

# **User's Manual**

# M-Series Mk2 Sonars



Part Number: 1015282, Doc. Number: OM21282-2

Version 2, May 2020

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# **System Contents**

Along with the BlueView M-Series Mk2 Sonar, you will receive an accessory kit containing the following:

Sonar to surface cable, 8m+1m (25ft)

Ethernet cable whip, 1.2m (4ft)

Cat 6 Ethernet cable, 2.1m (7ft)

POE box

Power cord (for POE box)

Power cable, 230V EU

Shipping case

#### **The Manual Packet includes:**

Documentation on USB with:

- Electronic copy of M-Series Mk2 User's Manual
- Electronic copy of M-Series Mk2 Quick Start Guide

Printed copy of the M-Series Mk2 Quick Start Guide

ProViewer on USB

#### For VDSL Sonars only:

VDSL specific parts:

• VDSL box with power cable, 230V-12V PSU

**NOTE:** BlueView M-Series Mk2 sonars are supplied with cables that are compatible with VDSL and non-VDSL sonar versions.



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#### **Disclaimers:**

"Open Source License (GPLv2):

The firmware included in this product contains copyrighted software that is licensed under the GPL, specifically a modified Linux kernel. A copy of that license is at the following link; <a href="https://www.gnu.org/licenses/gpl-2.0.html">https://www.gnu.org/licenses/gpl-2.0.html</a>. A hard copy is available upon request. You may obtain the complete Corresponding Source code from us for a period of three years after our last shipment of this product by contacting Teledyne BlueView Customer Support. This offer is valid to anyone in receipt of this information."

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### Warnings:

**WARNING!** This device should not be used as a navigational aid to prevent collision, grounding, boat damage, or personal injury.

**WARNING!** This equipment contains high voltage electronics. Tampering with or using damaged equipment could lead to serious injury.

### **Cautions:**

**CAUTION!** Disassembly and repair of this electronic unit should only be performed by authorized service personnel. Any modification of the serial number or attempt to repair the original equipment or accessories by unauthorized individuals will void the warranty.

**CAUTION!** Changes or modifications to this unit not expressly approved by the party responsible for compliance may void the user's authority to operate this equipment.



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# Chapter 1: BlueView M-Series Mk2 Sonar Overview

The BlueView M-Series Mk2 sonar is a general purpose underwater imaging sonar designed for ROV, AUV, vessel mounted, and stationary tripod integration. With its Ethernet interface and user-friendly software, the sonar system is designed to be just as easy-to-use as it is functional. This manual covers operations of all the M-Series Mk2 sonar systems.

#### BlueView Mk2 Sonars

Sonar	Shallow Water (1000m)	Deep Water (6000m)
M450 Mk2	Shoviou	Bhoview
M900 Mk2		
M900-2250 Mk2 (130/45deg)		
M900-2250 Mk2 (130/130deg)		

#### **About the Sonar**

The BlueView M-Series Mk2 sonar streams sonar imagery making it easy to search and navigate in low and zero visibility water. Teledyne RESON A/S has coupled high-performance imaging capability with a powerful software package creating one of the world's most versatile underwater imaging systems available today.

Advanced sonar technology, rugged design, and powerful software are just a few highlights of your sonar system. This manual explains imaging sonar interpretation and provides instructions on the installation and operation of your sonar system. For detailed information on using the sonar imaging software, please see the ProViewer Software Handbook found both on the software USB key and under the software's Help menu.

### **CE Marking**

#### BlueView M-Series Mk2 Sonars

#### **EC DECLARATION OF CONFORMITY**

We Teledyne RESON A/S

Fabriksvangen 13 3550 Slangerup Denmark



in accordance with the following directive(s):

2014/35/EU Electromagnetic Compatibility (EMC)

2011/65/EU Restriction of Hazardous Substances in Electrical and Electronic Equipment (ROHS 2)

(EU) 2015/863 Restriction of Hazardous Substances in Electrical and Electronic Equipment (ROHS 3)

and in accordance with the following regulation(s):

(EC) 1907/2006 Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

(EC) 1272/2008 Classification, labelling and packaging of substances and mixtures (CLP)

hereby declare that the following equipment:

BlueView M-Series Mk2 Sonars

is in conformity with the applicable requirements of the following standards:

REF. No. TITLE EDITION/DATE

EN 60945 Maritime navigation and radio communication equipment and systems - 2002

§9 and §10 General requirements - Methods of testing and required test results.

I hereby declare that the equipment named above has been designed to comply with the relevant sections of the above referenced specifications. The unit complies with all applicable essential requirements of the directives.

Location: Slangerup, Denmark

**Date:** 27 April 2020

Name: Ole Søe-Pedersen

Position: VP & Group General Manager

Document No. CERT21379

Signature:

### VDSL box topside - BlueView

#### **EC DECLARATION OF CONFORMITY**

We

Teledyne RESON A/S Fabriksvangen 13 3550 Slangerup Denmark



in accordance with the following directive(s):

2014/30/EU

Electromagnetic Compatibility (EMC)

hereby declare that the following equipment:

VDSL box topside - BlueView

is in conformity with the applicable requirements of the following standards:

REF. No.	TITLE	EDITION/DATE
EN 55024	Information technology equipment - Immunity characteristics - Limits and methods of measurement	2010
EN 55032	Electromagnetic compatibility of multimedia equipment - Emission requirements	2012
EN 61000-3-2	Electromagnetic compatibility (EMC): Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase).	2014
EN 61000-3-3	Electromagnetic compatibility (EMC): Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection.	2013

I hereby declare that the equipment named above has been designed to comply with the relevant sections of the above referenced specifications. The unit complies with all applicable essential requirements of the directives.

Location: Slangerup, Denmark

Date: 3 July 2018

Name: Ole Søe-Pedersen

Position: VP & Group General Manager

Document No. CERT19401

Signature:

# **Chapter 2: Understanding an Imaging Sonar**

### What is an Imaging Sonar?

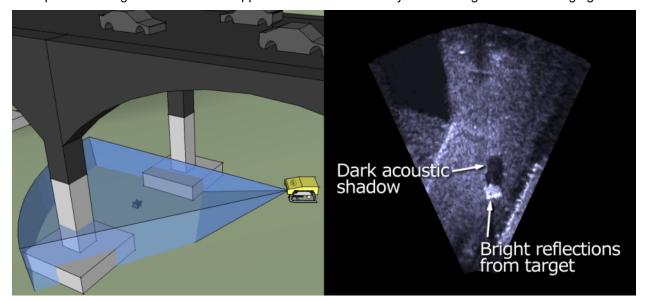
Many people are familiar with scanning type sonar, which employ mechanical rotation of a single acoustic beam over an imaging area. This works well when used on stationary platforms and/or when imaging static targets. They become much less useful when working from a moving platform and/or trying to image moving targets since any motion can cause errors in the final image.

By comparison, Teledyne BlueView imaging sonars are multibeam sensors, which form many small acoustic beams at once. This allows them to work well from both stationary and moving platforms. An imaging sonar can produce several high-quality images per second, making it possible to get movie-like imagery from the sonar.

