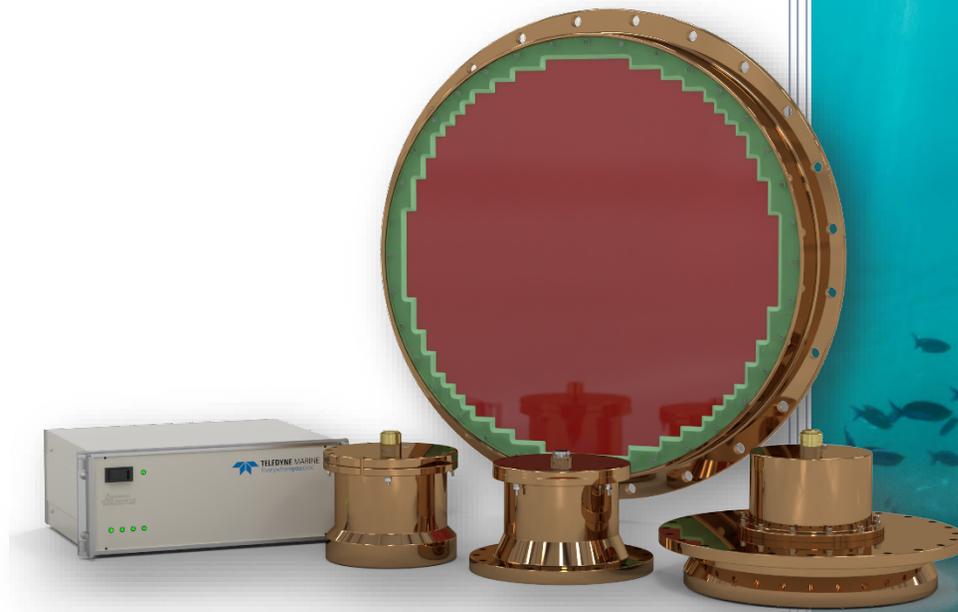


OCEAN SURVEYOR/OBSERVER DEPLOYMENT GUIDE



P/N 95A-6052-00 (July 2023)

© 2023 Teledyne RD Instruments, Inc. All rights reserved.



<https://www.teledynemarine.com/rdi>

Use and Disclosure of Data
Information contained herein is classified as EAR99 under the U.S. Export Administration Regulations. Export, reexport or diversion contrary to U.S. law is prohibited.

TABLE OF CONTENTS

GETTING STARTED	1
CONNECTING TO THE SYSTEM.....	3
MECHANICAL INTEGRATION.....	7
USING VMDS	8
OCEAN SURVEYOR CARE.....	11
WANT TO KNOW MORE?	12

HOW TO CONTACT TELEDYNE RD INSTRUMENTS

If you have technical issues or questions involving a specific application or deployment with your instrument, contact our Field Service group:

Teledyne RD Instruments	Teledyne RD Instruments Europe
14020 Stowe Drive Poway, California 92064	2A Les Nertieres 5 Avenue Hector Pintus 06610 La Gaude, France
Phone +1 (858) 842-2600	Phone +33(0) 492-110-930
Sales – rdisales@teledyne.com	Sales – rdie@teledyne.com
Field Service – rdifs@teledyne.com	Field Service – rdiefs@teledyne.com
Client Services Administration – rdicsadmin@teledyne.com	

Web: <https://www.teledynemarine.com>

For all your customer service needs including our emergency 24/7 technical support, call +1 (858) 842-2700

Self-Service Customer Portal

Use our online customer portal at <https://www.teledynemarine.com/support/RDI/technical-manuals> to download manuals or other Teledyne RDI documentation.

Teledyne Marine Software Portal

Teledyne RD Instruments Firmware, software, and Field Service Bulletins can be accessed only via our Teledyne Marine software portal.

To register, please go to <https://tm-portal.force.com/TMsoftwareportal> to set up your customer support account. After your account is approved, you will receive an e-mail with a link to set up your log in credentials to access the portal (this can take up to 24 hours).

