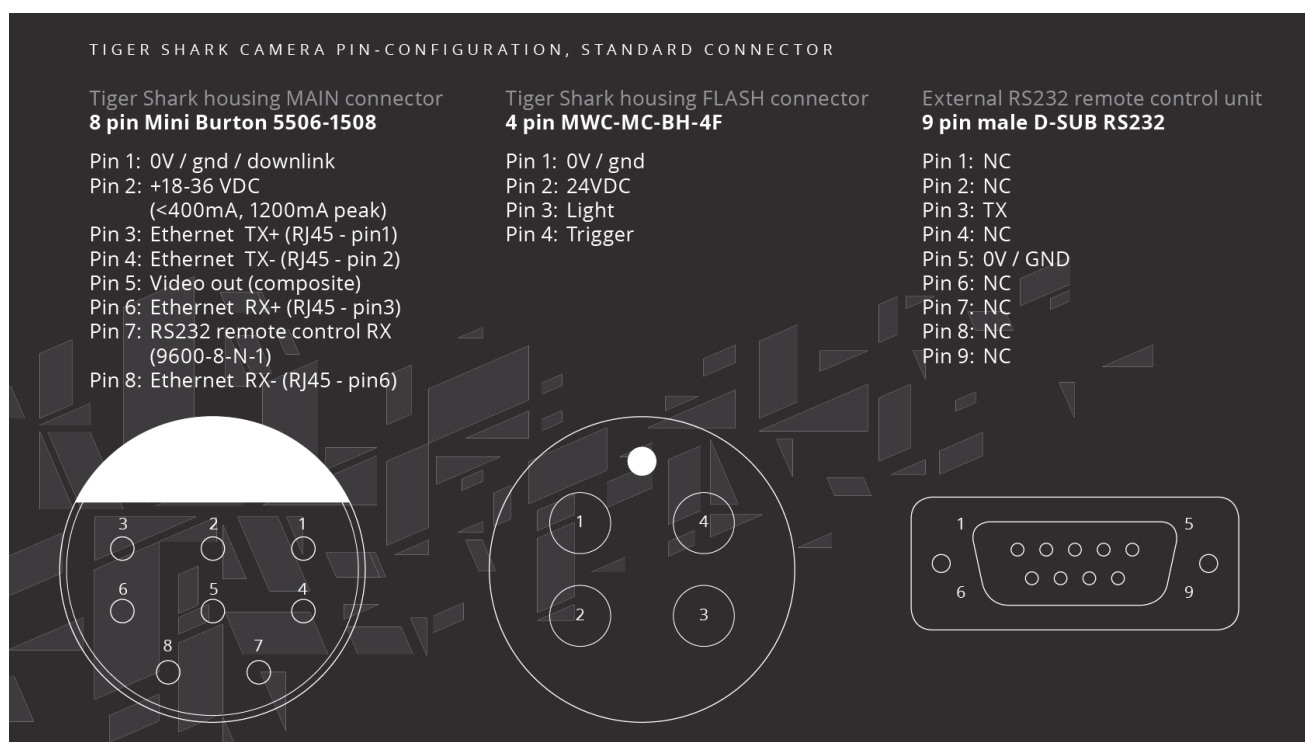


Figure 1, Communication paths

4.4 Default Connector Pin-out





4.5 RS232 remote control protocol

Controlling the Tiger Shark is done by sending RS232 Ascii text commands to the camera at 9600 baud with 8 data bits, 1 stop bit and none parity. Each command must have proper string termination (New Line <0x0A> and Carriage Return <0x0D>). Each command represents pressing down a remote control function button and must be released by sending the Release command after a short time period.

Control example: Turning on the camera, take a picture and turn off the camera again.

1. **FUNC 7<0x0A><0x0D>** - Turn camera on by pressing the Power button. Wait 100ms or more to give camera time to register button press.
2. **STOP<<0x0A><0x0D>** - Release button. Wait 5 seconds or more for camera to initialize.
3. **FUNC 16<0x0A><0x0D>** - Trigger button pressed. Wait 100ms or more to give camera time to register button command.*
4. **STOP<<0x0A><0x0D>** - Release button (picture is taken at release). Wait 2 seconds or more for camera to finish processing the image.
5. **FUNC 7<0x0A><0x0D>** - Turn camera off by pressing the Power button. Wait 100ms or more to give camera time to register button command.
6. **STOP<<0x0A><0x0D>** - Release button

*If Trigger is pressed for only a short time (>100ms) and released, the camera will perform an autofocus and take a picture instantly when focus is found. If trigger is keep longer the camera will continue to auto focus until trigger release (picture is taken at release).

