



CONDOR

INSTRUMENTS

ACTTRUST – USER MANUAL



Model: AT0503

ActStudio Version: 2.1.0

Condor Instruments Ltda.

06/07/2023

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ActTrust Introduction

Before using the device, read the user manual as a whole.

Indications of Use

The ActTrust is an ultra-compact, lightweight, wrist-worn activity, temperature and ambient light monitor that can be used to analyze circadian rhythms, automatically collect and store data for sleep parameters, and assess activity in any instance where quantifiable analysis of physical motion is desirable. The device is intended to monitor limb or body movements during daily living and sleep.

Contraindications

There are no contraindications to the use of the device.

Adverse Effects

Patients should inform your doctor and discontinue use immediately if they experience itching or irritation in the contact area of the device with the skin.

Maintenance

Sterilization is not required for any part of the product.



PRECAUTIONS

Inspections and repairs should only be performed by an authorized agent. Under no circumstances should you attempt to open or personally carry out repairs or maintenance of the device.

This product must be inspected by a Condor authorized service center five years from the date of manufacture, before that, the device is intended to provide a safe and reliable operation provided that it is operated and maintained in compliance with the instructions provided by Condor. The details concerning the Condor warranty applicable are provided with the device from its original purchase. Of course, like all electrical devices, be careful and request inspection at a Condor authorized service center if any malfunctions are detected.

Warnings and General Precautions



Warnings

A **warning** to the possibility of personal injury.

- Before using the device, read the entire manual.
- The device and its accessories must be used only for the purpose for which they are intended.
- Only use accessories and parts that are original and approved by Condor.

Additional equipment connected to medical electrical equipment must comply with the respective IEC or ISO standards (p. Ex., IEC 60950 relating to data processing equipment). In addition, all configurations must meet the requirements for medical electrical systems (see IEC 60601-1-1 or clause 16 of the 3rd Ed. Of IEC 60601-1, respectively). Anyone who connects additional equipment to medical electrical equipment configures a medical system and is therefore responsible for the system to comply with the requirements for medical electrical systems. It called attention to the fact that local laws take precedence over the above requirements. If in doubt, contact your local representative or service department.

Training and Qualification

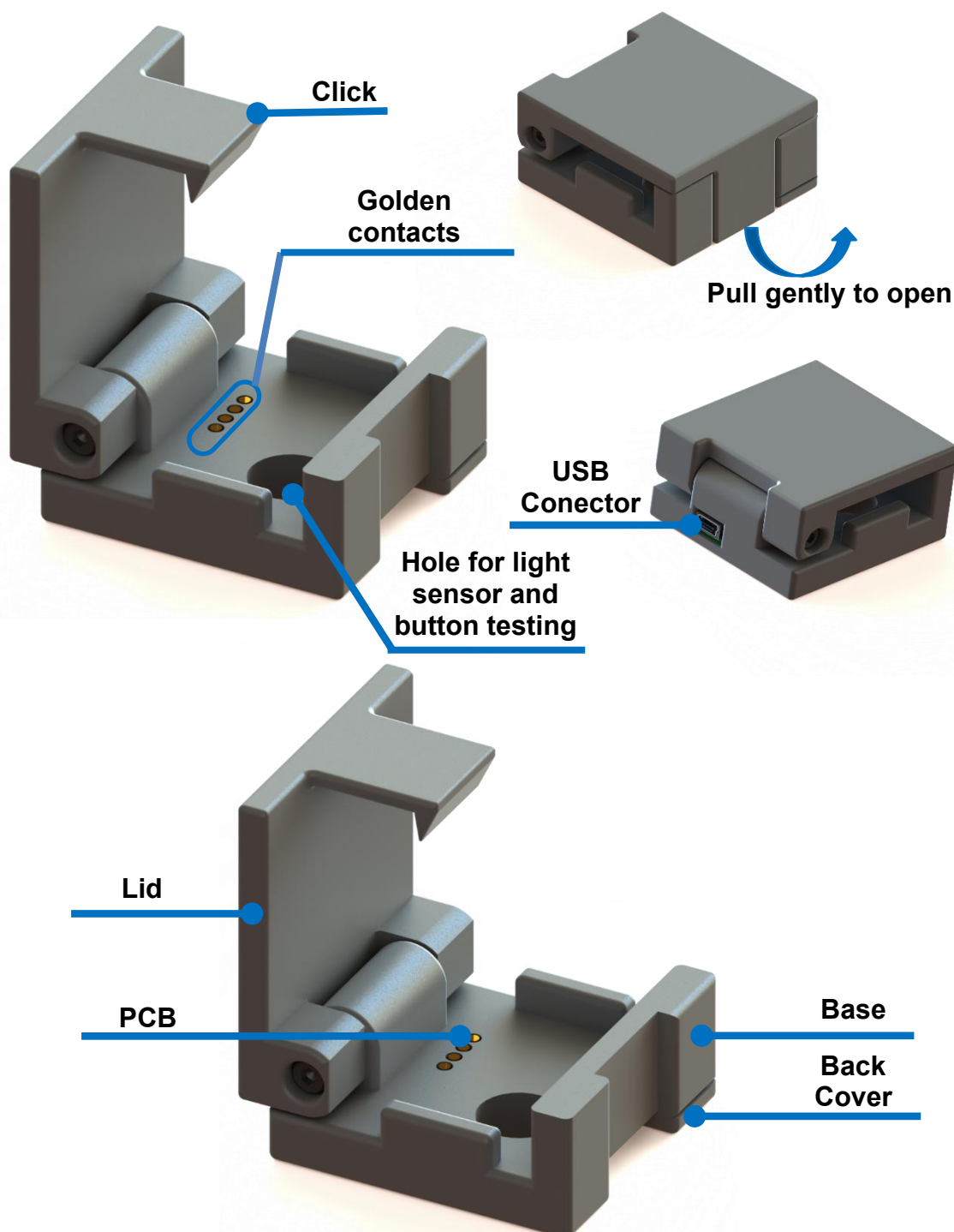
Any operator must have read the manual and have the computer skills necessary to configure the device

The analysis should only be made by people who are qualified to make them



ActDock

Description



The ActDock (common name: USB Adapter) is composed of four parts, the Lid, The Base, The Back Cover and the PCB. This accessory is intended to adapt the USB pins in the ActTrust to a normal USB connector.



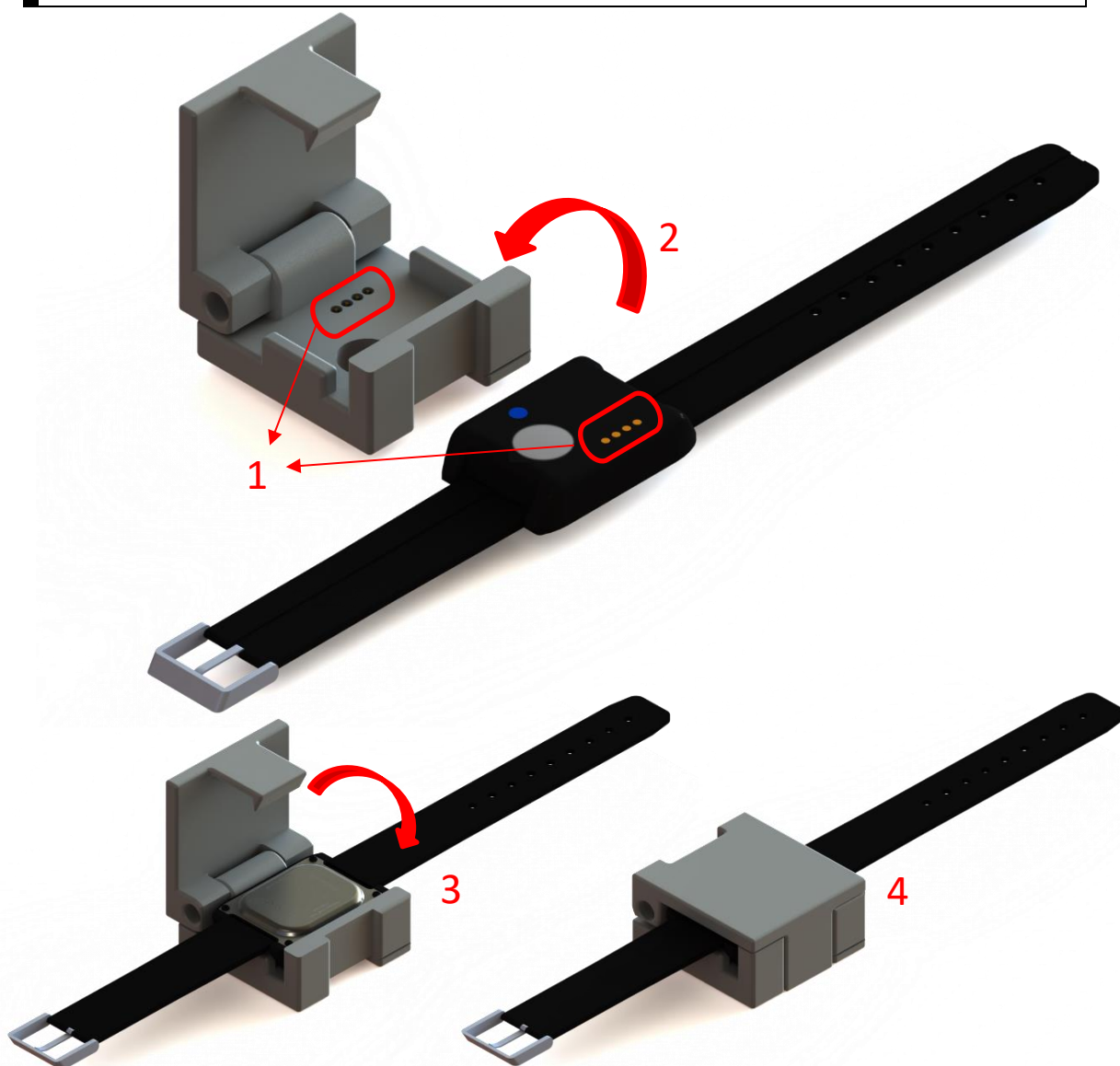
Cleaning and Maintenance

- Only clean using a damp cloth and mild soap.

Notes:

- Avoid contact with gasoline, benzine, thinner or acetone and, in case of contact with any of these substances, clean the device using a damp cloth and mild soap as soon as possible.
- Do not use abrasive cleaning components or highly alkaline (e.g., saponaceous or ammonia-based cleaners).
- Do not use Isopropanol or Butyl Cellulose in any surface of the dock.

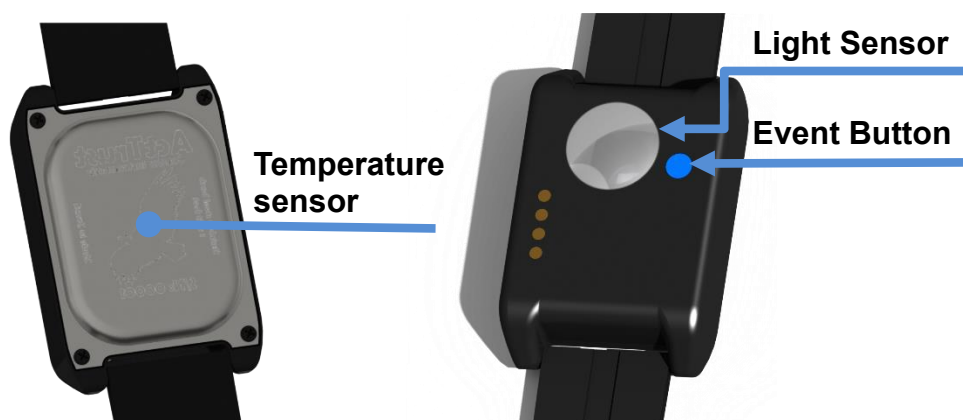
Using the ActDock



1. Guarantee that the golden pins in both the dock and in the ActTrust are aligned as shown.
2. Rotate the ActTrust in order to dovetail it in dock.
3. Close the dock and pressure it until the click locks.

ActTrust

Description



The ActTrust is an Activity Recording Device (Actimeter) that measures Activity, Wrist temperature and light exposure. It is intended to be worn in one of the limbs to assess sleep parameters needed to evaluate sleep quality and sleep disorders. It requires one of the ActDock accessories to extract the data.

Cleaning and Maintenance

- Wash only with warm water and mild soap.
- Always wash the device when it got into contact with salt water.
- Whenever the ActTrust is going to be stored, put the same into power down mode.
- Do not leave the ActTrust with the battery fully discharged for long periods. This may reduce the lifetime of the internal battery.
- If the ActTrust is stored for long periods, perform a full charge of the battery every 6 months.

