µAURAL

USER GUIDE

MULTI
ÉLECTRONIQUE

Warranty policy

ONE (1) YEAR LIMITED WARRANTY (NEW PRODUCTS)
For a period of one year after the date of original shipment from our factory, products manufactured by Multi-Électronique (MTE) Inc. are warranted to function properly and be free of defects in materials and workmanship. Should a Multi-Électronique (MTE) Inc. instrument fail during the warranty period, return it freight pre-paid to our factory. We will repair it (or at our option, replace it) at no charge, and ship it back to you at your charge using the carrier of your choice.

LIMITED WARRANTY ON SERVICE & REPAIRS
Your warranty begins from the day (the "Purchase Date") you purchase the Product from Multi-Électronique (MTE) Inc. and is valid for a period of one year. This warranty is only available to the original purchaser of the Product and is not transferable.

For all equipments that are used on or under water, the warranty ends after one year or with the first deployment, whichever occurs first.

Equipments manufactured by other companies are warranted only to the limit of the warranties provided by their original manufacturers (typically 1 year).

Electrical cables and dummy plugs are warranted to function properly and be free of defects in materials and workmanship for 1 year.

This warranty is void if in our opinion the instrument has been damaged by accident, mishandled, altered, improperly serviced, or repaired by the customer where such treatment has affected its performance or reliability. In the event of such misuse/abuse by the customer, costs for repairs plus two-way freight costs will be borne by the customer. Instruments found defective should be returned to the factory carefully packed, as the customer will be responsible for freight damage.

Incidental or consequential damages or costs incurred as a result of product malfunction are not the responsibility of Multi-Électronique (MTE) Inc.

SERVICE / WARRANTY EXCLUSIONS – WHAT IS NOT COVERED BY THIS WARRANTY?
The following items are specifically excluded from, and not covered by, this limited warranty:

- Service, repairs or replacement made necessary by accident, misuse, abuse, moisture, liquids, dust, dirt, neglect, accident, damage, improper installation, improper operation, improper cleaning, improper maintenance, normal wear and tear, or any other event, act or omission outside the control of Multi-Électronique (MTE) Inc.
- Replacement of missing parts, the provision of retrofits, or preventive maintenance.
- Installation or removal of accessory retrofits, peripheral equipment or computer systems of which the Product may be a part.
- Service, repair or replacement made necessary by, or relating to, improper connection with any peripheral.
- Software, software faults, or software replacement or fixes.
- Repair or replacement of batteries, covers, plastics, or appearance parts such as interior or exterior finishes or trim.
- Batteries, zinc anodes or other consumable/expendable items are not covered under this warranty.
- Repair of damage that is cosmetic only or does not affect the Product functionality, such as wear and tear, scratches, dents, and scratched, faded or discolored keycaps.
- Service made necessary by any external cause, including fire, theft, acts of God, alteration, problems arising from software or hardware not supplied by Multi-Électronique (MTE) Inc., power failures, power surges or power shortages, lightning, other electrical faults, or repairs, modifications or replacements by persons other than those authorized by Multi-Électronique (MTE) Inc. to service the Product.
- On-site service and repair of the Product.
- Damage to Product caused by failure to follow the specifications, User manuals or Guides as to usage and/or storage.
- Modification to the Products not approved in writing by Multi-Électronique (MTE) Inc.

DISCLAIMER AND LIMITATION OF REMEDY
Multi-Électronique (MTE) Inc. can not be held responsible for any injury caused by the use of Multi-Électronique (MTE) Inc. Product.
Multi-Électronique (MTE) Inc. can not be held responsible for any monetary lost cause by a unit failure of any sort
Multi-Électronique (MTE) Inc. can not be held responsible for any damage to Multi-Électronique (MTE) Inc. product caused by misuse or water intrusion.

You must read and follow all set-up and usage instructions in the applicable user guides and/or manuals enclosed. If you fail to do so, this product may not function properly and you may lose data or suffer other damage.

This warranty will not cover any service that is required, in part or in whole, as a result of any failure to follow the set-up and usage instructions. This warranty does not apply and shall be void and unenforceable if the product is opened, serviced, or repaired by persons other than those authorized by Multi-Électronique (MTE) Inc. to service or repair the product.

If your product fails to work as warranted above, your sole and exclusive remedy shall be repair or replacement of the defective part. In no event will Multi-Électronique (MTE) Inc. be liable to you or any third party for any damages. This limitation applies to damages, costs or expenses of any kind whatsoever including damage to, or loss or corruption of, your records, programs, data or removable storage media, or any direct or indirect damages, lost profits, lost savings or other special, incidental, exemplary or consequential damages, or wheter arising out of the use of or inability to use such product and/or the enclosed user guides and or manuals.

PRE-INSTALLED SOFTWARE & OPTIONS
Multi-Électronique (MTE) Inc. offers no warranty or representation, either expressed or implied, with respect to software, its quality, performance, merchantability, fitness for a particular purpose or otherwise. Nor does Multi-Électronique (MTE) Inc. guarantee that the functions contained in this software will meet your requirements or that the operation of this software will be uninterrupted or error free. As a result, unless otherwise stated in writing, this software is provided "as is". Should this software prove defective, you, the purchaser, are assuming the entire risk as to its quality and performance as well as any costs associated with servicing, repair, or correction. In particular, Multi-Électronique (MTE) Inc. shall have no liability for any programs or data stored or used with Multi-Électronique (MTE) Inc. Products, including the costs of recovering such programs or data. Factory installed hardware items included or bundled with your Product are covered under this Limited Warranty. Multi-Électronique (MTE) Inc. accessory items purchased with the Product are covered by their own respective limited warranties.

WE ARE HERE FOR YOU
We believe in our customers and we are here for you. We understand that you may have questions regarding your Multi-Électronique (MTE) Inc. Products. Should you require any assistance, from technical questions to more general information, our Technical Support and Customer Service staff is available to you. You may reach any one of our Technical Support or Customer Service Representatives by contacting our Support line at 418-724-5835 or visit our website at www.multi-electronique.com. Please note that when you call the Multi-Électronique (MTE) Inc. Support Center you will be asked to provide your name, phone number, address, model number and serial number of your unit if applicable, in order to provide you quality support. All customer information will be used internally under strict confidential policies. If you unit is Out of Warranty and you call the Multi-Électronique (MTE) Inc. Support Center, please be advised that your call may be chargeable.

