



EXC-300

Installation and Operation Manual



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

Warning! *This product contains lead, a chemical known to the state of California to cause cancer, birth defects and other reproductive harm. Handling and/or opening this unit may result in exposure to lead, in the form of solder.*

Warning! *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.*

Warning! *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.*

Warranty Information

The EXC-300 Ethernet Extender is backed by a standard 12-month parts and labor warranty policy.

For more information on EXC-300 safety and/or maintenance issues please call BlueView Technologies at 206.545.7260.

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1. Introduction

The EXC-300 Ethernet Extender converts short-haul 4 wire Ethernet communications into long-haul 2 wire communications. EXC-300 long-haul communications with a ProViewerE Sonar have been demonstrated on the bench using over 4000 feet of cat 5 cable, and over 2000 feet of ROV umbilical.

EXC-300 Communication Signal Integrity

Successful communications over long wires depends on proper cable, splice and connector construction. *Attention to the following details will dramatically improve signal integrity between the topside and the sonar.*

1. For the long-haul segment, use twisted pair type wire.
2. In cable splice construction, take care to minimize the lengths of untwisted wires.
3. Inside control boxes and ROVs take care to maximize the distance between the data wires and motors or other noisy electronic circuits such as computers, video hardware or other sonar equipment. Where data wires must pass close to electrical noise generators, insure the two wires are twisted 3 turns per inch and shielded to minimize electronic noise. Experiment with different low noise locations to tie the shield.

2. System Contents

Verify that your EXC-300 integration kit includes the following components:

Component
EXC-300 Ethernet Extender Can
Topside Extender Interface Box
3 ft Titan to Titan Connector Cable
7 ft Black Ethernet Cable
5 ft Gray Bench-Top Test Cable (RJ45 to RJ45 Connectors)
6 ft Gray EXC Integration Cable (RJ45 to Tinned Conductors)
4 ft Cable Whip (Titan Connector to Bitter End)
Installation and Operation Manual
Quickstart Guide
Patton User Manual
Hardigg "Storm" Carry Case

Bench Top Hardware Verification

When you first receive your EXC-300 Kit, follow these steps to verify the EXC-300 operates correctly.

Collect the Necessary Equipment

In addition to the items that came with your EXC-300 Kit, you will need the following equipment to complete the tests in this section.

- Windows Based PC with a free Ethernet Port
- BlueView Sonar System with the following parts
 - ProViewer Software
 - ProViewerE Sonar
 - POE Box (power injector for bench-top testing)
 - 25 ft Sonar-to-PC Test Cable

WARNING! The following sections use the POE Box (bench-top test power supply) that came with your sonar. The Sonar/J1 port on this component has 48V between pins 4+5 and pins 7+8 as specified by the “Power Over Ethernet” standard. Some Ethernet based equipment may not be compatible with this standard, so care should be taken not to hook equipment up to this port unless specified in these instructions.

Test the BlueView Sonar Hardware

Test the BlueView Sonar components without the EXC-300 Ethernet extender system to verify that your sonar and PC are communicating properly. Briefly:

- 1) Install the ProViewer software on your PC
- 2) Connect your PC Ethernet port to the POE 'Data' port using a standard Cat5 Ethernet cable.
- 3) Connect your ProViewerE Sonar to the POE 'Data and Power' port using the Sonar-to-PC Test Cable supplied with the BlueView Sonar.

- 4) Set the IP address on your PC's network card to 192.168.1.3
- 5) Apply AC power to the POE Box.
- 6) Using the ProViewer software on your PC, 'connect' to the sonar and verify you can view images from the sonar on your PC. After successfully viewing images from the ProViewerE on your PC, disconnect all the cables and reconfigure the system as described below.

Note: For more details on setting up and testing the sonar, consult the User Handbook that came with your Sonar system.

Test the Sonar through the EXC-300 Ethernet Extender

In this section, you will verify that your PC can talk to your Sonar through the EXC-300 Ethernet extender system. Do not apply power to anything until you are sure these connections have been properly made:

- 1) Using the "3 ft Titan to Titan Connector Cable", connect your BlueView to the side of the EXC-300 Can labeled "CONNECT TO SONAR":



- 2) Using the '25 ft Sonar-to-PC Test Cable' supplied with your BlueView Sonar, connect the POE Box 'Sonar/J1' (RJ45) port to the EXC-300 can (the end with the serial number).



