

# **Digibar S**

**USER MANUAL**  
Version: 0.1

Teledyne Odom Hydrographic  
1450 Seaboard Avenue  
Baton Rouge, Louisiana  
USA  
70810-6261

Telephone: (225) 769-3051 Fax: (225) 766-5122

[Odom@teledyne.com](mailto:Odom@teledyne.com)

<http://www.odomhydrographic.com>

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**TELEDYNE**  
**ODOM HYDROGRAPHIC**  
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## CONTENTS

|          |  |                                     |
|----------|--|-------------------------------------|
| <b>1</b> | <b>Introduction.....</b>                       | <b>4</b>                            |
| 1.1      | Purpose.....                                   | 4                                   |
| 1.2      | Scope.....                                     | 4                                   |
| <b>2</b> | <b>Product description.....</b>                | <b>5</b>                            |
| 2.1      | Digibar S General Specifications .....         | 5                                   |
| 2.2      | PROBE (Probe).....                             | 5                                   |
| 2.3      | Scope Of Material Included.....                | 6                                   |
| 2.4      | Digibar S Components.....                      | 6                                   |
| 2.4.1    | Probe.....                                     | 6                                   |
| 2.4.2    | Cable.....                                     | 6                                   |
| 2.4.3    | Shackle .....                                  | 6                                   |
| 2.4.4    | Shorting Plug .....                            | 6                                   |
| 2.4.4.1  | LED status .....                               | 6                                   |
| 2.4.5    | Download/Charging cable.....                   | 7                                   |
| 2.4.6    | USB Charger.....                               | 7                                   |
| 2.4.7    | Silicone Capsules .....                        | 7                                   |
| <b>3</b> | <b>Installation.....</b>                       | <b>8</b>                            |
| 3.1      | USB Driver Installation.....                   | 8                                   |
| 3.2      | Digibar S Download and Control program .....   | 9                                   |
| 3.2.1    | Installation.....                              | 9                                   |
| 3.2.2    | Starting Digibar Download/Control Program..... | 9                                   |
| 3.2.3    | File Menu .....                                | 10                                  |
| 3.2.3.1  | Open .....                                     | 10                                  |
| 3.2.3.2  | Export .....                                   | 10                                  |
| 3.2.3.3  | Print.....                                     | 10                                  |
| 3.2.4    | Settings Menu .....                            | 10                                  |
| 3.2.4.1  | Connection Settings.....                       | 10                                  |
| 3.2.4.2  | Display Settings.....                          | 10                                  |
| 3.2.5    | Help.....                                      | 10                                  |
| 3.2.6    | Connect to Probe .....                         | 10                                  |
| 3.2.6.1  | Download Casts.....                            | 11                                  |
| 3.2.6.2  | Digibar Settings .....                         | 11                                  |
| 3.2.6.3  | Digibar Status .....                           | 11                                  |
| 3.3      | Using the Digibar S .....                      | 12                                  |
| 3.4      | Memory for Casts.....                          | 12                                  |
| <b>4</b> | <b>Trouble Shooting.....</b>                   | <b>Error! Bookmark not defined.</b> |
| <b>5</b> | <b>Digibar S Dimensions .....</b>              | <b>14</b>                           |

## 1 INTRODUCTION

The Digibar S was designed to measure the speed of sound in water as well as pressure and temperature. The Digibar S uses a 2 MHz transducer and time-of-flight circuitry sounding across a known distance to measure the sound velocity directly. Measurements from the Digibar S are stored internally in non-volatile memory which is then downloaded using a USB port on a computer.



### 1.1 Purpose

The purpose of this document is to explain the features and operation of the Digibar S sound velocity probe.

### 1.2 Scope

The scope and content of this document is focused on providing useful information to the end-user concerning both installation and operation of the instrument.

## 2 PRODUCT DESCRIPTION

### 2.1 Digibar S General Specifications

### 2.2 PROBE

#### Body Dimensions:

- 59.84 cm in length
- 6.87 cm round

#### Sounding Chamber:

- Path Length – 63.5 mm
- Head Material – 316 Stainless
- Spacers – 316 Stainless
- Reflector Plate – 316 Stainless
- Acoustic Frequency – 2MHz

#### Weight:

- 2.8 Kg (6.0 lbs.)