### How do I interpret the Sonar images?

Imagine a flashlight lying on a table and an object, such as a coffee cup, located in front of the flashlight. If you look down on this scene, you will see a bright area where light is reflecting off the face of the coffee cup. You will also see a dark shadow behind the coffee cup where light is unable to reach.

The same idea can be applied to a Teledyne BlueView imaging sonar by replacing the light source with a sound source. Bright areas on the sonar image are the result of objects reflecting sound, while dark areas are acoustic shadows resulting from an object blocking the sound. The two figures below provide an example of how a given scene would appear when viewed visually and with high-definition imaging sonar:





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# **Chapter 3: Installation**

This chapter contains step by step instructions for setting up your Teledyne BlueView sonar.

### Install the Software

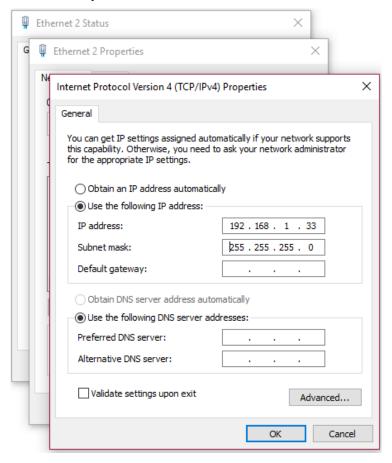
Whether connected to an external PC or an onboard AUV controller, the ProViewer software can be used to operate the M-Series Mk2 sonar. The following describes how to install the ProViewer 4 software on a user-supplied PC. For more information on ProViewer and integration, see the ProViewer Software Handbook found on the software USB key, as well as under the software's Help menu.

**NOTE:** Running other applications in conjunction with the ProViewer software may affect performance of one or both of the applications.

- 1) Place the ProViewer USB key in the USB drive. Installation will start automatically.
  - If the USB drive does not automatically run:
  - Select Run from the Start menu, and type x:\setup in the Open box (where x is the drive letter for the USB drive), then click OK.
- 2) The Welcome window opens. Click Next.
- 3) Follow the instructions on the screen to complete the installation.

### **Configure the PC**

The IP address on the user's PC will need to be set either to "Obtain an IP address automatically," or to a static IP: 192.168.1.x where x is any number besides 45 that doesn't conflict with the user's system:





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#### **Firewall Software**

ProViewer software communicates with the sonar head using standard networking protocols. If your PC has firewall software, a warning popup may ask permission to allow the ProViewer software to connect to the sonar. In that case, you may need to configure the firewall to allow communications between your sonar and your PC using TCP and UDP on port 1149.

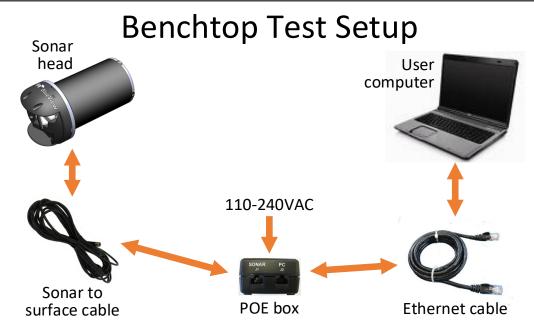
Refer to your antivirus software vendor or your computer tech support resources for assistance with your antivirus software.

### **Set Up Equipment**

### **Benchtop Test Setup**

After installing ProViewer 4, the M-Series Mk2 Sonar is ready for standalone operation. The only additional items required are the included Power Over Ethernet box (POE) and sonar to surface cable. The diagram below illustrates the proper connections needed for the system to function properly.

**NOTE:** The setup is the same regardless of what type of Mk2 sonar you have.



- 1) Inspect all cable connectors to ensure that there is no moisture, corrosion, or damage before assembling the system. Make sure that all O-rings are present (where applicable) and in good shape before making the connection.
- Connect the underwater connector on the sonar cable to the bulkhead connector on the rear of the sonar. Once connected, ensure that the connector is fully engaged and tightened.
- 3) Connect the RJ45 connector on the sonar cable to the SONAR J1 port on the POE box.
- 4) Connect the standard Ethernet cable to the PC J2 port on the POE box and the user computer.
- 5) Plug the POE box power cable into a standard 120 or 220VAC wall outlet. The sonar head will power up and initialize itself in approx. 45 seconds.

**NOTE:** Correct operation requires that power be cycled from the AC side of the POE box. If you cycle the power off briefly, leave the power unplugged for at least 10 seconds.

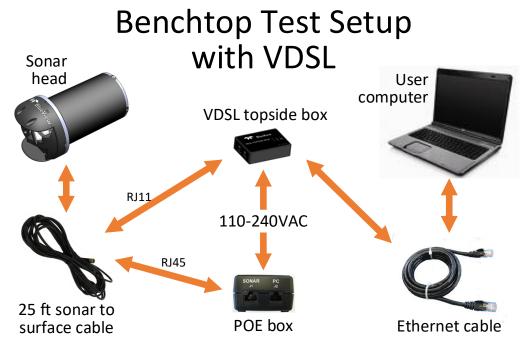
6) Turn on your computer.



### **Benchtop Test Setup with VDSL**

The VDSL option enables communication over a single twisted pair. The diagram below illustrates the proper connections needed for the system to function properly.

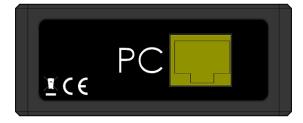
NOTE: The setup is the same regardless of what type of Mk2 sonar or VDSL topside box you have.



- Inspect all cable connectors to ensure that there is no moisture, corrosion, or damage before
  assembling the system. Make sure that all O-rings are present (where applicable) and in good
  shape before making the connection.
- Connect the underwater connector on the sonar cable to the bulkhead connector on the rear of the sonar head. Once connected, ensure that the connector is fully engaged and tightened.
- 3) Connect the RJ45 connector on the sonar cable to the SONAR J1 port on the POE box.
- 4) Connect the RJ11 connector on the sonar cable to the SONAR port on the VDSL box.



- 5) Plug the 230V-12V power cable from the VDSL box to the wall outlet.
- 6) Connect the standard Ethernet cable to the PC port on the VDSL box and the user computer.



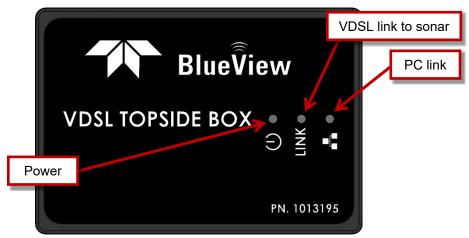
BlueView

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7) Plug the POE box power cable into a standard wall outlet. The sonar head will power up and initialize itself in approx. 60 seconds.

**NOTE**: Correct operation requires that power be cycled from the AC side of the POE box. If you cycle the power off briefly, leave the power unplugged for at least 10 seconds before reconnecting the plug.

