



## HydroBeam S2

## User Manual



# HydroBeam S2

## Manual Revision

### HydroBeam S2

Revision Date	Revision Level	Description
Aug. 2024	1	HydroBeam S2 User Manual

## Introduction

Welcome to the Satlab HydroBeam S2. This introduction describes how to use this product.

### Experience Requirement

In order to help you use Satlab series' products better, we suggest you carefully read the instructions. If you are unfamiliar with the products, please refer to <http://www.Satlab.com.se/>

### Tips for Safe Uses

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**Notice:** The contents here are special operations and need your special attention. Please read them carefully.

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**Warning:** The contents here are very important. Wrong operation may damage the machine, lose data, break the system and endanger your safety.

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### Exclusions

Before using the product, please read these operating instructions carefully: they will help you to use it better. Satlab Surveying Instrument Co., Ltd assumes no responsibility if you fail to operate the product according to the instructions, or operate it wrongly due to misunderstanding the instructions. Satlab is committed to constantly perfecting product functions and performance, improving service quality and we reserve the right to change these operating instructions without notice.

We have checked the contents of the instructions the software and hardware, without eliminating the possibility of error. The pictures in the operating instructions are for reference only. In case of non-conformity with products, the products shall prevail.

### Technology and Service

If you have any technical issues, please call Satlab's technology department for help.

### Relevant Information

You can obtain this introduction by:

1. Purchasing Satlab products: you will find this manual in the instrument container to guide you on operating the instrument.
2. Logging onto the Satlab official website, downloading the electronic version introduction at "Download center" "Partners" "Partner center".

### Advice

If you have any comments and suggestions for this product, please email [info@Satlab.com.se](mailto:info@Satlab.com.se). Your feedback will help us to improve the product and service.

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# Chapter 1

## Overview

### **This chapter contains:**

- System Overview
- Product Introduction
- Main Features
- Technical Specifications
- Safety Matters

## 1 Overview

### 1.1 System Overview

The HydroBeam S2 dual-frequency echo sounder working principle is shown in Figure 1-1.

By the transducer transmit and receive wave signals, solve the depth information of water, and receives the coordinate information from GPS. Both are transmitted to the SLHydro Sounder software and combined to get the 3D coordinates of the water bottom.

