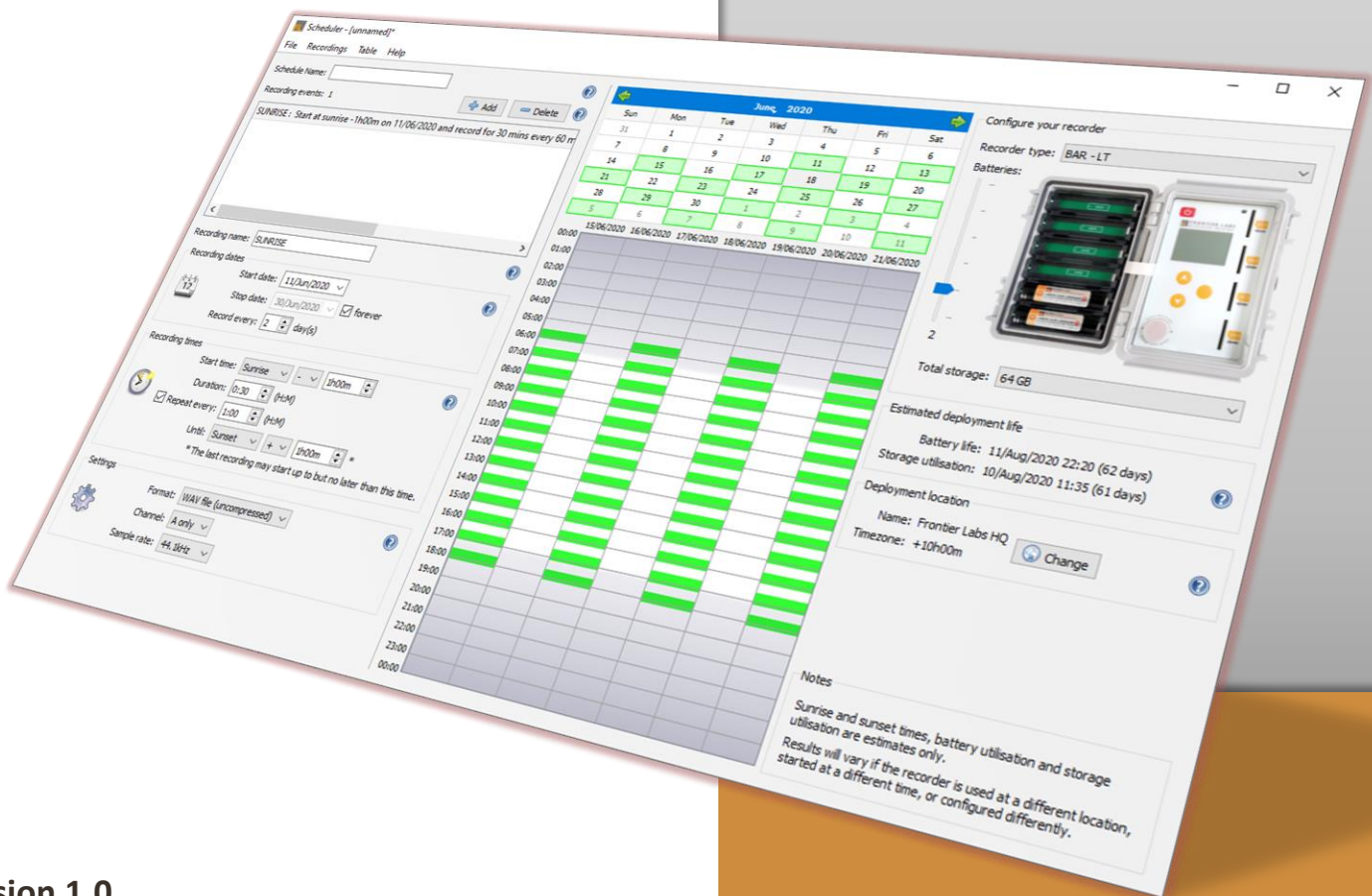


# SCHEDULER User manual

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Version 1.0

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11/06/2020



FRONTIER  
LABS **FL**

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# Overview

## Introduction

The Scheduler application allows you to create, edit, visualise and save schedule files in the Frontier Labs Schedule (FLS) format. These schedule files can be used to control the operation of Frontier Labs' sound recording devices, such as the BAR, the BAR-LT and the Solar-BAR, allowing them to only record during specified times and then sleep in between to save power.

An overview of the features of the application and file format are given below.

## Features

The Scheduler application and FLS file format provide the following features:

- Recording events may be created, edited or viewed. Each event specifies one or more recording commands for the device; up to 250 such events may be created in a single schedule file. Each recording event consists of 3 main sections; recording dates, recording times and recording settings as described below.

### Recording Dates:



Recordings start on a particular date then repeat until a specified end date is reached or repeat forever. You can also skip N days between each recording if you choose.

e.g. Start at 01/July/2019 and record every day forever.

e.g. Record every 7th day from 1st March to 29th March (inclusive)

### Recording Times:



Recording times can begin at a precise time (e.g. 06:00) or relative to dawn/dusk (e.g. sunrise - 1hour). Then repeat at a specified interval until a certain time is reached.

e.g. Start at sunrise - 1 hour and record for 10mins every hour until sunset + 1 hour.

e.g. Record for 10 minutes every hour between 6PM and 6AM

### Recording Settings:



Recording settings such as sample rate, channel and file format may be configured independently for each event.