Notes:

- Avoid contact with gasoline, benzene, thinner or acetone and, in case of contact with any of these substances, wash the device with mild soap and water as soon as possible.
- Do not use abrasive cleaning components or highly alkaline (e.g., saponaceous or ammonia-based cleaners).
- Do not use Isopropanol or Butyl Cellulose in the protective surface of the ActTrust.
- Do not swim or dive with the ActTrust.

ActLumus Introduction

Before using the device, read the manual in its entirety.

Indications for use

ActLumus is an ultra-compact and lightweight monitor of activity, temperature and ambient pulse light that can be used to analyze circadian rhythms, automatically collect and store data for sleep parameters, and validate activity in any instance where quantifiable analysis of physical motion is desired. The device is intended to monitor limb or body movements during daily life and sleep.

Contraindications

There are no contraindications to the use of the device.

Adverse effects

Patients should tell their doctor and discontinue use immediately in case they experience itching or irritation in the skin contact area of the device.

Maintenance

Sterilization is not required for any part of the product.



PRECAUTIONS

Inspections and repairs should only be carried out by an authorized agent. Under no circumstances should you attempt to open, or personally repair or maintain the device.

This product must be inspected by an authorized Condor service centre five years after the date of manufacture. Prior to this, the device is intended to provide safe and reliable operation provided that its use and maintenance complies with the instructions provided by Condor. Details regarding the applicable Condor warranty are provided with the device from your original purchase. Obviously, like all electrical devices, you should be careful and request inspection of the device at a Condor authorized service center if you detect anomalies in it.

General Warnings and Precautions



Notices

The vision for the possibility of bodily injury.

- Before using the device, read the manual in its entirety.
- The device and accessories should only be used for the purpose for which they are intended.
- Use only original and Condor approved accessories and parts.

Additional equipment connected to electrical medical equipment must comply with the respective IEC or ISO standards (e.g. IEC 60950 for data processing equipment). In addition, all configurations must meet the requirements for electrical medical systems (see IEC 60601-1-1 or clause 16 of the 3rd ed. of IEC 60601-1, respectively). Anyone who connects additional equipment to electrical medical equipment configures a medical system and is therefore responsible for the system meeting the requirements for electrical medical systems. Attention is drawn to the fact that local legislation has precedence over the above-mentioned requirements. If in doubt, consult your local representative or technical assistance department.

WARNING: The use of this adjacent equipment or other equipment should be avoided, as it may result in improper operation. If this use is necessary, it is advisable that this and the other equipment be observed to verify that they are operating normally.

WARNING: The use of accessories, transducers and cables other than those specified or supplied by the MANUFACTURER of this equipment could result in high electromagnetic emissions or reduced electromagnetic immunity from this equipment and result in improper operation.

WARNING: Portable RF communication equipment (including peripherals such as antenna cables and external antennas) should not be used within 30 cm of any part of the (EQUIPMENT IN OR IN SYSTEM), including cables specified by the MANUFACTURER, otherwise performance degradation of this equipment may occur.



Notifications

- Condor Instruments and ActLumus are trademarks and therefore subject to applicable copyright laws and regulations.
- This product is manufactured by:
Condor Instruments Ltda - EPP
Rua Professor Tulio Ascarelli, 290, Vila Madalena
São Paulo - SP CEP.: 05449-020



Note

The EMISSION characteristics of this equipment make it suitable for use in industrial areas and hospitals (ABNT NBR IEC/CISPR 11 class A), if used in a residential environment (for which ABNT NBR IEC/CISPR 11 class B is normally required), this equipment may not offer adequate protection for radio frequency communication services. The user may need to take mitigation measures, such as relocating or reorienting the equipment,

Training and qualification

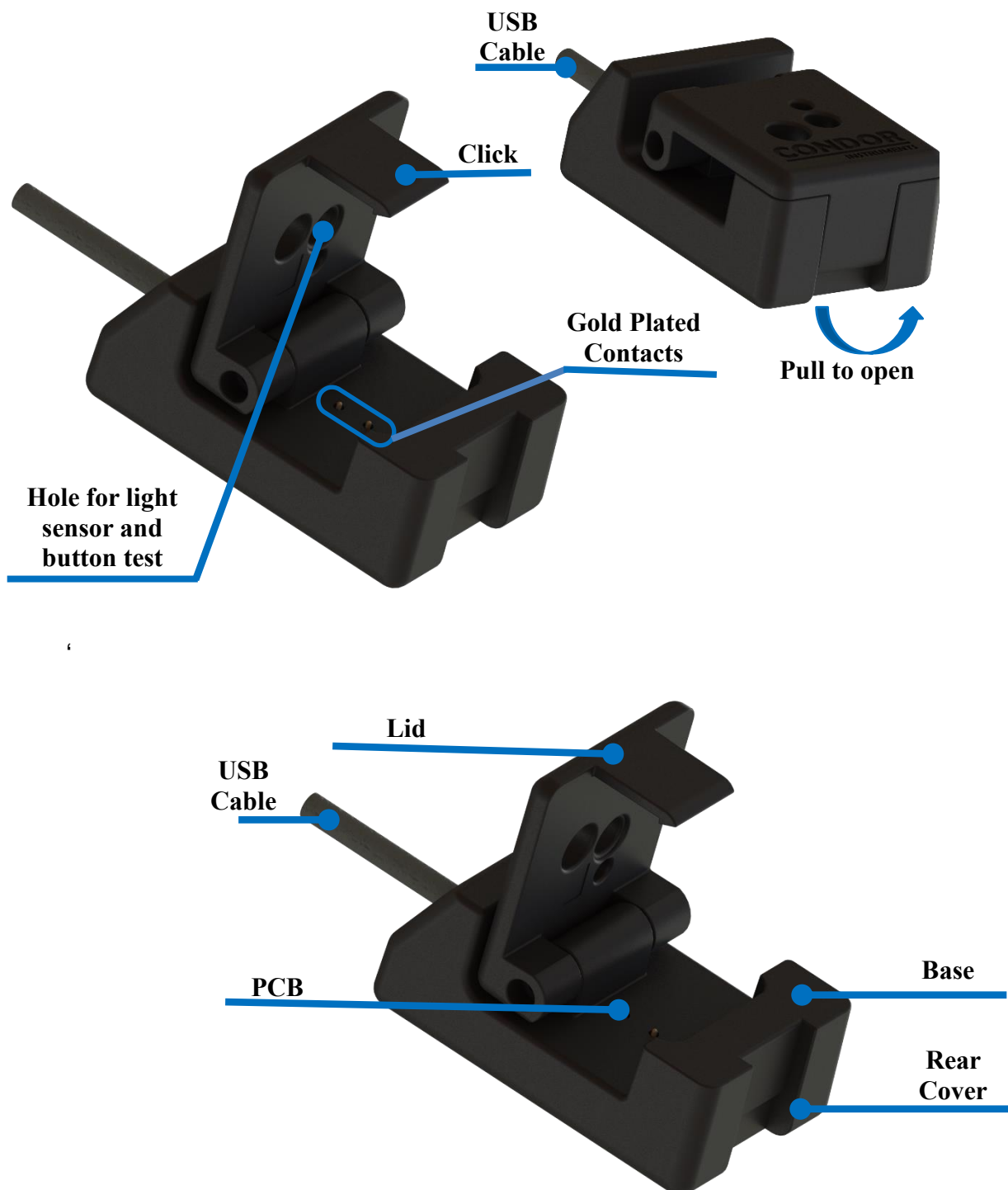
Any operator must have read the manual and have the necessary computer skills to configure the devices

Analyses should only be carried out by persons qualified to do so



ActDock Lumus (ADL0101)

Description and Functionality



The ActDock Lumus (common name: USB/Bluetooth adapter) consists of five parts, the Lid, The Base, the Rear Cover, the PCB and the USB cable. This accessory is intended to adapt the USB pins in ActLumus to a normal USB connector as well as enable the Bluetooth connection of the ActLumus to the computer.

Maintenance and Cleaning

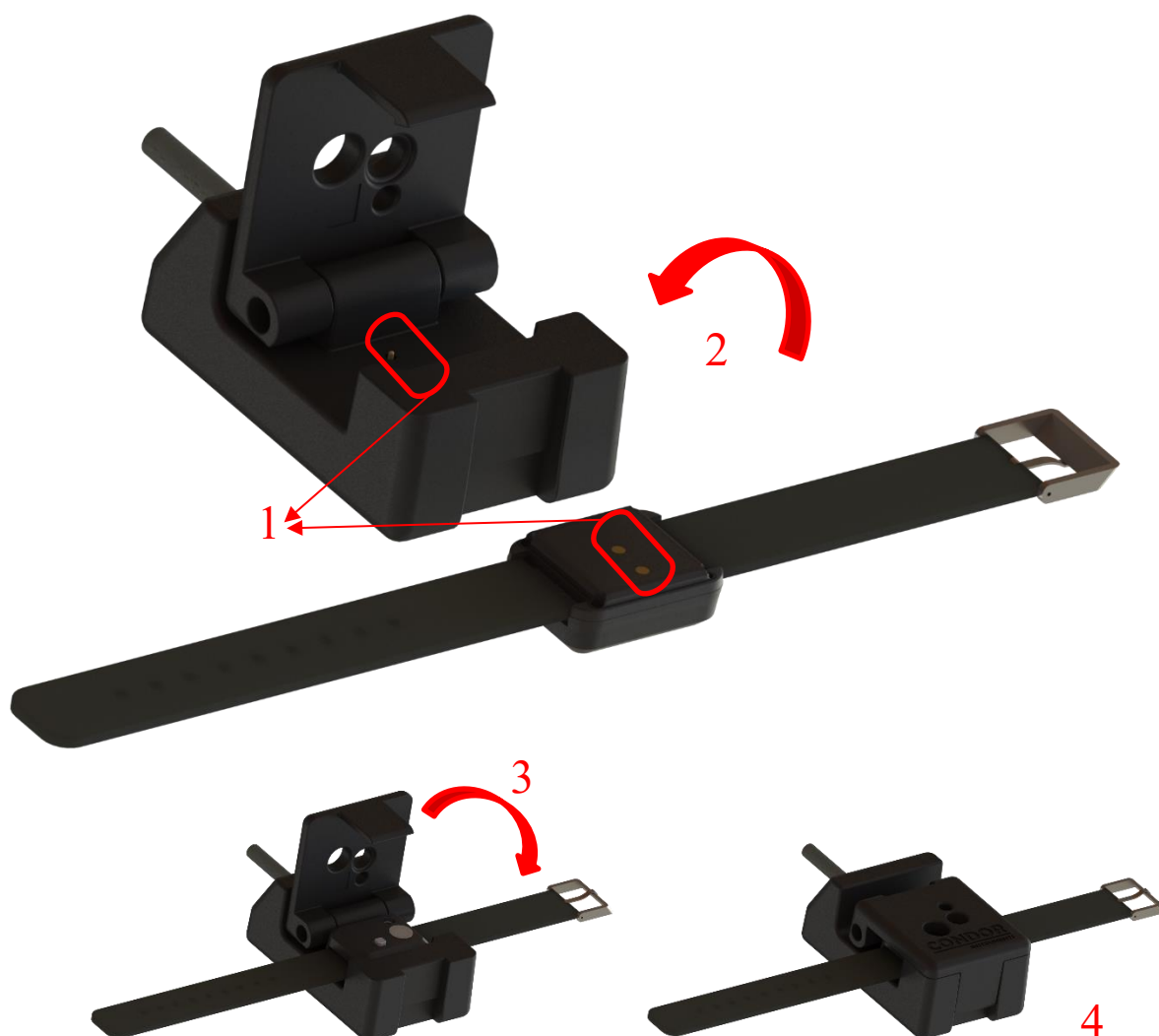
- Clean with damp cloth and mild soap.

Notes:

- Avoid contact with gasoline, benzene, thinner or acetone and, in case of contact with one of these substances, clean with damp cloth and neutral soap as soon as possible.
- Do not use abrasive or highly alkaline products (e.g., saponaceous or ammonia-based cleaning products).
- Do not use Isopropanol or Butyl cellulose on any of the dock surfaces.



Using ActDock Lumus



4. Ensure that the gold pins of both the dock and the device are aligned as shown in the figure.
5. Rotate actlumus to fit it into the dock.
6. Close the dock and press until the click locks.

ActLumus (AL0101)

Description and Functionality



ActLumus is a Device whose function is to use activity data, skin temperature and exposure to light. It is intended to be used in one of the limbs to hurt the sleep parameters needed to assess sleep quality and sleep disorders. Requer one of the ActDock Lumus accessories to extract the data.