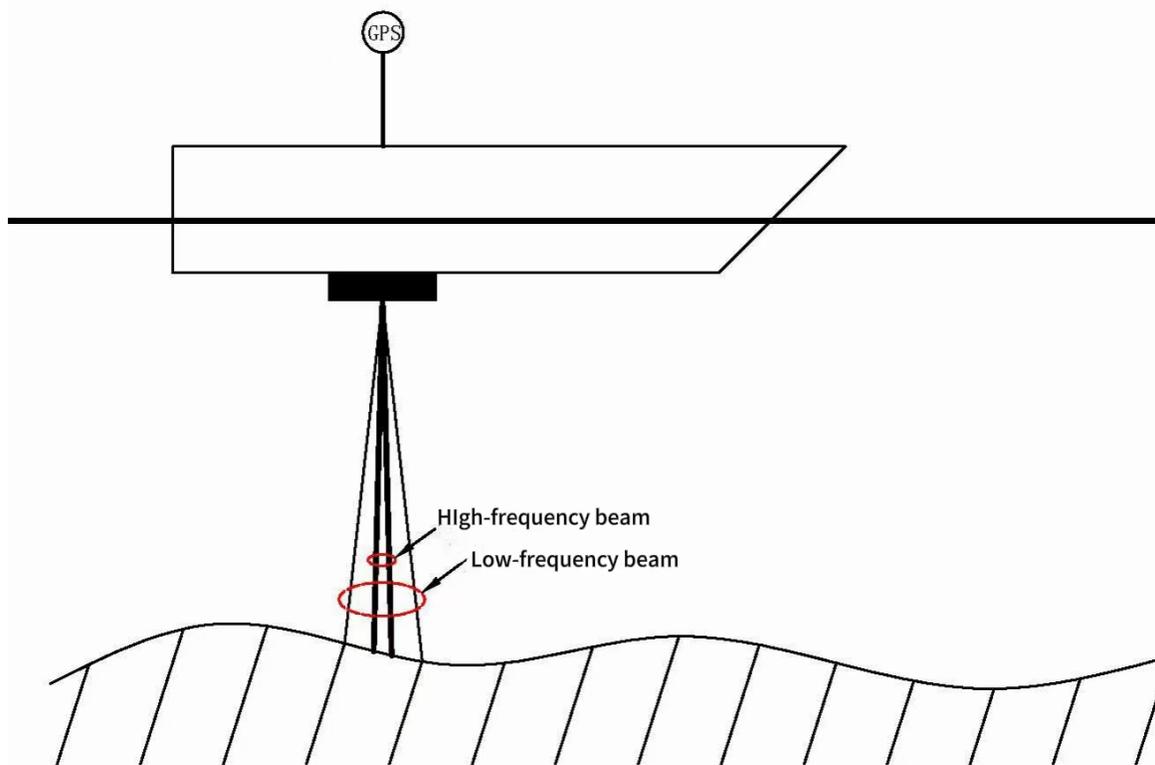


Figure 1-1 Underwater Depth Survey

Dual-frequency echo sounder can measure large water depth or shallow water floating mud or soft mud layering, it is suitable for surveying deep sea or silt channel. When the system works, by transducer at the same time transmit high-frequency and low-frequency waves to the bottom of the water. High-frequency waves return as soon as reach the surface of the water bottom, low-frequency waves reach the surface of small density only return a small number of waves, most of the wave will continue to transmit downward, until it meets a high-density hard bottom will return to more waves. The two signals have a time difference, and this time difference basically shows the thickness of the silt layer.

## 1.2 Product Introduction

HydroBeam S2 is a dual-frequency echo sounder system. By hardware frequency conversion to adapt to 10KHz-50KHz, 100KHz-1MHz frequency transducer. The depth measurement range is 300m(215dB) for high frequency and 2000m(215dB) for low frequency.

The system consists of two parts, the HydroBeam S2 dual frequency echo sounder Host and the HydroBeam S2 single/dual frequency transducer, as shown in Fig 1-2.



Figure 1-2 HydroBeam S2 System

## 1.3 Main Features

### **Precision Depth Measurement**

- ✧ Real-time dual-frequency synchronization for unmatched accuracy.
- ✧ Built-in temperature sensor for precise sound velocity calculation.
- ✧ Versatile transducer options to suit various water depths.
- ✧ Analog-digital depth overlay for detailed data visualization.

### **Efficient Operation**

- ✧ Integrated software for seamless device and data management.
- ✧ Large, high-brightness 15" display for optimal visibility.
- ✧ Intuitive physical buttons for easy control.
- ✧ Lightweight and portable design for convenient use.

### **Rugged and Reliable**

- ✧ IP66-rated protection for harsh environments
- ✧ Durable construction for long-lasting performance
- ✧ PPS and Trig inputs for precise timing synchronization
- ✧ Flexible power options (DC/AC) for versatile applications

## 1.4 Technical Specifications

**Table 1 Echo Sounder Host**

Supported Frequencies	High Frequency 100kHz~1MHz Low Frequency 10kHz~50kHz
Sound Velocity	1370~1700 m/s, Resolution 1 m/s
Max Ping Rate	50Hz
Output Data Format	Standard NMEA 0183, DESO 25, ODOM, Knudsen, Bathy, EchoTrac
Screen	15 inches; Resolution:1280x1024@60 Hz
CPU	2.0GHz, Quad-core(windows 10)
RAM	16GB
Storage	1TB SSD
Interfaces	RS232*3, USB2.0*1, USB3.0*2, BNC*2, HDMI*1, LAN*1, Transducer*1, Power*1
Input Power	DC 10~30V, DC 110~240V
Power Consumption	50W
Temperature	Operating at -5°C to +55°C Storage at -20°C to +60°C
Weight	8.1kg for host
Dimension	441mm*105mm*324mm
Ingress Protection	IP66
Housing Material	Magnesium alloy