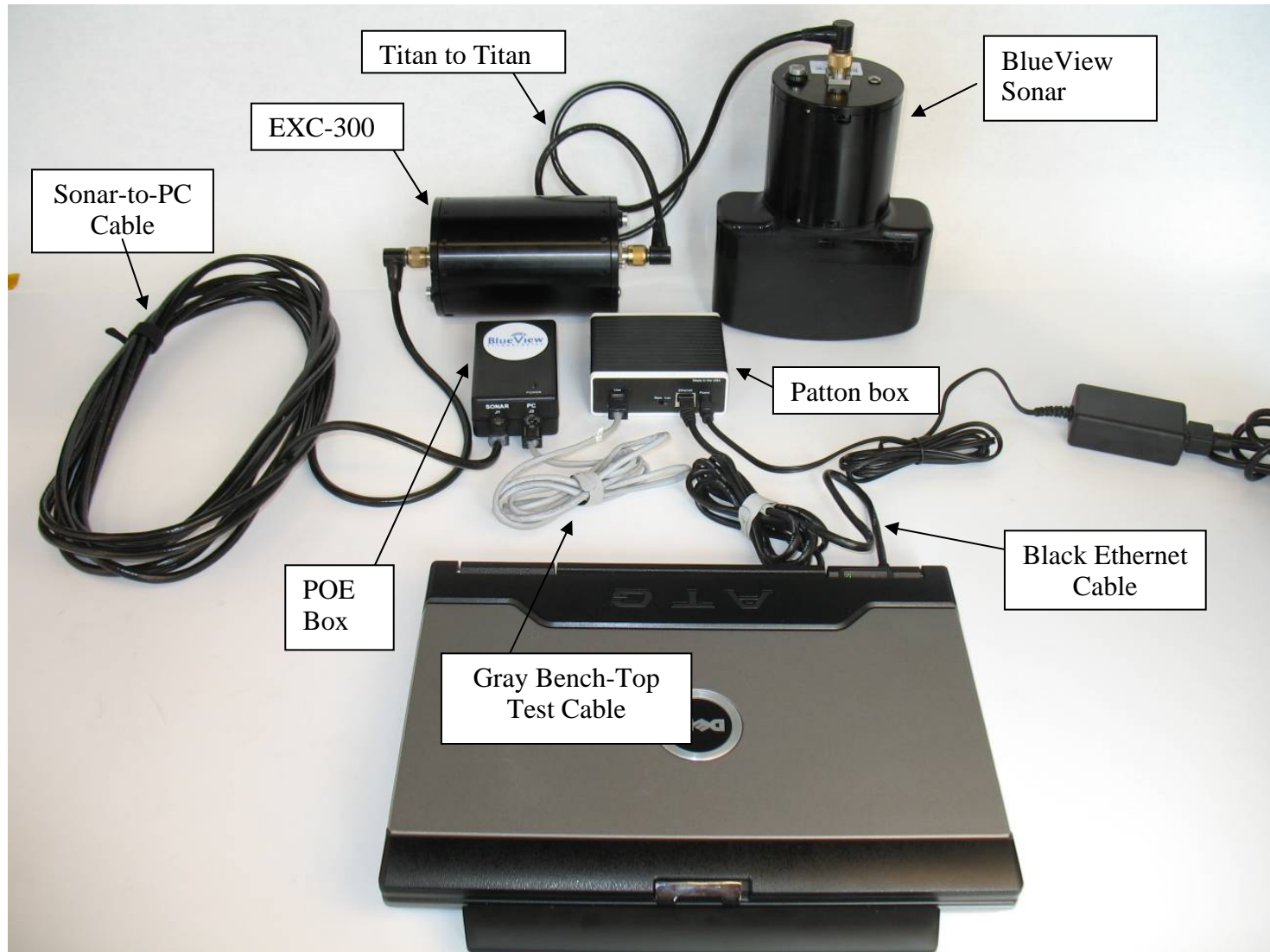
- 3) Using the gray "5 ft Gray Bench-Top Test Cable", connect the RJ45 'PC/J2' port on the POE box to the 'line' port on the Patton box:



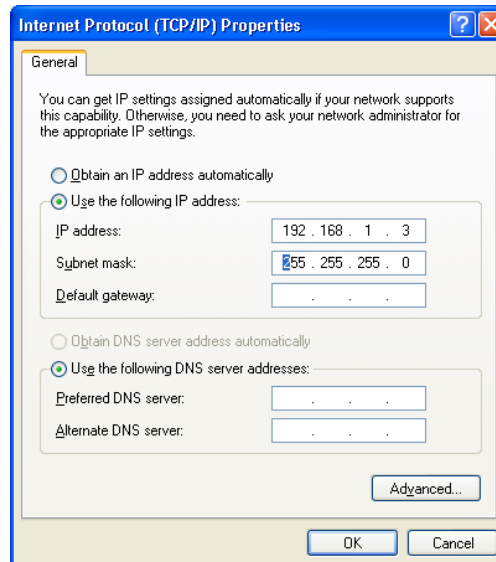
- 4) Using the "7 ft Black Ethernet Cable", connect the 'Ethernet' port on the Patton Unit to your PC network card. For best results, do not make this connection through a network; make this connection directly to your PC:



5) Here is how your equipment should now be connected:

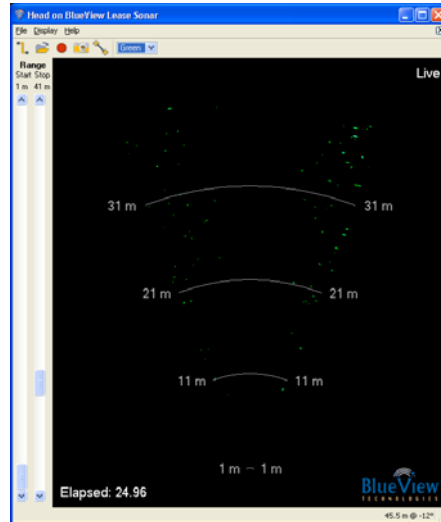


Turn on your computer and verify that the Ethernet card's IP address is set to 192.168.1.3/255.255.255.0:



- 6) Apply power to the Patton Unit. The Patton green 'Ethernet' LED should solidly illuminate within a few seconds, indicating that the Patton topside unit is in communication with your PC's network card.
- 7) Apply power to both the EXC-300 and the Sonar by plugging AC power into the POE box. On the POE box, you should see the green power LED steadily illuminate after a second or two. A blinking LED indicates a power short on the 'SONAR' circuit and should be resolved before continuing.
- 8) About 30 seconds after you apply power to the setup, the green 'Link' LED on the Patton Unit should illuminate steadily. This indicates that long-haul communications between the EXC-300 and the Patton box is active.

You should now be able to use the ProViewer software on your PC to connect to the BlueView sonar:



As a final step, familiarize yourself with the image update rate when operating with the EXC-300. 4 things affect your image update rate:

1. The sonar range settings. The longer the range you're looking, the longer it takes for the echo to return and be displayed.
2. The speed of the network. The Patton box is hardwired for 6.6 Mbps, which is slower than common local area Ethernets.
3. Your PC:
 - a. CPU speed.
 - b. Network card (commonly 10 or 100 mega bits per seconds)
 - c. Other applications running on your PC
 - d. The amount of memory your PC has.
4. The quality of the physical connection between the topside Patton box and the EXC-300. The quality of the physical connection will dictate how much nearby electronic circuits can interfere with the long-haul communications.

You should consider each of these items when evaluating how to optimize the image update rate with your system.

Refer to the Troubleshooting section if you're having problems communicating with the BlueView Sonar. Refer to the "Patton User Manual" that came with your EXC-300 kit for information about the Patton box.

5. ROV Installation

Referring to Figure 4.1 below, follow these step to ensure reliable operation of your ProViewerE-EXC-ROV system.