#### Communications:

- USB port with virtual RS232 drivers 19.2 k Baud

#### Temperature Range (operation)

- 1°C to 45°C (typical, other ranges available)

#### Velocity Range:

- 1400 – 1700 m/sec

#### Sample Rate:

- > 100 Hz

#### Logging Rate:

- Time basis of 1 to 999 seconds
- Depth basis of 0.5 meter to 30.0 meters

#### Resolution:

- 0.1m/sec

#### Accuracy:

- $\pm 0.2$ m/sec

#### Submersion Depth:

- 500 m max. with adequate pressure sensor

#### Available Memory for casts:

- 65280 bytes
- 255 casts maximum

## 2.3 Scope Of Material Included

The Digibar S is supplied with the probe, data download cable, stainless steel shackle, shorting plug, charger, download program and silicone capsules.

## 2.4 Digibar S Components

### 2.4.1 Probe

The main component of the Digibar S is the probe. The probe has internal non volatile memory to log cast data, battery backed real time clock and 3 AA Nickel Metal Hydride batteries. The probe uses a time-of-flight technique to determine sound velocity using the 2 MHz transducer.

Care should always be taken with the acoustic chamber of the probe as it will require recalibration should it become dislodged. The probe also has a pressure sensor which is used to measure water depth. The pressure sensor is available in different pressure ratings. Make sure not to exceed the pressure rating of the pressure sensor or it might get damaged. The Digibar S also has a temperature sensor. When lowering the Digibar S through the water column do not exceed 1 meter/second or 3 ft/second so the temperature sensor can stabilize to the changing water temperature.

The connector on the end of the probe should always have the protective cap in place when not in use to protect the pins from shorting out.

### 2.4.2 Cable

The Digibar S is supplied with a USB cable which is used to download data from the probe and set logging parameters for the probe. The USB cable is also used to charge the Nickel Metal Hydride batteries in the probe.

### 2.4.3 Shackle

A stainless steel shackle is provided to tie the Digibar S to a rope or cable.

### 2.4.4 Shorting Plug

The shorting plug is used to turn the Digibar S on before deployment. The shorting plug has an LED on the end that gives operator feedback as to the status of the Digibar S. The shorting plug should only be connected to the Digibar S when in use. Make sure the pins on the connector are lubricated with the provided silicon so the shorting plug slides on easily.

If the shorting plug is connected for more than 6 minutes without the Digibar S sensing it is in water the Digibar S will shut down and the LED will turn off. This is done to conserve the battery power.

#### 2.4.4.1 LED status

- LED stays on – Digibar S has been turned on and the electronics are stabilizing. This should not last more than 15 seconds. Do not lower the probe into the water until the LED starts blinking.

- LED blinking 1 times/second – The Digibar S is ready to be deployed in the water. Once in the water the LED will go off.
- LED blinking 4 times/second – The Digibar S battery voltage is at a critical voltage and should be charged. Connect to the USB charger to charge quickly.
- LED blinking irregularly - This indicates the Digibar S memory is full and needs to be cleared before starting a cast. The Digibar S will not overwrite previously stored cast data.

#### **2.4.5 Download/Charging cable**

This cable connects the Digibar S to a computer's USB port. This allows the Digibar S to communicate with a computer as well as charge the probe's batteries. To charge the batteries quicker plug the USB end of the cable to the supplied USB charger.

#### **2.4.6 USB Charger**

A USB wall charger is supplied with the Digibar S to charge the batteries at a faster rate than is possible with a computer's USB port. The Digibar S should not be left plugged into the USB wall charger for over 24 hours. The wall charger will work from 90 VAC to 240 VAC.

#### **2.4.7 Silicone Capsules**

Silicone capsules are provided to lubricate the pins on the Digibar S probe.