Contents

Warranty policy **2**
Packing contents 5
About µAURAL 7
- Conventions used in this guide 7

Precautions **8**
- Important safety instructions 8
- Repair 8

Handling of the µAURAL **9**

Parts identification **11**
- Electronic board 12
- Batteries 13
- µAURAL NiMH charger 13
- SD memory card 14
- Hydrophone 14

Setting up µAURAL with software **15**
- Install driver and software 15
- Connect to a computer 15
- µAURAL setup 17
- Continuous recording mode 18
- Cycle recording mode 19
- Mission overview 20

Start-up **22**
- Led code and meaning 23
- Recovery of the unit 24

Options **25**
- Support 25
- Extra battery pack 26

Appendix 1 – Getting started **27**

Packing contents

- ❑ 1 x µAURAL
- ❑ 1 x Magnet
- ❑ 1 x User guide
- ❑ 1 x USB key
- ❑ 1 x Communication cable (USB)
- ❑ 1 x Power supply cable
- ❑ Hydrophone cage (optional)
  - ❑ Spare tie wraps
  - ❑ 4 x o-ring og-568-113
- ❑ 1 x NiMH charger
- ❑ 1 x o-ring cg-568-137
- ❑ 1 x o-ring 568-144
- ❑ 1 x Grease pot
- ❑ 2 x Decicabag

S/N : _____

Check by _____

ABOUT µAURAL

(Micro-Autonomous Underwater Recorder for Acoustic Listening)

Fields of application

- Mammal studies
- Hydrophone network
- Ice cracking
- Drilling and explosions
- Any sea noise…

Functions

- Underwater Sounds Recorder

Characteristics

- 24 Bits Digital recording
- Programmable recording mode : continuous, duty cycle
- Configurable sampling rate: 8000, 16 000, 32 000, 48 000, 64 000, 96 000* samples/seconds
- SD HC card storage

Design Features

- Hydrophone HTI-96-MIN
- Uses rechargeable NiMH removable battery packs

*96 000 samples/second is available in 16-Bit

Conventions used in this guide

Please read the following manual carefully before using your µAURAL. This manual contains important information on how to properly operate the unit.

Tips or Tricks

Essential information to know about the device

WARNING – To prevent possible injuries and equipment damage

Precautions

Thank you for purchasing the micro - Autonomous Underwater Recorder for Acoustic Listening from Multi-Électronique (MTE) Inc. For optimum performance and safety, read this guide and retain it for future reference.

Important safety instructions

- Read this manual before using the device for the first time.
- Keep these instructions for future reference.
- Heed all warnings.
- Follow all instructions.
- Contact Multi-Électronique (MTE) Inc. for any repair. Servicing is required when the device has been damaged in any way. Do not try to repair the µAURAL by yourself.

Repair

Contact Multi-Électronique for any service, repairs, or part replacement. The unit might require repairs if:

- Water has infiltrated the unit.
- The unit was dropped or damaged.
- The unit's performance has changed.

Do not try to repair this product by yourself.

Call Multi-Électronique (MTE) Inc. at (418) 724-5835 or by email at info@multi-electronique.com

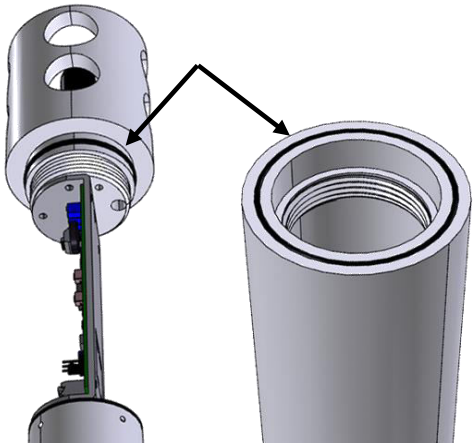
Handling of the µAURAL

Never use the hydrophone cage to fix a cable so you may severely damage the hydrophone.

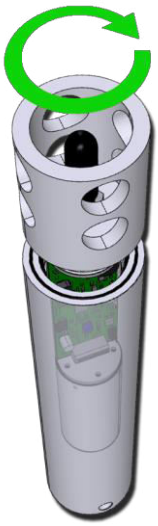
Use the hole located on the bottom part of the cylinder to fix a cable for deployment.

Make sure the o-rings are in place before mooring.

Before each immersion, it is important to make sure that both o-rings located on the cap and the housing are in place and clean to prevent water infiltration.



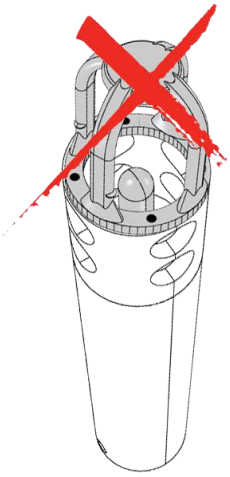
Use the delrin cage as handle to open/close the cap.

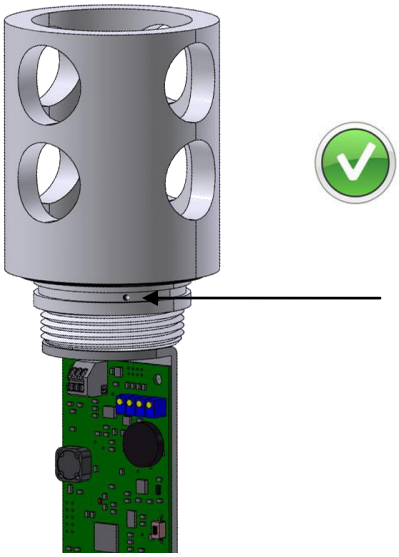


To remove the cap and access the electronic section, use the delrin cage as handle and turn counter clockwise. Remove the inner section of the device by pulling it upwards.

To close the cap, use the delrin cage as handle to turn clockwise. Use hand force to tighten and make sure the o-ring makes a good seal. **Do not over tighten.**

If your µAURAL is equipped with the optional plastic cage, do not use it as handle to open/close the cap or you may damage it.





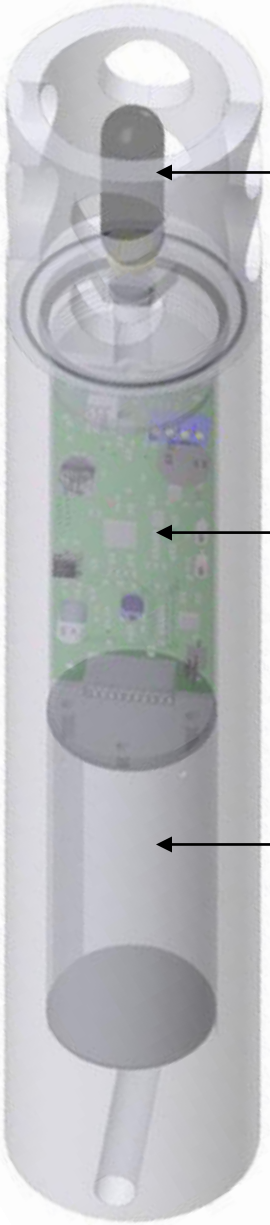
When you open the µAURAL, progressively loosen the cap until you see the exhaust hole and wait for the pressure to settle.