- Storage utilisation is estimated and displayed, giving the user feedback on whether their desired set of recordings will fully fit within the space available.
- Battery utilisation is estimated and displayed, giving the user feedback on whether the recording device has sufficient power to complete the full set of recordings.

- A graphical timetable view allows the user to visualise their schedule, showing sunrise/sunset times, recording events, and predictions on when the battery and storage will run out.
- Details of the recorder location, batteries and storage space are fully configurable and saved for future use and may be transferred from one FLS file to another.

## Main Window

The main window is divided into 3 sections: The first section (left) is where you edit your schedule and add/modify/delete recording events. When you first start the Scheduler program, or when you have no recording events to edit, this will show some “Getting Started” notes. The middle section is a calendar and timetable view which shows a graphical representation of the schedule. The third section is where you can configure the recorder such as the recorder type, number of batteries you will use and the total storage space of the memory cards you will use. This information is then used to calculate the battery life and storage requirements of the schedule.

The screenshot shows the Scheduler User Manual Main Window. It is divided into three main sections:

- Schedule edit area:** This section is on the left. It contains a "Getting Started" note, a "Recording Dates" section, a "Recording Times" section, and a "Settings" section. It also has buttons for "Add" and "Delete" recording events.
- Calendar/Timetable view:** This section is in the middle. It displays a calendar for June 2020 and a timetable view showing recording times from 00:00 to 23:00.
- Recorder configuration:** This section is on the right. It contains a "Configure your recorder" panel with fields for "Recorder type", "Batteries", "Total storage", "Estimated deployment life", "Battery life", "Storage utilisation", "Deployment location", and "Timezone". It also includes a "Notes" section.

Callouts point to the "Schedule edit area", "Calendar/Timetable view", and "Recorder configuration" sections.

### Helpful hints!



Wherever you see this question mark icon in the scheduler program, click or hover your mouse over it for a useful tip about the item it's near.