4.6 Setting network IP addresses

By default, the Tiger Shark will use any available DHCP server in the network to automatically select an IP address. If there is no DHCP server available, the last known address will be used (192.168.0.10 by default).

If this address does not match the IP address assigned to the computer, the USB to Ethernet client will show the Tiger Shark device with a <in different network segment> warning. If so, the computer IP address must be changed to match the Tiger Sharks IP address range.

For example, if the Tiger Shark address is 192.168.0.10, the computer IP address can be set to 192.168.0.11 or any other free IP address in that range (192.168.0.1-255).

After setting the correct IP address, restart the Hub client and there should no longer be a <in different network segment> warning. Communication with the Tiger Shark device is now possible.

4.7 Enable / disable Ethernet

Some ROV installations still use unshielded wires for video transmission. With unshielded video wires, there is a high risk that the Ethernet signal could generate noise in the video signal.

To prevent video noise while operating the ROV, it is possible to completely disable the Tiger Shark Ethernet Interface. While the interface is disabled, the camera can only be operated using the RS232 remote control.



Tiger Shark II - User Manual

Procedure:

Make sure the Tiger Shark camera is off (no video signal).

Using the RS232 remote control, press and hold down the <Power> button.

The Tiger Shark camera will turn on and start streaming a live video feed.

Keep pressing the <Power> button until the Tiger Shark turns off again (approximately 10 seconds).

The Ethernet interface is now either enabled or disabled, depending on the previous state.

When the Ethernet interface is disabled, no Tiger Shark device will appear in the MFP client software. The link status light on the Ethernet switch or computer network port connected to the Tiger Shark will also indicate if the Ethernet interface is turned on. If disabled, pressing the USB remote control button will enable the Ethernet interface for image file transfer.



5 Operational Instructions

5.1 Connector configuration

Study the connector configuration diagram in 4.4 and make connections accordingly.

5.2 Hazards and protective measures

The Tiger Shark Subsea Camera does not generate or use dangerous high electrical voltages. The camera is filled with inert gas at atmospheric pressure. Follow the safety information at the beginning of this manual.

5.3 Over-temperature precautions

The camera is designed for operation in water that will absorb the heat generated by the camera. Imenco acknowledges that the camera must be checked on deck before operation as well as tested and demonstrated in house, but the conditions when operating the camera in air may not provide sufficient cooling. Remember that sunlight and/or high outside temperature will add significant heat to the camera.

CAUTION: *When operating the camera in air or unusual hot water, shut off the camera or apply active cooling to always keep the temperatures below 60°C / 140 °F.*

5.4 Camera Control

5.4.1 Remote Control unit

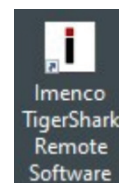
The topside remote control is used to operate the camera and change camera settings. Camera menu options and functionality settings are displayed on the video monitor and can be changed as needed.



Tiger Shark II - User Manual

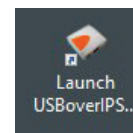
5.4.2 Remote Control Software

A PC Remote Control Software user interface is also available for this product. It has the same button layout and functionality as the physical remote control, allowing the camera to be controlled via a computer. This Software can be installed from the supplied memory stick. When installed, the following icon will appear on your Desktop.