- 8) Check the LEDs on the VDSL box:
  - The Power and VDSL link to sonar LEDs should be a steady green color. This indicates that a valid link between the topside box and the sonar exists.
  - An orange VDSL link to sonar LED indicates that a connection exists between the sonar and the topside box, but that the unit has reduced the data throughput to 10BASE-T or 10Mbit/s. This may be caused by the use of a non-Teledyne BlueView cable or a cable length in excess of the rated specification.
  - If the VDSL link to sonar LED does not turn on, there is no connection. Verify that all connections are properly secured and inspect the cable for damage.



9) Turn on your computer. The PC link LED should be a steady green color.

NOTE: If the computer is not connected, the LED will be off.

- 10) Start ProViewer, and click the Connect button ...
- 11) In the event of installation issues, please see Chapter 7: Troubleshooting.

# **Connecting with ProViewer 4**

Once the network settings are properly configured, open the ProViewer software on the user computer and click the Connect button.



**NOTE:** If the sonar has just received power, it will take 30-60 seconds to boot and be ready for a connection.

When the Connect button is clicked, the ProViewer software will automatically list all sonar systems and sonar heads connected to the PC. Select the desired Sonar and Head from their respective drop-down menus.

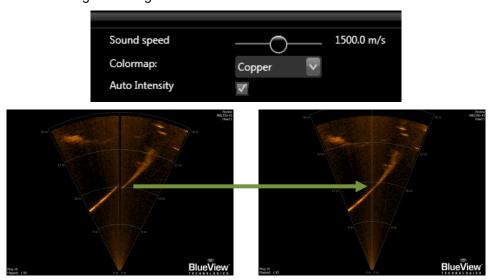




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# **Sound Speed Calibration**

If an image looks broken or misaligned, it's most likely caused by an incorrect sound speed value. To access the Sound speed slider in the ProViewer UI, right-click anywhere in the imagery window and adjust the slider bar to align the image.



### **Shutdown**

To shut down the sonar, close the Sonar Window by clicking on the X icon in the top right-hand corner of the window, or select Exit from the File menu to close the entire program.

To avoid data loss, close and save any sonar data files before removing the sonar power. It is now safe to power down the sonar or disconnect the sonar Ethernet cable from the computer.

When power cycling the sonar, allow at least 10 seconds of 'off time' before turning the sonar back on.



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# **Chapter 4: Sonar Mounting**

### **Mount the Sonar**

After installing your software and running your sonar for the first time, you're ready to put the sonar into the water.

In order to do this, the sonar needs a mounting structure to hold it securely in its underwater environment. This mount can either be one purchased from Teledyne RESON A/S or a customer-supplied mount. The preferred mounting method is a clamp-type fixture around the cylindrical portion of the unit. For custom mounts, refer to the technical drawings provided in your kit.

### **Mounting Location**

The sonar head should be mounted looking forward, preferably on the same pan-and-tilt as the ROV's main camera.



## **Sonar Up-Down Orientation**

The Teledyne BlueView, logo on the top front of the sonar is used to determine the up-down orientation of the sonar (pictured below).

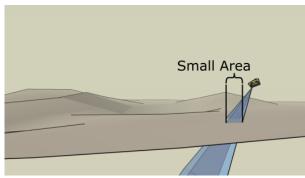




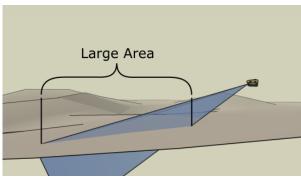
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### **Sonar Angle**

To achieve the optimal performance while imaging targets and/or the bottom at a given depth, the sonar's tilt angle relative to the surface is important. This issue is demonstrated in the figures below.

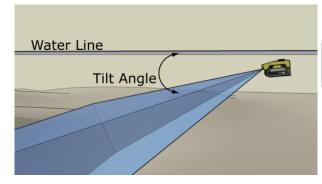


The sonar is tilted down at a steep angle that provides only a narrow field of view of the bottom. Consequently, the generated display will show a narrow strip of the bottom.



The sonar is set at a much shallower angle that provides both a better perspective on targets and a larger field of view of the bottom. Consequently, the generated display will show a broad area of the bottom.

In general, shallower tilt angles are preferred, as they produce imagery of larger areas of the bottom.



### Recommended tilt angles

Target depth, m (ft)	0	3 (10)	6 (20)	9 (30)	12 (40)
Approx. tilt angle	0°	3°	8°	10°	10°



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# **Chapter 5: Advanced Sonar Network Configuration**

### **Changing the Sonar IP Settings**

As communication with the M-Series Mk2 sonar is handled through an Ethernet interface, the sonar requires an IP address to function properly. There are three ways to accomplish this:

- Static IP
- DHCP server
- DHCP host

The system is shipped from the factory with a static IP address of 192.168.1.45 and a DHCP server enabled. These settings, however, can be changed using the ProViewer software.

**NOTE**: The ability to change IP settings is an advanced feature of the ProViewer software and is only recommended for users familiar with IP settings and network configurations.

CAUTION! Incorrect settings can result in the loss of communication with the sonar.

- With the M-Series Mk2 sonar powered and connected, open the ProViewer 4 software and click the Connect button.
- 2) Select the relevant M-Series Mk2 sonar and click Connect.



3) Under Settings , choose the Sonar tab and select Show Advanced Settings. Under Network Settings, you can change the various network settings of the sonar.





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4) If any changes are made, click Apply IPv4 Settings and power cycle the sonar.

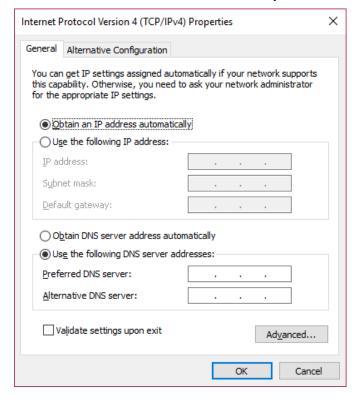
**NOTE:** The sonar Ethernet wiring is designed to connect directly to a PC network card (i.e. it is wired as a crossover cable). You can connect your sonar to an 'auto sensing' network device with the same cable you use to attach to a PC.

**CAUTION!** By factory default, the sonar provides DHCP service to the computer or network it is attached to. If your network has a DHCP server operating, you should disable the sonar DHCP server before connecting it to the new network.

### When You Forget the M-Series Mk2 Sonar's IP Address

To connect with the sonar, the M-Series Mk2 sonar's IP address must be compatible with the network or computer to which it is attached. If you misconfigure the sonar's network settings and are unable to connect to it, follow this procedure to re-establish communications with the sonar:

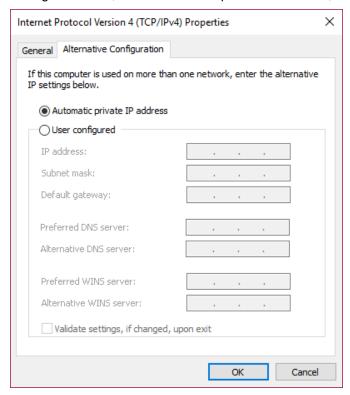
- Connect the sonar communication cable directly to a Windows computer's network interface card.
- 2) As described in *Configure the PC* on *p. 11*, open the Internet Protocol (TCP/IP) Properties window for the network interface card you plugged the sonar into.
- 3) Under the General tab, select Obtain an IP address automatically.