**Table 2 Transducer**

Transducer Type	Dual Frequency	Single Frequency
Transducer Frequency	200kHz& 24kHz	200kHz
Depth Range	0.15~300m@200kHz 1~2000m@24kHz	0.15~300m
Accuracy	+0.01m±0.1% of depth @200kHz +0.10mt + 0.1% of depth @24kHz	+0.01m±0.1% of depth
Resolution	1cm@200kHz 10cm@24kHz	1cm@200khz
Temperature Sensor	-55°C to +125 , resolution ±0.5°C	

## 1.5 Safety Matters

In order to ensure the safety of people and equipment during the use of the HydroBeam S2 echo sounder system, please read the following in detail before use.

### 1.5.1 Equipment Safety

- ✧ During transportation, provide the necessary shock absorption for the transportation box.
- ✧ Check the transportation box for damage such as cracks and dents before unpacking.
- ✧ Check each part of the system for damage before installation.
- ✧ Avoid dropping the equipment and accessories from the air to avoid damage to the equipment.
- ✧ Avoid plugging or unplugging any connecting cables while the equipment is in normal operation.
- ✧ Avoid rain or water ingress at all cable ports of the echo sounder.
- ✧ Don't put the dual echo sounder under water to prevent damage to the electric components.
- ✧ When the transducer is not placed underwater, the echo sounder is not allowed to be tested or operated.
- ✧ Without protection, it is not allowed to place the transducer downward, and it is not allowed to hit the surface of the transducer with hard or acute objects.
- ✧ All cables of the system are not allowed to be folded, rolled, squeezed, pulled, cut or other operations that may cause physical injury.
- ✧ Do not over the system working and storage temperature.

### 1.5.2 Equipment Maintenance

- ✧ The following measures are recommended for protection when using or storing the echo sounder.
- ✧ **Cleaning:** Use clean water and a soft brush for cleaning.
- ✧ After echo sounder use, flush the transducer with fresh water.
- ✧ Cannot use any paint on the transducer.
- ✧ Cannot place the transducer in the sun for exposure to prevent damage.
- ✧ **Idle maintenance:** When the echo sounder is not in use, the transducer should be removed, and the surface should be cleaned with a soft cloth. Put the transducer and dual-frequency echo sounder into the transportation box and close the connection port to prevent dust entering.

# Chapter 2

## Installation Introduction

**This chapter contains:**

- Transducer Installation
- HydroBeam S2 Host Installation

## 2 Installation Introduction

### 2.1 Transducer Installation

Commonly used transducer installation is hanging installation, the installation steps are as follows:

A. Pass the transducer cable through the survey pole as shown in Figure 2-1:



Figure 2-1 Transducer Installation

B. Fix the survey pole with screws. Before entering the water, you need to measure the distance from the bottom surface of the transducer to a reference position of the survey pole, which is used to measure the draft depth of the transducer after put into the water.

C. Put the transducer into the water and fix the survey pole at the side of the ship, using steel cables or wires to connect and protect the transducer.

#### Installation Notes:

- ✧ Choose a suitable measuring ship according to the survey water hydrological conditions, equipment size and draft requirements.
- ✧ The front of the transducer should be free of obstacles, suction and discharge ports, and the installation depth should avoid the shade of the ship's bottom.
- ✧ During installation, the surface of the transducer needs to be protected to avoid hard objects hurting it.
- ✧ Shallow water is not suitable for survey operations to avoid damaging the transducer.
- ✧ Poor environment and too much debris (reefs, tree branches, fishing nets, etc.) is not suitable for survey operations to avoid damage to the transducer.
- ✧ The fix of the transducer should be stable to avoid shaking and deformation during movement.

## 2.2 HydroBeam S2 Installation

### 2.2.1 HydroBeamS2 Introduction

The front panel of the HydroBeam S2 is shown in Figure 2-2. From bottom to top, they are: Power On/Off, Marking, Change Line, Start/Stop, Arrow buttons: Up, Down, Left, Right, and OK.