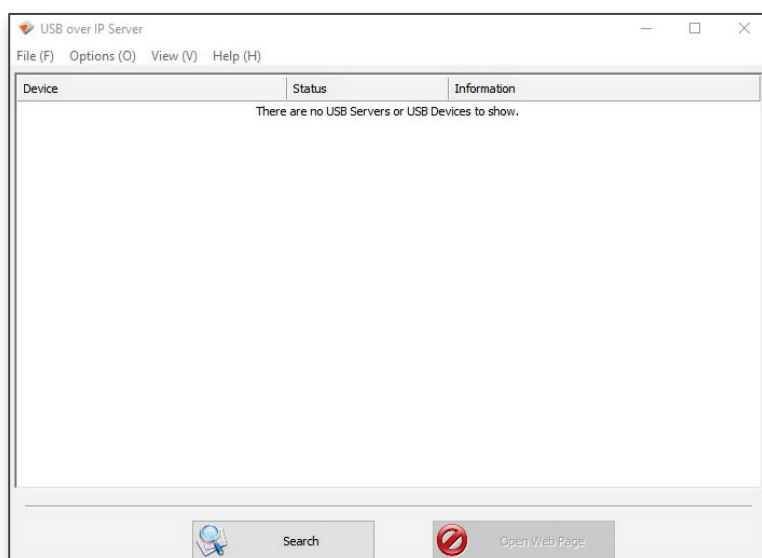


5.4.3 USB to Ethernet Hub Software

The Remote-Control Software communicates with the Camera over Ethernet with the by means of a USB to Ethernet Hub inside the camera. Install the USB to Ethernet Hub Software from the supplied memory stick, and the following icon will appear on your Desktop.



When the USB to Ethernet application is launched, the following window will open:



The application will automatically start the search for the Hub in the camera.

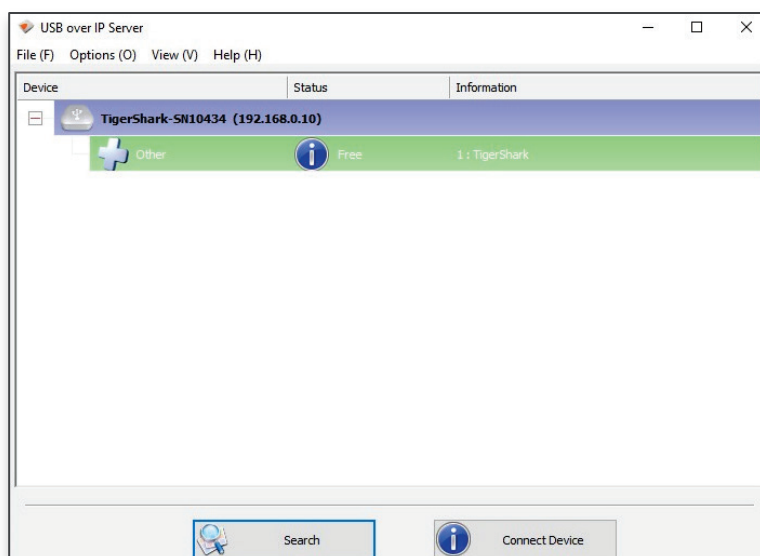
It can take *up to 2 minutes* for the application to find it, so be patient . . .

If the Tiger Shark camera is connected to the same network as the computer, it should now show up as a line for the Tiger. Mark the line and press "Connect Device"

If the is not in the same network, see 4.6.

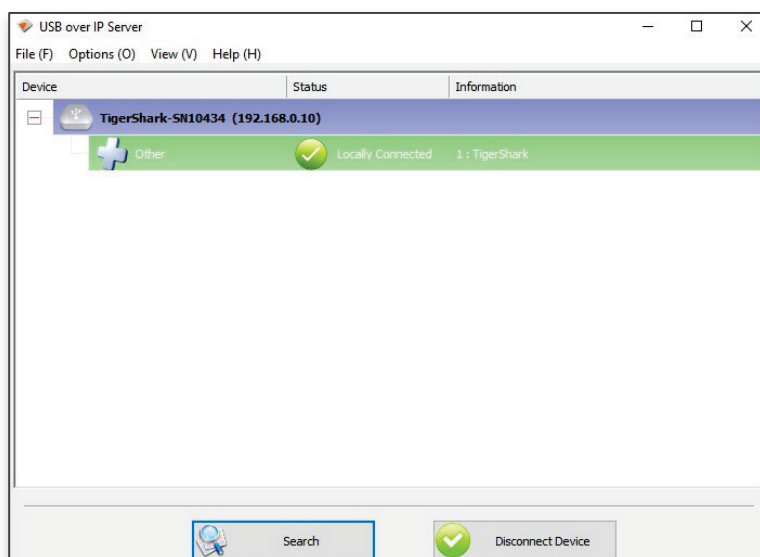


Tiger Shark II - User Manual



The active line may disappear if "Connect Device" is not pressed within 2 minutes. If this occurs, it will reappear again after about 2 minutes.