Once you have secured an account, use the Teledyne Marine software portal to access this data with your unique username and password.

If you have an urgent need, please call our Technical Support hotline at +1-858-842-2700.

Getting Started

Identifying what's in the Box

Ocean Surveyor/Observer Inventory

Part Number	Name	Description
OSII38, OSII75, OSII150F, OSII150 71A-2019-01 (38 kHz) 71A-2019-02 (75 kHz) 71A-2019-03 (150 kHz)	Ocean Surveyor/Observer	The Ocean Surveyor/Observer system includes the transducer, connector dummy plug, and electronic chassis. When unpacking, use care to prevent physical damage to the transducer face and connectors.
97A-6004-00 (38 kHz) 97A-6005-00 (75 kHz) 97A-6006-00 (150 kHz) 97A-6011-00 (Chassis)	Shipping Case	Shipping case with foam inserts.
73A-6010-xxx 73A-6017-xxx 73A-6024-xxx ↓	I/O Cable	The Ocean Surveyor/Observer I/O cable allows you to connect the Ocean Surveyor/Observer transducer to the electronics chassis and computer. The I/O cable is available with straight or right-angle connectors and with both connectors installed or only the wet-end connector installed.
730-6002-00 730-6003-00	RS-232 cables	RS-232 cable 25/25 pin and 9/25 pin.
95A-6053-00	Ocean Surveyor/Observer Getting Started Sheet	A printed quick start card showing test setup is included. A PDF version is included on the documentation CD.
95Z-6007-00	Download instructions	This sheet has instructions for downloading the software and manuals.
	WinADCP	<i>WinADCP</i> gives users a visual display of the entire set of data. You can zoom in on a portion of the data for closer analysis and export data to text or MatLab files.
	TRDI Toolz	Utility software that can be used to test the system.
	VmDas	<i>VmDas</i> is a real-time data collection software package for use with vessel mounted ADCPs. This software package supports the Workhorse PDO Binary Output Data Formats for data collection, playback, and reprocessing.
75AK6011-00	Tools and spare parts	See Table 1 for a list of included parts.



This list only shows the part included with the standard Ocean Surveyor/Observer. See the packing slip for additional options. If you are missing parts, contact TRDI support rdifs@teledyne.com or call +1 (858) 842-2700.

Table 1: Ocean Surveyor/Observer Spare Parts

Item ID	Description	Where Used
97Z-6017-00	2-020 O-ring	End-Cap/Top Hat connector
97Z-6019-00	2-022 O-ring	I/O Cable wet end connector
5020	Lubricant, silicone	O-ring lubricant
314025	Fuse, 25A Fast blow, 3AB	Power Assembly PCB
M4x0.7x6PH	Screw, pan head, SST	Electronic Chassis cover

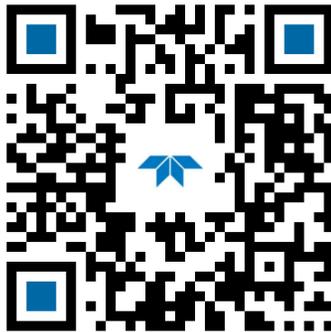


TRDI recommends that the Top Hat/End-Cap and Vent Plug O-rings be replaced whenever the transducer assembly is opened. These O-rings are not included in the spare parts kit. Make sure you have replacement parts before opening the transducer.

Installing Documentation and Software

The Ocean Surveyor/Observer documentation and software are downloaded.

1. Follow the instruction sheet on downloading TRDI software and manuals.
2. Software is available on <https://tm-portal.force.com/TMsoftwareportal>. Install *TRDI Toolz*, *WinADCP* and *VmDas*.
3. Use our online customer portal at <https://www.teledynemarine.com/support/RDI/technical-manuals> to download manuals or other Teledyne RDI documentation. Download the Ocean Surveyor Installation Guide and Technical Manual.