Figure 2-2 Front panel of the HydroBeam S2

HydroBeam S2 right side panel as shown in Figure 2-3:

1. USB interface
2. TX/RX cable interface
3. Power interface
4. COM1 interface.



Figure 2-3 HydroBeam S2 right side panel

The TX/RX interface uses an 8-pole circular connector, with the pin defined as shown in Table 3:

**Table 3 Pin Description**

Pin	1	2	3	4
Description	Low Frequency +	Low Frequency-	CAN-Shield	High Frequency +
Pin	5	6	7	8
Description	High Frequency -	CAN-GND (Temp)	Data (Temp)	5V Power (temp)

HydroBeam S2 left side panel as shown in Figure 2-3:

1. Trig interface
2. HDMI interface
3. PPS interface
4. LAN interface
5. COM interface

As shown in Figure 2-4.



Figure 2-4 HydroBeam S2 left side panel

### 2.2.2 Other Accessories

The AC adapter is shown in Figure 2-5:



Figure 2-5 AC Adapter

The input voltage of the adapter is: 100~240VAC 50/60Hz, which can adapt to the power environment of most different countries.

### 2.2.3 HydroBeam S2 Installation Steps

Installation steps as follows:

1. Insert the adapter's power plug into the Power interface of the HydroBeam S2, tighten it.
2. Insert the LEMO connector of the transducer into the TX/RX cable interface of the HydroBeam S2.
3. Insert the DB9 connector into the COM1 port of the HydroBeam S2 and connect the other end to the DB9 interface of the GNSS device. After that, set the Instrument type and baud rate, choose HydroBeam S2 for type, com1 baud rate 115200, com 2 baud rate 115200. As shown in Figure 2-6 below.

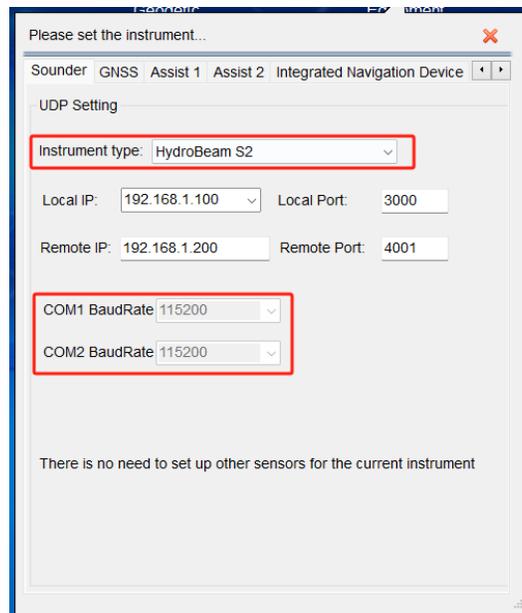


Figure 2-6 Sounder Setting

4. After the GNSS device is set up normally, there is no need to set up the GNSS connection information, and the serial port is selected as none. Enter the depth measurement interface, and the positioning data can be accessed. As shown in Figure 2-7.

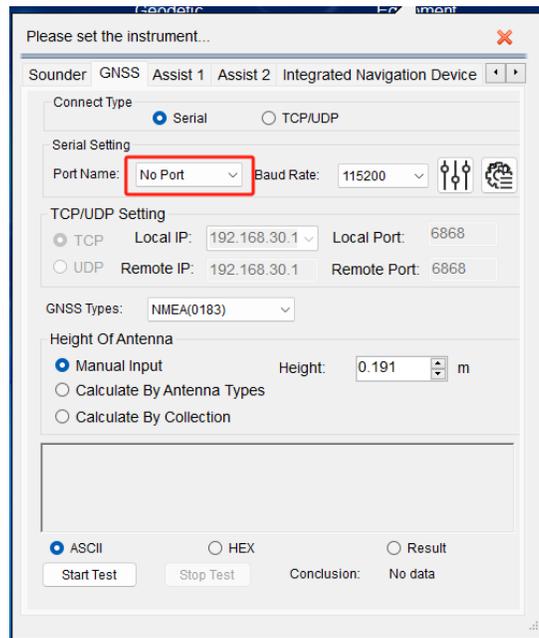


Figure 2-7 GNSS Setting



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