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4) Under the Alternate Configuration tab, select Automatic private IP address, and click OK.



- 5) Close the rest of the Windows folders you opened.
- 6) Cycle the sonar power off (for at least 10 seconds), then turn the sonar back on.
- 7) After approx. 100 seconds, the Windows PC and the sonar should have negotiated a 'link local' IP address (in the range of 169.254/16).
- 8) Using the ProViewer software, connect normally and reconfigure the sonar's network settings to be compatible with its intended network.

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# **Chapter 6: Maintenance**

#### **Before Use**

- Before assembling any components, ensure that all connector contacts are clean, dry, and free
  of dirt and/or corrosion.
- 2) Inspect the sacrificial zinc anode on the rear bulkhead of the sonar head and replace if it appears that more than half of the anode has been lost to corrosion.
- 3) Inspect all cables and connectors for abrasion, cuts, or cracks. Repair or replace as needed.
- 4) Inspect the anodized sonar shell and front/rear bulkheads for excessive corrosion. If there is any question as to usability with the extent of any corrosion, contact Teledyne BlueView Customer Support.
- 5) Inspect the front and rear bulkhead joints of the sonar head to ensure the flush mount housing screws are in place.

**CAUTION!** These are not field-replaceable items and should <u>never</u> be removed except by factory trained personnel. Noncompliance may affect warranty.

#### **After Use**

- After use, rinse the sonar, the rear connector on the sonar, and the sonar cable with a solution of mild soap and fresh water.
- 2) At this time, inspect all components for corrosion, wear, and damage. This includes the sonar, connectors, cables, and anode. Replace any component showing corrosion or damage.
- Clean the connectors on the sonar cable and the connector on the rear bulkhead of the sonar unit with alcohol.

**CAUTION!** The connector on the rear bulkhead of the sonar unit is NOT a field replaceable item. If any damage is detected, please contact Teledyne BlueView Customer Support for an RMA number to return the sonar to the factory for replacement, repair, and retest.

- 4) Lubricate mating surfaces with 3M Silicon Lubricant or equivalent. DO NOT grease! Connectors must be lubricated on a regular basis.
- 5) Check that the anode is in place and it has not deteriorated. Replace as necessary. If less than 50% remains, the anode should be replaced. When replacing the anode, make sure the surface under the anode is bare and bright before the anode is installed to ensure good electrical contact. For a replacement anode, please contact Teledyne BlueView
- 6) Customer Support.



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# **Chapter 7: Troubleshooting**

Possible Cause	Solution
No power	Confirm that the POE box is plugged into a standard 120 or 220VAC outlet and that the small green LED on the POE box is illuminated. Check that the Sonar-to-Surface cable is plugged into the SONAR J1 port on the POE box.
Improperly connected	In addition to the connections described above, verify that you have a good cable between the computer Ethernet port and the PC J2 port on the POE box.
Bad state	Reset the sonar by removing the POE box AC power cord for 10 seconds. The sonar head takes approx. 45 seconds to reboot after power is re-applied.
Dirty connectors	Make sure that all connector pins are clean and corrosion free.
Improper Ethernet cable	The sonar head cabling is conveniently designed so that you can connect your POE box to a PC with a standard Ethernet cable.  However, when connecting your POE box to a network hub, a crossover Ethernet cable is required unless your network hardware is capable of automatically handling crossed Ethernet cables.
PC networking software is confused	Restart the networking software. There are several ways to do this depending on your particular operating system: Open the windows network connection window and right-click on the Ethernet connection. Select repair or disable then enable. You can also simply restart the computer or cycle the power on the sonar.
IP subnet masks don't match	Make sure the subnet mask is the same on both PC and sonar. For the factory default Class C network configuration, the subnet mask is 255.255.255.0. The 255 defines the network portion of the IP address. The 0 defines the device portion of the IP address.
IP network addresses don't match	Make sure the IP network part of the IP address is the same on both the sonar and the computer. In the factory default case, this is the first 3 numbers in the IP address: 192.168.1.
IP network device addresses are the same	The device part of the IP address must be different for every device on the network. In the factory default case, the sonar is set to 45 and the PC is set to 3. Do not use 255 as it is reserved for broadcast use.
PC ARP table is stale	In the ProViewer Sonar Devices window, click the Add button and enter the IP address you think the sonar is set to respond to, then click OK. The sonar should respond within several seconds. Alternatively, the PC power can be cycled to refresh the ARP table.
Poor connection quality	Use an ohmmeter to verify Tx and Rx line connectivity between the Ethernet connector that plugs into the PC and the connector that plugs into the sonar head. Refer to the Sonar to Surface Cable drawing in <i>Appendix D: Drawings</i> for pin to pin connection information.



# **Image Updates Seem Slow**

Possible Cause	Solution
Ethernet congestion	Shut down any other computers or services that are consuming the Ethernet network bandwidth.
Range settings	When your sonar pings, it must wait for the echo to return from a distant object; long range settings directly cause slow updates. Reduce the Range Stop distance to increase the update rate.
GUI window size	The larger the displayed sonar image, the longer it takes for the ProViewer software to construct the image. To increase the image display update rate, decrease the size of the sonar image display window by grabbing one of sides or corner of the GUI and dragging it towards the center of the GUI window.

# Still not working?

Please contact Customer Support:

Website: <a href="http://www.teledynemarine.com/blueview/">http://www.teledynemarine.com/blueview/</a>

Email: <u>blueview-support@teledyne.com</u>

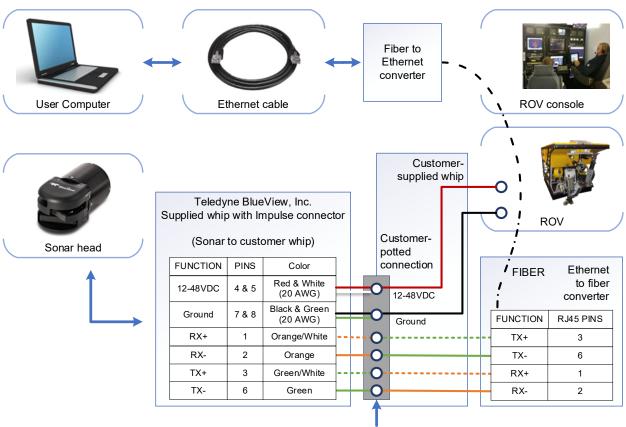
Hotline: Europe: +45 20 999 088 / USA: +1 805 233 3900



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# **Appendix A: ROV Interface Setup**

#### **ROV Interface Setup**



Note: If there is no sonar communication, try a straight Ethernet connection. (Swap 1 & 3, 2 & 6.)