The active line will change to "Locally Connected"



6 Using the Camera

6.1.1 Remote Control Functions

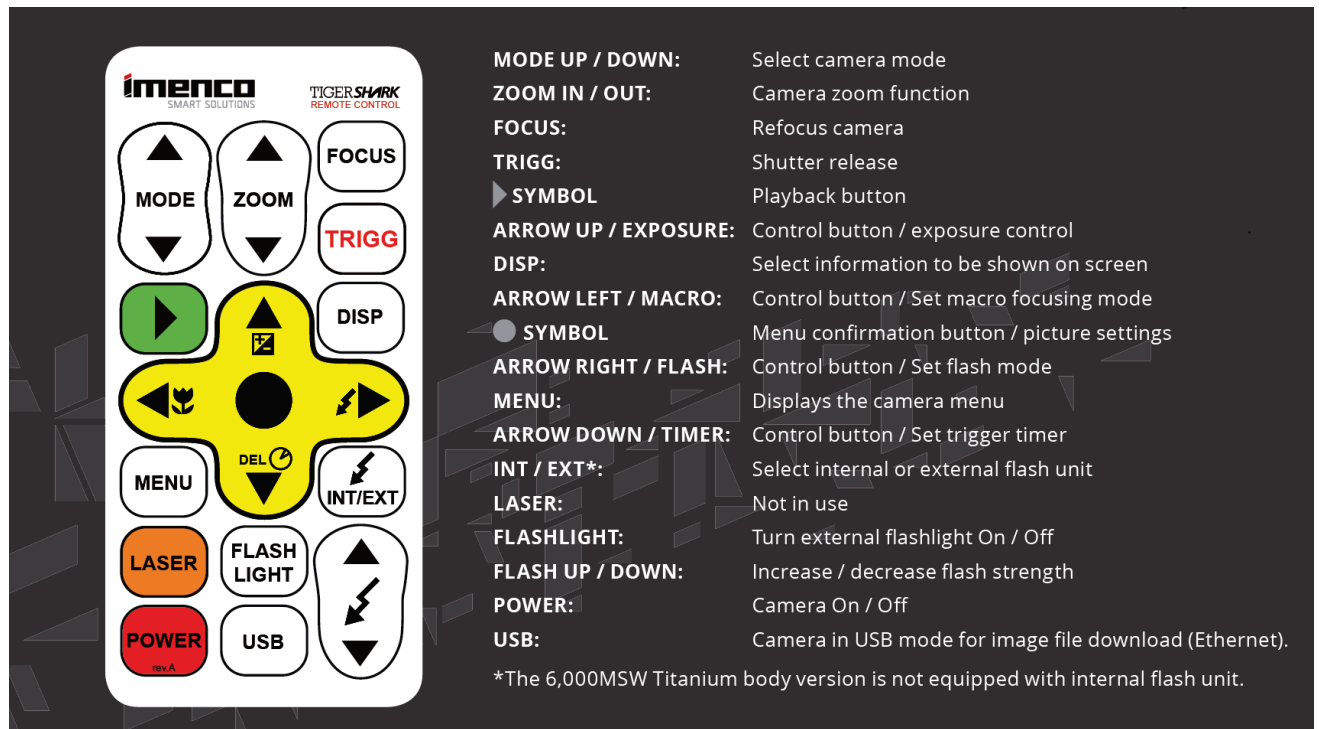
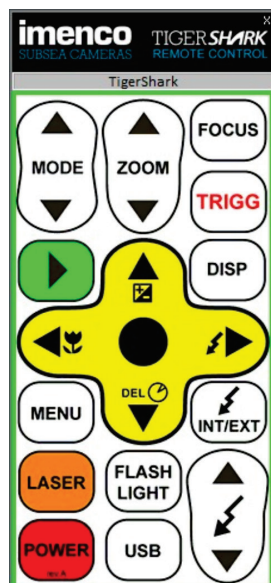


Figure 3, Control interface layout

A full manual for the Camera module (Sony IXUS 130) can be found on the supplied memory stick

6.1.2 Using the Remote-Control Software

Launch the application from your desktop. The following window will open:



The text in the grey field on the top will change from "Not connected" to "Initializing" and finally to "TigerShark"

The frame around the buttons will change from orange to green.



Tiger Shark II - User Manual

6.2 Camera Functions

Turn on the Tiger Shark camera by pressing the Power button on the remote control. The Viewfinder window image from the camera module will appear on your control screen. This window is used when setting up the camera module functions and will in normal operation display the scene captured by the camera. Please note that this is a low-resolution image not representative for the image / video quality recorded by the camera



The Tiger Shark camera has two focus modes. Servo AF (Auto Focus) on or off. Servo AF is changed by pressing the <MENU> button, selecting Servo AF in the menu and turning it on/off with the <LEFT> or <RIGHT> button.



