SONOPTIX

ECHO Forward Looking Sonar

User Manual

March 2023

Contents

Revision history

Revision	Section	Comment
1		Initial revision

Electrical Interface

2.1 Ethernet Based Sonar

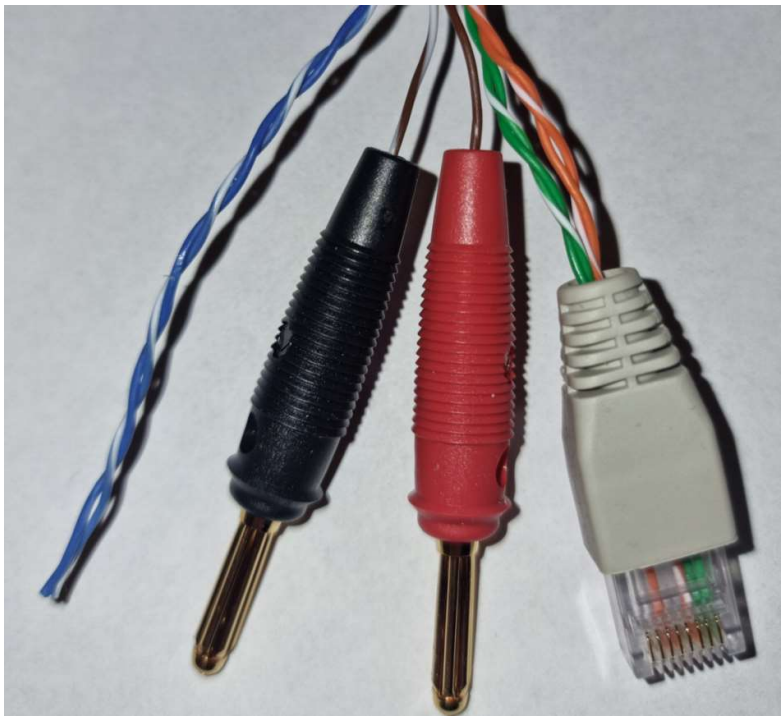
The ECHO utilizes Ethernet connectivity to transmit sonar data over a network. Unlike older, traditional sonar systems that rely on specialized cabling or hardware to transmit data, Ethernet-based sonars use standard Ethernet cables and protocols to connect to a network, making them easier to install and maintain. This technology enables real-time sharing of sonar data with multiple devices and users on the network, facilitating collaborative exploration and analysis of underwater environments.

2.1.1 Subsea Cable Wiring Diagram

Top side	Sonar Cable Wires	Description	Sonar Internal
Unterminated	Blue/White	Trigger -	J1:1
Unterminated	Blue	Trigger +	J1:2
1	Green/White	TX+	J1:6
2	Green	TX-	J1:5
3	Orange/White	RX+	J1:4
6	Orange	RX-	J1:3
Black 4mm	Brown/White	0V	Stripped 5mm
Red 4mm	Brown	9-28VDC	Stripped 5mm

2.1.2 Sonar Cable Termination

Topside



For more information on setting up the network connection, please see Section 4 Network Connection

User Interface

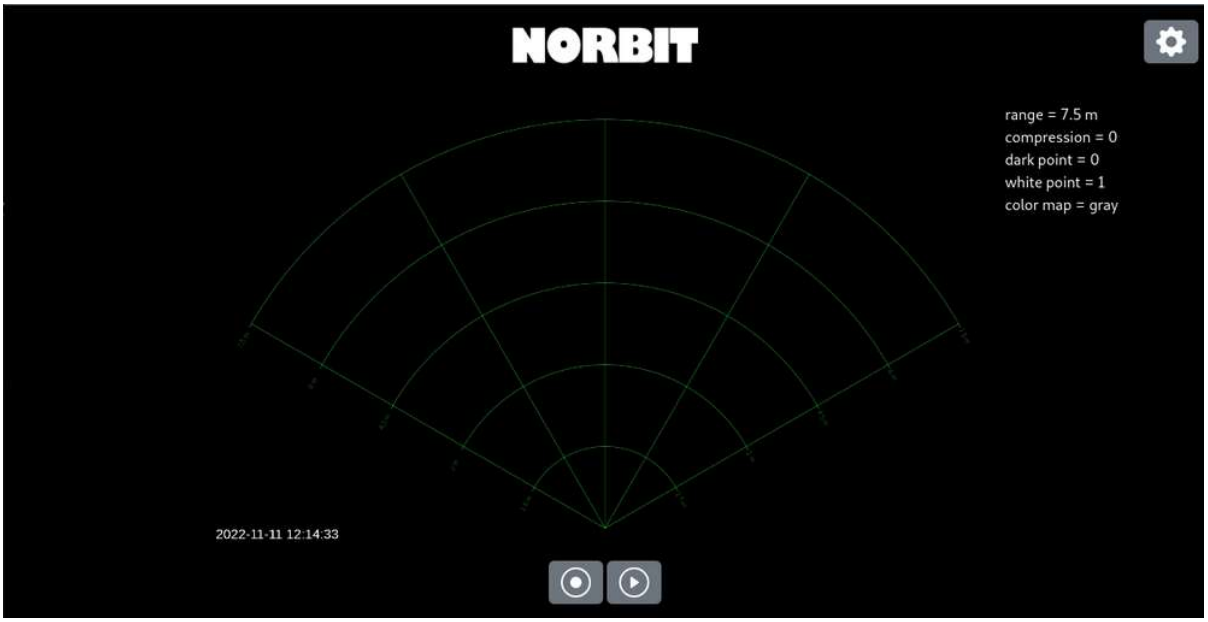
The user interface runs on the sonar and can be accessed using a standard webpage browser by typing in the IP (internet protocol) address that the sonar is set to.