Figure 1: ROV Interface Setup

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# **Appendix B: ROV Interface Setup with VDSL**

#### **ROV Interface Setup with VDSL**

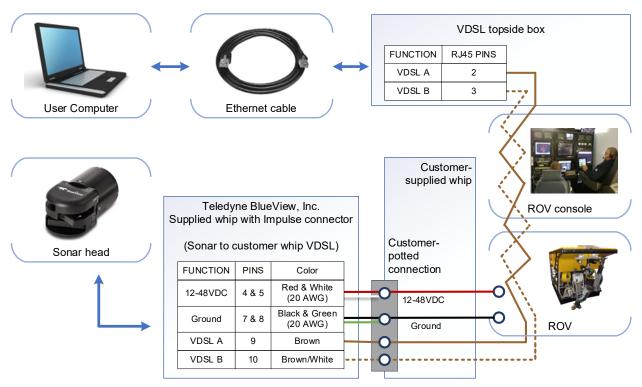


Figure 2: ROV Interface Setup with VDSL



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# **Appendix C: Hardware Trigger**

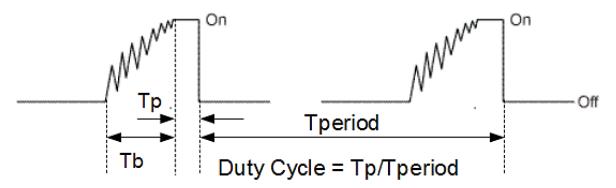
### Introduction

This appendix provides the required instructions to utilize your Teledyne BlueView sonar's hardware trigger capabilities. Wiring details are provided with reference to specific functions. To correlate these functions with particular connector points and/or wire colors, see the cable pinout for your specific unit in *Appendix D: Drawings*.

### **Utilizing the Hardware Trigger**

Connect your trigger signal source to the HW TRIG wire and your trigger ground to the HW TRIG GND wire on the provided test cable. In general, the hardware trigger requires a 5V pulse and a 10µs minimum pulse width on the leading edge. See the tables below for more detailed information.

Specification	Quantity
Trigger Input Type	5V TTL/CMOS
Minimum input as logic '1'	3.68 Volts
Maximum input as logic '0'	2.06 Volts
Maximum input current to drive to logic '1'	0.32 mA
Maximum input current [@ Vin = 5V]	0.53 mA



Specification	Quantity
Activate Trigger Pulse	Leading Edge
Minimum pulse width after bounce "Tp"	10 uS
Maximum bounce allowed "Tb"	< (pulse width - 10uS)
Maximum Duty cycle	1%
Maximum trigger delay after leading edge	100 mS

# **Software Setup**

See the BlueView ProViewer or SDK manual for the procedure to enable the hardware trigger within the software.



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# **Appendix D: Drawings**

### **Outline Drawings**

- Figure 3: Outline: M450 130° Mk2 Shallow Water
- Figure 4: Outline: M450 130° Mk2 Deep Water
- Figure 5: Outline: M450 130° BR8 Mk2 Deep Water
- Figure 6: Outline: M900 130° Mk2 Shallow Water
- Figure 7: Outline: M900 130° VDSL Mk2 Shallow Water
- Figure 8: Outline: M900 130° Mk2 Deep Water
- Figure 9: Outline: M900/2250 130° Mk2 Shallow Water
- Figure 10: Outline: M900/2250 130° VDSL Mk2 Shallow Water
- Figure 11: Outline: M900/2250 130° Mk2 Deep Water

# **Cable Drawings and Pinout Information**

- Figure 12: Sonar to Surface Cable MKS10
- Figure 13: Sonar to Surface Cable MKS(W)
- Figure 14: Sonar to Surface Cable BR8



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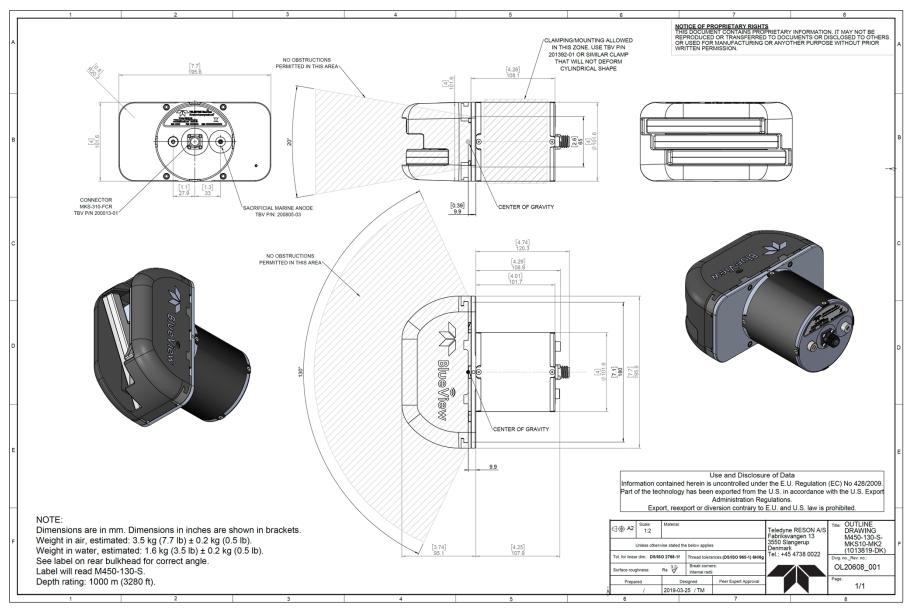