Exhaust hole

If the µAURAL take on water, pressurised water can escape by the hole. **Be careful.**

Parts identification

µAURAL



Hydrophone

Electronic Section

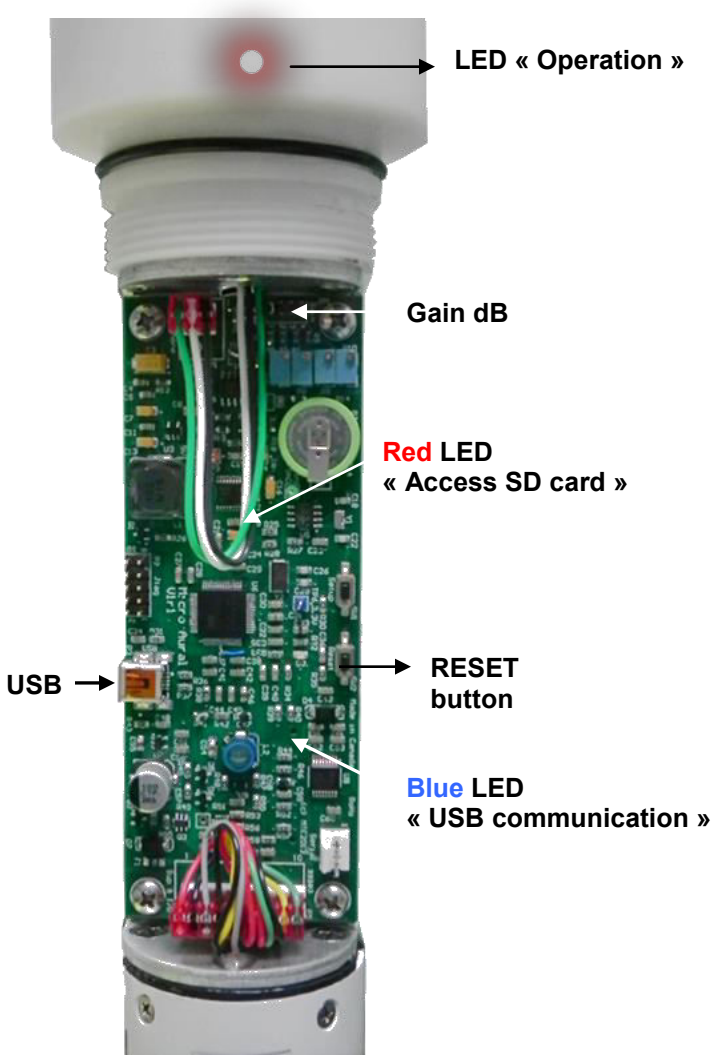
Battery Section

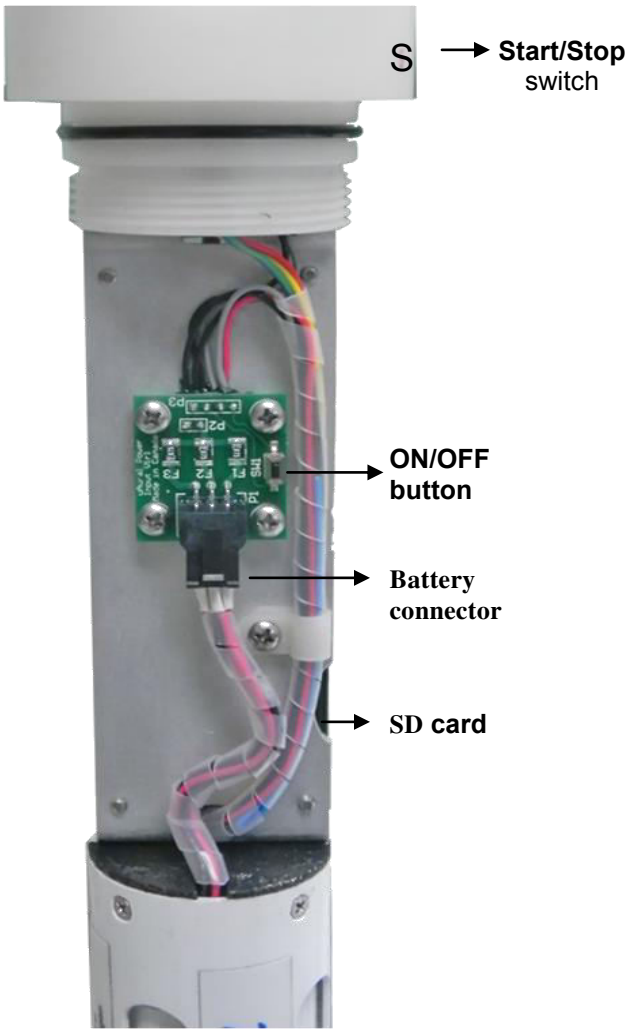
User Guide

Software

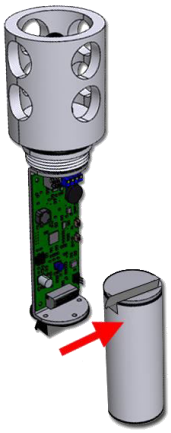
Magnet

Electronic board





Batteries



The µAURAL is powered with a rechargeable NiMH battery pack. The battery pack is made of 3 sections of 7 x AA cells for a total of 8.4V, 2700 mA X 3.

To change a battery pack:

1. Press and hold the clip of the battery connector, gently pull in the direction of the cable to remove the connector from its socket.
2. Slide the battery pack.

µAURAL NiMH Charger

The charger is designed to charge the entire battery pack and to turn off automatic went the charge is done to avoid damage the cells. You do not need to remove the battery pack to charge it.

The battery pack may get warm when charging them. Be sure to charge the battery in a well ventilated environment.

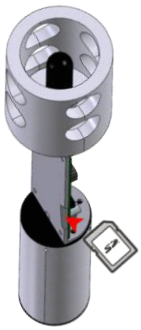
Green (Connected): Battery is properly connected and ready to charge.

Red (Fault): It may happen that an error occurs occasionally. To clear the error code, unplug the battery connector and the power supply and connect again. If the fault still appears, you may have a problem with the battery. Contact Multi-Electronique for more detail.

Yellow (Charging): The LED turns On when battery is charging. It turns OFF when completed.

Wait for all three (3) battery section to be fully charged before disconnecting it (all yellow LEDs will turn OFF). The charging time may differ from a battery section to another. You can keep the battery pack on the charger; it will turn OFF when fully charged and automatically restart if needed.

SD memory card



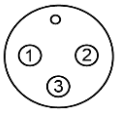
To ensure the proper working of the µAURAL, we recommend to use *Transcend* or *Sandisk* SD-HC memory card. These brands have been tested and approved after several tests in our facilities.

When you change or insert a SD card, make sure the µAURAL is shut down.