Ocean Surveyor/Observer Installation Guide



Ocean Surveyor/Observer Installation Technical Manual

Connecting to the System

Power Overview

The Ocean Surveyor/Observer uses 1600 watts of peak power. Teledyne RD Instruments recommends using a UPS system with a rated output power of at least 2400 watts.

All Ocean Surveyor/Observer ADCPs draw the same amount of peak current and inrush current (power up current draw). They will also draw the same average power assuming that they are setup the same.

There is no frequency dependence on the power requirement. All Ocean Surveyor/Observer ADCP frequencies (38, 75, and 150) use the same amount of peak power, 1600 Watts. The only difference is the duration that they draw the peak power.

Here are the power specifications for all Ocean Surveyor/Observer ADCPs:

Table 2. Ocean Surveyor/Ocean Observer Electronics Chassis Power

Electronics Chassis Input Voltage	90-120VAC or 220-240VAC, 47-63Hz
Electronics Chassis Output Voltage	48VDC 50Amps Max
Input Power (between transmit)	60W Typical
Input Current @ 230VAC	<34Amps rms
Ride through time	20ms
Transient Surge	EN/IEC 1000-4-2 Level 4
Common mode & normal mode	EN/IEC 1000-4-5 Level 3

Recommended UPS 3200Watts (2200Watts Minimum)

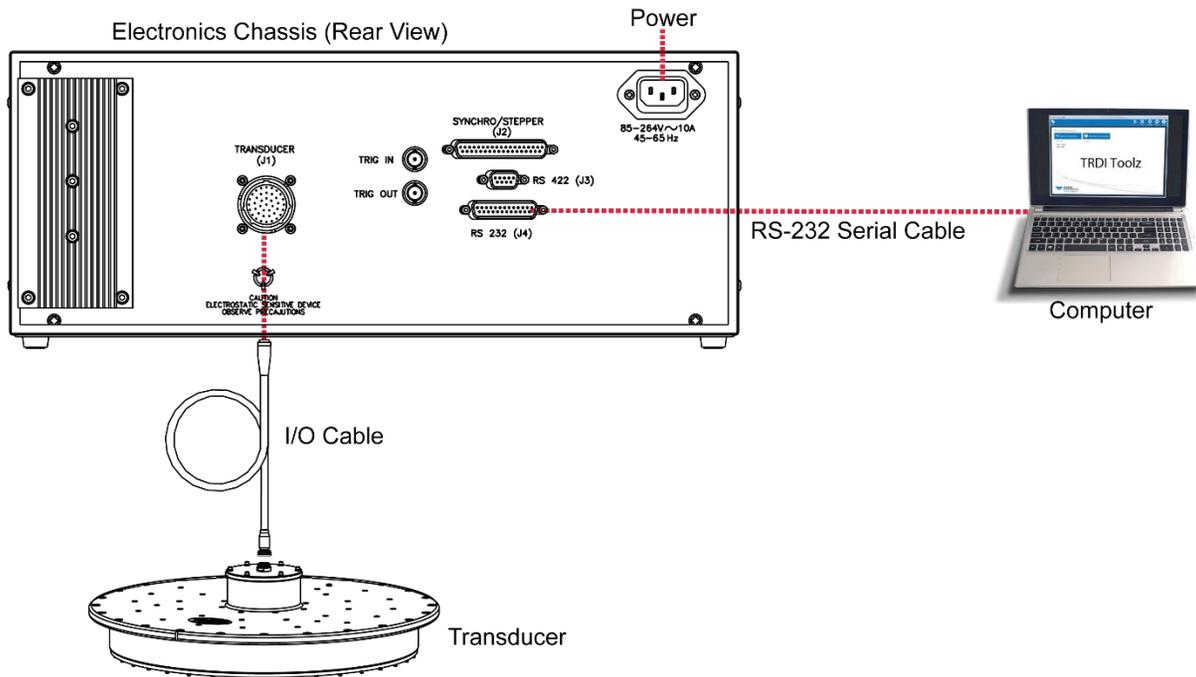
Table 3. Ocean Surveyor/Ocean Observer Transducer Power Requirements

ADCP Input Voltage	24-48VDC (48VDC Typical)
Power	1600W peak
Inrush Current	<46A
Transmit Power	1100W typical
Standby Power	2W



TRDI recommends a dedicated AC circuit protected by a 20 Amp (115 VAC) or 40 Amp (230 VAC) circuit breaker.