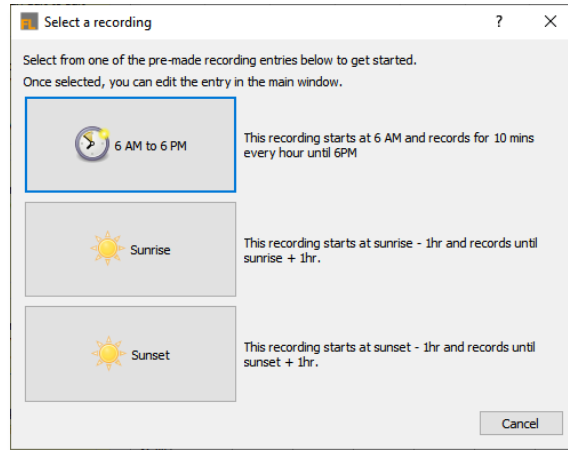
# Creating a Schedule

## Adding a new recording event

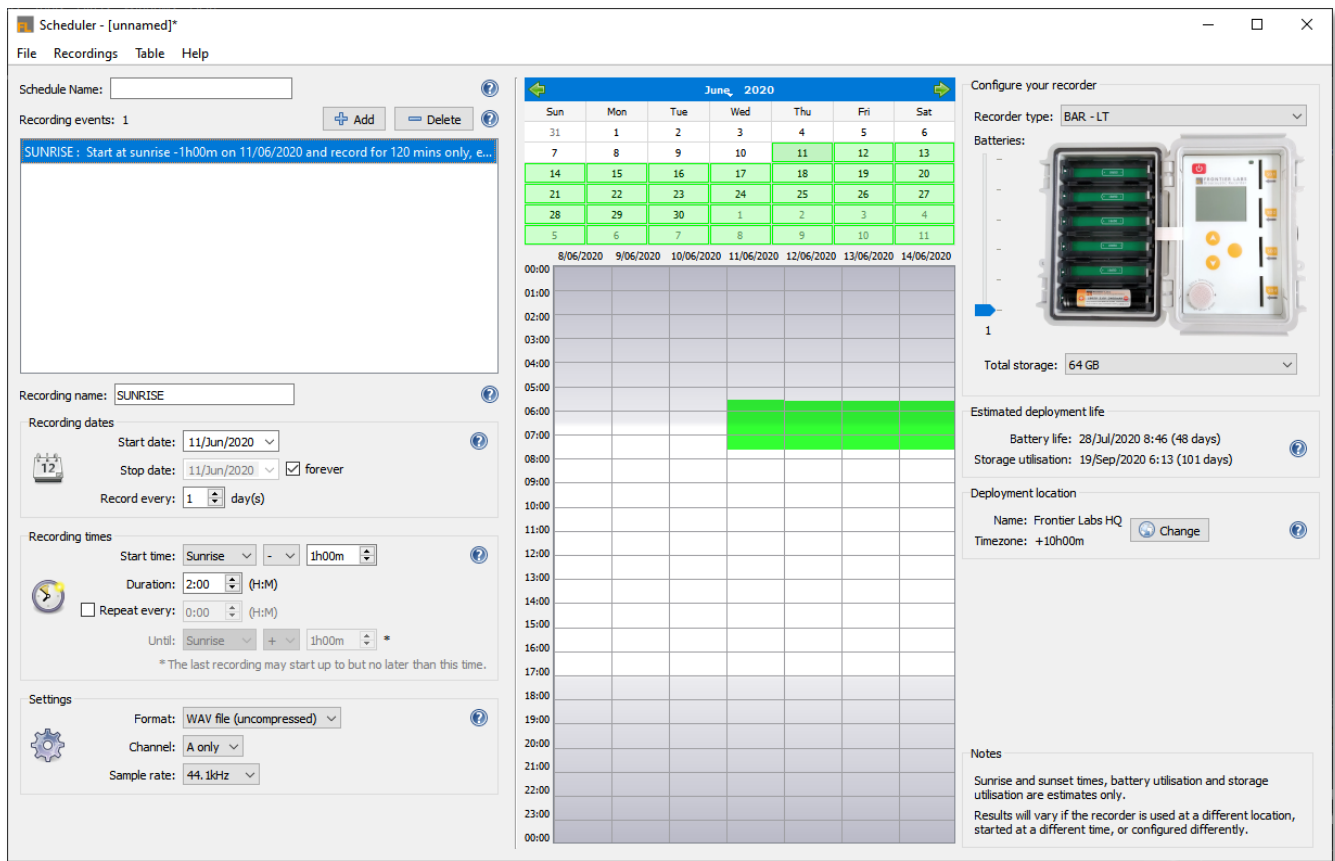
Click the [+Add] button shown below to create a new recording event.

The screenshot shows the 'Scheduler - [unnamed]' application window. The interface includes a menu bar (File, Recordings, Table, Help), a 'Schedule Name' input field, and a 'Recording events' section with an '+ Add' button and a '- Delete' button. A large red arrow points to the '+ Add' button. Below the 'Recording events' section is a 'Getting Started' panel with instructions on creating a new recording event, including sections for 'Recording Dates', 'Recording Times', and 'Settings'. The main area displays a calendar for June 2020 and a grid for recording times from 00:00 to 23:00. On the right, the 'Configure your recorder' panel shows settings for the 'Recorder type' (BAR - LT), 'Batteries', 'Total storage' (64 GB), 'Estimated deployment life' (Battery life, Storage utilisation), 'Deployment location' (Name: Frontier Labs HQ, Timezone: +10h00m), and 'Notes'.

This will bring up a menu for you to choose from some common recording patterns, such as recording for 2 hours around sunrise or recording for 10 mins every hour between 2 set times for example.



Select an example recording and it will pre-fill the schedule edit window as shown below. Now you can edit the recording dates, times and settings to exactly what you need and see the changes updated in the graphical calendar and timetable view. Editing a recording event is described in detail in the next section.



### Editing a recording event

Select the recording event you wish to edit from the list of events on the left and the details of that entry will appear below it. These details include the recording name, dates, times and settings of the recording and are described in detail below. While making changes to those fields the graphical calendar and timeline views will be updated as well as the estimated battery life and storage utilisation.

The screenshot shows the 'Scheduler - [unnamed]\*' application window. On the left, a list of recording events shows 'SUNRISE: Start at sunrise -1h00m on 11/06/2020 and record for 120 mins only, e...'. A large yellow arrow points to this event. Below the list, the details for the selected event are shown:

- Recording name:** SUNRISE
- Recording dates:** Start date: 11/06/2020, Stop date: 11/06/2020, ☒ forever, Record every: 1 day(s)
- Recording times:** Start time: Sunrise, Duration: 2:00 (H:M), ☐ Repeat every: 0:00 (H:M), Until: Sunrise, 1h00m \*
- Settings:** Format: WAV file (uncompressed), Channel: A only, Sample rate: 44.1kHz

In the center, a calendar for June 2020 shows the recording period highlighted in green. Below the calendar is a timeline view from 00:00 to 23:00, also showing the recording period in green. On the right, the 'Configure your recorder' panel shows:

- Recorder type:** BAR-LT
- Batteries:** A visual representation of the recorder's battery status.
- Total storage:** 64 GB
- Estimated deployment life:** Battery life: 28/Jul/2020 8:46 (48 days), Storage utilisation: 19/Sep/2020 6:13 (101 days)
- Deployment location:** Name: Frontier Labs HQ, Timezone: +10h00m
- Notes:** Sunrise and sunset times, battery utilisation and storage utilisation are estimates only. Results will vary if the recorder is used at a different location, started at a different time, or configured differently.

### Recording Name:

The recording name gets appended to the file name of each recording. It appears after the date and time stamp which are automatically added by the recorder.