Maintenance and Cleaning

- Wash only with warm water and mild soap.
- Always wash the device when it has contact with salt water.
- Whenever ActLumus is to be saved, put it to Off mode.
- Do not leave ActLumus for long periods with the battery fully discharged. This can lead to a reduction in the service life of it.
- If the device is stored for long periods of time make a full charge on it every 6 months.

Notes:

- Avoid contact with gasoline, benzene, thinner or acetone and, in case of contact with one of these substances, clean with damp cloth and neutral soap as soon as possible.
- Do not use abrasive or highly alkaline products (e.g., saponaceous or ammonia-based cleaning products).
- Do not use Isopropanol or Butyl cellulose on any of the surfaces of ActLumus.

ActStudio Software

ActStudio software is used to extract, export and analyze data from the ActTrust device. It is composed of 3 menus, each described in the next sections. Note that this manual was written for the ActStudio version written on the cover and some features described may not be available in previous versions of the software.

Installation

ActStudio software does not require any installation. It can be run from a pen drive or other external device, or from a directory in the computer itself. The files stored in the user's computer are the setting and database files. The software version can be updated without any loss of configuration. Note that both settings and databases can be easily imported and exported to and from ActStudio.

Windows

To run the software, unzip the software files in a chosen folder in your computer and run the executable (.exe) file.

OS X

To run the software on OS X, open the .dmg file and run the ActStudio .app file.



Control Menu

ActTrust Control Tab

Control

Data

Analysis

Calculate Analysis

Calculate Statistics

Export Analysis

Generate Report

Save to Database

Quick Guide

ACTTRUST

ACTLUMUS

CONTROL

SUPPORT

DEVICE	ID	BATTERY	HARDWARE	FIRMWARE	POWER MODE	MEMORY	LAST FULLY CHARGED
ActTrust 2	01710	4.19 CHARGING	1.2	1.5	ACTIVE	0.01%	01/01/2000 00:16:45

TRIAL INFORMATION

Example

Gender : None Date of Birth : 01/01/2000

description

Select Patient Clear Fields Load Apply

SENSORS

ACCELEROMETER

X : 0
Y : -32
Z : -32

LIGHT

AMB : 0.00 LUX
R : 0.00 µW/cm2
G : 0.00 µW/cm2
B : 0.00 µW/cm2

ORIENTATION

IR : 0.00 µW/cm2
UVA : 0.00 µW/cm2
UVB : 9.52 µW/cm2

TEMPERATURE

Int : 21.35 °C
Ext : 21.29 °C

SWITCH

RELEASED
BUZZER

System: 03/07/2023 18:52:25
Device: 03/07/2023 18:52:24

ACTIONS

START TRIAL

ERASE > CONFIGURE > SYNC > ACTIVATE

FINISH TRIAL

0%

POWER DOWN POWER UP

Erase Memory

CONFIGURATIONS

	Desired	Current
Mode :	PIM/TAT/ZCM	PIM/TAT/ZCM
Interval :	60	60
Tat Threshold :	1024	1024
UV Sensor :	Enabled	Enabled

Save log after reading : Yes
Ask where to save : Yes
Default location : C:/

Preferences

INFORMATION

DEVICE	Name of the connected device.
ID	Unique identifier of the connected device.
BATTERY	Charge status of the battery of the connected device and its power. CHARGING CHARGED
HARDWARE VERSION	Hardware version of the connected device.
FIRMWARE VERSION	Firmware version of the connected device.
POWER MODE	Active or Power Down.
MEMORY	Percentage of the memory used.
LAST FULLY CHARGED	Shows the last time (date and time) that the device was fully charged (only for hardware and firmware versions >= 3).



TRIAL INFORMATION

Information of the person using the connected device.	
SELECT PATIENT Button	Opens the Patient Selection window to load the information into the trial information fields.
CLEAR FIELDS Button	Clears the editable fields.
LOAD Button	Load the information registered in the connected device.
APPLY Button	Applies the edited information to the device.

SENSORS

ACCELEROMETER	Instantaneous sampled value from the internal accelerometer.
ORIENTATION	Indicates the current position of the device (Z Minus, Z Plus, Y Minus, Y Plus, X Minus, X Plus).
TEMPERATURE	Instantaneous sampled value from the temperature sensors (°C).
LIGHT	Instantaneous sampled value from the light sensor.
SWITCH	Current state of the event button: released or pressed.
BUZZER	Button that emits a beep sound in the device to check if the buzzer is working properly.
System	Date and Time of the computer.
Device	Date and Time of the connected device.

ACTIONS

START TRIAL button	It will perform the following operations. ERASE: Clears the device data CONFIGURE: Apply the chosen configurations(desired) to the device(current) SYNC: Synchronizes the time of the device to the computer's time. ACTIVATE: Power up the device
FINISH TRIAL button	Read the data stored in the memory of the connected device.
POWER DOWN button	Sets the connected device to enter power down mode when disconnected from the dock
POWER UP button	Sets the connected device to enter active mode when disconnected from the dock
Erase Memory button	Clears the data stored in the memory of the connected device.

CONFIGURATIONS

DESIRED	Desired settings of the connected device, set in the preferences window.
CURRENT	Current settings of the connected device.
Mode	Activity sampling mode:



	TRIAXIAL: Vector composition of the three axes. UNIAXIAL: Each axis is calculated independently (not available) PIM: Proportional Integral Mode TAT: Time Above Threshold ZCM: Zero Crossing Mode.
Interval	Sampling interval (in seconds between 1 and 86400).
Tat Threshold	TAT Threshold, it is recommended to use 1024.
UV Sensor	The device UV Sensor status (enabled or disabled).
Save log after reading	It will save the log after reading when pressing the FINISH TRIAL button in the Default Location.
Ask where to save	It will show a dialog to choose a location to save the log (it will open in the default location).
Default location	Location where the log will be saved.
Preferences button	Open the preferences window

Patient Selection

TRIAL INFORMATION

Example

Gender : None

Date of Birth : 01/01/2000

description

Select Patient

Clear Fields

Load

Apply

The Select Patient button from the Trial Information will open the Patient Selection window where you can select and manage patient records in the database:

Patient Selection

Filter :

ID	NAME	IDENTIFIER
1	Mary	-
2	John	-
3	Test 1	-
4	Test 2	-

Manage Records

Select Record

Close

PATIENT SELECTION	
Display the patients registered in the database (it is possible to filter the records by ID, Name or Identifier).	
Manage Records Button	Opens the Patient Information window.
Select Record Button	Loads a record into the desired trial information (records can be selected by double-clicking).
Close Button	Closes the Patient Selection window.

The Manage Records button from the Patient Selection opens the Patient Information window where you can add, delete, and edit records.



Patient Form

PATIENT INFORMATION

ID :

*Name :

Identifier : Gender :

Date of Birth : Age : Height :

E-mail : Phone : Weight :

Note :

Filter :

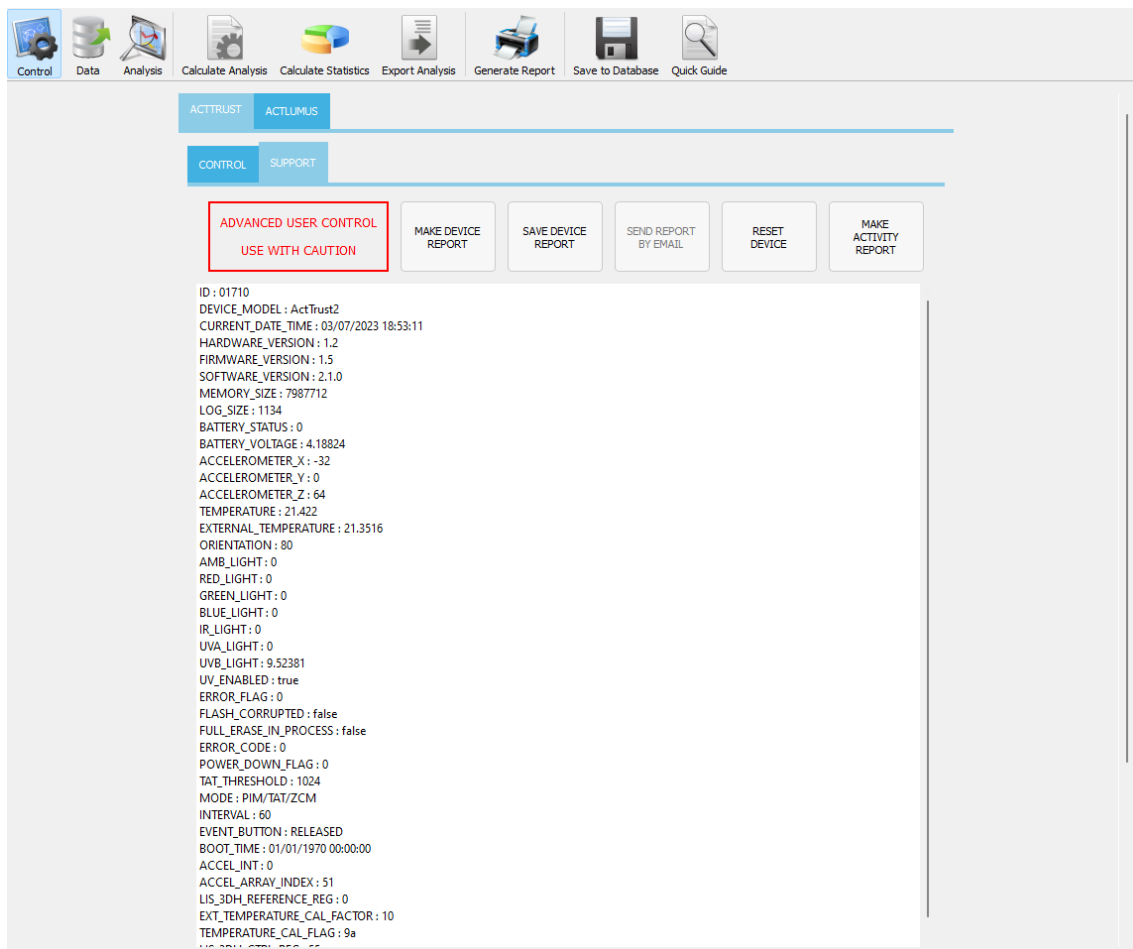
ID	NAME	IDENTIFIER	GENDER	DATE OF BIRTH	EMAIL	PHONE	HEIGHT	WEIGHT
1	Mary	-	Female	09/03/2000	-	-	0.00	0.00
2	John	-	Male	-	-	-	0.00	0.00
3	Test 1	-	Male	20/03/2000	-	-	0.00	0.00
4	Test 2	-	None	19/07/1995	-	-	0.00	0.00

Tips: Fields with asterisk are required. Double-click the record to select it for editing.

Patient Information	
In the Patient Form you can select the records from the table for editing (you can filter the records by any of the table fields).	
ID	Current record ID (read only).
Name	Patient's name
Identifier	Patient Identifier
Gender	Gender of the Patient.
Date of Birth	Patient's date of birth.
Age	Patient's age based on the date of birth (read only).
E-mail	Patient's E-mail.
Phone	Patient's phone number
Height	Patient's height.
Weight	Patient's weight.
Note	Field for some relevant information about the patient (optional).
Delete Button	Delete the selected record.
Clear Button	Clear the fields of the selected record.
Select Button	Select a record to edit.
Insert/Update Button	Add a new record or update an edited record.
Close Button	Closes the Patient Form window.

ActTrust Support Tab

The support tab can be used to generate a full device report. It shows device ID, the hardware version, the firmware version, the battery voltage log, amongst other information related to the device.