Bench Test



Ocean Surveyor/Observer Connections for Bench Test



The I/O connector on the transducer uses a 2-020 O-ring and the I/O cable (wet end) uses a 2-022 O-ring. **Always check that both O-rings are in place when connecting the I/O cable to the transducer.** The 2-022 O-ring has a tendency to fall out if the cable connector is dropped. **If either of these O-rings are missing or damaged, the transducer will flood.**

To connect the I/O cable:

1. Verify the O-ring on the end-cap connector (2-020) and the wet end of the cable (2-022) are both installed.
2. Rotate the cable connector to align the key and pins and then insert it into the receptacle.
3. Push straight in to fully seat the connector.
4. Thread the coupling ring onto the receptacle to complete the connection.

Connecting to the Ocean Surveyor / Observer

To establish communications with the Ocean Surveyor / Observer:

1. Connect the system and apply power.
2. Start the *TRDI Toolz* software.
3. Select **New Serial Connection**.
4. Enter the ADCP's communication settings. Select the **COM Port** the serial cable is connected to and set the **Baud Rate** from the drop-down lists. If you are unsure of the ADCP's baud rate, use **Tools, Find ADCP**. *TRDI Toolz* will try different baud rates until it connects to the ADCP.
5. Click the **Connect** button. Once connected, the button will change to **Disconnect**.
6. Click the **Break** (⚡) button. From the **Break** button drop down menu, select **Hard Break**. The wakeup banner will display in the terminal window.

```
[[BREAK Wakeup A]
Broadband ADCP Version 23.xx
Teledyne RD Instruments (c) 2006
All Rights Reserved.
>
```



A delay of up to three seconds before the message appears is normal.

Changing the Baud Rate

The Ocean Surveyor / Observer ADCP can be set to communicate at baud rates from 300 to 115200. The factory default baud rate is always 9600 baud. The baud rate is controlled via the CB-command. The following procedure explains how to set the baud rate and save it in the ADCP. This procedure assumes that you will be using the program *TRDI Toolz* that is supplied by Teledyne RD Instruments.

```
[[BREAK Wakeup A]
Broadband ADCP Version 23.xx
Teledyne RD Instruments (c) 2006
All Rights Reserved.
>cr1
[Parameters set to FACTORY defaults]
>
```

Connect the ADCP to the computer and apply power.

Start the *TRDI Toolz* program and establish communications with the ADCP.

Click the **Break** (⚡) button.

At the ">" prompt in the communication window, type **CR1** then press the Enter key. This will set the ADCP to the factory default settings.

BAUD RATE	CB-command
300	CB011
1200	CB111
2400	CB211
4800	CB311
9600	CB411 (Default)
19200	CB511
38400	CB611
57600	CB711
115200	CB811

Send the CB-command that selects the baud rate you want to use. The table on the left shows the CB-command settings for different baud rates with no parity and 1 stop bit.

For example, to change the baud rate to 115200, at the ">" prompt in the communication window, type **cb811** then press the Enter key.



The **CB?** command will identify the communication setting.

```
>cb?
CB = 411 ----- Serial Port Control (Baud
[4=9600]; Par; Stop)
>cb811
>CK
[Parameters saved as USER defaults]
>cb?
CB = 811 ----- Serial Port Control (Baud
[8=115200]; Par; Stop)
>
```

TRDI Toolz will send the command **CK** to save the new baud rate setting.