The filename format is the ISO8601 timestamp followed by the recording name.

e.g. 20200101T050000+1000\_SUNRISE.wav



### Recording Dates:



#### Start date:

This is the first day on which the selected recording event will take place. If this is set to the future, the recorder will enter sleep mode until that date is reached and then wakeup and begin recording.

#### Stop date:

This is the last day on which the selected recording event will take place. If you select the “forever” check box then the recording event will repeat until the recorder runs out of either battery or storage space.

#### Record every n day(s):

This allows you to record for just 1 day every *n* days and skipping the days in between. Letting you sub-sample over multiple days and prolong the length of your deployment.

e.g. Start at 01/July/2021 and record every day forever (until battery or storage runs out).

e.g. Record every 7th day from 1st March to 29th March (inclusive)

### Recording Times:



#### Start time:

This is the start time of the first recording of the day for the selected recording event.

You can select from:

- Sunrise +/- an offset, e.g. Sunrise – 1hr 00mins
- Sunset +/- an offset, e.g. Sunset + 0hr 30mins
- An absolute time, e.g. 06:00

#### Duration:

This is how long each recording runs for.

#### Repeat every \_\_\_\_ :

Tick the checkbox to enable this field. This allows you sub-sample over a day by repeating the recording event multiple times until a stop time is reached. If you just want to record for 1hr around sunrise for example leave this box unchecked. Or if for example you want to record for 10mins every hour between two set times then you should check this box instead of creating multiple separate recording events.

If you want to record for a large chunk of time, e.g. 12 or even 24hrs a day then you could set the Duration to 12/24hrs and the recorder will split the files up automatically when they reach the 2GB boundary however we recommend setting the duration and repeat period to 1hrs to keep your data more manageable the recording event to 1hr every 1hr

e.g. Start at sunrise - 1 hour and record for 10mins every hour until sunset + 1 hour.

e.g. Record for 10 minutes every hour between 6PM and 6AM

## Recording Settings:



Recording settings such as sample rate, channel and file format may be configured independently for each event.

Format:

- WAV file (uncompressed)
- FLAC file (lossless compression giving about 40% reduction in file size)

Channel:

- A only
- B only
- Both A and B

Sample rate:

- 8 kHz
- 16 kHz
- 22.05 kHz
- 32 kHz
- 44.1 kHz
- 48 kHz
- 96 kHz

In this example, there is one recording event set to start at 1hr before sunrise on the 11<sup>th</sup> Jun 2020 and record for 30 minutes every hour until 1hr after sunset, recording every second day for as long as possible.

The screenshot displays the Scheduler application window with the following components:

- Top Bar:** Scheduler - [unnamed]\*, File, Recordings, Table, Help.
- Left Panel:**
  - Schedule Name:** [Empty text box]
  - Recording events:** 1 (Add, Delete buttons)
  - Event List:** SUNRISE : Start at sunrise -1h00m on 11/06/2020 and record for 30 mins every 60 m
  - Recording name:** SUNRISE
  - Recording dates:** Start date: 11/Jun/2020, Stop date: 30/Jun/2020, ☒ forever, Record every: 2 day(s)
  - Recording times:** Start time: Sunrise, Duration: 0:30 (H:M), Repeat every: 1:00 (H:M), Until: Sunset, 1h00m \*
  - Settings:** Format: WAV file (uncompressed), Channel: A only, Sample rate: 44.1kHz
- Center Panel:** Calendar for June 2020 showing recording slots (green bars) for the SUNRISE event.
- Right Panel:**
  - Configure your recorder:** Recorder type: BAR - LT, Batteries: [Image of recorder], Total storage: 64 GB
  - Estimated deployment life:** Battery life: 11/Aug/2020 22:20 (62 days), Storage utilisation: 10/Aug/2020 11:35 (61 days)
  - Deployment location:** Name: Frontier Labs HQ, Timezone: +10h00m
  - Notes:** Sunrise and sunset times, battery utilisation and storage utilisation are estimates only. Results will vary if the recorder is used at a different location, started at a different time, or configured differently.

## Multiple recording events

You can have up to 250 independent recording events in a single schedule file, each with their own recording dates, times and settings. This means you can have multiple recording events happening per day, like sunrise and sunset events, and also have different recording events for different times of the year, like a winter schedule and a spring schedule.

To add multiple recording events, simply click the [ +Add ] button again as described in **Adding a new recording event** To edit any event simply select the entry you wish to modify from the list of recording events and the details for that entry will appear below it.

The example below shows a schedule with 2 recording events that records for 2hr around sunrise and sunset, repeating every second day forever (until either the batteries or SD card storage space runs out). The currently selected recording event is the “SUNRISE” event as shown by the blue selection box in the event list, and the blue box around the entry in the graphical timeline view. In this example we can also see that the estimated battery life (using 2 batteries) is 95 days of operation and the storage memory (64 GB) will become full after 101 days.