Default IP address: 192.168.2.42

3.1 Functions

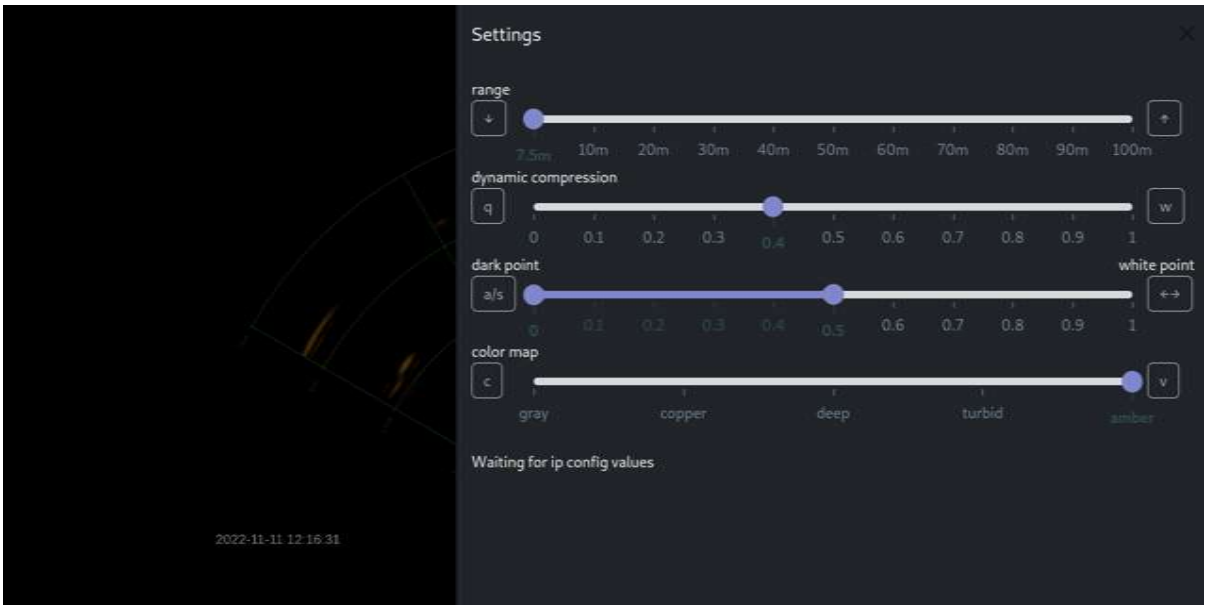
The user interface has three buttons:

- Settings wheel for accessing the settings
- Play button for starting and stopping pinging
- Record button for video recording (the record button is red when recording)



When play button is pressed, the sonar starts pinging and the button changes to a stop button

When settings button is pressed, a overlay settings panel appear with sliders for range, dynamic compression, dark and white point setting, and color map. The keyboard short cuts are shown in front and in back of the slider.



3.2 Sonar Settings

3.2.1 Range

Range can be adjusted from 7.5 m to 100 m. The sonar opening angle for 7.5 m – 30 m is 120°. For 40 m – 100 m the opening angle is 90°.

3.2.2 Dynamic Compression

This setting controls the sonar image level of dynamic compression. A higher level of compression will make low reflections more visible.

3.2.3 Dark Point and White Point

The dark point and white point setting controls the sonar image contrast stretching, or image normalization. Increasing dark point will darken the image, decreasing the white point will increase the brightness. These settings also act as a threshold on the image intensities. All image intensities below the dark point value will be black, and image intensities above the white point will be white (before color map is applied).

