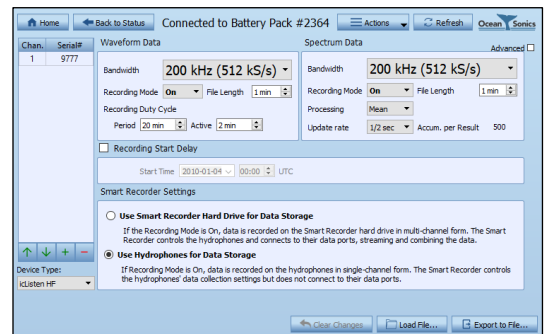
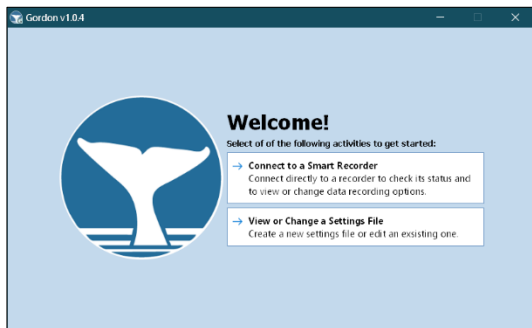




Gordon Smart Recorder User Guide



April 2020

Version 2.3

Table of Contents

Terminology.....	2
Introduction.....	2
Gordon Smart Recorder Quick Start.....	3
Data Retrieval.....	5
Hard Drive Data Retrieval	5
Hydrophone Data Retrieval	6
Pre-Deployment Testing.....	7
Test on Bench – Without Using Batteries	7
Dry Run – Deployment Test Using Batteries with Battery Pack	8
Appendix A	9
Installing the Gordon Application	9
Appendix B	10
Actions Menu	10
Set the Smart Recorder time from this PC	10
Change the Smart Recorder’s network settings	10
Reset the connected Smart Recorder	10
Disconnect from the Smart Recorder	10
Appendix C	11
Duty Cycling.....	11
Appendix D	13
Gordon Board	13
Connecting to the Gordon Board through Micro USB	14
Indicator Light.....	14
RS232 / RS422 Serial Port Interface.....	15
RS-232 Position	15
RS-422 Position	15

Terminology

Gordon Board – The board used to control the duty cycled recording of hydrophones and can record to a hard drive.

Gordon Application – The software application used to control the settings; including the hydrophone sampling rates, duty cycle and network settings.

Gordon Smart Recorder– A long-term acoustic recorder composed of an Ocean Sonics Battery Pack with a Gordon Board inside.
[Sometimes referred to as **Gordon**]



Battery Pack – An Ocean Sonics instrument that is used to provide additional power to icListen hydrophone(s) over long-term deployments. Other equipment can be powered from the battery pack through the MCBH8F Bulkhead Connector. See Ocean Sonics [Battery Pack User Guide](#) for more information.

Introduction

The Smart Recorder is a long-term acoustic recorder composed of an Ocean Sonics Battery Pack with a Smart Recorder Gordon board installed inside. This device gives users the option of customization on their deployments with low-power duty cycling and up to 2 TB of additional memory on a solid-state hard drive.

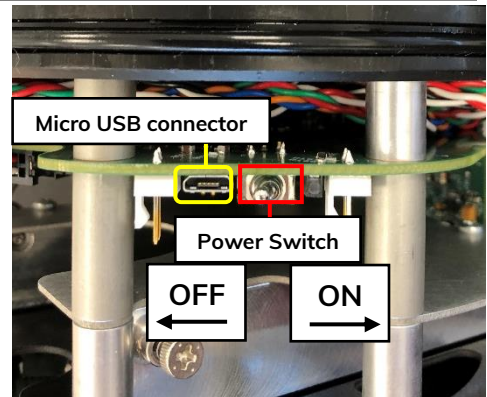
Associated Documents	Associated Software
<input type="checkbox"/> Battery Pack User Guide	<input type="checkbox"/> Gordon
<input type="checkbox"/> icListen Hydrophone Data Retrieval	<input type="checkbox"/> Lucy
	<input type="checkbox"/> Gordon Calculator
	<input type="checkbox"/> Array Data Manager

Gordon Smart Recorder Quick Start

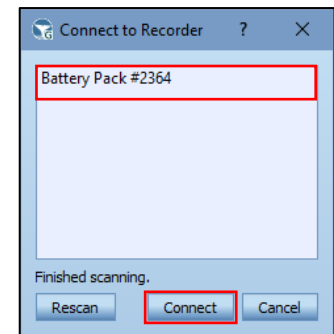
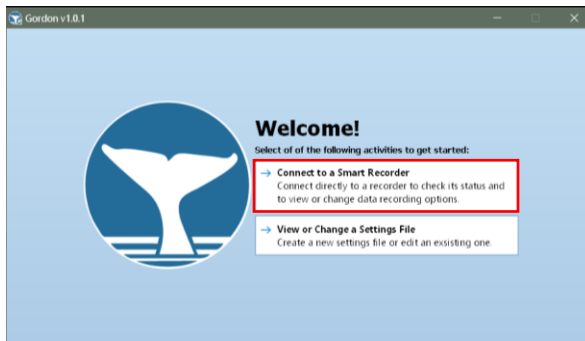


OSL Tip Prior to setup please read the **Ocean Sonics Battery Pack User Guide**. [Pre-deployment](#) testing is highly recommended.