Figure 3: Outline: M450 130° Mk2 – Shallow Water



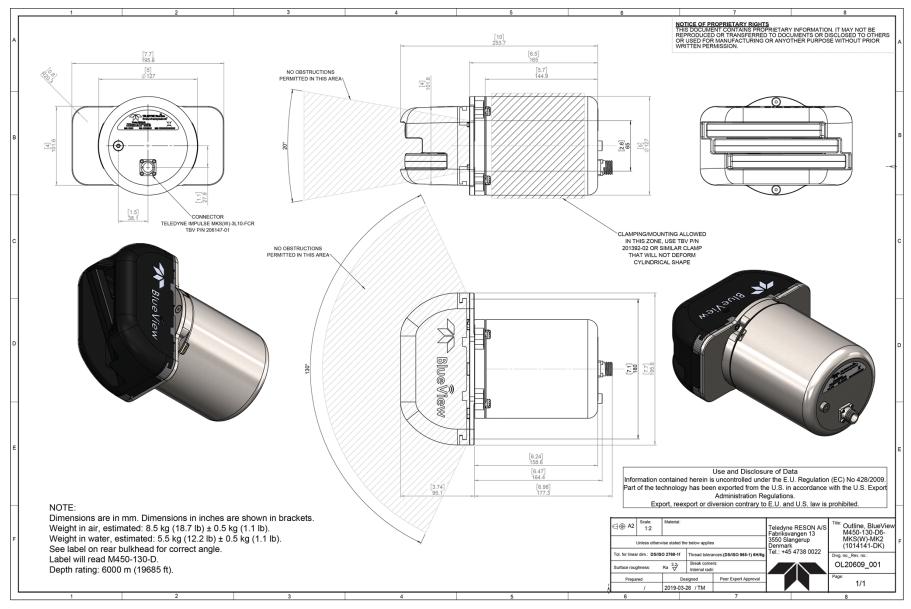


Figure 4: Outline: M450 130° Mk2 – Deep Water



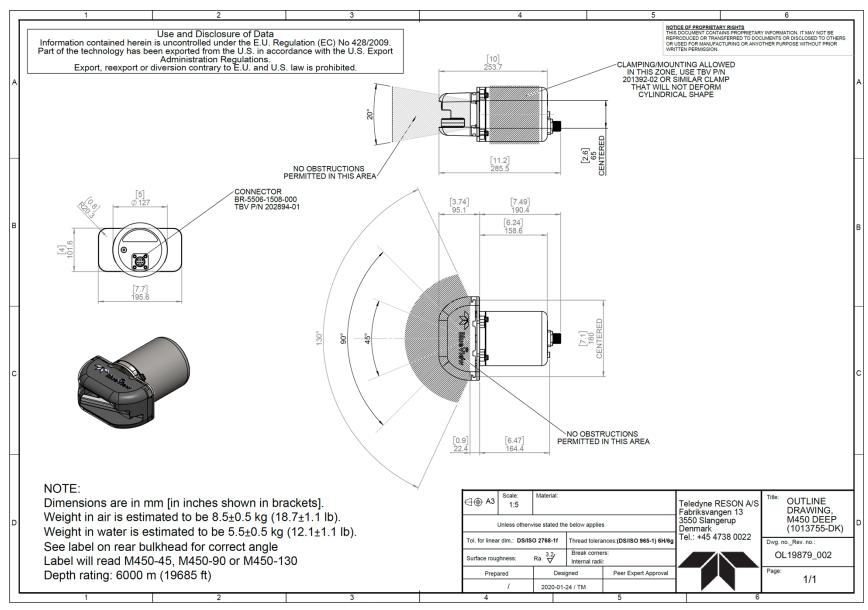


Figure 5: Outline: M450 130° BR8 Mk2 - Deep Water



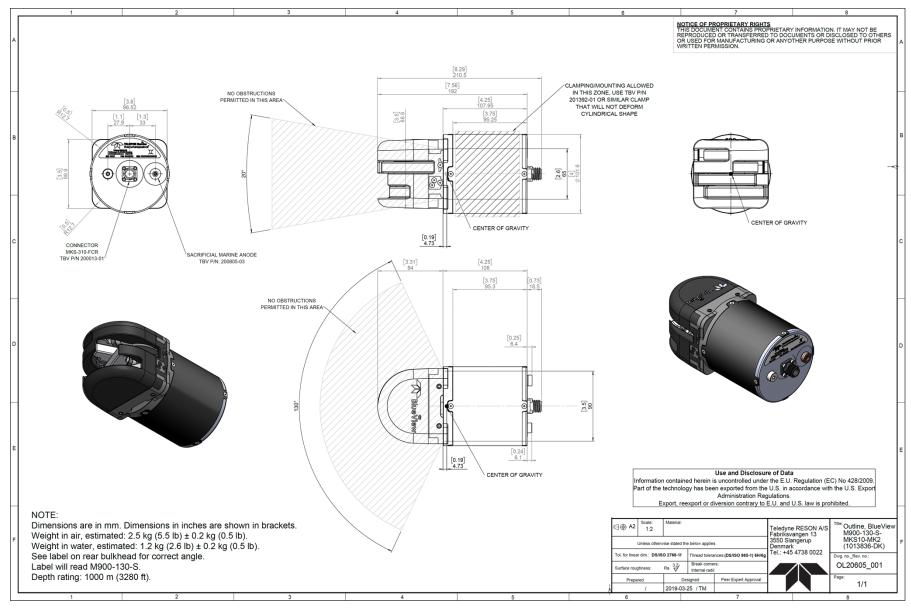


Figure 6: Outline: M900 130° Mk2 – Shallow Water



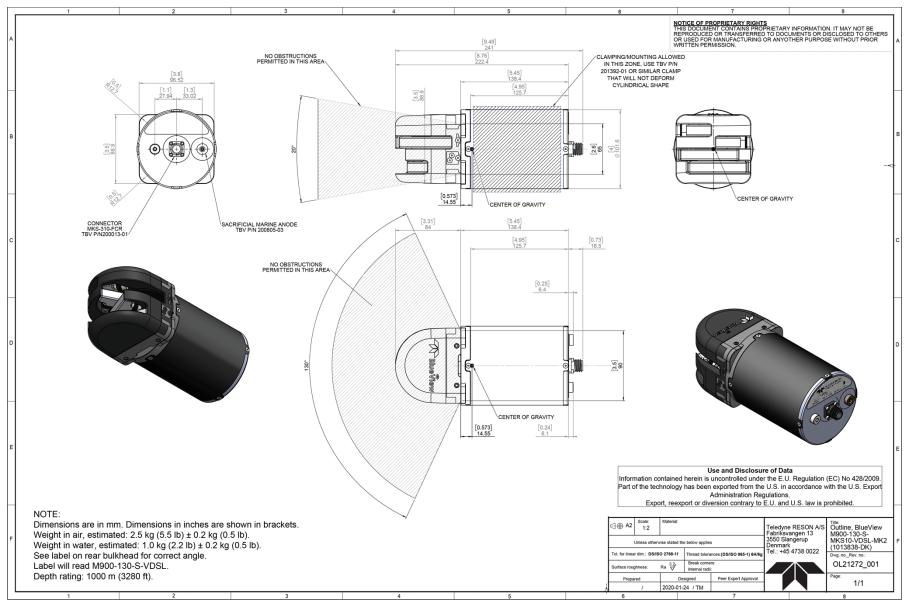


Figure 7: Outline: M900 130° VDSL Mk2 – Shallow Water



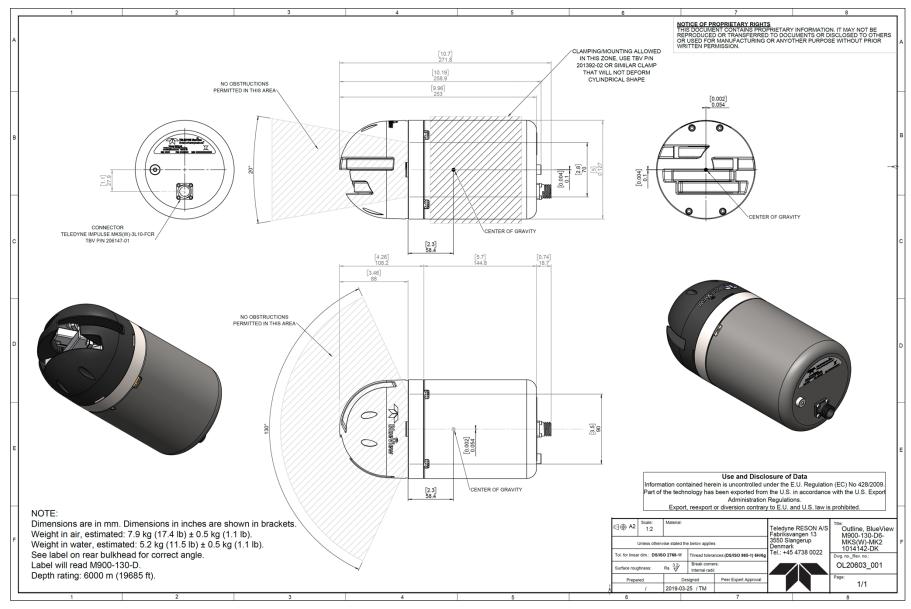