To deploy your BlueView Sonar/EXC-300 system on an ROV:

1. Minimize Non-Twisted cabling between EXC connection point on ROV and Interface cable connection point on ROV Control Box
2. Create an interface cable using the BlueView supplied cable whip and a cable whip specific to the ROV accessory connection. Refer to Figure 4.1 for connection information. Verify the system works before potting the connection
3. Validate your wiring is correct by powering on the sonar using the ROV power and ROV wiring and using the ProViewer software to view images from the sonar head.
4. When you're satisfied that the connections between the ROV interface cable and the EXC whip are correct, pot the ROV interface cable to the EXC whip.
5. Mount sonar to ROV.
6. Dock test the sonar while mounted on the ROV:
 - a. Start sonar.
 - b. Quantify the update rate by observing the ProViewer image update rate.
 - c. Quantify the quality of the data link by observing the orange QOL LED on the Patton box.
7. Dock test the sonar while exercising unrelated ROV functions (thruster activity, video signals, other communications):
 - a. Start the sonar
 - b. Quantify the effects of ROV activity on image update rate and QOL. Note, electrical interference from thruster activity is often dependent on whether or not the ROV is in water. Improving wiring for success in one environment will probably work for the other environment as well.
8. Revise wiring as required to reduce interference sufficiently to meet operational image update requirements.