1. Install the Ocean Sonics **Gordon** application provided on the USB stick ([Appendix A](#)).
2. Provide power to the Gordon Board.
3. Move toggle Power Switch on the Gordon Board to the **ON** position.
4. Connect to **Gordon** by using the micro USB connector provided ([Appendix D](#)).
 - a. Connect the micro USB cable to the Gordon Board.
 - b. Connect the opposite end of the cable to the USB port on your PC.



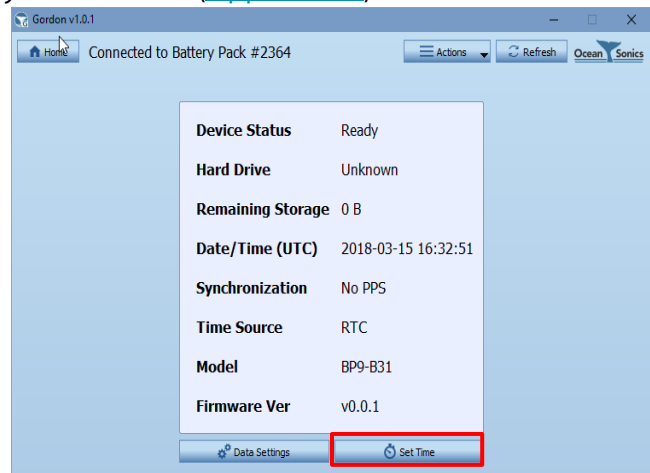
5. Open the **Gordon** application on your PC.
6. Choose **Connect to a Smart Recorder**.



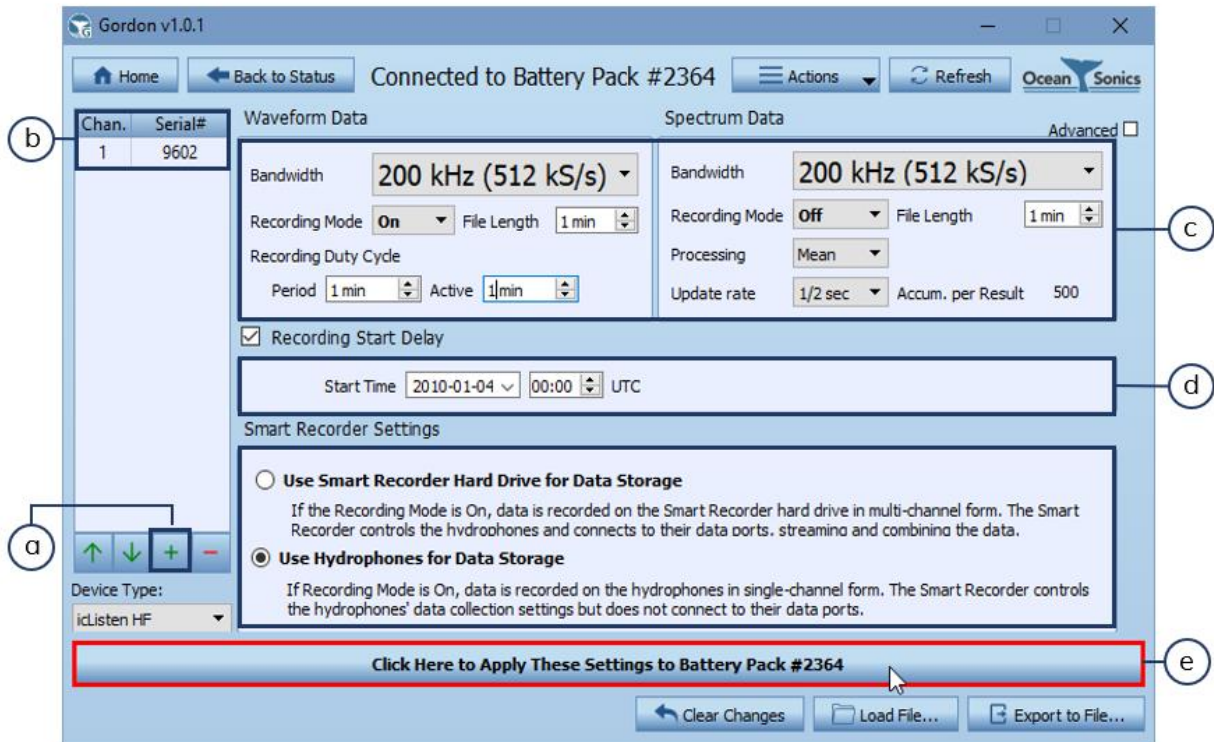
7. Choose your device from the list.
 - a. Click on the device
 - b. Click **Connect**
8. A page will be displayed with the Battery Pack Status ([Appendix B](#)).
 - a. Click **Set Time**

Setting the time is important to avoid unwanted recording and for the data to have the correct date & time.