Control Data Analysis Calculate Analysis Calculate Statistics Export Analysis Generate Report Save to Database Quick Guide

ACTTRUST ACTLUMUS

CONTROL SUPPORT

ADVANCED USER CONTROL
USE WITH CAUTION

MAKE DEVICE REPORT

SAVE DEVICE REPORT

SEND REPORT BY EMAIL

RESET DEVICE

MAKE ACTIVITY REPORT

ID : 01710
 DEVICE_MODEL : ActTrust2
 CURRENT_DATE_TIME : 03/07/2023 18:53:11
 HARDWARE_VERSION : 1.2
 FIRMWARE_VERSION : 1.5
 SOFTWARE_VERSION : 2.1.0
 MEMORY_SIZE : 7987712
 LOG_SIZE : 1134
 BATTERY_STATUS : 0
 BATTERY_VOLTAGE : 4.18824
 ACCELEROMETER_X : -32
 ACCELEROMETER_Y : 0
 ACCELEROMETER_Z : 64
 TEMPERATURE : 21.422
 EXTERNAL_TEMPERATURE : 21.3516
 ORIENTATION : 80
 AMB_LIGHT : 0
 RED_LIGHT : 0
 GREEN_LIGHT : 0
 BLUE_LIGHT : 0
 IR_LIGHT : 0
 UVA_LIGHT : 0
 UVB_LIGHT : 9.52381
 UV_ENABLED : true
 ERROR_FLAG : 0
 FLASH_CORRUPTED : false
 FULL_ERASE_IN_PROCESS : false
 ERROR_CODE : 0
 POWER_DOWN_FLAG : 0
 TAT_THRESHOLD : 1024
 MODE : PIM/TAT/ZCM
 INTERVAL : 60
 EVENT_BUTTON : RELEASED
 BOOT_TIME : 01/01/1970 00:00:00
 ACCEL_INT : 0
 ACCEL_ARRAY_INDEX : 51
 LIS_3DH_REFERENCE_REG : 0
 EXT_TEMPERATURE_CAL_FACTOR : 10
 TEMPERATURE_CAL_FLAG : 9a

SUPPORT	
MAKE DEVICE REPORT	Generates a report with relevant information about the connected device.
SAVE DEVICE REPORT	Saves the report generated with the MAKE DEVICE REPORT button.
SEND REPORT BY EMAIL	Loads the device report in the description of a contact form to be sent by email to Condor Instruments (the email type will change to Device Report automatically).
RESET DEVICE	Resets the connected device.
MAKE ACTIVITY REPORT	Creates a report about software utilization.



ActLumus Operation Tab

Control

Data

Analysis

Calculate Analysis

Calculate Statistics

Export Analysis

Generate Report

Save to Database

Quick Guide

ACTTRUST

ACTLUMUS

CONNECTION

DOCK

DEVICE

AUTO CONNECT

ActLumus_1000

DISCONNECT

DEVICE INFO

MODEL: AL0101

ID: 1000

FIRMWARE: 1.0

HARDWARE: 1.0

MECH REV: 1

HARD ID: 5152

DEVICE STATUS

STATUS: CHARGING

ERROR: NO ERROR

BATTERY STATUS

LAST FULLY CHARGED

DAYS PASSED

OPERATION

RTD

SUPPORT

CONTROLS

LOG READ

READ 100%

MEMORY USAGE

0% ERASE

TIME MANAGEMENT

SYNC

System: 04/07/2023 13:21:57

Device: 04/07/2023 13:21:57

TRIAL INFORMATION

ID Name Clear Fields

DATE OF BIRTH 1/18/90 Select Patient

GENDER Male < - LOAD Trial Applied

DEVICE PLACEMENT Wrist APPLY ->

POWER MANAGEMENT

POWER DOWN

ACTIVATE

ACTIVE

CONFIGURATIONS

Save log after reading : Yes

Ask where to save : Yes

Default location : C:/

Preferences

CONNECTION	
DOCK	Represents dock connection state
DEVICE	Represents device connection
AUTO CONNECT	Enables the software to connect to some device automatically. If the user enters a number on the editable line bellow, the software will connect only to the device that has the ID entered.
DEVICE LIST	List just below the editable line that lists the available devices to connect to. By double-clicking on a list item, the software will attempt to connect to the chosen device.
DISCONNECT	Button to disconnect from a connected device.
DEVICE INFO	Connected device information: MODEL: Model ID: Device ID FIRMWARE: Firmware Version HARDWARE: Hardware Version MECH REV: Mechanical Review HARD ID: Device Hardware ID
DEVICE STATUS	Connected device status: STATUS: Battery Status



	ERROR: Device Error
BATTERY STATUS	Connected device battery status: LAST FULLY CHARGED: date of the last full charge DAYS PASSED: days since the last full charge

CONTROLS	
READ	Button to read the data stored on the connected device.
MEMORY USAGE	Percentage of the memory used from the connected device.
ERASE	Erases internal memory from the connected device.
SYNC	Synchronizes the device time with the system time.
TRIAL INFORMATION	ID: patient's identification DATE OF BIRTH: patient's date of birth GENDER: patient's gender DEVICE PLACEMENT: Where the device is placed on the patient.
Clear Fields	Clear the Trial information fields.
Select Patient	Select a patient from the database to fill the Trial Information fields.
LOAD	Loads the information from the connected device to fill the Trial Information fields.
APPLY	Apply the current Trial Information fields to the device.
POWER DOWN	The connected device will enter low-power mode when it is disconnected and removed from the dock
ACTIVATE	Activates the connected device.
CONFIGURATIONS	Save Log after Reading: It will save the log in the Default Location after reading. Ask where to save: It will show a dialog to choose a location to save the log (it will open in the default location). Default location: Location where the log will be saved. Preferences button: Open the preferences window



ActLumus Real Time Data Tab

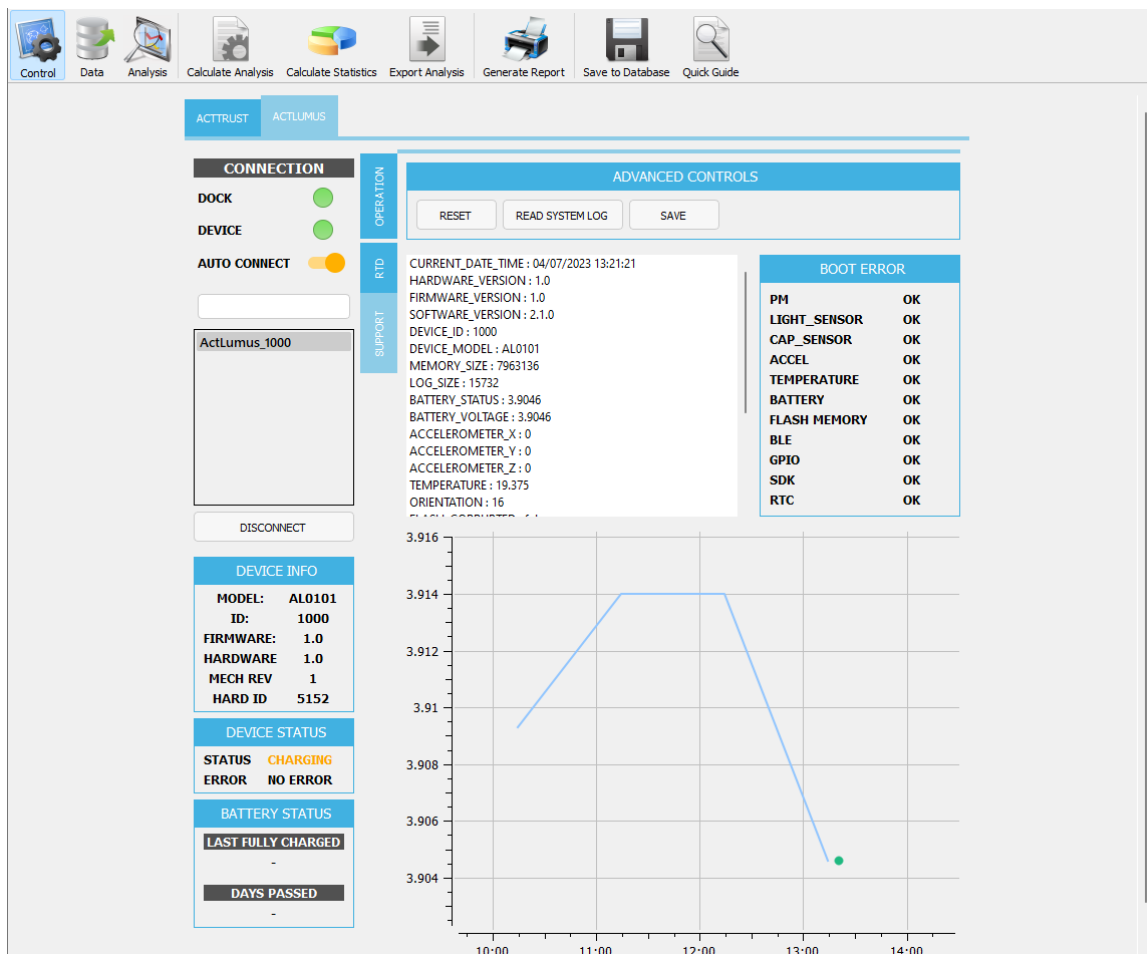


REAL TIME SENSORS

Real-time data from those collected by the sensors of the connected device.

LIGHT SPECTRUM	Light Spectrum Measurement
MELANOPIC LUX	Melanopic Lux Measurement
PHOTOPIC LUX	Phototopic Lux Measurement
ACCELEROMETER	Accelerometer measurement
TEMPERATURE	Temperature sensor measurement
BATTERY VOLTAGE	Measurement of the voltage of the device's internal battery
CAPACITIVE SENSOR	Measurement of capacitive sensor

ActLumus Support Tab

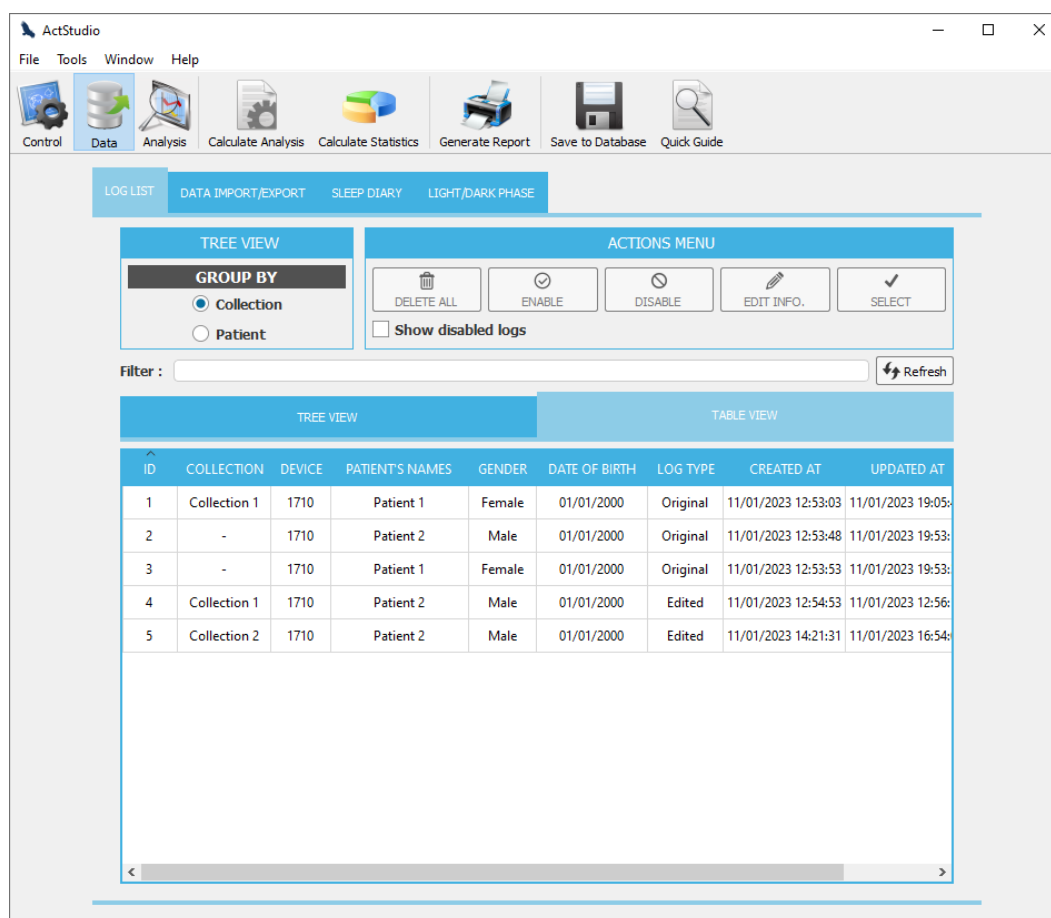


SUPPORT	
RESET	Reinitializes connected device.
READ SYSTEM LOG	Boots reading the system logs of the connected device.
SAVE	Saves the system log to a text file.
BOOT ERROR	Reports if there were any errors at the time of device startup on any of the system components.
SYSTEM LOG	Text box below the READ SYSTEM LOG button. Contains system logs read from device memory
BATTERY	Graph with battery voltage stored in logs.

Data Menu

Log List

In the Log List page, you can manage all logs stored in the database. In the Log List page you can select a log to perform analyzes, edit its trial information (e.g. subject name, gender, date of birth), disable a log (it will still be available in the disabled logs), enable a log that is disabled and permanent delete disabled logs from the database.