Exit *TRDI Toolz*.

The ADCP is now set for the new baud rate. The baud rate will stay at this setting until you change it back with the CB command.



Exit *TRDI Toolz* so the communication port is available for use with other programs.

Testing the Ocean Surveyor/Observer

You should test the Ocean Surveyor/Observer:

- When you first receive the system.
- Before each deployment or every six months.
- When you suspect instrument problems.
- After each deployment.



Do NOT ping the Ocean Surveyor/Observer with the transducer in air. The power assembly board will short, causing the electronics chassis to no longer communicate. The transducer is pinged by sending a **CS** or **PT5** command or if *VmDas* is started for collecting data – either of these methods will cause damage if the transducer is in air.

```
[BREAK Wakeup A]
Broadband ADCP Version 23.xx
Teledyne RD Instruments (c) 2006
All Rights Reserved.
>CR1
[Parameters set to FACTORY defaults]
>CK
[Parameters saved as USER defaults]
>PA
RAM test.....PASS
ROM test.....PASS
Receive test.....PASS
Bandwidth test....PASS
>PS0
      Frequency:  38400 HZ
      Configuration:  4 BEAM, JANUS
      Transducer Type:  ROUND 36x36
      Beamformer Rev:  A02 or later
      Beam Angle:  30 DEGREES
      Beam Pattern:  CONVEX
      Orientation:  DOWN
      CPU Firmware:  23.03
      FPGA Version:  XA
      Attitude Sensor:  SYNCHRO
>
```

Start the *TRDI Toolz* program and establish communications with the ADCP.

Click the **Break** (⚡) button.

At the ">" prompt in the communication window, enter the command **CR1** then press the **Enter** key. This will set the Ocean Surveyor/Observer to the factory default settings.

At the ">" prompt in the communication window, enter the command **CK** then press the **Enter** key. This will save the factory default setting as the user default.

Place the Ocean Surveyor/Observer in a tank of water (at least a few inches to cover the transducer face).

At the ">" prompt in the communication window, enter the command **PA** then press the **Enter** key. This will run the Ocean Surveyor/Observer deployment test.

At the ">" prompt in the communication window, enter the command **PS0** then press the **Enter** key. PS0 displays system configuration info.

If the wakeup displays, PA message displays with a result of "PASS", and PS0 displays, the system is functioning normally.