- b. To setup hydrophone recording Click **Data Settings**



9. Add your hydrophone(s). Ensure the hydrophones are connected to the Gordon board.
 - a. Click on the [+] button to add a channel for each hydrophone that will be attached to Gordon.
 - b. Type in the serial number of the icListen hydrophone connected for each channel added.



- c. Choose the settings for the Waveform Data, Spectrum Data, Start Delay and Smart Recorder Settings. For help with Duty Cycle sampling see [Appendix C](#).
- d. A Start Delay is suggested to know the exact start time of recording and for monitoring the duty cycle before it is deployed.
- e. Click Apply Settings: 'Click Here to Apply these settings to Battery Pack #_'

The Apply Button will disappear indicating that the settings were applied successfully.

Note

When logging on the Hard Drive for Data Storage there is a maximum combined sampling rate of 512 kS/s (200 kHz).

Number of Hydrophones	Maximum Sampling Rate
1	200 kHz / 512 ksps
2	100 kHz / 256 ksps
3	50 kHz / 128 ksps
4	25 kHz / 64 ksps

Data Retrieval

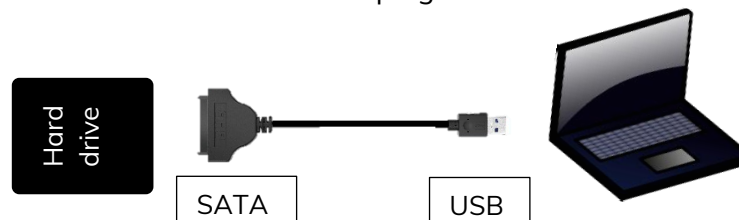
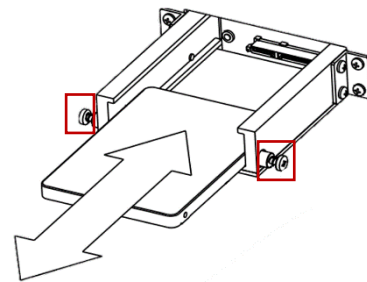
Data can be recorded on the hydrophones or the hard drive depending on your setup. If you have used the hard drive to record the data, follow the **Hard Drive Data Retrieval** below. If you have recorded on the hydrophone's internal memory, use the **icListen Data Retrieval Document** or follow the **Hydrophone Data Retrieval** for multiple hydrophone data retrieval.

WARNING!

- Hard drives and storage enclosures require careful handling, especially when being transported.
- Mishandling or improper care could result in data loss.
- Before handling the hard drive or any electrical components you should ensure you are properly grounded. You can discharge yourself by touching a large grounded metal surface for several seconds.

Hard Drive Data Retrieval

1. In a dry environment ensure all hardware is clean and dry.
Special care should be paid to moving parts and crevasses.
2. Open the Battery Pack to view the Gordon Board
3. Ensure Smart Recorder is in the **OFF** position
4. Remove the hard drive
 - a. Unscrew the 2 thumbscrews securing the drive
 - b. Slide out the hard drive along the metal base as a guide
 - c. **DO NOT** pull up or down on the hard drive as it could damage the connector
5. Once the hard drive is removed it can be connected to a computer
 - a. Use a SATA to USB cable to plug the hard drive into a USB port of a computer



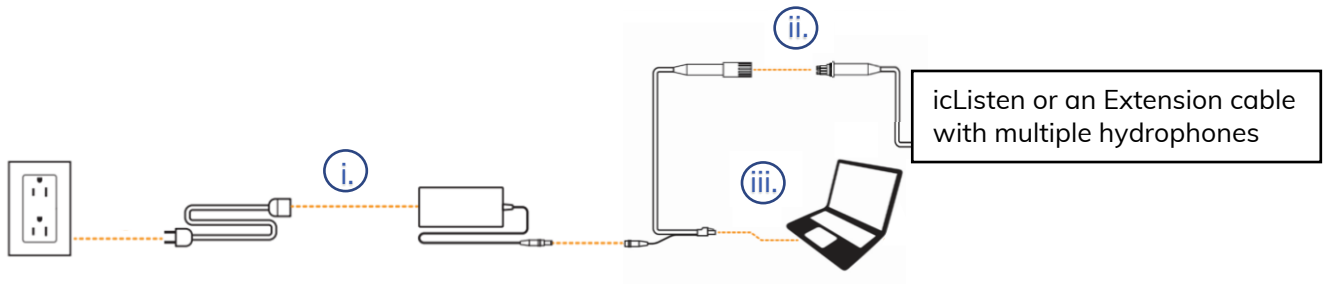
6. Retrieve the data on the hard drive and remove data for next deployment
7. Ensure you safely eject the hard drive before unplugging the USB connection on the computer.
8. After data transfer, return the hard drive to the Smart Recorder
 - a. If you are replacing the drive with a new drive, ensure the correct formatting has been applied to the drive (exFAT with MBR partitioning).