TREE VIEW

Groups logs by collection title or patient name (tree view only).

ACTION MENU

The menu that provides the options to perform actions from the selected log in the table below.

SHOW DISABLED LOGS	By selecting this option only the disabled logs will be shown in the table below.
DELETE ALL	It will permanently delete all disabled logs from the database.



	Note 1: you can only delete all logs when the "Show Disabled Logs" option is selected. Note 2: this process may take a few seconds to complete (depends on the database size) because it will delete the disabled logs and will rebuild the database file. It will probably decrease the database size.
ENABLE	Enable a disabled log.
DISABLE	Disable an enabled log. It will still be available by selecting the "Show Disabled Logs" option.
EDIT INFO.	Select the Patient and Collection of the current Log.
SELECT	Loads the selected log to perform analyzes. When a log is selected, ActStudio will automatically redirect to the "Import/Export Data" page.

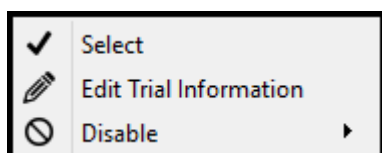
LOG LIST VISUALIZATION	
ActStudio provides two ways of data visualization in the Log List page (it's possible to filter the logs by any of the table fields). The Log List is updated when the ActStudio is initialized; if the data set is changed (e.g. while connected to a remote database, another instance of ActStudio inserts a new Log.), the Refresh button will refresh the Log List.	
TABLE VIEW	It will show all logs from the database in a table view, and the user can sort the log list based on the column by clicking on the column header.
TREE VIEW	It will show all logs from the database in a tree view. This option groups the logs with the same subject name and the user can expand or collapse each item to facilitate the visualization.
FIELDS	
ID	Log ID from the database. It is used for internal control and can be used to identify what log are you using when you have multiple logs from the same subject.
COLLECTION	Title of the selected collection in the database.
DEVICE	ActTrust device ID. It represents the ID of the device used to register the data. If a log is included into the database from a log file this field will be empty.
PATIENT'S NAME	The subject name of the data sample.
GENDER	Gender of the subject.
DATE OF BIRTH	Date of birth of the subject.
LOG TYPE	Original: It represents an original data log from the device. Note: the "original" data must never be "edited". When you are editing an "original" log and save it, it will be saved as a new "edited" log. Imported: It represents a data log from the log file. Note: the "imported" data must never be "edited".



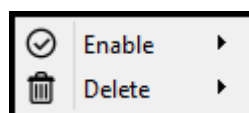
	When you are editing an “imported” log and save it, it will be saved as a new “edited” log. Edited: An “edited” log is generated when you are editing an “original” log and clicks on the save button to save it into the database. Note: when you are editing an "edited" log and tries to save it, you can choose if wants to create a new log from it or if wants to override the current log.
CREATED AT	Shows the date and time when the log was inserted into the database.
UPDATED AT	If the log has already been updated, it will show the date and time of your update.

QUICK ACTIONS MENU

By right clicking on the log list table, you will see one of the quick actions menus shown below. The quick action menus provide the same options from the main action menu and a few extra options.



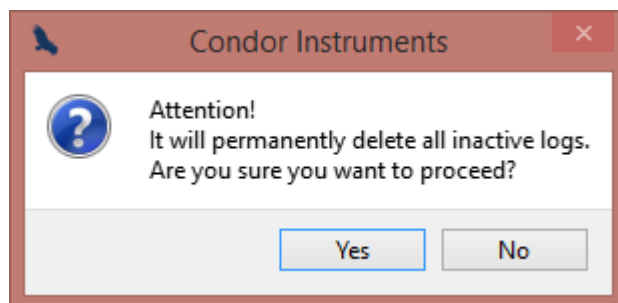
This menu is shown only for the "Enabled" logs. In addition to the main options, here you can "Disable All" enabled logs.



This menu is shown only for the "Disabled" logs. In addition to the main options, here you can "Enable All" disabled logs and "Delete" only a selected log.

DELETING ALL DISABLED LOGS

By clicking on the "Delete All" button the following message will be shown to you confirm the process:



By clicking on the Yes option all the disabled logs will be permanently deleted from the database. The following message will be shown while the logs are being deleted:



Please wait!
This process may take a few seconds to complete!
Deleting all logs and cleaning up the database!

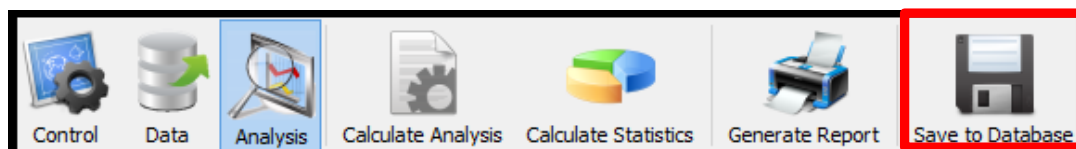
As the message explains, this process may take a few seconds to complete (it depends on the database size), and you need to wait until it finishes.

Note: this option should be used when you have some disabled logs that you want to permanently delete. If you want to permanently delete only one or two logs use the single delete option provided by the quick actions menu.

EDITING DATABASE LOG

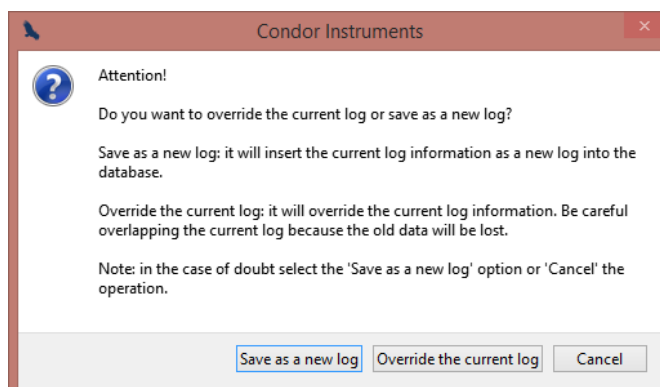
When a log is selected from the database through the Log List page, the log information will be shown in the right upper corner of ActStudio, meaning an existing log is being edited.

The log data can be edited by changing the period selection, log selection, time zone, sleep diary and sticky notes. When editing is finished, you can click on the **"Save to Database"** button.



Here we have two options:

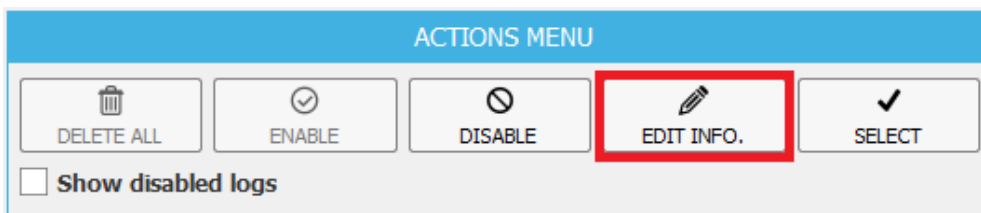
1. If you are editing an **"Original"** or **"Imported"** log it will insert a new log with the **"Log Type"** **"Edited"**, then the selected log (and log information) will be changed to this new log. It means that now you are editing this new log (the **"Edited"** log).
2. If you are editing an **"Edited"** log you will see the following message:



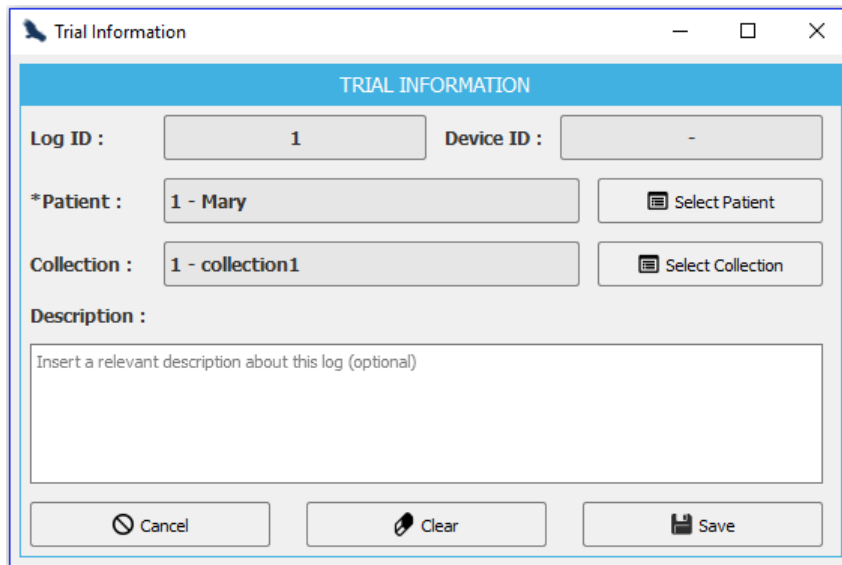
Here you can choose one of the following options:

- **Save as a new log:** it will insert the current data log as a new log into the database and will change the selected log to this new one.
- **Override the current log:** it will override the current log data. Be careful to not override important information.
- **Cancel:** it will only cancel the operation and will not save the log into the database.

Collection Selection



The Edit Info button from the actions menu will open the collection information window, where you can select and manage patient and collection records in the database:



TRIAL INFORMATION	
Select Patient and Collection from the database to edit the Log.	
Cancel Button	Cancels the operation and close the window.
Clear Button	Clears all the editable fields.
Save Button	Saves the current Log Trial Information.

The Select Collection button will open the Collection Selection window. Where you can select and manage a collection record in the database:



COLLECTION SELECTION	
Displays registered collections in the database (you can filter the records by ID, title, initial date, or final date)	
Manage Records Button	Opens the Collection Information window.
Select Record Button	Loads a record in the Trial Information (records can be selected by double-clicking).
Close Button	Closes the Collection Selection window.

The Manage Records Button from the Collection Selection opens the Collect Information window, where you can add, delete, and edit records:



Collection Form

COLLECTION INFORMATION

ID :

*Title :

Initial Date : Final Date :

Description :

Filter :

ID	TITLE	INITIAL DATE	FINAL DATE
1	collection1	14/03/2018	15/03/2018
2	collection2	14/03/2018	15/03/2018

Tips: Fields with asterisk are required. Double-click the record to select it for editing.

COLLECTION INFORMATION	
In the Collection Form you can select the records from the table for editing (you can filter the records by any of the table fields).	
ID	Current record ID (read only).
Title	Collection's title.
Initial Date	Collection's initial date.
Final Date	Collection's final date.
Description.	Relevant information about the collection.
Delete Button	Deletes the selected record.
Clear Button	Clears the fields of the selected record.
Select Button	Selects a record to edit.
Insert/Update Button	Adds a new record or updates an edited record.
Close Button	Closes the Collections Form window.



Data Import/Export

ActStudio

File Tools Window Help

Control Data Analysis Calculate Analysis Calculate Statistics Generate Report Save to Database

Log ID: 1
Device ID: -
Log Type: Imported
Subject Name: Log 1

LOG LIST DATA IMPORT/EXPORT SLEEP DIARY LIGHT/DARK PHASE

PERIOD SELECTION

INITIAL 04/14/2015 16:54:50
FINAL 05/04/2015 23:59:48
RESET APPLY

CHANGE TIMEZONE

HOURS 0
RESET APPLY

IMPORT/EXPORT

OPEN SAVE Preferences

	DATE/TIME	MS	EVENT	TEMPERATURE	EXT TEMPERATURE	ORIENTATION	PIM
0	14/04/2015 16:54:50	0	0	24.43	24.31	0	4054
1	14/04/2015 16:55:50	0	0	24.35	24.38	0	0
2	14/04/2015 16:56:50	0	0	24.32	24.38	0	237
3	14/04/2015 16:57:50	0	0	24.31	24.38	0	2009
4	14/04/2015 16:58:50	0	0	24.36	24.44	0	4001
5	14/04/2015 16:59:50	0	0	24.44	24.56	0	4019
6	14/04/2015 17:00:50	0	0	26.87	24.88	0	6368
7	14/04/2015 17:01:50	0	0	27.68	25.69	0	10670
8	14/04/2015 17:02:50	0	0	28.25	26.31	0	6340
9	14/04/2015 17:03:50	0	0	28.57	26.81	0	1816

PERIOD SELECTION

Field used to select the period of the data to be filtered.

INITIAL	Initial date and time of the sample.
FINAL	Final date and time of the sample.
RESET	Redefine to the original period (initial and final).
APPLY	Applies the selected period.