3.2.4 Color map

Applies a color map to the sonar image.

Network Connection

4.1 DHCP

If the sonar finds a DHCP server on the network, the sonar will obtain an IP address from it.

4.2 Static IP

If the sonar doesn't find a DHCP server, the sonar will set a static IP address which is 192.168.2.42 with net mask 255.255.255.0.

A typical setup is when plugging the sonar RJ45 connector directly into a laptop. The laptop network interface must be configured so that the laptop has a static IP address on the 192.168.2.0/255.255.255.0 network.

4.3 mDNS

The sonar will publish its hostname on the its subnet using mDNS. This also known as zeroconf or bonjour.

The published default host name is *echo-######.local*, where ###### is the sonar 6 digit serial number. The sonar web UI can be accessed on http://echo-######.local

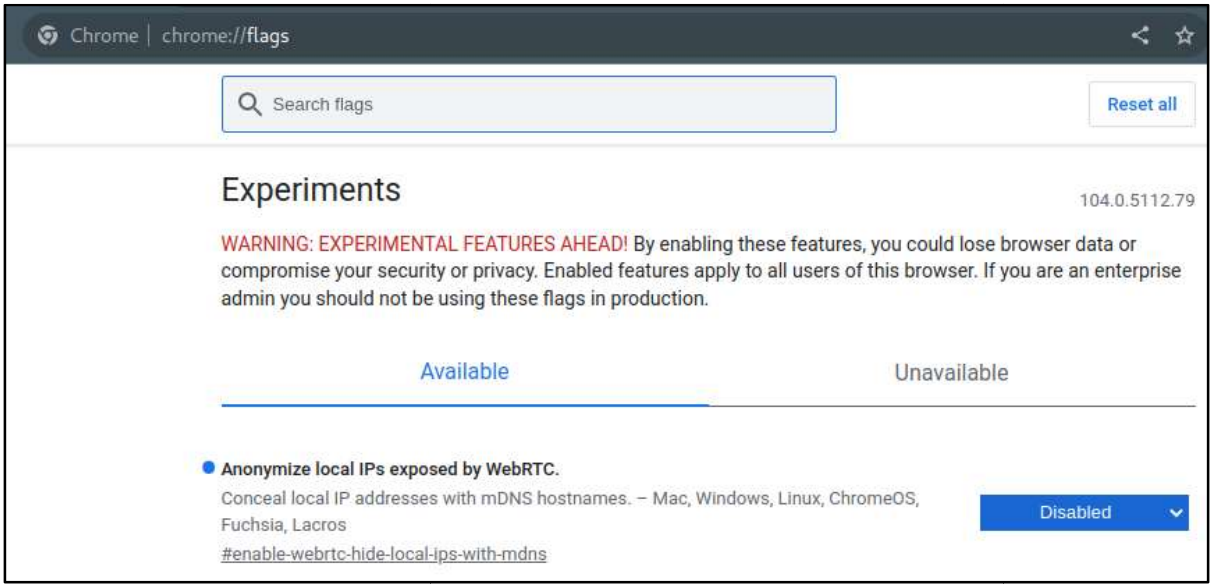
Software Upgrade

The sonar can be upgraded from a web browser by obtaining a software update image file (.swu).

To perform a upgrade, oppen the URL http://192.168.2.42:8081/ in a web browser. The software update page is self-guiding.

6.1.1 No video stream for Google Chrome

The video stream doesn't work if the setting "Anonymize local Ips exposed by WebRTC" is enabled. Disable this setting by and restarting Google Chrome.



Advanced Integration

7.1 Application Programming Interface

The ECHO sonar can be interfaced with using an API (application programming interface). The type of API used to interface with the ECHO sonar is called a “REST API” or “RESTful API”.

7.1.1 What is REST API

Representational State Transfer (REST) is a software architecture that imposes conditions on how an API should work. REST was initially created as a guideline to manage communication on a complex network like the internet. You can use REST-based architecture to support high-performing and reliable communication at scale. You can easily implement and modify it, bringing visibility and cross-platform portability to any API system.

API developers can design APIs using several different architectures. APIs that follow the REST architectural style are called REST APIs. Web services that implement REST architecture are called RESTful web services. The term RESTful API generally refers to RESTful web APIs. However, you can use the terms REST API and RESTful API interchangeably.

7.2 User Interface Video Stream

The Video stream is transferred using a protocol named WebRTC**.** This is a free and open standard with very low latency. It is supported by virtually all browsers, both on desktop and mobile. There are also a lot of SDKs that allows for integration of WebRTC in many different solutions.

https://webrtc.org/

For more information on advanced integration, please contact Sonoptix directly.