Hydrophone Data Retrieval

Please see the **icListen Hydrophone Data Retrieval Document** for options on single hydrophone data retrieval.


Ocean Sonics **Array Data Manager** software can be used to retrieve large amounts of data from multiple hydrophones and merge single WAV files into multi-channel WAV files.

1. Connect to hydrophone(s) using a test cable.



- i. Plug power cord into wall and plug power into test cable.
 - ii. Plug test cable into smart cable or directly into the hydrophone.
 - iii. Insert Ethernet jack into PC or router and connect to the hydrophone.
2. Open **Marco** and ensure hydrophone(s) are connected.

Pre-Deployment Testing

 **OSL Tip** To test the Gordon Smart Recorder before deployment, it is recommended that dry practice runs are performed over two or more duty cycles. Multiple runs can be performed using the bench power and at least one run should be performed using the battery power.

NOTE

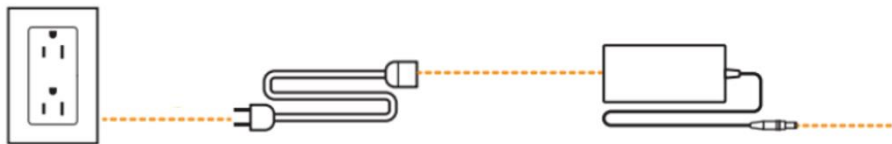
Gordon will not duty cycle power on board if Gordon application is still open on computer and USB is connected to the computer.

Test on Bench – Without Using Batteries

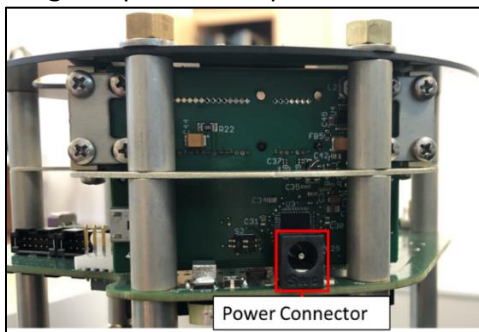
 **ENSURE NO BATTERIES ARE IN BATTERY PACK when using bench power** 

To test without using batteries in Battery Pack, the Gordon Board can be powered by using the icListen power adapter. Plug into the top board as shown in Step 5.

1. Remove any batteries from the Battery Pack.
2. Set up the Battery Pack in clean/dry environment so top board (Gordon Board) is accessible.
3. Lay the battery pack on its side, so the Gordon Board is still accessible, but adapters, cables and connectors are not being damaged.
4. Plug the Power cord into the wall and plug into the power adapter.



5. Plug the power adapter into the Gordon Board Power Connector.



6. Move the Toggle Switch to the **ON** position.
7. Plug the hydrophone and the cable into the Battery Pack.
8. Run the Gordon application and connect using the Quick Start procedures above.
9. Disconnect from the Gordon application and unplug the USB from the PC.
10. Record the data with the deployment settings and verify the data recorded was collected properly by checking the hydrophone or hard drive depending on setup.

Dry Run – Deployment Test **Using Batteries with Battery Pack**

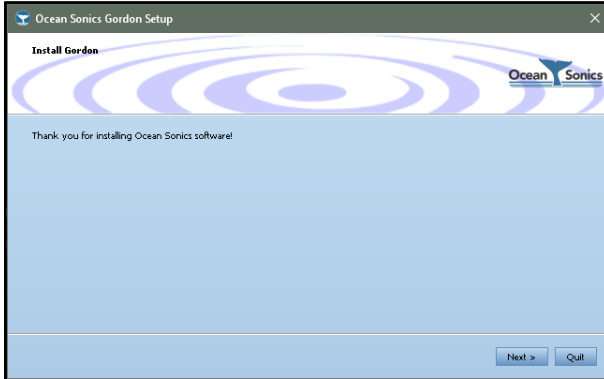
1. Configure the Recorder settings as you would for a field deployment (Quick Start instructions above).
2. Allow the icListen hydrophone to record at least two (or more) duty cycles.
3. Verify the data was recorded properly on the chosen memory option (hydrophone or hard drive).
4. After testing ensure all instruments are turned off to conserve battery.
 - a. Turn off the Gordon Board.
 - b. Reverse bias the hydrophone(s)- using the power down tool (9V battery).