CHANGE TIMEZONE

Field used to change the time zone of the entire period.

HOURS	The field used to select the time zone.
APPLY	Add or subtract hours of the column DATE/TIME in the entire period.
RESET	Reset the DATE/TIME column to the original time zone.

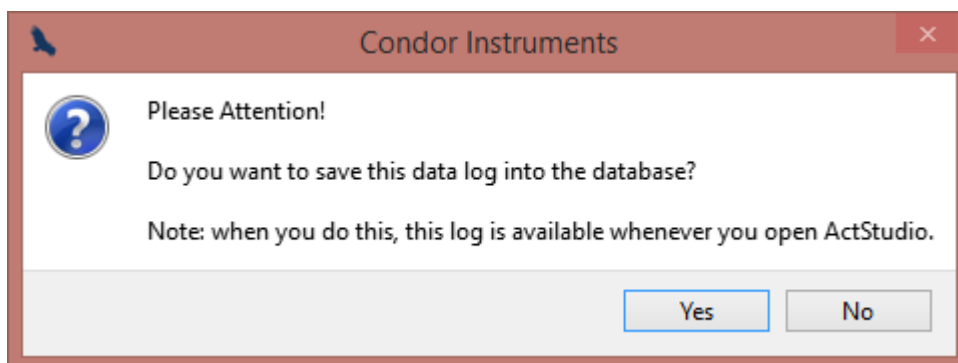
IMPORT/EXPORT

OPEN BUTTON	Open data from old logs (the data must have the header).
SAVE BUTTON	Saves the extracted data with the desired settings.
PREFERENCES BUTTON	Open the preferences Window on the Log Export page.



INSERTING LOG IN THE DATABASE

Every time you open a new log file you will see the following message:



If you select the **"Yes"** option, the log that you opened will be inserted into the database and will be available every time you open ActStudio. Otherwise, if you select the **"No"** option the log will not be inserted into the database.



Sleep Diary

In the Sleep Diary menu, the user can insert data from a manual sleep diary provided by the patient. This data can be used as a parameter to the sleep scoring algorithm.

	Date	Bed Time	Date	Get Up Time
1	14/04/2015	16:54:50	15/04/2015	00:00:00
2	15/04/2015	16:54:50	16/04/2015	00:00:00
3	16/04/2015	16:54:50	17/04/2015	00:00:00

DATA INSERTION

Field used to insert the data from a sleep diary.

Bed Time	Field to insert the date and time that the patient went to bed.
Get Up Time	Field to insert the date and time that the patient got up.
Delete All	Deletes all registers from the sleep diary table.
Delete	Delete a selected row in the sleep diary table.
Cancel	If has any row selected this button cancel the edit operation.
Add	Adds the inserted data to the table to be used as parameter at the sleep scoring algorithm.
Edit	The edit button is shown when a row is selected by double clicking. Clicking at the edit button will edit the selected row.



IMPORT/EXPORT DATA

Field used to import or export data to text file.

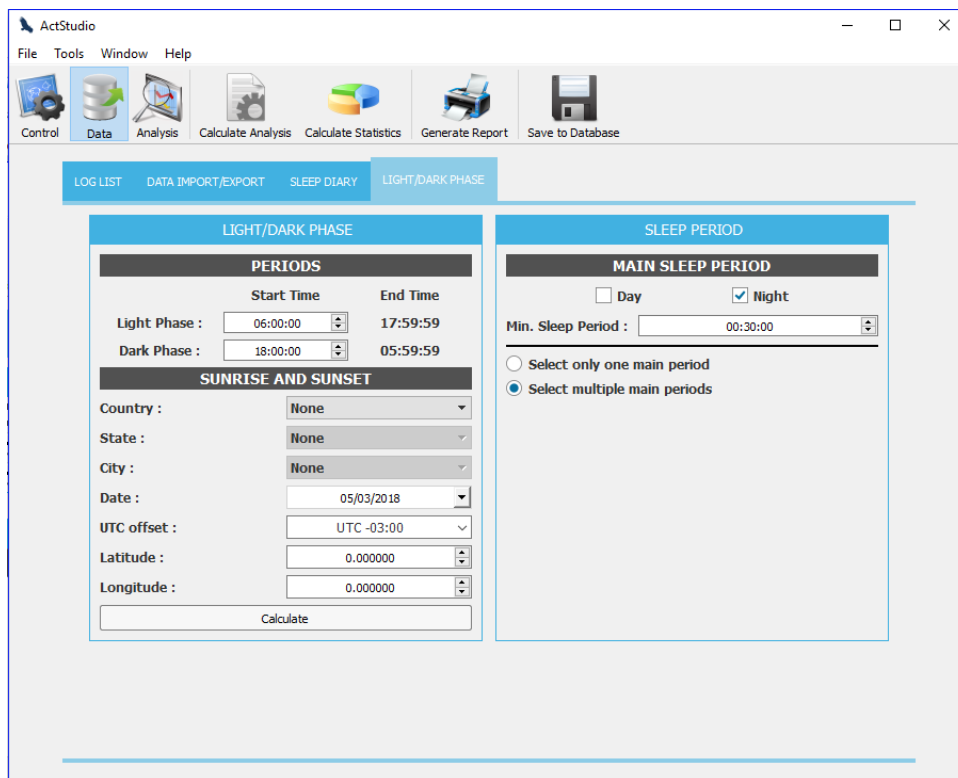
IMPORT	Button to import the sleep diary data from a text file. Must be a text file exported by the sleep diary menu. Sleep diary in csv format can also be imported.
EXPORT	Button to export the sleep diary data to a text file.

TABLE

The table is used to show the inserted data. The data in the table are the same that will be used as parameter to the sleep scoring algorithm. The user can edit or delete any row of this table, by selecting the row using the double click.

Light/Dark Phase

Form used to define parameters to be used in the **Sleep Scoring**, **Sleep Periods** and **Statistics** menus. These parameters are basically used to define when the day starts and when it ends, and to define the main sleep periods.

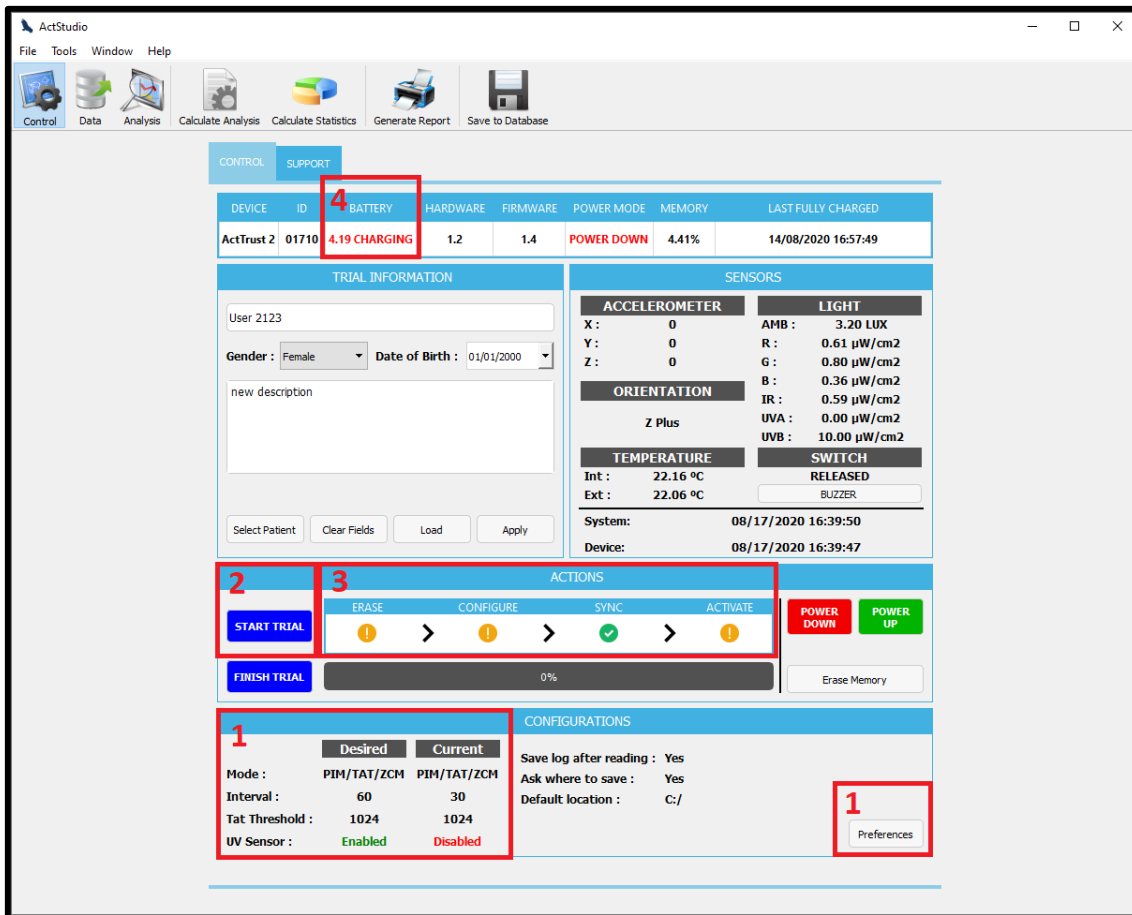


LIGHT/DARK PHASE	
Start Time	
Light Phase	The start time of the light phase of the day.
Dark Phase	The start time of the dark phase of the day.
End Time	
Light Phase	The end time of the light phase of the day (read only).
Dark Phase	The end time of the dark phase of the day (read only).
SUNRISE AND SUNSET	
Calculate the apparent sunrise and sunset times based on the latitude, longitude, date and UTC offset. The sunrise is used as the start time for the light phase and the sunset is used for the start time of the dark phase.	
Country	The user can select a country, a state and a city to automatically load the latitude and longitude. The database has all cities from Brazil and United States and the main cities of other countries.
State	The user can select a state. The states will be automatically loaded when the user selects a country. The states from the United States are defined as "state-county", because the same state can have more than one city with the same name. Not all countries have registered states.



City	The user can select a city. The cities will be automatically loaded when the user selects a state. By selecting a city the latitude and longitude will be automatically loaded, but you can always manually change it. If the city that you need is not in the database you can also insert the latitude and longitude manually.
Date	The user can define a date to calculate the sunrise and sunset. By default it gets the current date.
UTC offset	The user can set the desired UTC offset, based on the local time.
Latitude	The latitude must be defined by the user.
Longitude	The longitude must be defined by the user.
Calculate	By clicking on the Calculate button the sunrise and sunset times will be calculated and automatically set in the light and dark phases start time. If you want to save the latitude and longitude as default, just save the ActStudio settings.
SLEEP PERIOD	
Day	Used to select the main sleep periods in the day (based on the light and dark phases).
Night	Used to select the main sleep periods in the night (based on the light and dark phases).
Min. Sleep Period	Used to select only sleep periods longer than this time.
Select only one main period	This option is used in the buttons "Main Sleep Periods" from the Sleep Scoring and Statistics pages. By checking this option the "Main Sleep Periods" function will select only one main sleep period for each day.
Select multiple main periods	This option is used in the buttons "Main Sleep Periods" from the Sleep Scoring and Statistics pages. By checking this option the "Main Sleep Periods" function will select multiple main sleep periods for each day.

Configuring ActTrust for an Operation



The screenshot shows the ActStudio software interface with several key areas highlighted by red boxes and numbered 1 through 4:

- Box 1:** The **CONFIGURATIONS** section at the bottom, showing a table with 'Desired' and 'Current' settings for Mode, Interval, Tat Threshold, and UV Sensor. A 'Preferences' button is also visible.
- Box 2:** The **ACTIONS** section, containing buttons for 'START TRIAL' and 'FINISH TRIAL'.
- Box 3:** The **ACTIONS** section, showing a progress bar and status indicators for 'ERASE', 'CONFIGURE', 'SYNC', and 'ACTIVATE'.
- Box 4:** The **BATTERY** status field in the top table, which currently shows '4.19 CHARGING'.