Servo AF on:

When Servo AF is turned on and the <FOCUS> remote button is pressed, the camera will do a continuous focus search for as long as the button is pressed. When <TRIGGER> is pressed the camera will do a continuous focus search and take a picture with the current focus

Servo AF off:

When Servo AF is turned off and the <FOCUS> remote button is pressed, the camera will search until focus is found and lock focus (indicated by showing AFL (Auto Focus Lock) in the display) when the button is released. When the camera focus is locked, no further focus changes can be done until the AFL is released. To release AFL, press the <LEFT> remote button and the AFL display indication will disappear. Changing zoom settings with the zoom buttons will also release AFL lock. If <TRIGGER> is pressed while AFL is locked, a picture is taken using the locked focus setting. If <TRIGGER> is pressed and AFL is not locked, the camera will search and lock focus a single time for each picture taken.

For complete information on camera functions and options, please see the Canon IXUS130 Camera User Guide included on the USB memory stick that came with the camera.



Tiger Shark II - User Manual

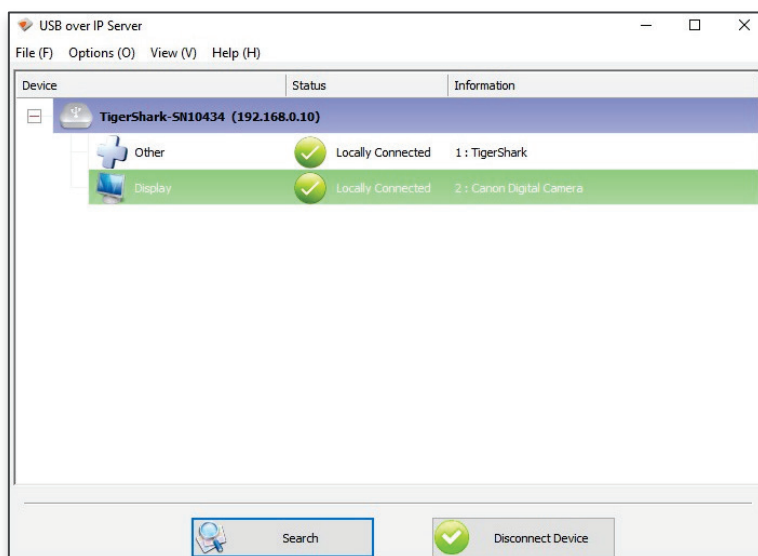
6.3 Downloading image files from camera

The Tiger Shark USB interface for image files transfer is activated by pressing the USB button on the remote control.

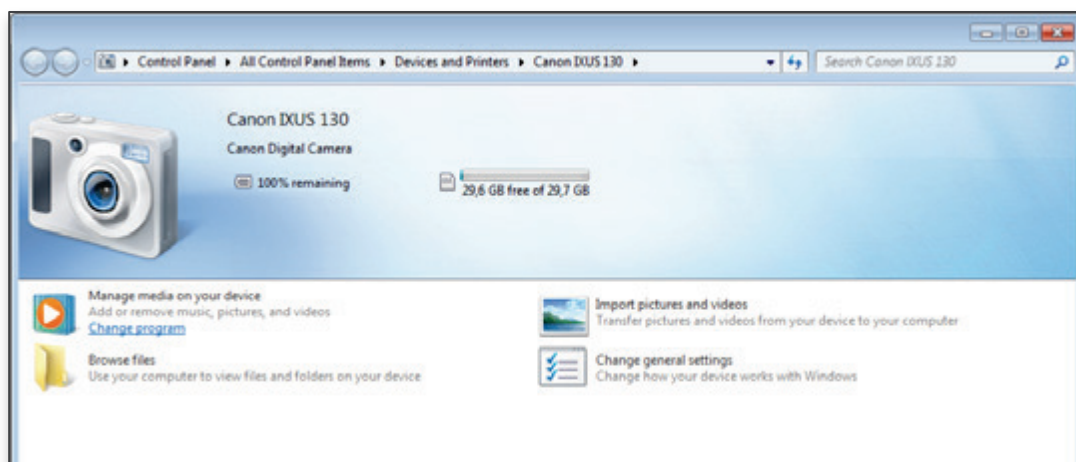
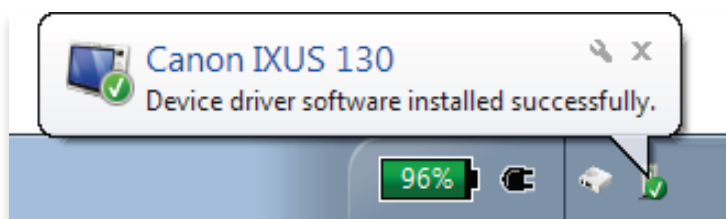


A new USB device named <Canon Digital Camera> will appear in the USB to Ethernet client software.