Figure 8: Outline: M900 130° Mk2 – Deep Water



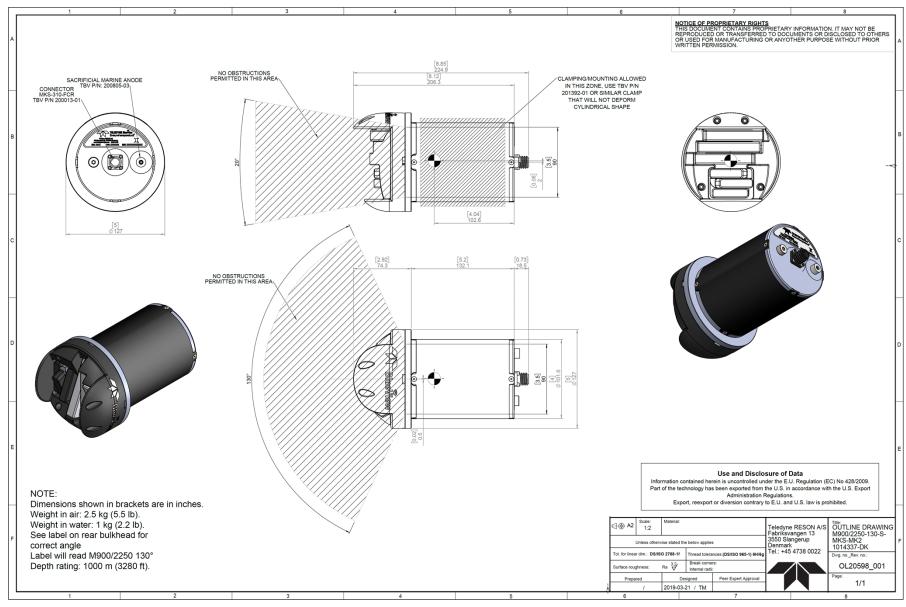


Figure 9: Outline: M900/2250 130° Mk2 - Shallow Water



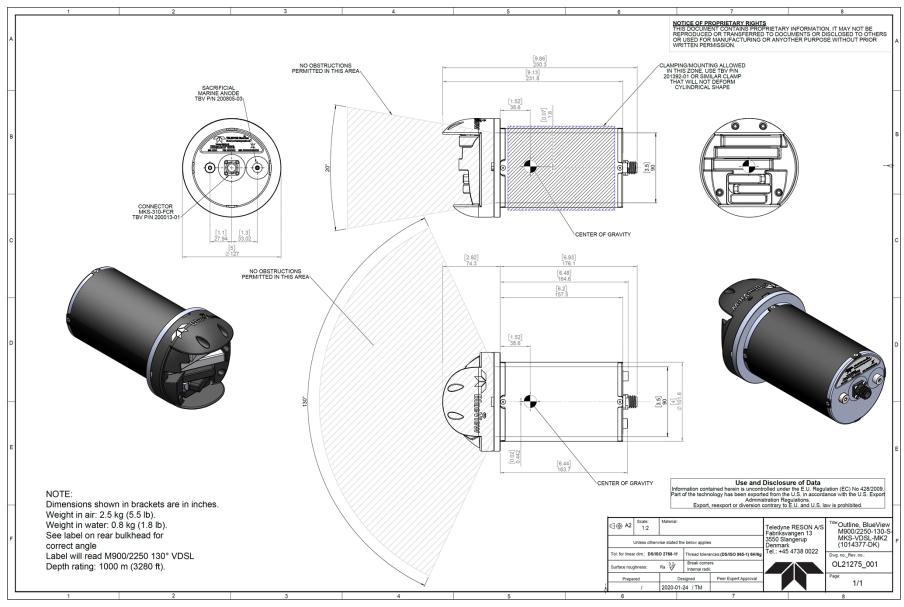


Figure 10: Outline: M900/2250 130° VDSL Mk2 - Shallow Water



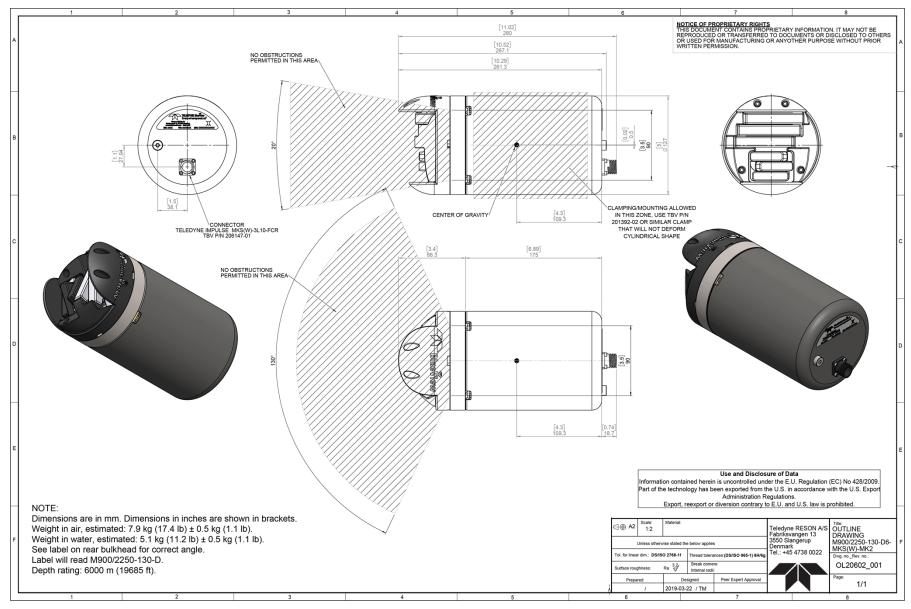


Figure 11: Outline: M900/2250 130° Mk2 – Deep Water



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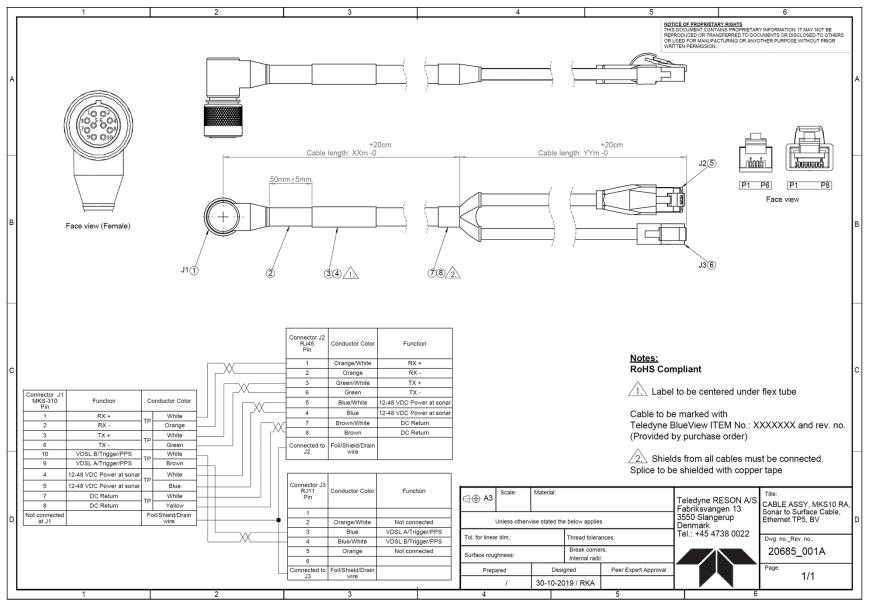