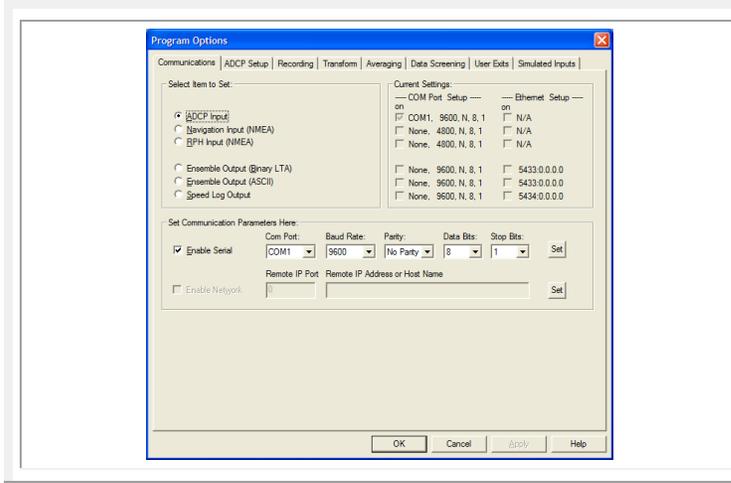
Mechanical Integration



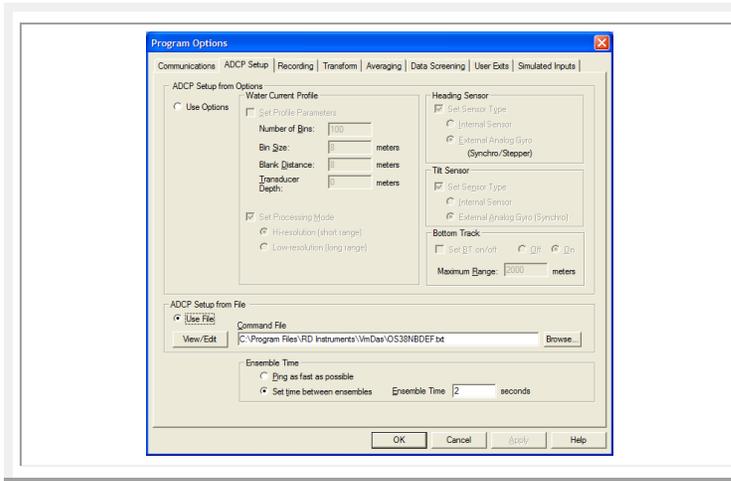
Refer to the Ocean Surveyor Installation Guide for full instructions on installing the Ocean Surveyor/Observer system.

Quick Review

	
<p>✓ Install the electronics chassis</p>	<p>➔ See the Ocean Surveyor Installation Guide, Chapter 1</p>
<p>✓ Install the I/O cable</p>	<p>➔ See the Ocean Surveyor Installation Guide, Chapter 1</p>
<p>✓ Install the transducer</p>	<p>➔ See the Ocean Surveyor Installation Guide, Chapter 2</p>
<p>✓ Install an Acoustic Window</p>	<p>➔ See the Ocean Surveyor Installation Guide, Chapter 3</p>



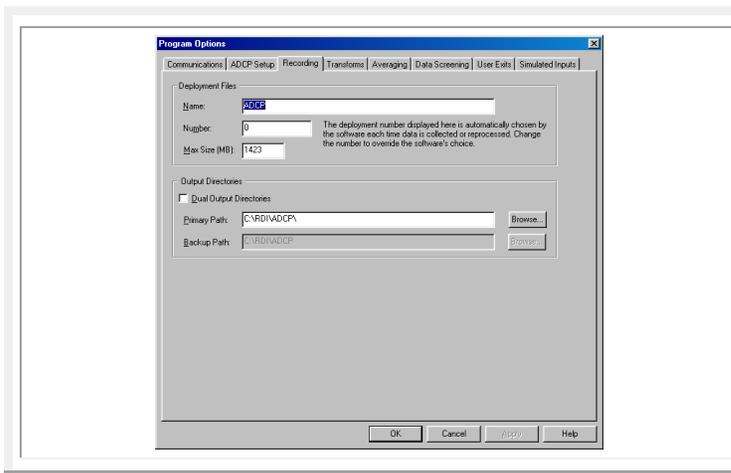
On the **Options** menu, click **Edit Data Options**. Click the **Communications** tab and set the communications settings with the ADCP and NMEA ports.



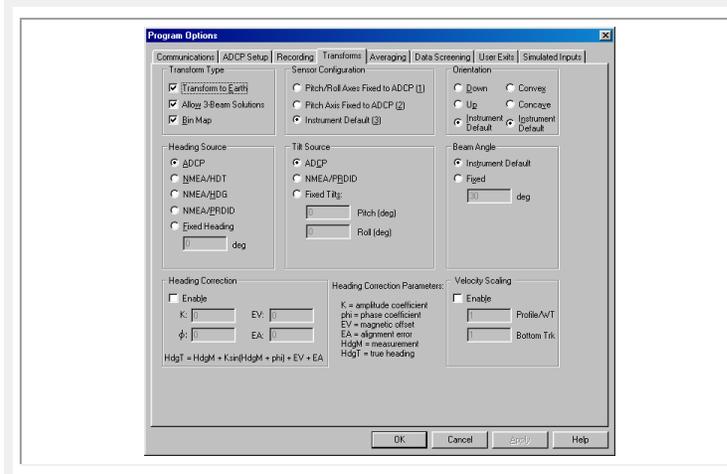
Click the **ADCP Setup** tab. Set the **Ensemble Time** to the value shown in the table below. Select the **Use File** button and choose a default command file for your ADCP, and load it into *VmDas* using the **Browse** button.