Appendix A

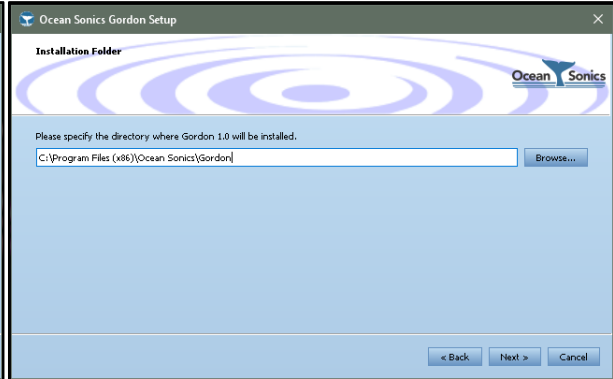
Installing the Gordon Application

1. Copy and Paste the **Gordon_v1_0_2_Setup.exe** onto PC Desktop or into a chosen folder.
2. Double Click on the copied file to run the Installation Setup.
3. Click through the following Setup procedures.

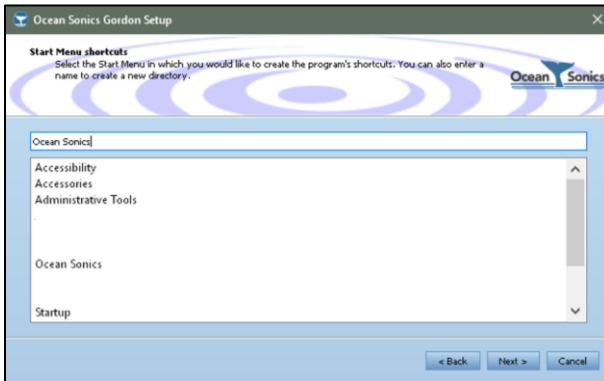
a. Click **Next**.



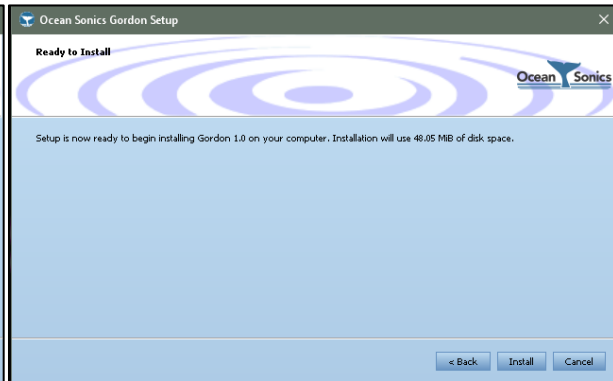
b. Choose Directory.



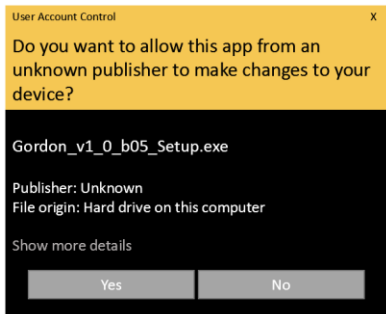
c. Choose Start Menu Shortcut.



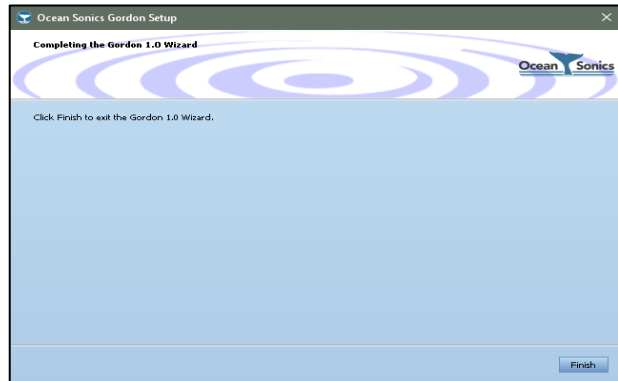
d. Click **Install**.



e. Click **Yes**.



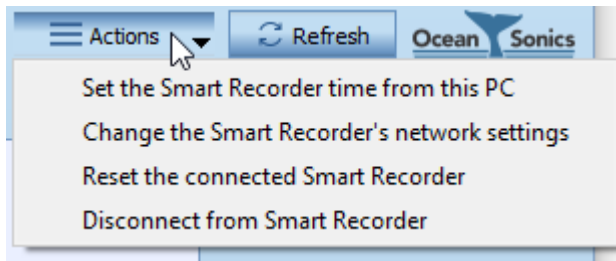
f. Click **Finish**.



Appendix B

Actions Menu

The Actions Menu will allow you to set the time, change network settings, reset and disconnect from the Battery Pack.



Set the Smart Recorder time from this PC

Will Set the time using your computer time.

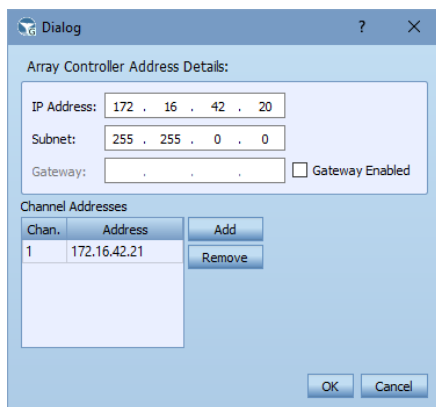
Same action as clicking Set Time under Status Display.