### 3 INSTALLATION

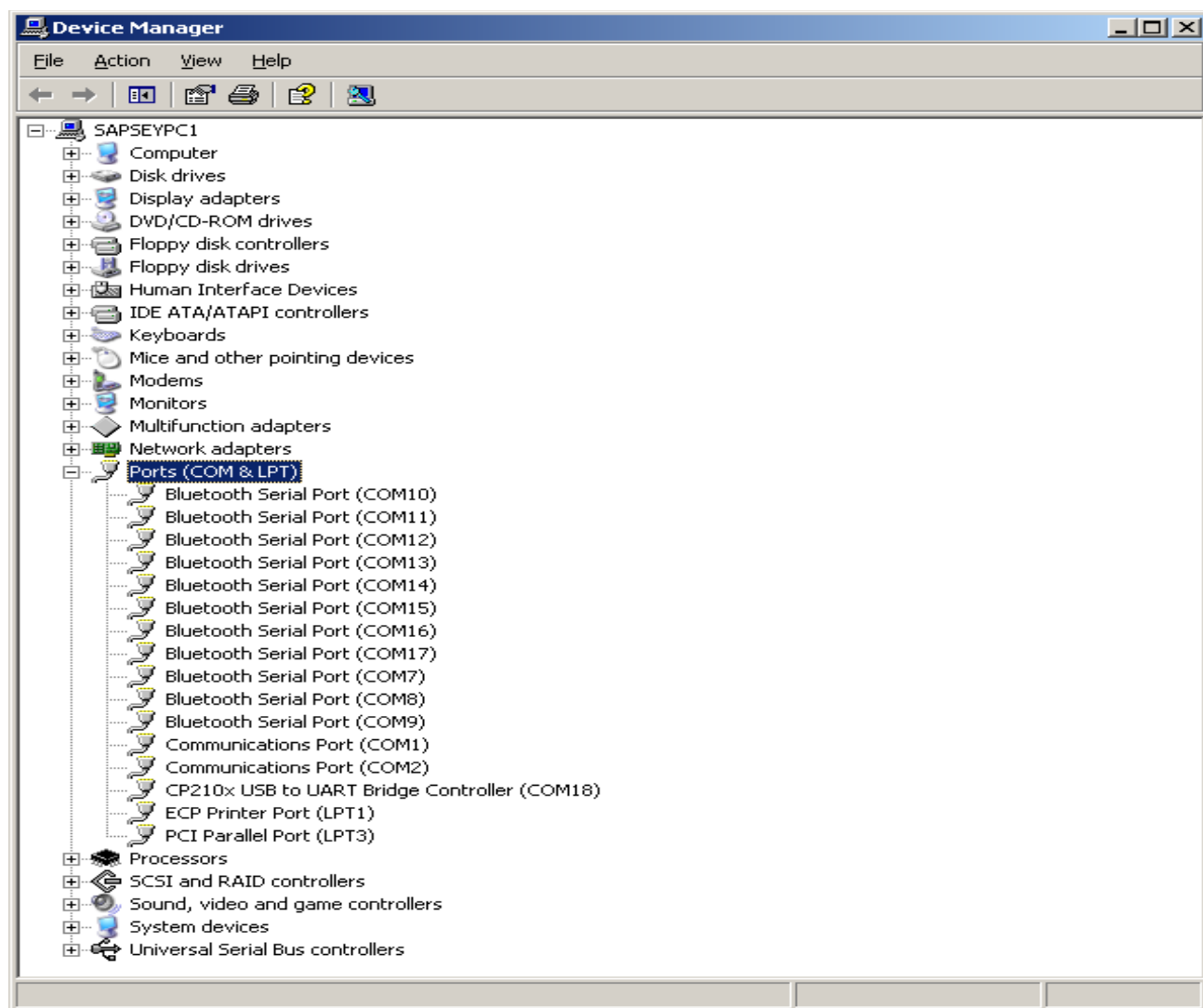
This section contains information necessary to install the USB drivers. These drivers should be installed before installing the Digibar Pro download and control program.

#### 3.1 USB Driver Installation

The USB port of the Digibar S uses a virtual serial port driver to send and receive data to the computer. Once the USB drivers are installed, the Digibar Pro program will treat the port as a normal serial port.

1. Install the software **BEFORE** plugging the Digibar S to the computer.
2. Insert the USB driver disk that is included with the Digibar S in the computer. If the disk is not available, download the program from our web site.
3. Run the CP210xVCPInstaller.exe file.
4. Once the program has been installed, plug in the Digibar S to the computer using the included USB cable.
5. Go to Device Manager on the computer and expand the Ports (COM & LPT) section. The USB drivers will enumerate the Digibar S to the next available com port. The com port will be labelled "CP210x USB to UART Bridge Controller (COM X)" where X is the com port number that the application should use to communicate with the Digibar S. In the example below the Digibar S has enumerated to COM18.





## 3.2 Digibar S Download and Control program

### 3.2.1 Installation

To install the Digibar S program run the DigibarSetupV3.0.1.exe file. The program will extract and install. This version of the Digibar Pro program will uninstall any previous versions of the Digibar Pro program. The current version of this program does not support the Digibar Pro.

### 3.2.2 Starting Digibar Pro Program

The installation program will put a shortcut to the Digibar Pro 3.0 program in the Start->Odom folder. Click on the shortcut and the program will start.