Hydrophone

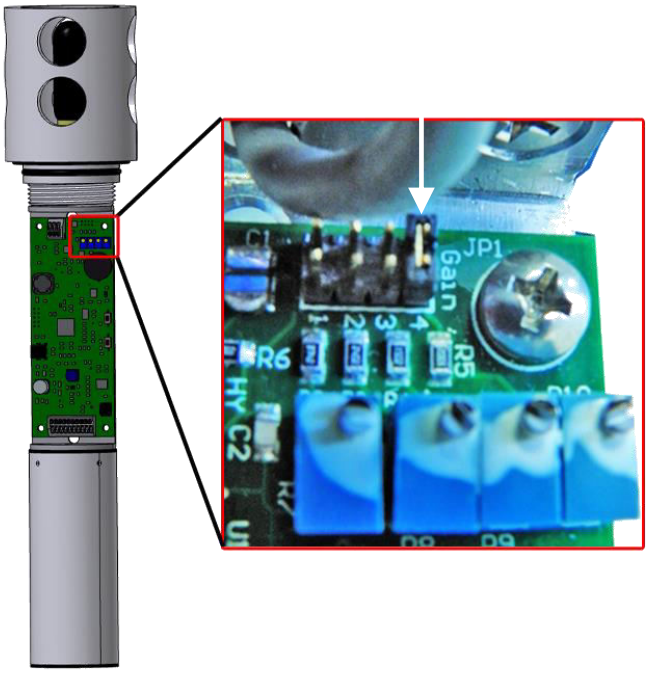
The hydrophone is calibrated directly at the factory. At the purchase of a µAURAL, we provide you with a sheet showing the sensitivity of the hydrophone. This sheet comes from the factory and Multi-Electronique cannot be held responsible for any information presented on that sheet.

If necessary, additional hydrophones can be obtained individually from Multi-Électronique. Each hydrophone is accompanied by a specification sheet (the same that was provided at the purchase of your µAURAL).

Pin Out	
1. +5V 2. Signal Output 3. 5DVC Return/Signal Gnd	

You can set the amplifier gain according to the required amplification. Open the unit to get access to the electronic section and move the jumper on the suitable pins (J1 to J4) as illustrated below:

Please note that gains are calibrated ± 0.002 dB.



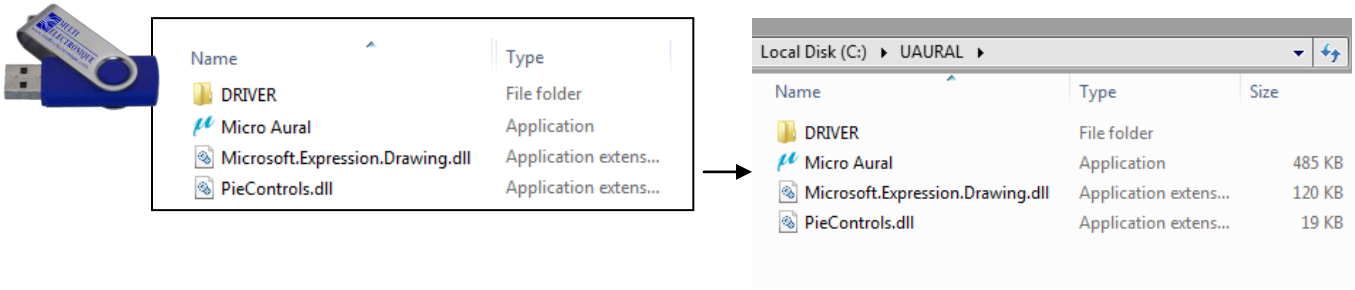
Jumper	Gain
1	18 dB
2	15 dB
3	12 dB
4	9 dB

Setting up µAURAL with software

Install driver and software

Before you connect the µAURAL to your computer for the first time, retrieve the content of the USB key.

Copy the content of the USB flash drive and paste it into a folder you will name UAURAL on the C drive of your pc.



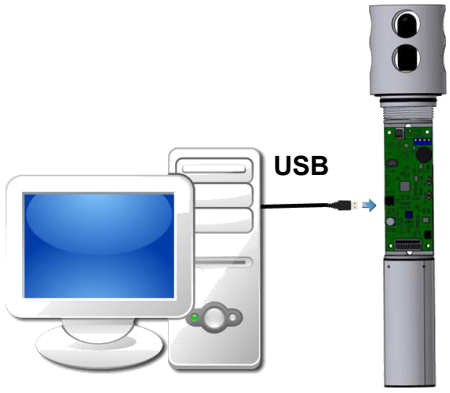
Connect to a computer

In order to save battery life, the µAURAL is powered by USB when plugged into a USB device such as a computer.

When connected to a computer, the µAURAL goes into "Mass storage" mode. You can browse through records files, format the memory card or set the device with the Micro AURAL setup software.

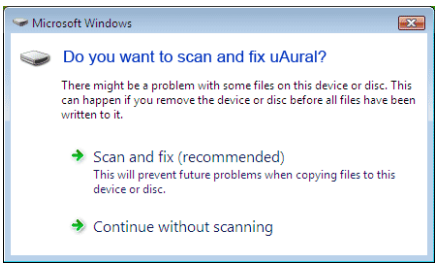
To connect the µAURAL to a computer:

1. Make sure the µAURAL is shut down. *(Refer to shutdown procedure on page 23 – LED Code and meaning)*
2. Connect the USB cable
3. You can launch µAURAL setup software provided in the USB Key.

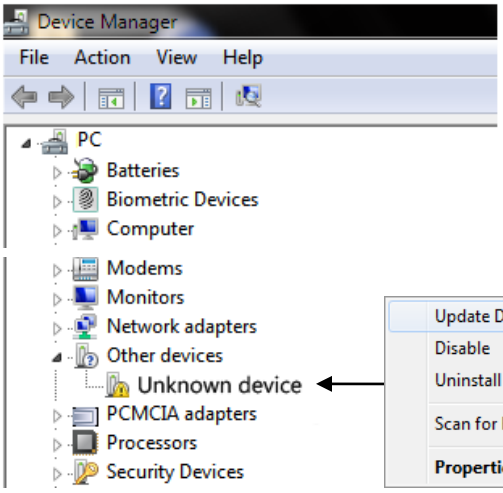


The µAURAL comes with configuration software. Updates are available on our website: www.multi-electronique.com

It may happen that an error message appears when connecting the µAURAL. If the following message appears, press on **Continue without scanning.**



If the following message error appears, you must update manually the driver.