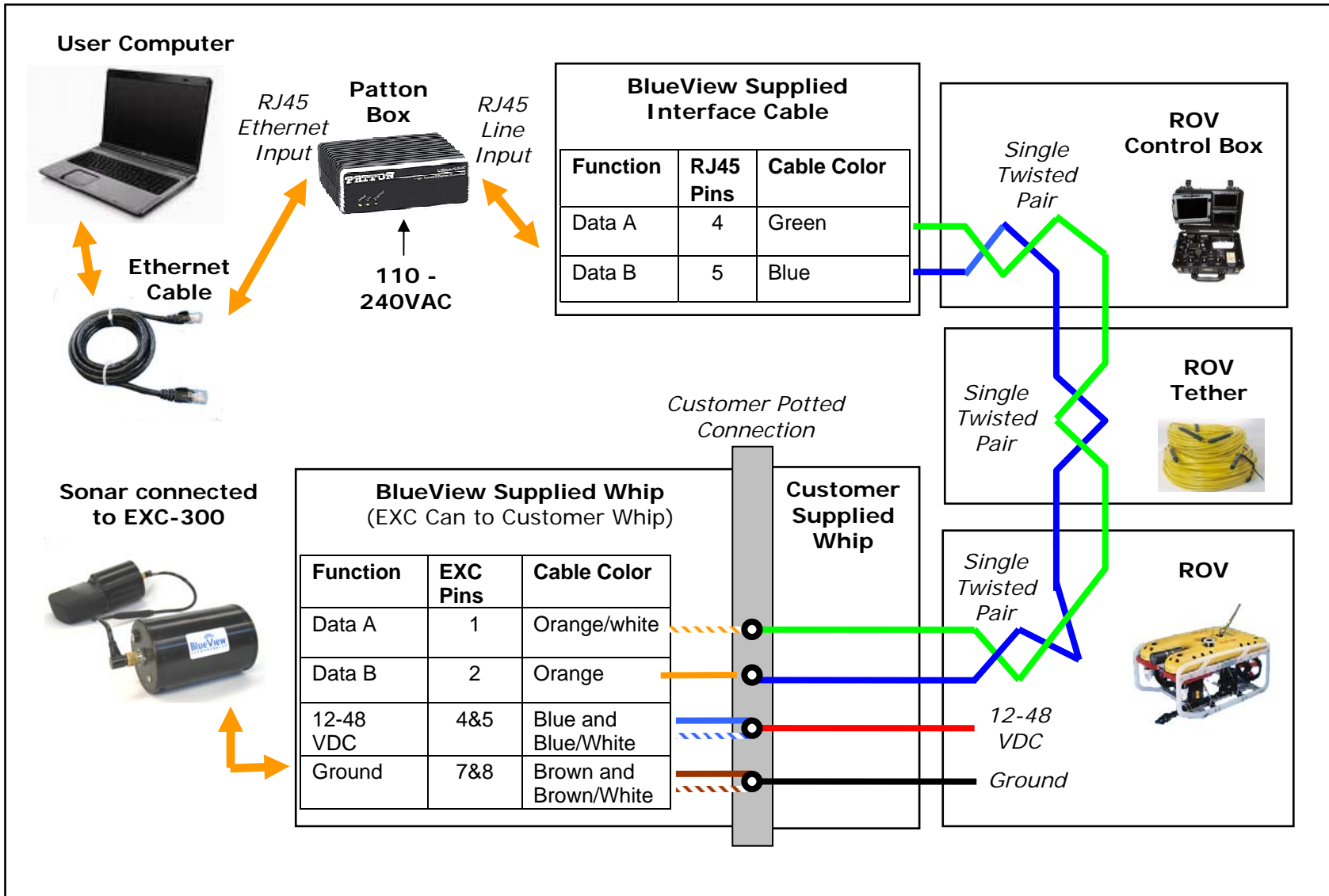


Figure 4.1 EXC-ROV Integration Diagram

5. Troubleshooting

If you're having trouble getting your BlueView sonar to connect through the EXC-300 system, use the table below to help identify a solution. If these steps do not resolve your problem we want to hear from you and help you resolve the issue.

Problem	Possible Cause	Cure
Patton Ethernet 'Link' LED off.	Wrong cable between the PC and the Patton Local box.	The Patton 2172 system should allow you to use either a standard Ethernet cable or a 'cross' Ethernet cable. If you've verified you have a good Ethernet cable, try cycling the power on your PC or the Patton box
Patton 'Link' LED is off	Improper cabling between the Patton Local box and the Patton Remote box inside the EXC-300	While the components are connected per Section 3, use a multimeter to verify continuity between each of the two wires at the end of "RJ45 Test Cable, 1,2 crossed to 4,5" and pin 1 or 2 at the end of the sonar-surface cable where you plug it into the EXC-300.
Image updates on the ProViewerE are slower than normal.	Long haul communications between the EXC-300 and the Patton Local box are set by default to 4 mega bits per second; actual update rate depends on cable quality and PC performance.	
Image updates on the sonar software are very slow and erratic, and the green Link LED is flickering.	Long haul communications are being degraded by cable noise.	Route the data pair over twisted wires, 3 turns per inch. Minimize untwisted segments, route away from electrical noise sources and shield if possible. Also try shielding noise generators.
The ProViewer software will not 'connect' to the sonar	PC Ethernet card is not set to proper IP address	Set the network card IP address to 192.168.1.3 and the netmask to 255.255.255.0

head		
Forgot the dip switch settings?	There are DIP switches on both the topside and bottom side Patton units. The bottom side unit (inside the pressure proof container) is configured as shown in this table. You must configure the topside the same way for correct system operation.	<p>S2-1 OFF Asymmetric operation</p> <p>S2-2/S2-3 OFF/OFF 4Mbps to topside, 1Mbps to bottom</p> <p>S2-4/S2-5/S2-6 ON/ON/ON Auto Negotiate</p> <p>S2-7 OFF Ethernet shutdown disabled.</p> <p>S2-8 OFF Remote Configuration Disabled.</p>
Remote Local Switch	The Remote/Local switch is located on the back side of the Patton box	For correct operation, set the remote/local switch to: REMOTE

Still not working?

Please contact us:

BlueView Technologies Customer Support

www.blueviewtech.com

206-545-7260

8am – 5pm PST Mon through Fri FAQ

Appendix A: Technical Specifications, EXC-300

Communications	
Bit rate:	4 Mbps
Max Tested range:	4000ft
Electrical	
Input Voltage	12-48V (Passes through to ProViewerE)
Input Power (EXC only)	2.5W
Input Power (EXC and ProViewerE)	12.5W-14.5W
Mechanical	
Depth Rating	1000ft
Weight in air	2.82 lbs
Weight in fresh water (measured)	0.11 lbs
Weight in salt water (calculated)	0.03 lbs
Dimensions (Max)	4.0" x 8.0"

Appendix B: Technical Drawings

ProViewerE Sonar Module Technical Drawing