The screenshot shows the Scheduler application interface. On the left, the 'Recording events' list shows two events: 'SUNSET' and 'SUNRISE'. The 'SUNRISE' event is selected, highlighted with a blue box, and a red arrow points to it. Below the list, the details for the 'SUNRISE' event are shown, including the recording name, dates, times, and settings. On the right, the 'Configure your recorder' panel shows the recorder type as 'BAR - LT', the number of batteries as 2, and the total storage as 64 GB. It also displays the estimated deployment life, battery life, and storage utilisation. The central part of the interface shows a calendar view for June 2020 and a timeline view showing the recording events as green bars.

**Schedule Name:** [ ]

**Recording events:** 2 [ +Add ] [ -Delete ]

SUNSET: Start at sunset -1h00m on 11/06/2020 and record for 120 mins only, ev...

SUNRISE: Start at sunrise 11/06/2020 and record for 120 mins only, e...

**Recording name:** SUNRISE

**Recording dates**

Start date: 11/06/2020

Stop date: 11/06/2020 [ ] forever

Record every: 2 day(s)

**Recording times**

Start time: Sunrise - 1h00m

Duration: 2:00 (H:M)

☐ Repeat every: 0:00 (H:M)

Until: Sunrise + 1h00m \*

\* The last recording may start up to but no later than this time.

**Settings**

Format: WAV file (uncompressed)

Channel: A only

Sample rate: 44.1kHz

**Configure your recorder**

Recorder type: BAR - LT

Batteries: 2

Total storage: 64 GB

**Estimated deployment life**

Battery life: 13/Sep/2020 18:38 (95 days)

Storage utilisation: 19/Sep/2020 6:13 (101 days)

**Deployment location**

Name: Frontier Labs HQ [ Change ]

Timezone: +10h00m

**Notes**

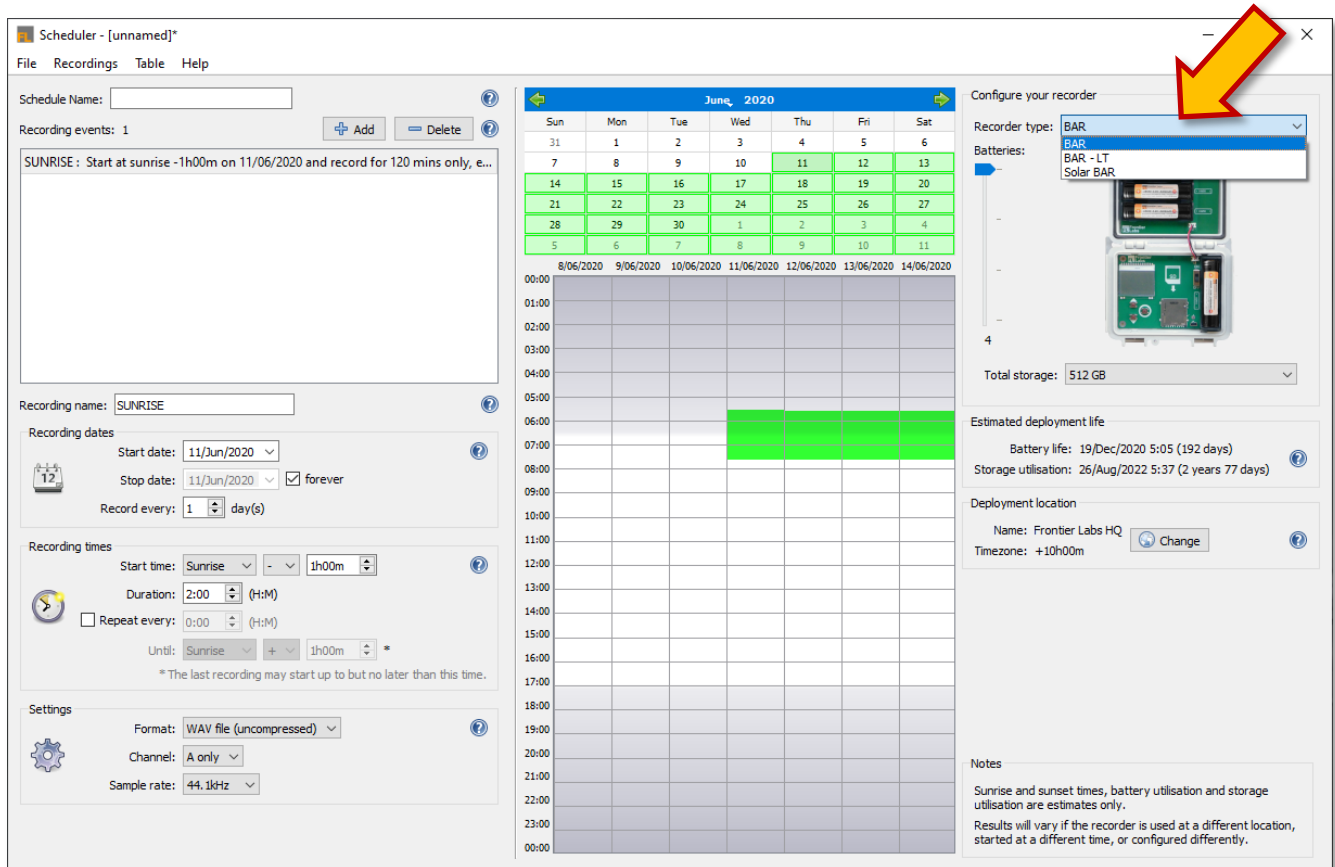
Sunrise and sunset times, battery utilisation and storage utilisation are estimates only.