Change the Smart Recorder's network settings

Allows users to set the IP Address of the Smart Recorder and Add Channel IP Addresses.

The Smart Recorder sets up a local Network from the smart recorder to the hydrophone(s). The IP addresses for the hydrophones will automatically be set by the Smart Recorder Board.

All hydrophones that are connected to a Smart Recorder will obtain the same IP address; this will require the user to set the IP address of the hydrophone again using **Marco** when the hydrophone is plugged into the PC ethernet/network.



Reset the connected Smart Recorder

Will reset the Smart Recorder.

Disconnect from the Smart Recorder

Will disconnect the Smart Recorder and the PC.

Appendix C

Duty Cycling

Duty cycling allows for a longer deployment time, saving battery during inactive periods (when hydrophones are not recording).

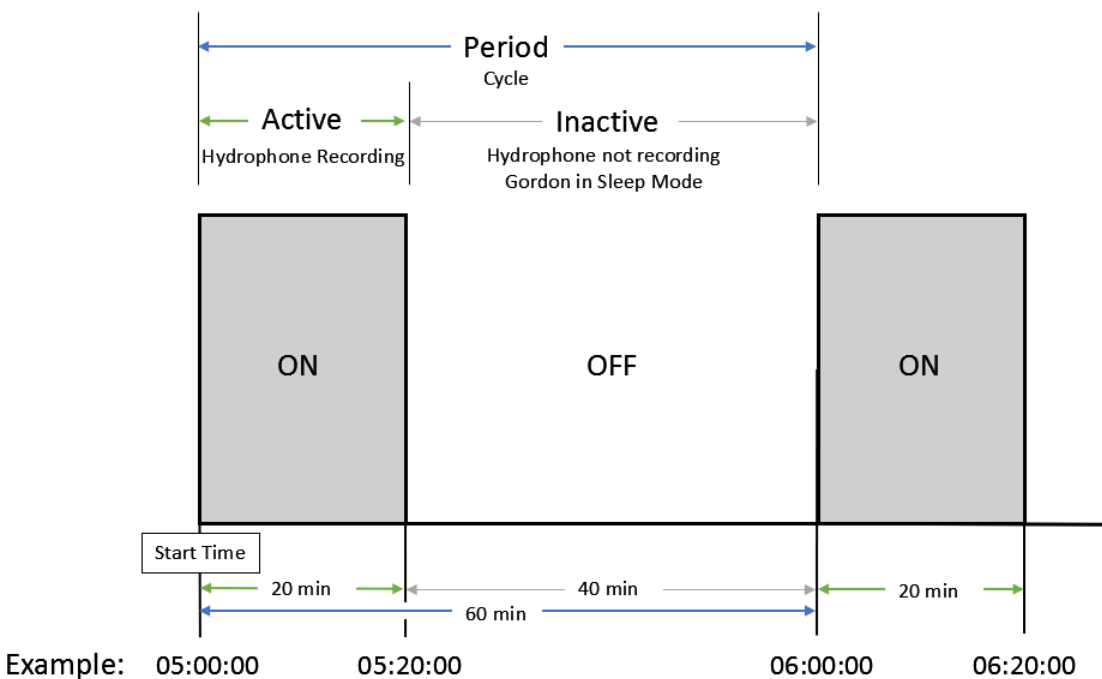
To make the most out of your smart recorder duty cycling choose a period and active time that works best for your project. This is a trade between the length of the deployment, the battery power and memory capability of your system.

Use the **Gordon Calculator (HTML)** provided on the USB with the Gordon Smart Recorder to help choose the settings that will provide the most useful data from your deployment.

The Gordon Smart Recorder will turn the power to the hydrophones on and off. This allows for longer deployments. The duty cycle is a period of sleeping (inactivity) and a wake period (activity) where the hydrophone is recording.

Period: The total time of the cycle (active and inactive time).

Active: The time where the hydrophones are recording.



<input checked="" type="checkbox"/> Recording Duty Cycle
Period <input type="text" value="60 min"/> Active <input type="text" value="20 min"/>
Recording Start Delay
Start Time <input type="text" value="2019-01-11"/> <input type="text" value="05:00"/> UTC

When using duty cycling the smart recorder will power on the hydrophone(s) approximately 3 minutes before the duty cycle is set to start recording and will power down the hydrophone(s) 1 minute after the recording has finished.

- The start up of the hydrophones is indicated by one buzz followed by a double buzz.
- The shut down of hydrophones will be indicated by three consecutive buzzes.

The minimum period suggested is 10 minutes. Any shorter periods will not give the smart recorder enough time to enter low power mode and it will continuously stay on and not conserve battery during inactivity.

All periods should be at least 5 minutes greater than the active periods for any conservation of battery.