Select and connect the <Canon Digital Camera> device to access the image files in the camera. The first time the USB remote button is pressed, and the camera USB device is connected, a Canon IXUS 130 driver will automatically be installed to enable the PC to access the camera SD card files.



With the <Canon Digital Camera> device connected, and the USB driver installed, a Wizard should appear and let you choose you preferred method of copying image files from the camera to the local hard drive. The camera image files are also available by clicking the <Canon IXUS 130> icon in the <My Computer> desktop folder.



6.3.1 Disconnecting the Camera

Before powering down and disconnecting the Camera, press the USB button on the Remote-Control to shut down USB communication.



7 Maintenance

7.1 General maintenance

After use in seawater or other corrosive environments, rinse the Imenco Tiger Shark Subsea Camera / Flash and cables in fresh water.

Inspect the front port for dirt and dust and remove any surface dirt using compressed air. Clean the front port glass using a mild detergent and a soft cloth. Do not use alcohol or solvent based cleaning solutions because that could damage the pressure seals and glass coating. Avoid circular wiping patterns.

Reapply silicon based lubricant to the connector regularly as needed.

7.2 Service and Repair

This product contains no user serviceable parts. Service and modifications are to be carried out by Imenco personnel or by qualified third party after appointment. Failure to comply may result in personal injury, damage to equipment and loss of warranty.

If the Imenco Tiger Shark Subsea Camera seems to not work properly, please try to speed up the service that Imenco can provide by describing the problem in specific terms from the person who have first handed observed the fault. Remember if necessary to describe the system where the camera is installed since the root cause sometimes can originate outside a failing part in an advanced system.

7.3 Packing & Shipping

The packing & shipping of the goods shall generally be according to Imenco's approved procedures.

Warning: *The Imenco Tiger Shark Subsea Camera includes fragile parts which must not be subject to vibrations and shock during transport.*

Appendix 1 - Tiger Shark remote Functions

RS232, 9600 BAUD, 8 DATA BITS, 1 STOP BIT AND NONE PARITY

Function	Commant string
Mode Up	FUNC 1
Mode Down	FUNC 2
Play	FUNC 3
Left	FUNC 4
Menu	FUNC 5
Laser	FUNC 6
Power	FUNC 7
Zoom In	FUNC 8
Zoom Out	FUNC 9
Up	FUNC 10
Set	FUNC 11

Function	Commant string
Down	FUNC 12
Flashlight	FUNC 13
USB	FUNC 14
Focus	FUNC 15
Trigger	FUNC 16
Display	FUNC 17
Right	FUNC 18
IntExtFlash	FUNC 19
Flash Up	FUNC 20
Flash Down	FUNC 21
Release	STOP



Appendix 2 - Interfaces

Appendix 2 - Interface overview



- Mini Burton to connect to camera
- Video out
- Ethernet connection
- 9-pin D-sub Female to remote control box
- 9pin D-sub Male RS232 pass-through



The Lantern Shark Subsea Flash



The Lantern Shark Subsea Flash is made for extending the use of the Tiger Digital Stills Camera and will facilitate high quality images at distances up to 7 – 10 meters.

It is connected directly to the Tiger Shark subsea camera's flash connector, and light output is controlled by the camera.

The Lantern Shark is produced in Duplex housing for 3,000MSW and Titanium housing for 6,000MSW.



Tiger Shark II - User Manual



SHARKRANGE

WHEN QUALITY VISION IS ESSENTIAL

HQ Haugesund, Norway
+47 52 86 41 00
imenco@imenco.com

Aberdeen, Scotland
+44 (0)1224 701749
uk@imenco.com

North America
Houston & Louisiana
+1985-518-2645 km@imenco.com

IMENCO AS
Org No: 923 005 749 MVA

Visiting Address: Kophaug 3, 5570 Aksdal, Norway
Postal Address: PO. Box 2143, 5504 Haugesund, Norway

Office: +47 52 86 41 00
Fax: +47 52 86 41 01
imenco@imenco.com
www.imenco.com