Results will vary if the recorder is used at a different location, started at a different time, or configured differently.

# Configuring your recorder

## Selecting recorder type

Different BAR recorders have different capabilities, such as battery life and maximum storage capacity. To get an accurate calculation of the battery life and storage requirement for the schedule you are making, be sure you set your recorder type. This can be done by selecting from the “Recorder type” drop down menu shown below.



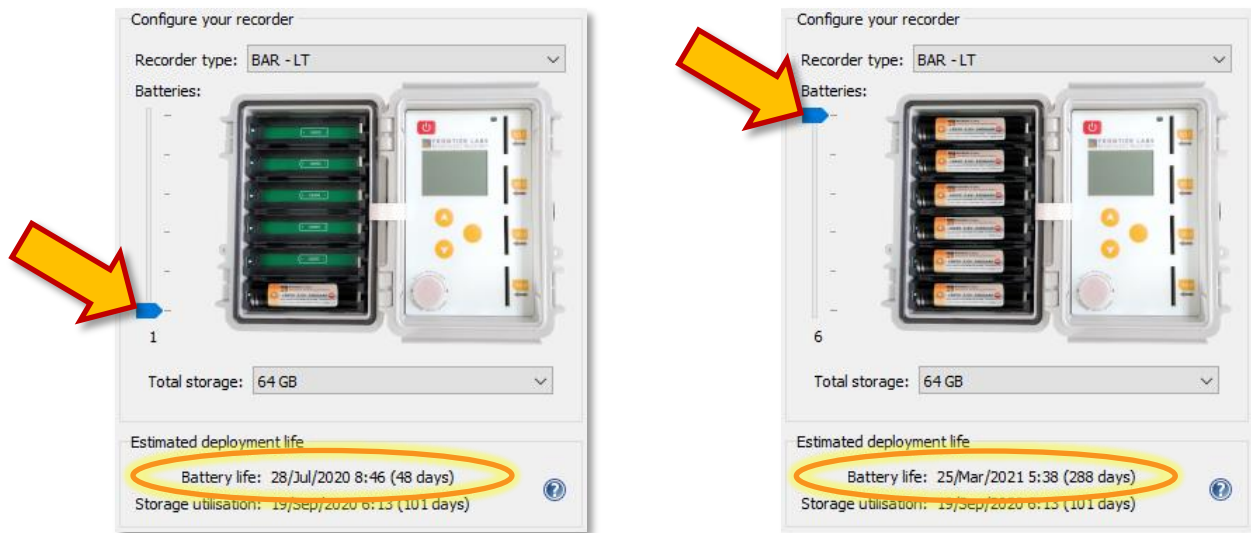
The different recorder types and their battery and storage capacities are listed below.

Recorder Type:	Battery capacity	Storage capacity
<b>BAR</b> 	<b>Up to 4 batteries</b> (18650 rechargeable Li-Ion)  Each battery lasts around 80hrs of recording (44.1kHz, 1 ch, using a SanDisk Ultra Class 10).	<b>1 x 512 GB card</b>
<b>BAR - LT</b> 	<b>Up to 6 batteries</b> (18650 rechargeable Li-Ion)  Each battery lasts around 100hrs of recording.	<b>2 TB</b> (4 x 512 GB card)
<b>Solar BAR</b> 	<b>1 x 12V 7.2Ah SLA battery</b>  Can recorder indefinitely until storage runs out. Capable of recording around 1000 hours (40 days non-stop recording) without any sun. Recharges from empty to full in 1-2 days of full sun.	<b>2 TB</b> (4 x 512 GB card)

### Changing the number of batteries

The BAR recorders do not need all of their battery slots to be filled in order to run. If you only need to record for a short amount of time you might only need to use 1 battery. If you want it to recorder for longer, simply increase the number of batteries. This allows you to save weight and expense by only deploying with the batteries you need.

To change the number of batteries, adjust the slider next to the image of the recorder.



The battery life calculation displayed below the recorder will also update whenever you change the number of batteries. In this example schedule (recording for 2 hours at sunrise, every day) it has gone from 48 days to 288 days of battery life.