Appendix D

Gordon Board

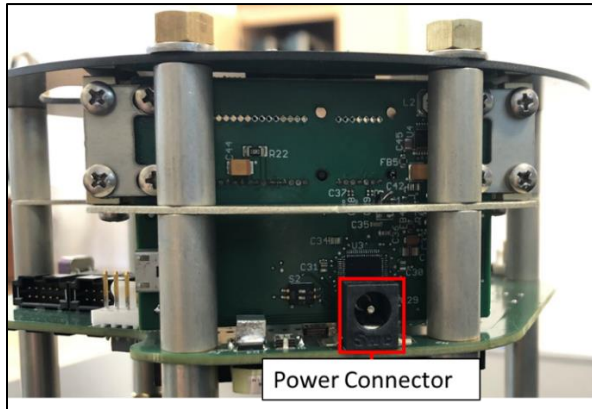


Figure 1. Power Connector socket used to provide power to the board and equipment.

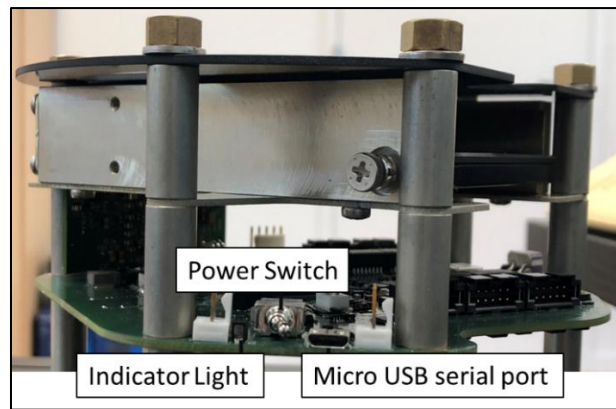


Figure 2. Micro USB B port available to communicate to the board using a connection to a PC and the Gordon Application, to setup for hydrophone deployment.

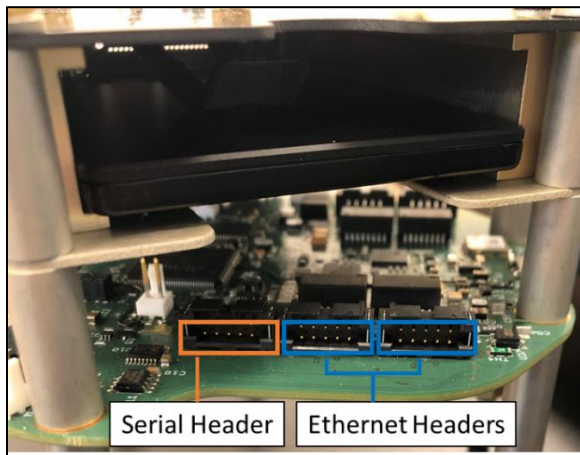


Figure 3. Shrouded headers, below hard drive. Serial header can be configured by DIP switch, see below.

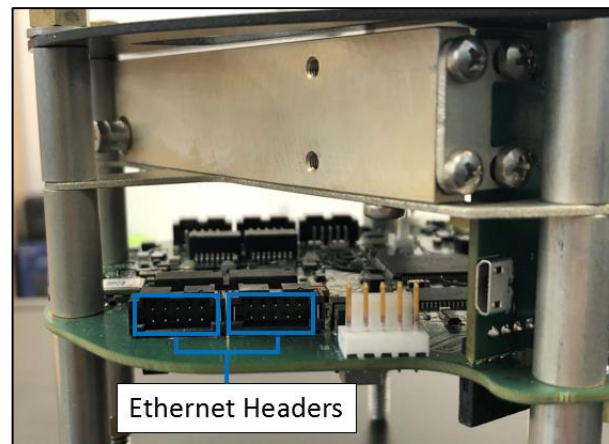
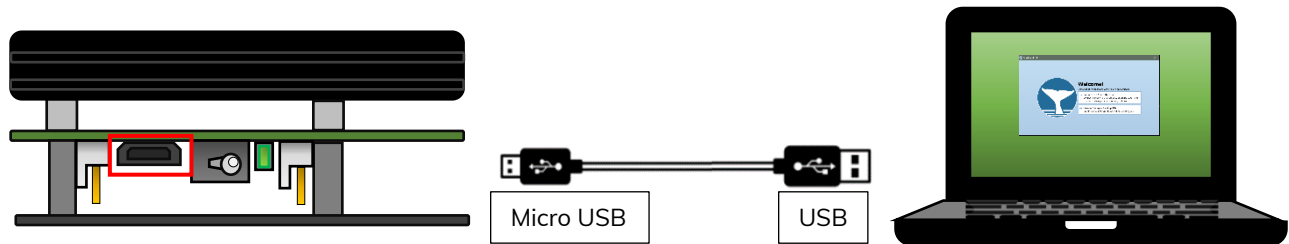


Figure 4. Ethernet shrouded headers.