### **3.2.3 File Menu**

#### **3.2.3.1 Open**

Opens up a previously stored cast. All cast are stored in a comma separated variable (csv) file format.

#### **3.2.3.2 Export**

Export the file with a \*.vel extension that Hypack will recognize.

#### **3.2.3.3 Print**

Prints a graph and a table of the cast to the default printer on the computer.

### **3.2.4 Settings Menu**

#### **3.2.4.1 Connection Settings**

Sets the port the Digibar S will use to communicate with the program. The Digibar S uses a virtual serial port that enables the computer to use serial drivers to communicate with the Digibar S. The drivers should be installed prior to using this program. Refer to section 3.1 for instruction on installing these drivers and obtaining the port number to put in this dialog box. This must be done before connecting to the Digibar S.

#### **3.2.4.2 Display Settings**

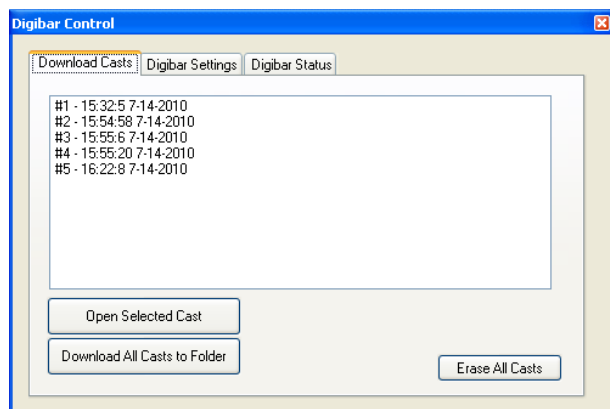
Sets the display settings used by the program to graph the data.

#### **3.2.5 Help**

Displays version information about the Digibar Pro program.

### **3.2.6 Connect to Probe**

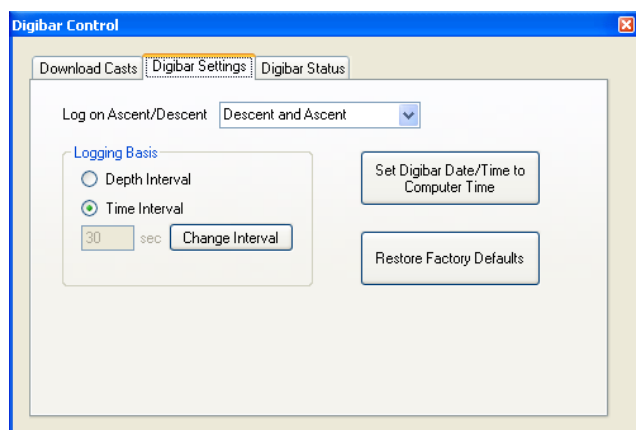
Once the Connection Settings port number has been selected, click on this icon to connect the Digibar Pro program to the Digibar S. If the connection is successful the dialog box below should appear on the screen.



### 3.2.6.1 Download Casts

The operator can either download a single cast or download all the casts to a folder. If a single cast is downloaded (,) the operator must export the cast as either a csv file or vel file in order to save the file. The Download All Casts to Folder selection will download all the casts as csv files.

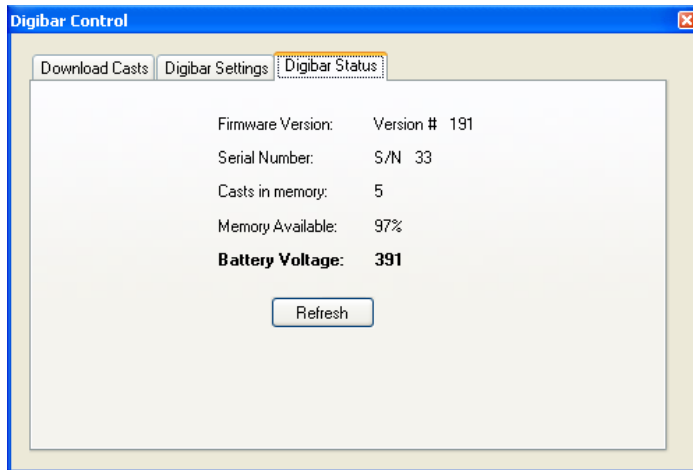
### 3.2.6.2 Digibar Settings



This screen is used to set the logging parameters for the Digibar S. The operator can choose whether to log data going down and up or just down with the Log on Ascent/Descent selection.