Ensemble Time

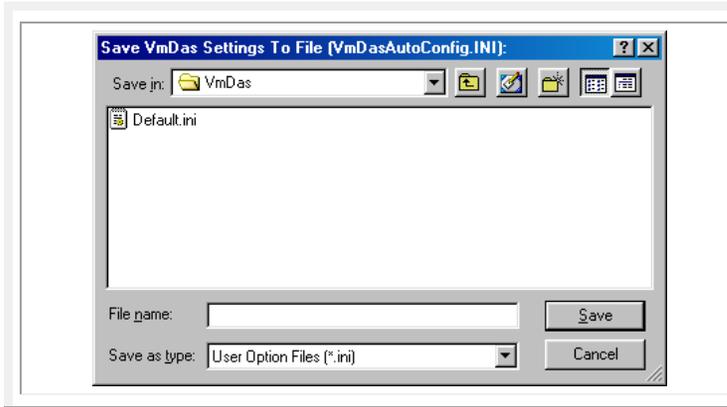
Frequency (kHz)	with Bottom Track (sec)	w/o Bottom Track (sec)
38	4	2
75	2	1
150	1	1



Click the **Recording** tab. Set the deployment name and path to where the data files are recorded.



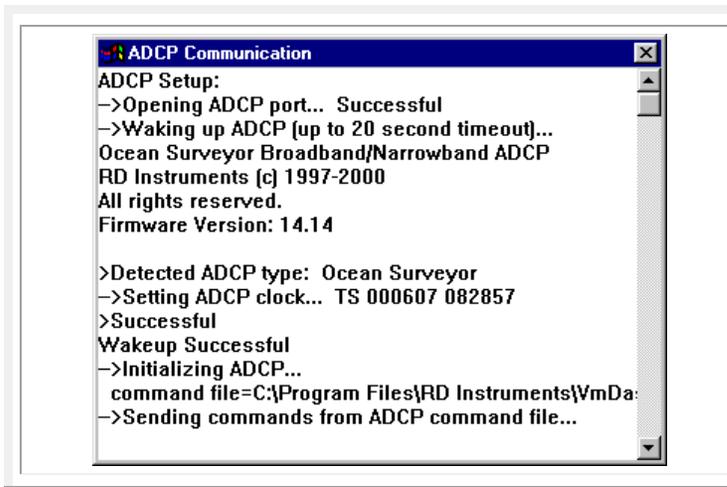
Click the **Transforms** tab and verify the Transform Type, Sensor Configuration, Orientation, Heading Source, Tilt Source, Beam Angle, and Heading Correction are set to your input.
Click **OK**.



On the **Options** menu, click **Save As**. The options may be saved to a file for later retrieval



Do NOT ping the Ocean Surveyor/Observer with the transducer in air. The power assembly board will short, causing the electronics chassis to no longer communicate. The transducer is pinged by sending a CS or PT5 command or if *VmDas* is started for collecting data – either of these methods will cause damage if the transducer is in air.



Ensure the transducer is submerged in at least one meter of water.

On the **Control** menu, click **Go** to begin collecting data. The ADCP Communication and NMEA window will open and show the commands from the command file being sent to the Ocean Surveyor and the Ocean Surveyor's response.

Ocean Surveyor Care

This section contains a list of items you should be aware of every time you handle, use, or deploy your Ocean Surveyor. *Please refer to this list often.*

General Handling Guidelines



Do NOT ping the Ocean Surveyor with the transducer in air. The power assembly board will short, causing the electronics chassis to no longer communicate. The transducer is pinged by sending a CS or PT5 command or if *VmDas* is started for collecting data – either of these methods will cause damage if the transducer is in air.