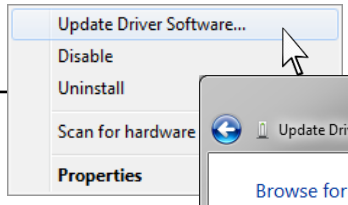


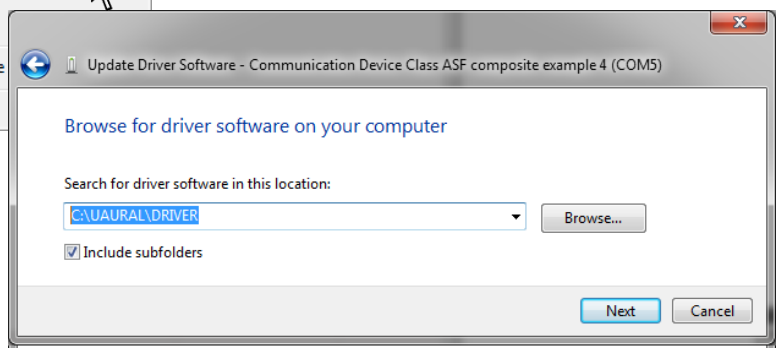
To update the driver manually:

1. Open Device Manager and locate the driver that not installed correctly

2. Right click on it to update driver software.

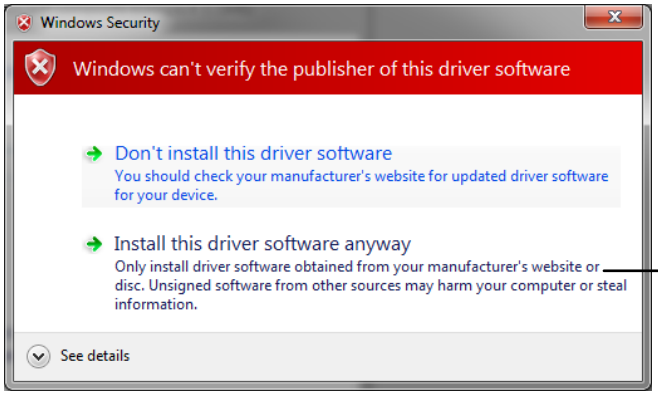
3. Search for driver located in folder C://UAURAL, DRIVER.

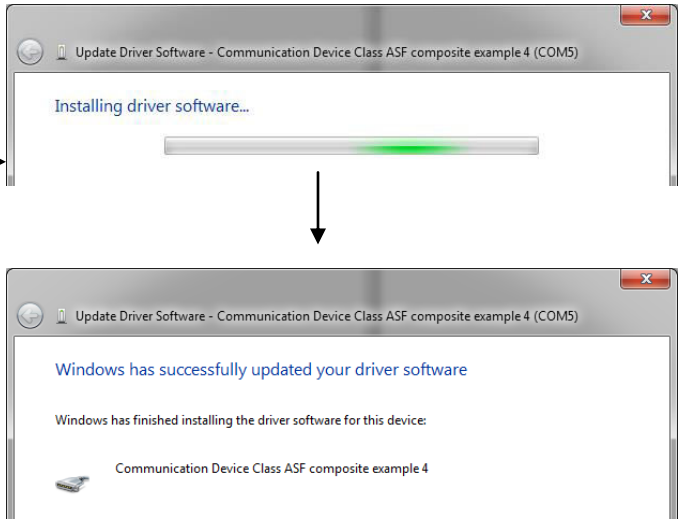




4. A Windows security message should appear, install the driver software anyway

5. Wait for the driver to install and press OK when installation is completed. You can now use your device properly.





µAURAL setup

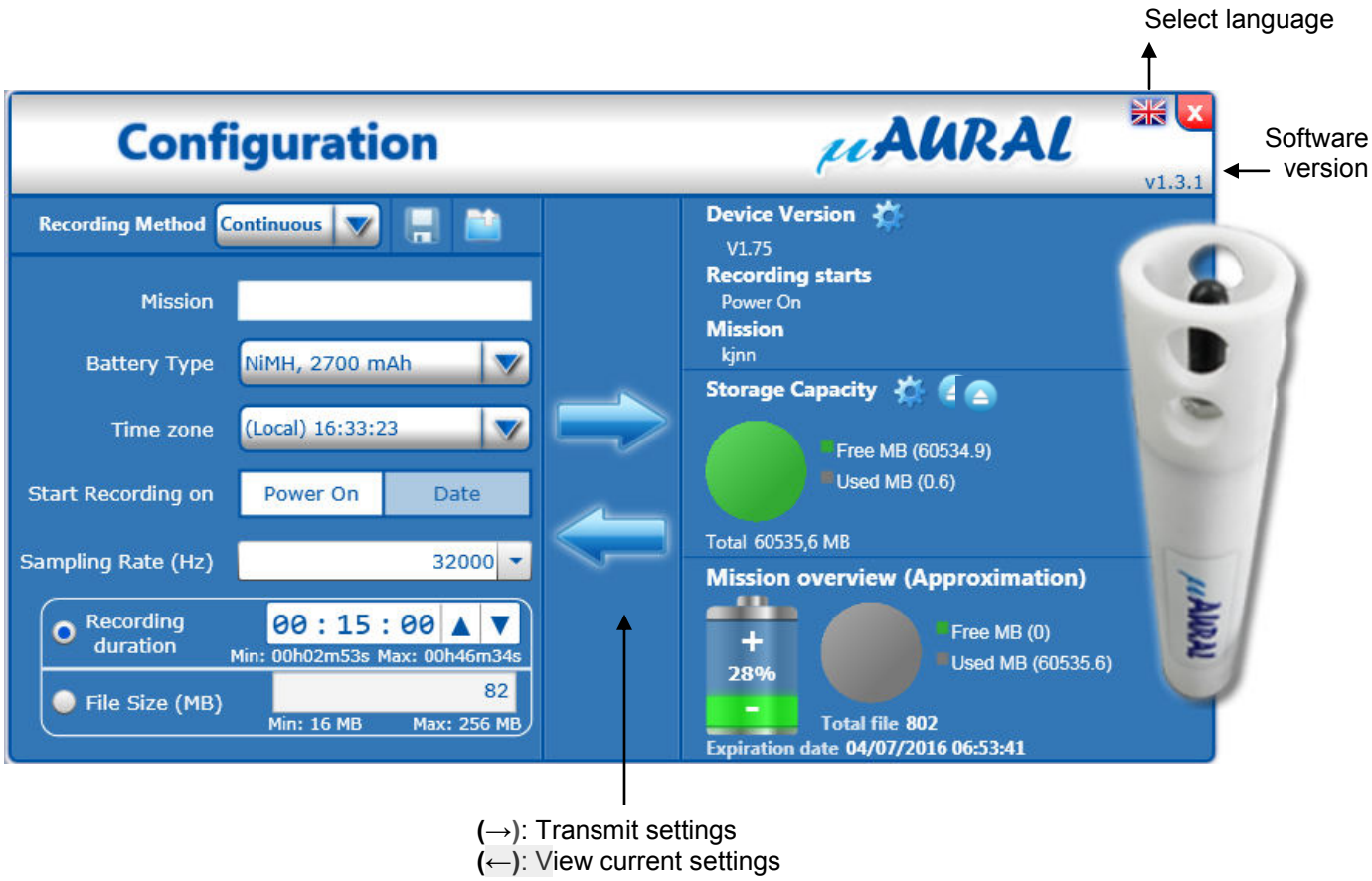
Configuration

- Select recording mode (continuous or cycle)
- Save or import a profile
- Select battery type
- Select time zone
- Select sampling rate

µAURAL

- It displays the firmware version and an overview of the mission.