The top table displays device information:

DEVICE	ID	BATTERY	HARDWARE	FIRMWARE	POWER MODE	MEMORY	LAST FULLY CHARGED
ActTrust 2	01710	4.19 CHARGING	1.2	1.4	POWER DOWN	4.41%	14/08/2020 16:57:49

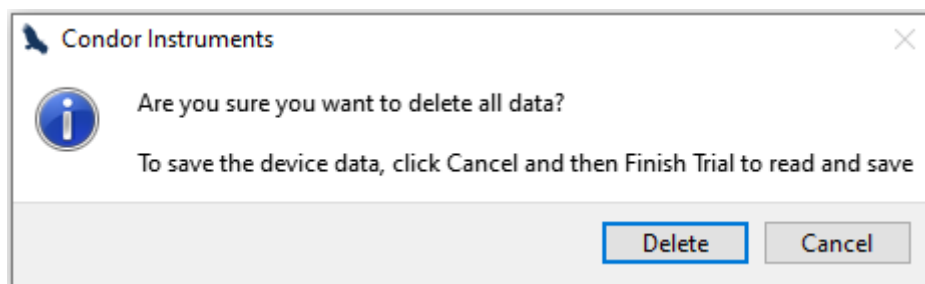
The **SENSORS** section on the right provides real-time data for Accelerometer, Light, Orientation, Temperature, and Switch status.

1. Choose the sampling mode and interval in the preferences window. chosen configurations will be shown in the “desired” column in the **CONFIGURATIONS** field, device configurations will be shown in the “current” column.
2. Device data must be deleted before starting a new sampling to maintain data consistency. In order to do so, click the **Start Trial** button to prepare a device for sampling. **Note:** The device memory must be erased before applying new configurations. An alert message will be shown to the user confirm the operation to delete the device data.
3. The **start Trial** button will **erase** the device data, **apply** the desired configurations, **synchronize** the device time with the time of the user's computer in order to reduce any accumulated drift and **power up** the device.
4. It is advisable to wait until the device's battery is fully charged to ensure the operating time specified. To monitor the state of the battery charge, check the **BATTERY** field. When the battery is fully charged, it will be indicated as **CHARGED**.

5. Incomplete steps will display a yellow exclamation point. With the steps checked, the device can be removed from the dock and it will be already in operation.

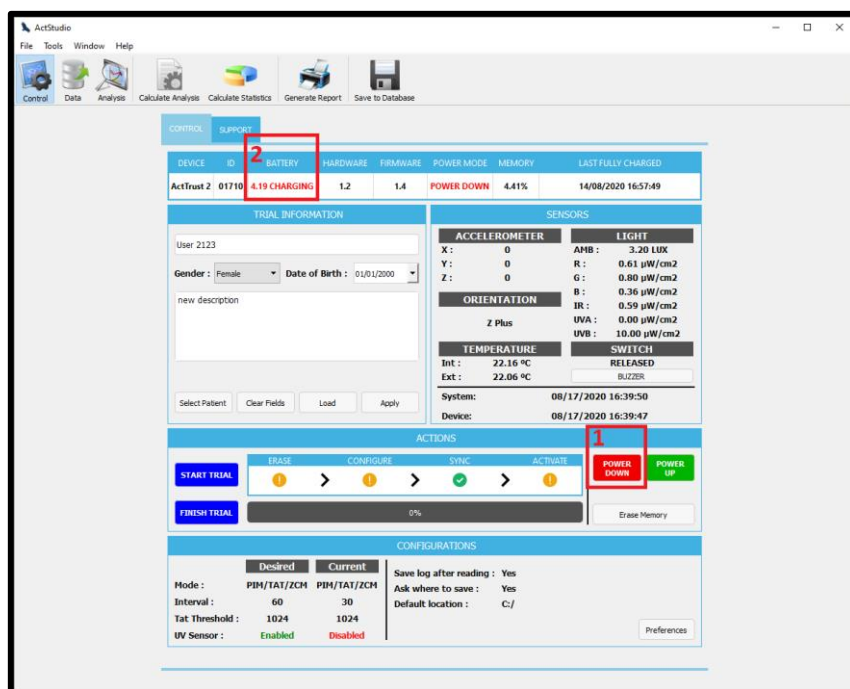
REMARKS: To start a trial, the device data must be deleted, you can click finish trial to read and save the data before starting a new trial.

When applying a new configuration, you will probably see a message asking if you want to delete all the device data:



If the data is not deleted, the desired configurations will not be applied, and the device will not be prepared for a new trial.

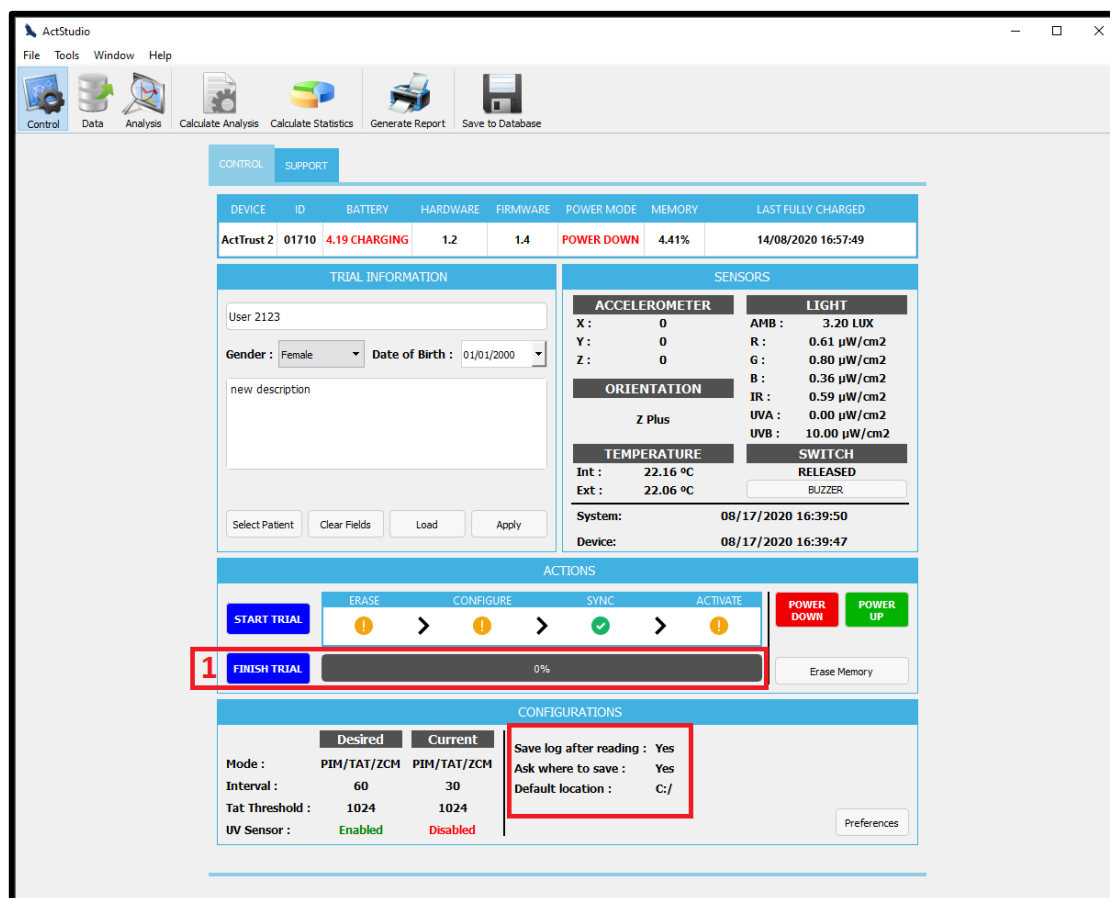
Putting ActTrust Into Power Down Mode



1. In the **ACTIONS** field, click in the **Power Down** button. Make Sure the **POWER MODE** field show's POWER DOWN.
2. It is recommended to wait until the ActTrust's battery is fully charged before putting it in storage mode. To monitor the state of the battery charge, check the **BATTERY** field. When the battery is fully charged, it will be indicated as **CHARGED**.
3. Just remove the ActTrust from the dock and it will already be in storage mode. In case it is reconnected to the dock, it will automatically come into the datalogger mode. If you want to check the device actually is in storage mode, press the event button a few seconds after it is removed from the dock. The buzzer should not beep when pressing the button. If the buzzer beeps, repeat the steps described above again.

Important Note: even in **Power Down** mode the device's battery needs to be charged approximately every 3 months.

Extracting ActTrust Data

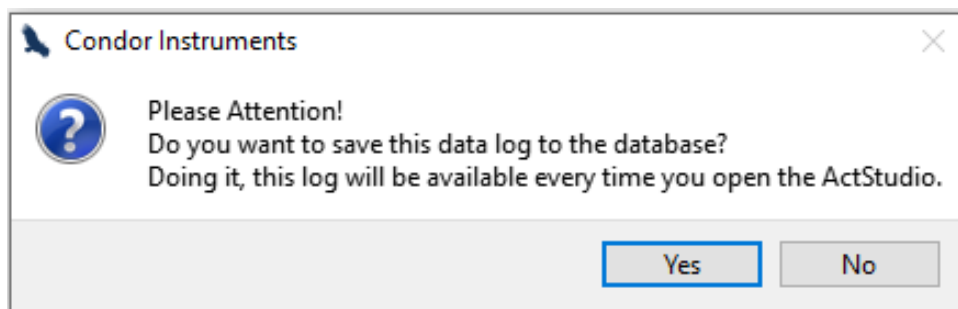


1. Click the **Finish Trial** button in the **ACTIONS** field. Wait for the reading to be performed. The control page will be disabled while reading the device data.
 The "Save log after reading" option is used to automatically save the .txt file in the default location after the reading operation is done.
 The "Ask where to save" option is used to ask the user a location to save the .txt file (will start in the default location).
 These options can be changed in the preferences window, device trial page.

When the log is completely loaded (100%) ActStudio will automatically check if the data has some problem. If the data has some gap, that happens when the device is connected to the computer and the data is not deleted, or if it has some 1970 date, ActStudio will show a message asking for a treatment option. You can read more about this in the subsection entitled "**Solving data problems**".

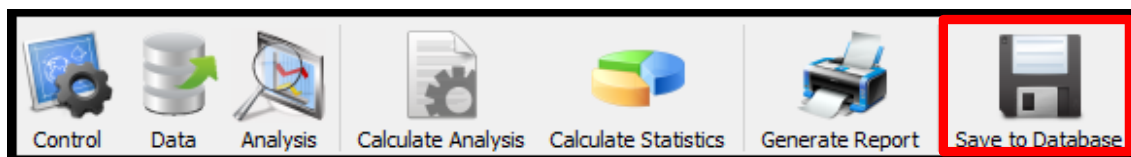
2. Saving the log into the database.

Every time you read a new data log from the device the following message will be shown:

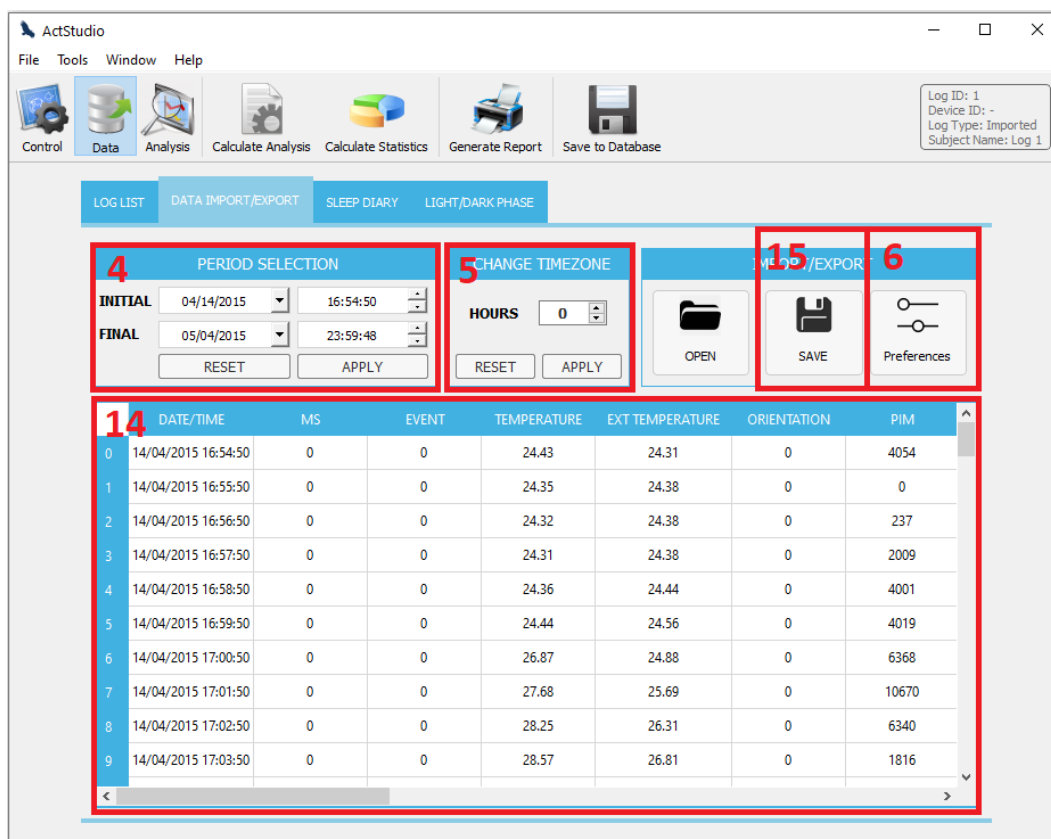


You can choose if wants to save the log into the database by clicking on the **"Yes"** option, or if you don't need to save it in the database click on the **"No"** option.