The Digibar S can either log data on time intervals or depth intervals. Valid time intervals are from 1 second to 999 seconds. Depth intervals are from 0.5 meters to 30.0 meters.

### 3.2.6.3 Digibar Status



The Digibar status window allows the operator to view the current battery voltage, casts in memory, amount of available memory, serial number of the Digibar S and the firmware version.

### 3.3 Using the Digibar S

The following procedure assumes the Digibar Pro program has been installed and connects to the Digibar S.

1. Connect the Digibar S to the computer and connect the download/control program. Check that the desired logging basis has been selected, there is enough memory and the battery voltage is above 3.3 VDC.
2. Disconnect the Digibar S from the computer and connect the supplied shorting plug. The LED on the shorting plug should turn on and remain on for 15 seconds. Wait for the LED to start blinking 1 time per second. If the LED starts blinking at 4 times/second or at a varying rate, refer to section 2.4.4.1 LED status as to the fault code.
3. Attach a rope or cable to the Digibar S and lower into the water. Make sure the Digibar S is fully submerged. The LED should turn off once in the water. This is normal. Let the Digibar S sit in the water for 1 minute before lowering it. This allows the electronics to acclimate to the water temperature. Lower the Digibar no faster than 1 meter/seconds until it touches the bottom.
4. When the Digibar S comes up to the surface the LED should start blinking once again. Disconnect the shorting plug to switch the Digibar S off. If the Digibar S is out of the water for more than 6 minutes, it will shut down to conserve the batteries.
5. Use the Digibar Pro program to download the cast.

### 3.4 Memory for Casts

The Digibar S has non-volatile memory to store the cast data that is 65536 bytes deep of which 65280 bytes are available to store the casts. The maximum number of casts allowed is 255. Each cast consists of a 16 byte header and 16 bytes records for each logging interval. The number of casts the Digibar S can log depends on the logging interval and the depth or time duration of the cast.

## 4 TROUBLE SHOOTING

- The Digibar S should be calibrated on an annual basis to make sure that it stays within specifications.
- The surface of the Digibar S must always be clean and free of oils. If the Digibar S is not outputting correct sound velocities then clean the face of the transducer with some liquid detergent.
- A quick test of whether the Digibar S is working properly is to put the probe in a bucket of fresh water and let it sit there for five minutes. Measure the temperature of the water and compare the sound velocity in the chart below at the temperature measured with the sound velocity the Digibar S has logged.

| Temperature | Sound Velocity | Temperature | Sound Velocity |
|-------------|----------------|-------------|----------------|
| 4.00        | 1421.62        | 17.50       | 1474.38        |
| 4.50        | 1423.90        | 18.00       | 1476.01        |
| 5.00        | 1426.15        | 18.50       | 1477.62        |
| 5.50        | 1428.38        | 19.00       | 1479.21        |
| 6.00        | 1430.58        | 19.50       | 1480.77        |
| 6.50        | 1432.75        | 20.00       | 1482.32        |
| 7.00        | 1434.90        | 20.50       | 1483.84        |
| 7.50        | 1437.02        | 21.00       | 1485.35        |
| 8.00        | 1439.12        | 21.50       | 1486.83        |
| 8.50        | 1441.19        | 22.00       | 1488.29        |
| 9.00        | 1443.23        | 22.50       | 1489.74        |
| 9.50        | 1445.25        | 23.00       | 1491.16        |
| 10.00       | 1447.25        | 23.50       | 1492.56        |
| 10.50       | 1449.22        | 24.00       | 1493.95        |
| 11.00       | 1451.17        | 24.50       | 1495.32        |
| 11.50       | 1453.09        | 25.00       | 1496.66        |
| 12.00       | 1454.99        | 25.50       | 1497.99        |
| 12.50       | 1456.87        | 26.00       | 1499.30        |
| 13.00       | 1458.72        | 26.50       | 1500.59        |
| 13.50       | 1460.55        | 27.00       | 1501.86        |
| 14.00       | 1462.36        | 27.50       | 1503.11        |
| 14.50       | 1464.14        | 28.00       | 1504.35        |
| 15.00       | 1465.91        | 28.50       | 1505.56        |
| 15.50       | 1467.65        | 29.00       | 1506.76        |
| 16.00       | 1469.36        | 29.50       | 1507.94        |
| 16.50       | 1471.06        | 30.00       | 1509.10        |
| 17.00       | 1472.73        |             |                |

## 5 DIGIBAR S DIMENSIONS