Figure 12: Sonar to Surface Cable – MKS10



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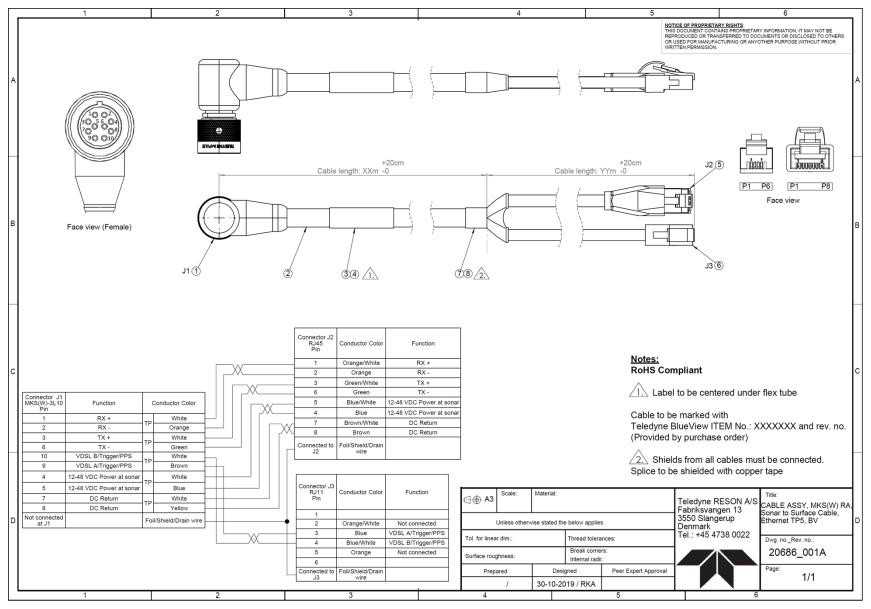


Figure 13: Sonar to Surface Cable – MKS(W)



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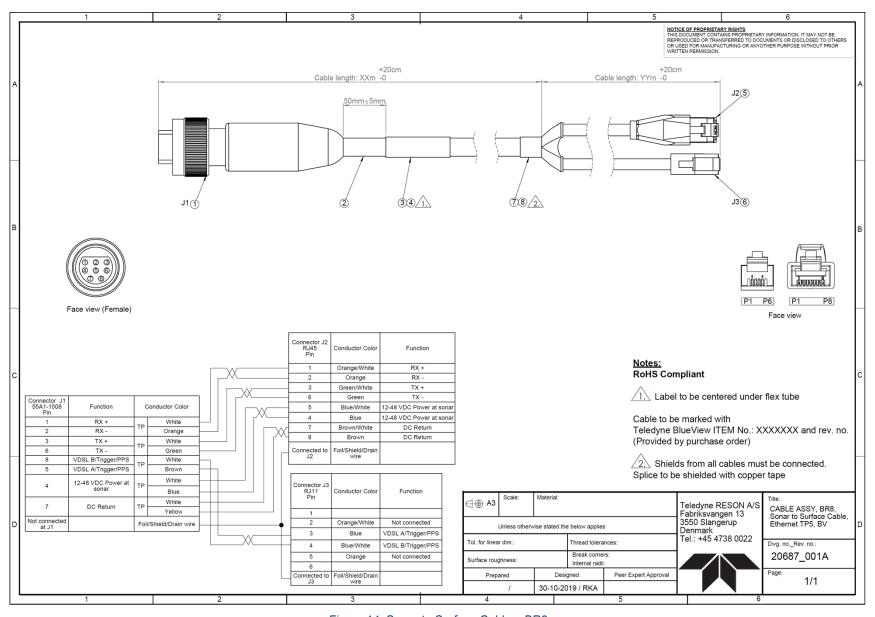


Figure 14: Sonar to Surface Cable – BR8



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# **Appendix E: GNU General Public License**

The BlueView sonar uses components which are licensed under the GNU General Public License:

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# **Appendix F: Warranty Information**

## **One-Year Limited Warranty**

Your Teledyne BlueView system is warranted against defects in materials and workmanship for a period of one year from acceptance of the system. During the warranty period, Teledyne Marine will, at its option, either repair or replace components that prove to be defective.

The warranty period begins on the day the system is accepted by the customer. Your Teledyne BlueView system must be serviced by the Teledyne Marine office that sold it. The customer shall prepay shipping charges (and shall pay all duty and taxes) for products returned for service. Teledyne Marine shall pay for the return of the products to the customer, not including any duty and taxes.

### **Exclusions**

The warranty on your Teledyne BlueView system shall not apply to defects resulting from:

- · Accidental damage.
- Improper or inadequate installation or maintenance by the customer.
- Improper site preparation or maintenance.
- Improper storage or transportation.
- Improper use.

- Opening of any parts of the equipment by anyone other than a Teledyne RESON authorized service facility.
- Operation outside the environmental specifications of the product.
- Service provided by anyone but a Teledyne RESON authorized service facility (see Appendix G: Support and Service).
- Unauthorized modifications, alterations, or repairs.

## **Warranty Limitations**

The warranty set forth above is exclusive and no other warranty, whether written or oral, is express or implied. Teledyne Marine specifically disclaims the implied warranties of merchantability and fitness for a particular purpose.

# **Servicing During Warranty Period**

If your system should fail during the warranty period, please contact the customer support hotline (see *Appendix G: Support and Service*) to protect your warranty rights.



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# **Appendix G: Support and Service**

## Support

For support, please contact the customer support hotline:

Europe: +45 20 999 088
 USA: +1 805 233 3900

• E-mail: <u>blueview-support@teledyne.com</u>

### **Returning Goods for Service**

**NOTE:** No goods may be returned without prior authorization, as evidenced by a Return Authorization (RMA) Number.

Before returning any equipment for service, you must follow the Teledyne RESON equipment return procedure stated below:

- Contact a Teledyne RESON office to obtain an approved Return Material Authorization (RMA) number.
- 2) Follow the instructions in the supplied document and pack the equipment in the original shipping containers.
- 3) Ship the equipment to your Teledyne RESON representative to the applicable address.
- 4) Ensure that the RMA number is included on all shipping documents and, most importantly, marked on the shipping container's address label.
- 5) Include a note with a brief, but thorough, description of the problem.



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M-Series Mk2 Sonars Operator's Manual

Document Number: OM21282-2 Part Number: 1015282