- Never set the transducer on a hard or rough surface. The urethane face may be damaged.
- Do not expose the transducer to prolonged sunlight. The urethane face may develop cracks. Cover the transducer face on the Ocean Surveyor if it will be exposed to sunlight.
- Do not scratch or damage the O-ring surfaces or grooves. All O-ring grooves and surfaces must be inspected for scratches or damages on every re-assembly. Do not risk a deployment with damaged O-ring surfaces.
- Do not lift or support an Ocean Surveyor by the external I/O cable. The connector or cable will break.
- Use three 0.5-inch eyelet bolts to lift a 38 kHz transducer. See outline installation drawing 96A-6009 for the bolt hole locations. Outline drawings are in the Installation Guide.

Assembly Guidelines

- The I/O connector on the transducer uses a 2-020 O-ring. **Make sure this O-ring is in place before connecting the cable.**
- The I/O cable (wet end) uses a 2-022 O-ring. **Always check that the I/O cable O-ring is in place when connecting the I/O cable to the transducer.**



The 2-022 O-ring has a tendency to fall out if the cable connector is dropped. If either of these O-rings are missing or damaged, the Ocean Surveyor/Observer transducer will flood.

- Read the Ocean Surveyor/Observer Technical Manual for details on Ocean Surveyor re-assembly. Make sure the top hat assembly O-rings stay in their groove when you re-assemble the Ocean Surveyor. Tighten the Top Hat hardware as specified. **Loose, missing, or stripped Top Hat mounting hardware or damaged O-rings can cause the Ocean Surveyor transducer to flood.**

Deployment Guidelines

- Use the default Command Files (installed to the same directory as *VmDas*) to help setup the Ocean Surveyor/Observer.



The Ocean Surveyor/Observer transducer may be damaged by pressure waves from seismic activity. Do not deploy the ADCP where it is subject to significant pressure waves from the operation of seismic air guns or similar equipment.

Want to know more?

Congratulations! You have completed the Ocean Surveyor/Observer Deployment Guide. Read the following chapters in the Ocean Surveyor/Observer Technical Manual for more detailed information.

- 🔗 [Chapter 1 – Ocean Surveyor/Observer Overview](#)
This chapter includes an overview of the Ocean Surveyor/Observer features, options, computer and power requirements, and connecting to the Ocean Surveyor/Observer.
- 🔗 [Chapter 2 – Maintenance](#)
This chapter covers Ocean Surveyor/Observer maintenance. Use this section to make sure the Ocean Surveyor/Observer is ready for a deployment.
- 🔗 [Chapter 3 – Testing the Ocean Surveyor/Observer](#)
This chapter covers test procedures and interpreting the test results.
- 🔗 [Chapter 4 – Troubleshooting the Ocean Surveyor/Observer](#)
This chapter covers troubleshooting procedures.
- 🔗 [Chapter 5 – Returning Systems to TRDI for Service](#)
Use this information to obtain a Return Material Authorization (RMA) number if the Ocean Surveyor/Observer needs to be returned to TRDI.
- 🔗 [Chapter 6 – Commands](#)
This chapter defines the commands used by the Ocean Surveyor/Observer.
- 🔗 [Chapter 7 – Output Data Formats](#)
This chapter defines the output data formats used by the Ocean Surveyor/Observer.

- 🔗 [Installation Guide](#)
This guide covers installation of the transducer and electronics chassis and includes specifications and dimensions for the Ocean Surveyor/Observer (including outline installation drawings).

- 🔗 [VmDas Software User's Guide](#)
This guide covers using VmDas and includes tutorials to help learn about the software.

PDDecoder Library in C language

The Teledyne Marine PDDecoder library is an open source library written in C language to decode the PDO data formats that are commonly output by Teledyne Marine/Teledyne RD Instruments ADCPs.

Available for download from the Teledyne Marine software portal:

<https://tm-portal.force.com/TMsoftwareportal>