  The background is grey when no device is connected. It turns blue when the µAURAL is detected.



Continuous recording mode

Save or import a mission profile

Mission name

Battery type

Time zone (Local, UTC-GMT or by Time zone)

Start Recording on Power on or at specific date

Date

Select the date you want to start recording.

If no time is specified, recording will start at 00:00.

The µAURAL records until memory card is full or the battery exhausted.

Recording duration / File Size

You have two options:

File duration: The µAURAL will create 15-minute recording files until the memory card is full or the batteries exhausted.

File size (MB): The µAURAL will create files of 83 MB until the memory card is full or the batteries exhausted.

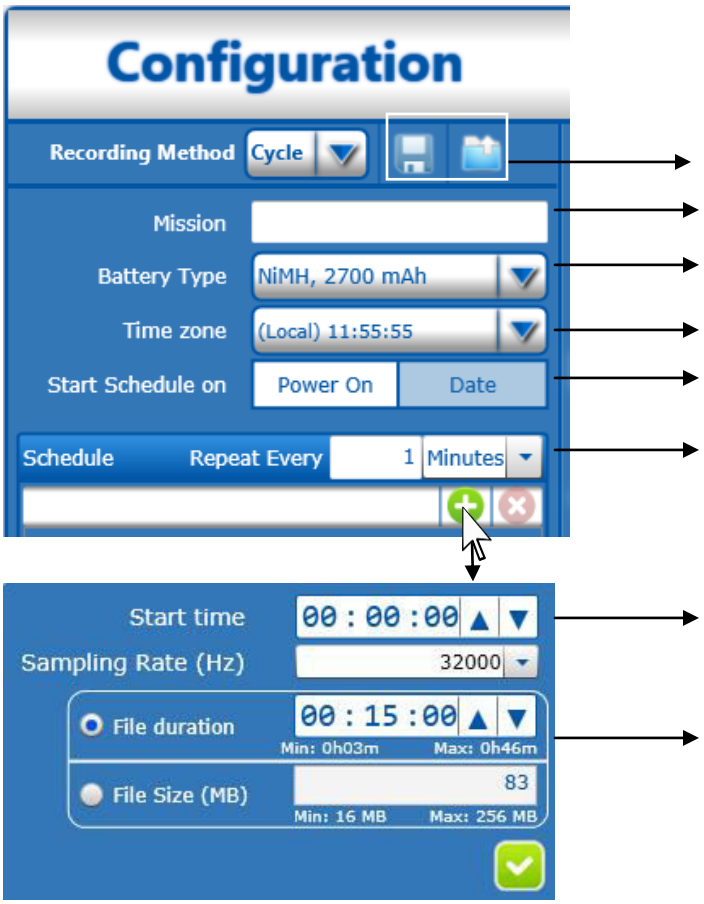
You can edit these numbers, using the minimum and maximum calculated by the software.

Select sampling rate

Click the arrow to send configurations to the device and check the approximate results of the mission.

Configurations will be stored in the memory of the µAURAL. Before mooring the instrument into water, **be sure to turn ON** the device by approaching the magnet to the switch.

Cycle recording mode:



Save or import a mission profile

Mission name

Battery type

Time zone (Local, UTC-GMT or by Time zone)

Start Schedule on (Power On or selected Date)

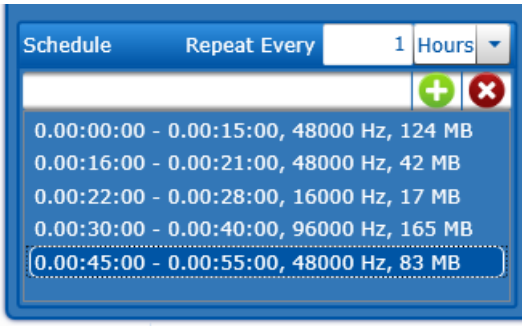
Select the duration of the cycle (minutes, hours, days)

Start time

Select the file size depending on the duration (in minute) or size (in MB). Your value must be between the minimum and maximum value calculated by the program.

Once your cycle is created, it appears in the sidebar. You can create as much cycle as desired, as long as there are no conflicts between them.

Example:



<u>1-hour cycle composed of 5 recordings</u>:

1. A 15-minute recording @ 48 000 Hz will start at 00:00 and end at 00:15. The size of the file is 124 MB.

2. A 5-minute recording @ 48 000 Hz will start at 00:16 and end at 00:21. The size of the file is 42 MB.

3. A 6-minute recording @ 16 000 Hz will start at 00:22 and end at 00:28. The size of the file is 17 MB.

4. A 10-minute recording @ 96 000 Hz will start at 00:30 and end at 00:40. The size of the file is 165 MB.

5. A 10-minute recording @ 48 000 Hz will start at 00:45 and end at 00:55. The size of the file is 83 MB.

This cycle will be repeated every hour until the memory card is full or the batteries exhausted.

Mission overview

After transmitting the configuration to the µAURAL, information will appear on the screen:

Device version
- Display the device version

Recording starts
- Date of your mission

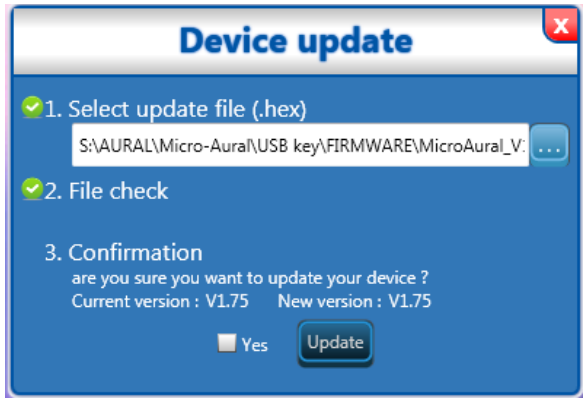
Mission
- Mission name

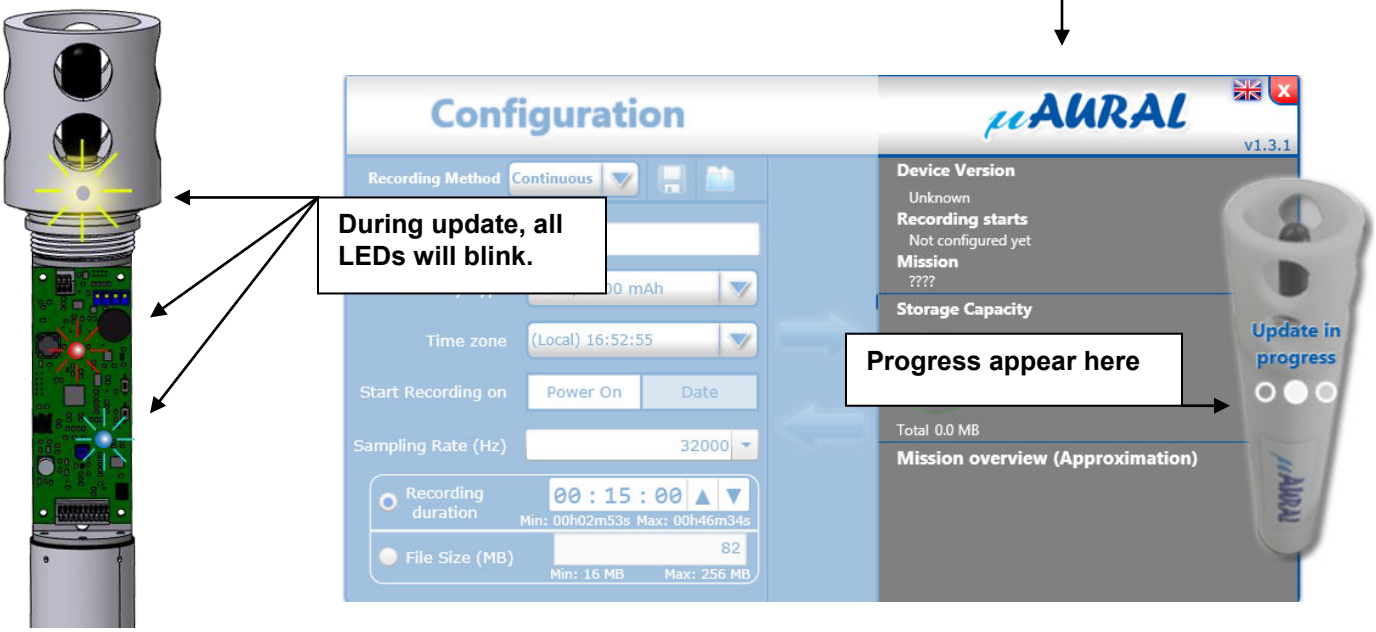
To update your device:

1. Check the µAURAL user section of our website for update file.

2. Open the .hex update file.

3. To confirm, click on update.



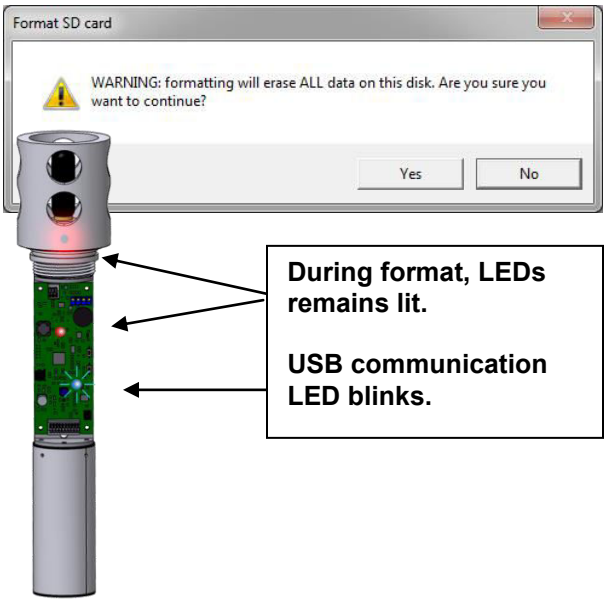


Storage Capacity

The storage capacity is represented by a pie chart.

Open with explorer: Browse your files in explorer.

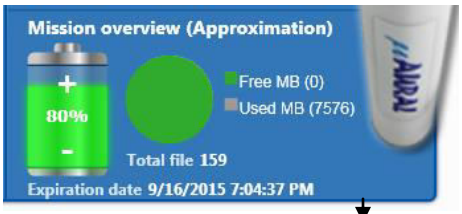
Format SD Card: Click on this button to format your memory card. **Warning this action is irreversible**.



Mission overview

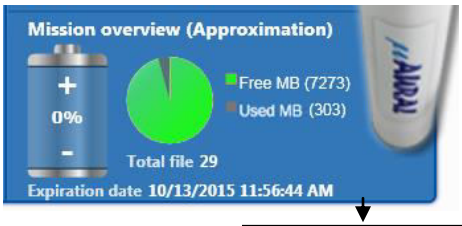
- The battery capacity after the mission
- The expiration date
- Number of files

Example 1



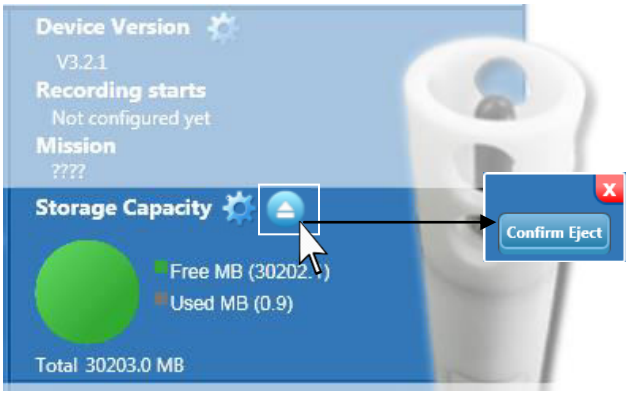
The memory will be full before battery are exhausted

Example 2



Batteries will be exhausted before the memory is full.

The software will estimate results, assuming that the batteries are at full charge.



You should always safely eject the µAURAL before physically unplugging it from USB.

Start-up

The µAURAL has been designed for quick and easy start-up before a mooring. It uses an ON/OFF switch which is activated by a magnet.

After configuration, be sure to turn ON the µAURAL before the mooring. Simply approach the magnet near the switch located under the cage.

To turn ON the µAURAL:

1. Locate the « S » (Start/Stop switch) on the cap.
2. Approach the magnet until the LED remains lit
3. Remove magnet
4. Refers to page next page for ***LED CODES and meaning***.

An alternate way to Turn ON/Turn OFF your µAURAL is to use the ON/OFF button located on the printed circuit board.

LED CODES and meaning

Here is the list of LED CODE that you should observe. Refer to this list to check the status of your µAURAL at anytime.

Legend:

: RED LED blinks quickly for 3 seconds

: GREEN LED blinks quickly for 3 seconds

: RED LED blinks very quickly for 3 seconds

: RED LED remains lit for 3 seconds

: GREEN LED remains lit for 3 seconds

: RED LED blinks slowly

Detecting	Checking system	Status of the µAURAL	→ What to do?
-**Detecting magnet**- RED LED blinks	- **Checking system** -	-**µAURAL has no configuration**- RED light remains lit until you configure device	• Launch micro-AURAL software and configure your device
- **Detecting magnet** - RED LED blinks	- **Checking system** - µAURAL is set for continuous recording	-**Recording**- RED LED blinks slowly when recording	• The µAURAL is active and is programmed to continuous recording. It will record or go into sleep mode depending on current setting.
-**Detecting magnet**- RED LED blinks	- **Checking system** - µAURAL is set for cycle recording, LED turns GREEN	-**Go to sleep mode until next recording** - GREEN LED blinks quickly and then turn OFF	• The µAURAL is active and is programmed for cycle recording. It will record or go into sleep mode depending on current setting
-**Detecting magnet**- GREEN LED blinks	- **Checking system** - µAURAL is set for cycle recording,	-**Go to sleep mode until next recording** - GREEN LED blinks	

Shutdown procedure (when in cycle recording)

To shut down the device, simply approach the magnet for approximately 6 seconds. It will blink red, blink green and shut down.