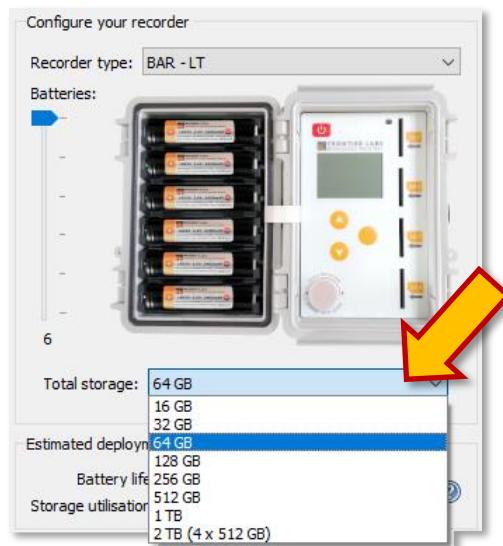


#### Optimise your deployment

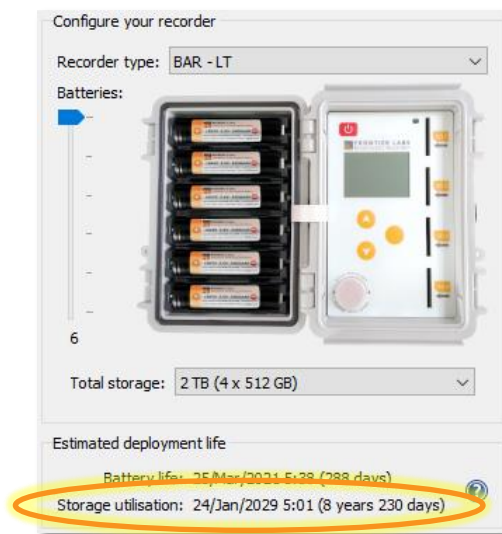
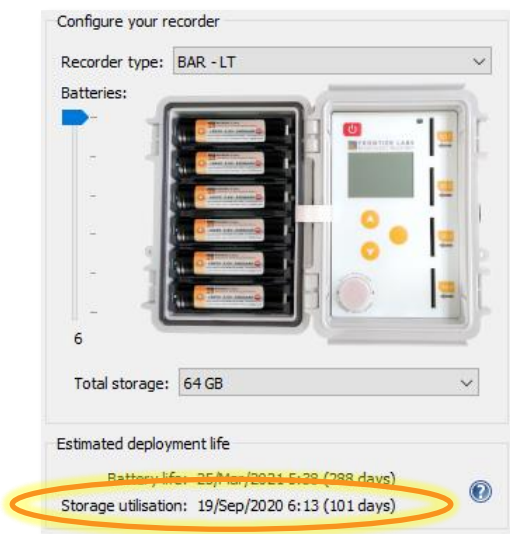
You can optimise your deployment by changing the number of batteries and the total storage size so that the battery life and storage utilisation are roughly the same number of days. After all there's no need to put in enough batteries for 200 days of recording if the SD card will fill up in 50 days.

### Changing the total storage space

To change the total storage space you plan to use in your recorder, select the “Total storage” dropdown menu. Each memory card slot on the BAR recorders takes up to 512GB. So, for the BAR (which has 1 card slot) the maximum total storage you can select is 512GB but for the BAR-LT and Solar BAR (which have 4 card slots) the maximum total storage you can select is 2TB.



The storage utilisation calculation displayed below the recorder will also update whenever you change the storage amount. In this example schedule (recording for 2 hours at sunrise, every day) it has gone from 101 days of recording on a 64GB card to 8 years and 230 days on 4 x 512GB cards.