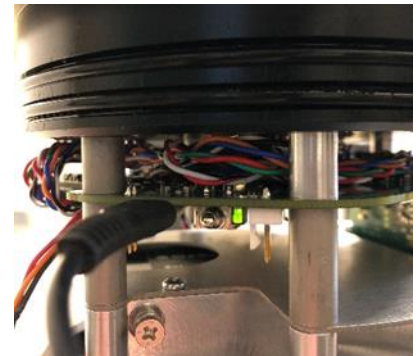
Connecting to the Gordon Board through Micro USB



1. Connect the micro USB to the port beside the toggle switch on the Gordon Board.
2. Connect the other end into a USB port on computer.
3. The device will then become discoverable on your PC through the Gordon App.
4. If the port is not discovered immediately, wait and try the search again.
 - a. To ensure the USB is recognized by the computer, on Windows go to the Device Manager List and look at the port that is connected when the USB is plugged into computer.
 - b. Try turning off and turning on the Smart Recorder.
 - c. Try unplugging and plugging back in the USB.

Indicator Light

There is a green LED indicator light located beside the ON/OFF switch on the Smart Recorder Board. This is used to indicate different functions being performed by the battery pack. The patterns are repeated indefinitely.



Status	Indicator Pattern	
Ready	0.9 seconds on, 0.1 seconds off	
Not Ready	0.5 seconds on, 0.5 seconds off	
Error (bad configuration)	blinks for 1 second, then 1x ¼ second blink	
Error (file system error)	rapid blink for 1 second, then 2x ¼ second blinks	
Off	no light, Gordon is in sleep mode/powerd down	

RS232 / RS422 Serial Port Interface

The DIP switch on the Gordon Board (Figure 5.) is used to control the serial port interface (RS232 or RS422).

These switches only control the communication interface of the shrouded header serial port.

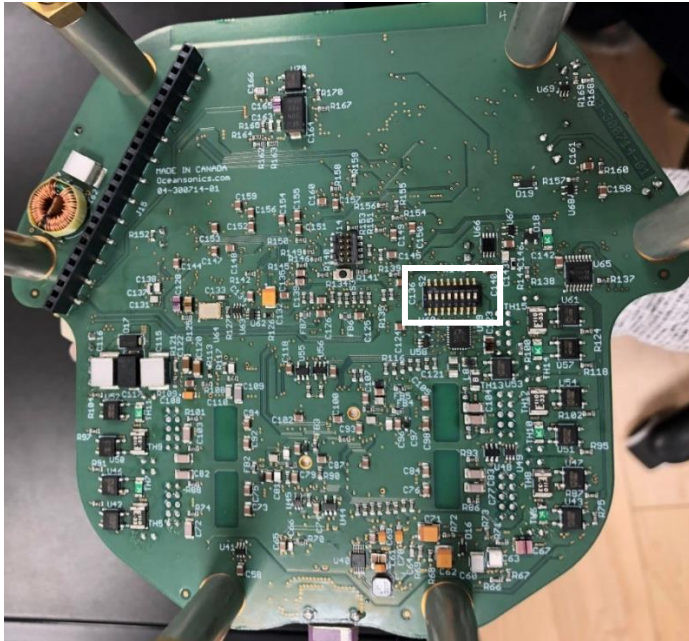
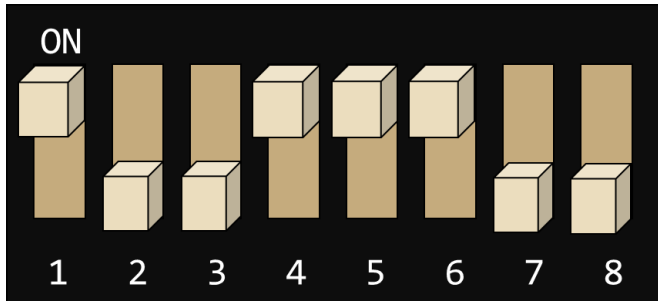


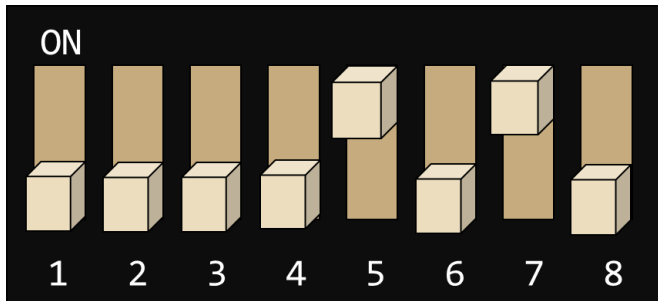
Figure 5. DIP Switch on the Gordon Board indicated by white outline.

RS-232 Position



ON	OFF	OFF	ON	ON	ON	OFF	OFF
1	2	3	4	5	6	7	8

RS-422 Position



OFF	OFF	OFF	OFF	ON	OFF	ON	OFF
1	2	3	4	5	6	7	8