Shutdown procedure (when in continuous recording)

To shut down the device, approach the magnet for approximately 3 seconds. It will blink red, stay illuminated and shut down.

Others

When the µAURAL blinks red and green simultaneously, it means the memory card is full.

When the µAURAL blinks red very quickly, it can't shut down because the USB cable is connected. Unplug it.

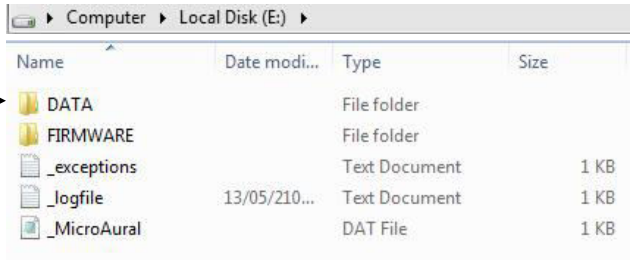
Recovery of the unit

Data transfer

The µAURAL is designed for very low battery consumption; therefore it uses a low data transfer rate to communicate through USB. To access and copy your files, we strongly recommend using the SD card reader on your computer to access your recording files.

Open the drive corresponding to your device.

The files will be located in the folder **DATA**.



File name data structure:

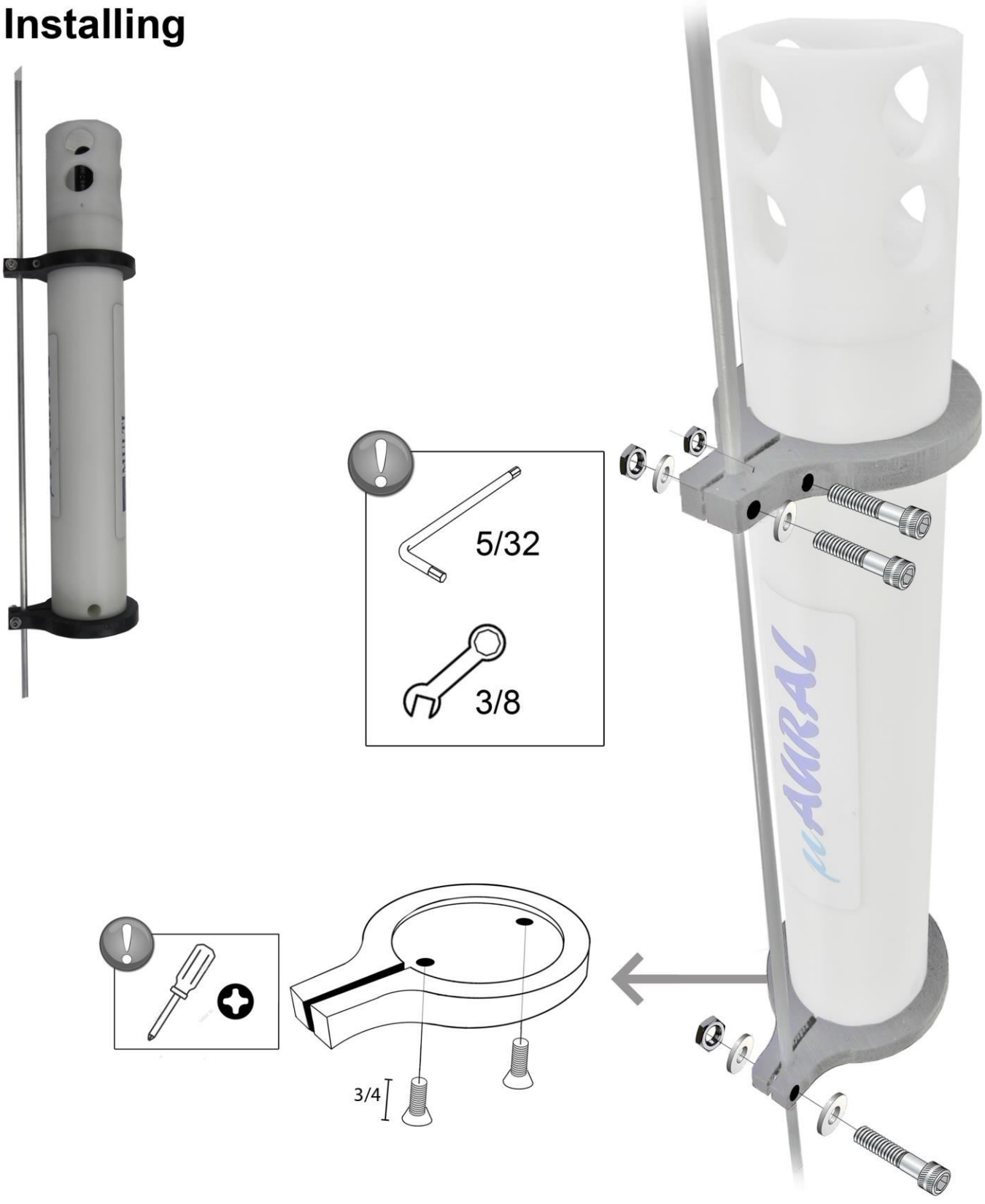
155626_20150826_32Khz_saintlawrence2015.wav

Hour date frequency mission name filename extension

Options- *Support*

The µAURAL can have in option a support to be fixed on a mooring rope.

Installing



Options- *Extra battery pack*

You can order an extra battery pack to allow you to collect data without having to wait until the pack is recharged.

Appendix 1- *Getting Started*

AURAL Unboxing

- ☐ Open the box and check if you have received everything
- ☐ From the provided USB key, recover the manual and install software
    - ☐ µAURAL setup

Configuration

- ☐ Open the µAURAL
- ☐ Charge the battery pack
- ☐ Run µAURAL Setup ☐ Format SD card
- ☐ In µAURAL Setup, select desired parameters to transmit to the device.
- ☐ Close the µAURAL

Mooring

- ☐ Make sure that the µAURAL is properly closed
- ☐ Turn ON before mooring

Recovery

- ☐ Retrieve µAURAL
- ☐ Thoroughly rinse µAURAL external parts with fresh water
- ☐ Visually inspect the µAURAL
- ☐ Open the µAURAL to retrieve SD card and data