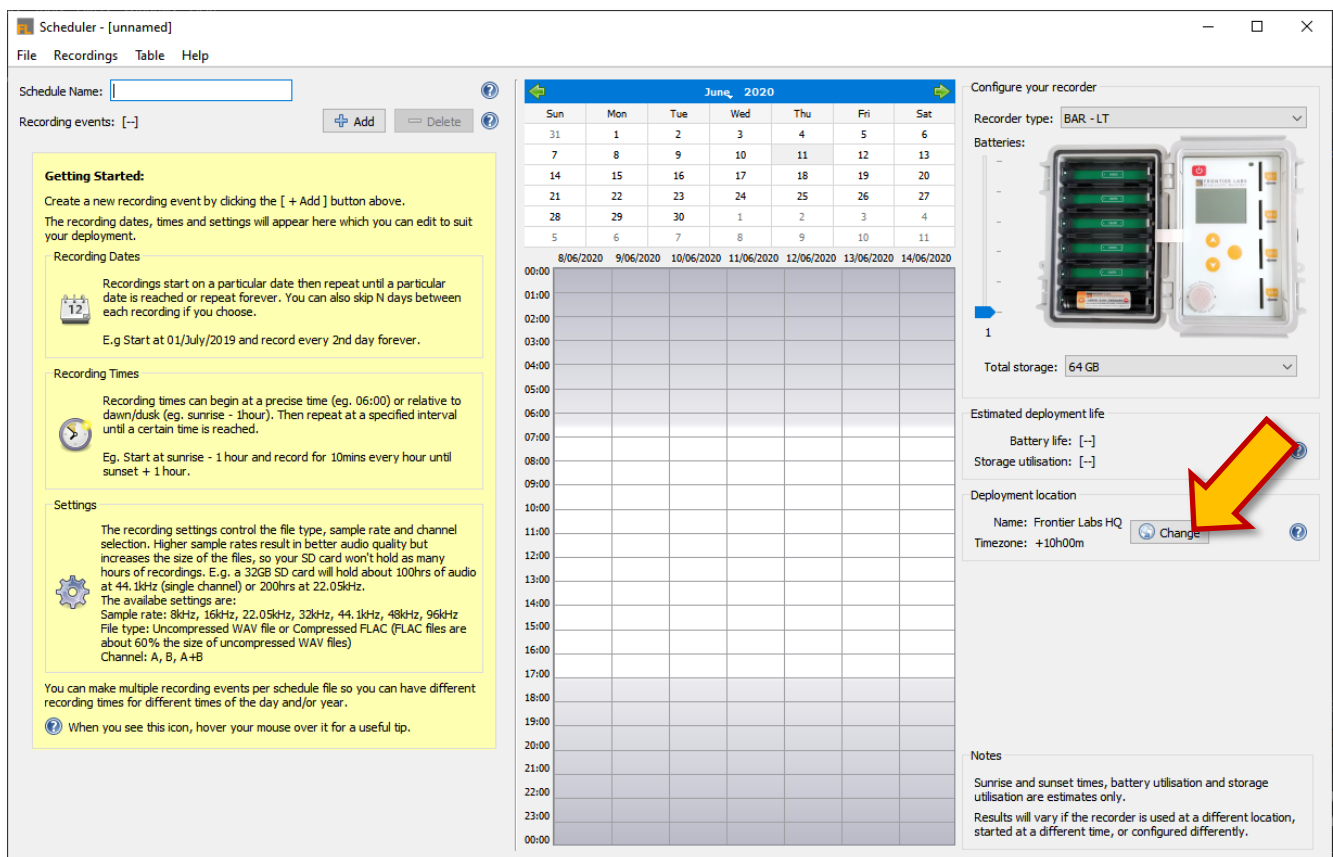




### Selecting the deployment location

Setting the deployment location and time zone is required to display the correct sunrise and sunset times in the graphical timetable view. It is also saved in the schedule file to be used as a backup location for the recorder to calculate sunrise/sunset times in the event that it cannot get a GPS position fix in the field. In most cases however, the recorder will get a GPS position fix from its built in GPS hardware and use that to calculate the sunrise and sunset times.

To set the deployment location, click on the button shown below to bring up the Edit Location window.

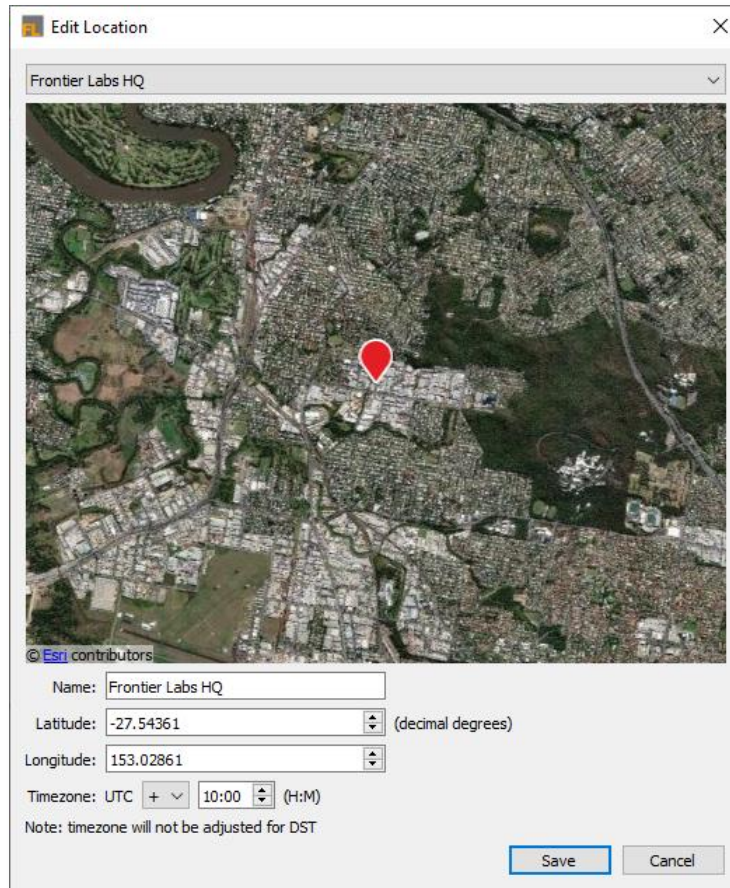


In the Edit Location window you can select from a previously used location in the dropdown menu at the top. This will populate the map view, location name, latitude and longitude in decimal degrees, and the UTC time zone of the selected location.

To modify that locations information, use your mouse to navigate around the map view or edit these fields directly then click Save. To add a new location, click on the dropdown menu at the top and select "Add new location", then edit the fields and click Save. N.B. the time zone information is **not**



automatically set from the latitude/longitude and you must set this to the correct value for the sunrise and sunset times to be correct in the timetable view, as this is shown in local time not UTC+00.



### Moving around the map view

Hold down your left mouse button and drag the map around and use your mouse's scroll wheel to zoom in and out. To place or move the red location marker, left click on the map where you would like it placed. You can also edit the latitude and longitude values directly in the text boxes and the map view and location marker will update.