Even if you don't save the log into the database in this step, you can do it after by clicking on the **"Save to Database"** button from the main menu.

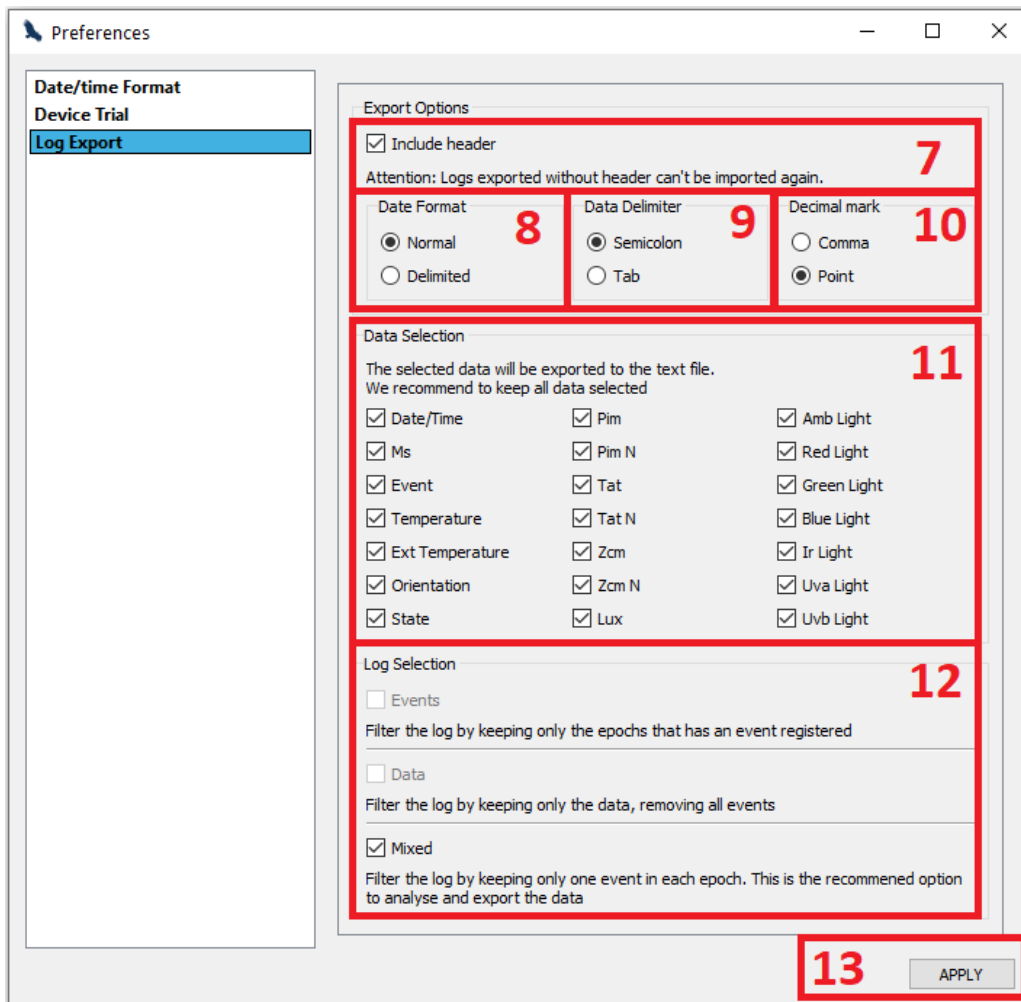


3. Navigate to the **DATA** menu.



4. Select the period of the data to be exported in **PERIOD SELECTION** field.
5. Change the time zone if needed in the **CHANGE TIMEZONE** field.
6. Press the **PREFERENCES** button to open the Preferences window in the Log Export page.
7. Select **INCLUDE HEADER** if you want to include a header in the exported data.
8. In the **DATE FORMAT** field, select which format will be used for the date and time of exported logs.
9. In the **DATE DELIMITER** field, select which character will be used as the data delimiter.
10. In the **DECIMAL MARK** field, select which character will be used as decimal separator.
11. Select the data to be exported in the **DATA SELECTION** field.
12. Select the types of log to be included in the exported file in the **LOG SELECTION** field.
13. Press the Apply button to confirm the changes.
14. The exported data can be seen in **Table** tab.
15. Press the Save button and select where the data will be saved and the file name.

REMARKS: After performing the steps 5 – 15 once, the data extraction process can be performed by using the **FINISH TRIAL** button, with the Save Log After Reading option enabled.



EXPORT OPTIONS	
INCLUDE HEADER	Selects whether to include a header in the exported data. Note: if the user does not include the header in the log file, ActStudio will no longer open this file.
DATE FORMAT	Date and Time field formatting when exported. NORMAL: Date and time delimited by a space. DELIMITED: Date and time delimited by the delimiter character (DATA DELIMITER) chosen.
DATA DELIMITER	Character used to delimit data when exported. TAB, SEMICOLON(;
DECIMAL MARK	Character used as decimal mark when exported. COMMA(,), Point(.)



DATA SELECTION	
Field used to select which data types will be exported.	
DATE/TIME	Date and time of the log.
MS	Milliseconds value of the log.
EVENT	Value of the event. Mixed Mode: Indicates whether there was an event during this log period.
TEMPERATURE	Value of the temperature (in ° C).
EXT. TEMPERATURE	Value of the external temperature (in ° C).
ORIENTATION	Value of the device orientation.
PIM	Activity value calculated in Proportional Integral Mode
PIMn	Value of the PIM normalized per second.
TAT	Activity value calculated in Time Above Threshold mode.
TATn	Value of the TAT normalized per second.
ZCM	Activity value calculated in Zero Crossing Mode
ZCMn	Value of the ZCM normalized per second.
LUX	Value of the light intensity in lux (Only hardware 2.x)
AMB LIGHT	Value of the light intensity in $\mu\text{w}/\text{m}^2$ (Only hardware 3.x)
RED LIGHT	Value of red light intensity in $\mu\text{w}/\text{cm}^2$ (Only hardware 3.x)
GREEN LIGHT	Value of green light intensity in $\mu\text{w}/\text{cm}^2$ (Only hardware 3.x)
BLUE LIGHT	Value of blue light intensity in $\mu\text{w}/\text{cm}^2$ (Only hardware 3.x)
IR LIGHT	Value of IR light intensity in $\mu\text{w}/\text{cm}^2$ (Only hardware 3.x)
UVA LIGHT	Value of Ultraviolet A light intensity in $\mu\text{w}/\text{cm}^2$ (Only hardware 3.x)
UVB LIGHT	Value of Ultraviolet B light intensity in $\mu\text{w}/\text{cm}^2$ (Only hardware 3.x)
STATE	Value generated on the sleep score screen that indicates the state of the patient: Awake, Sleeping, Resting, OffWrist (device removed) or Editable states.

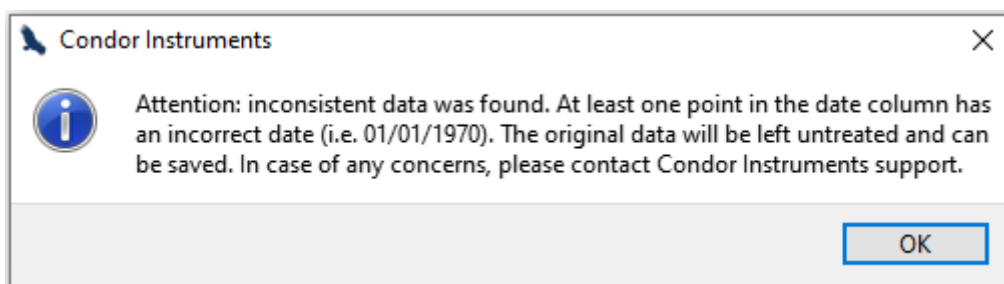
LOG SELECTION	
Field used to select types of log to be filtered.	
EVENTS	Event logs (e.g. button press)
DATA	Data logs (activity, temperature and light).
MIXED	Just data logs (DATA) will be exported, but will be informed if there was some event during the Data log period.

Solving data problems

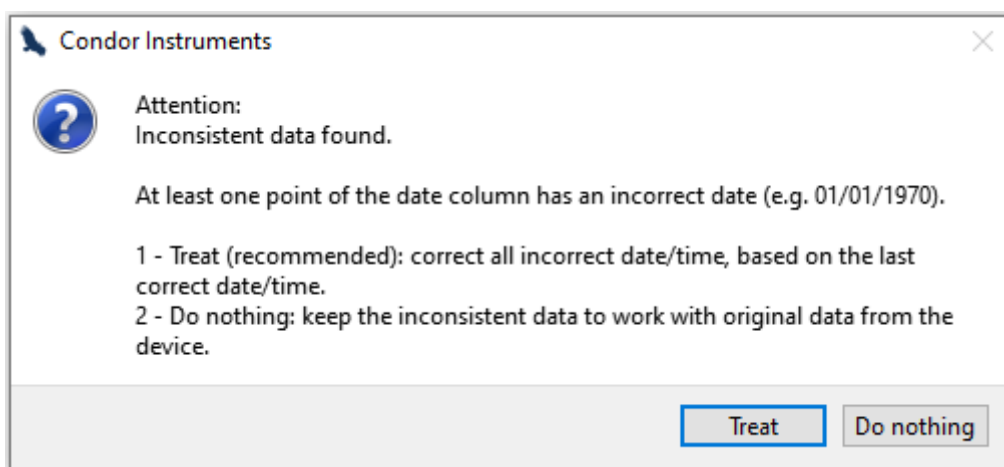
When reading the data from the device or from a log file, the software will check if the data have some problem.

If ActStudio find a date problem (problem that shows the year as 1970), the following message will be shown:

For logs read before ActStudio version 1.0.23, data correction is unavailable.



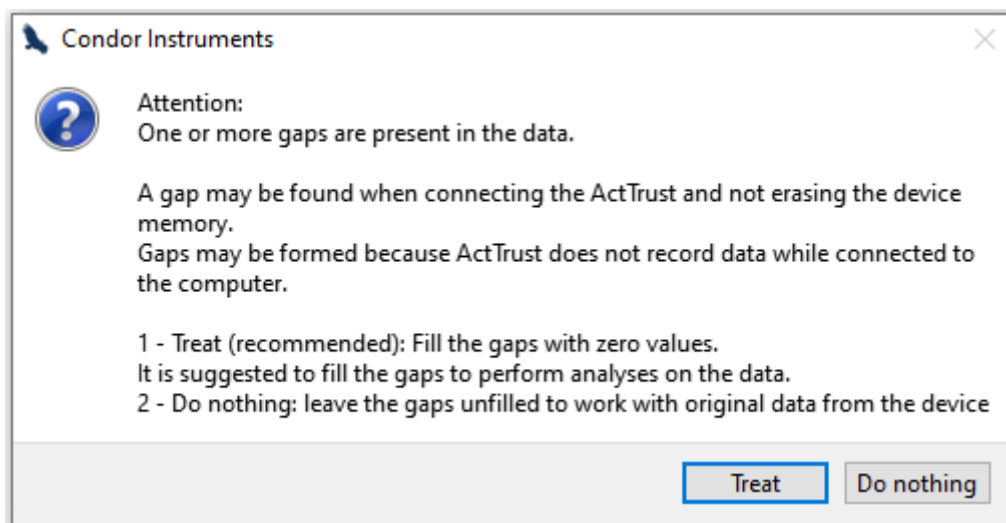
For logs read on ActStudio version 1.0.23 or higher.



The user can choose an option (treat or “do nothing”) based on the description that is shown in the window itself.

Note: when the data are loaded to process analysis, we recommend select the option "**Treat**" that will solve the date problem. **Attention**, the analysis may be inaccurate if the user do not solve the date problem.

If ActStudio finds a gap in the data, the following message will be shown:



The user can choose to fill the gap with null values (0) or not.

Note: when the data are loaded to process analysis, we recommend fill this gap with null values. **Attention,** the analysis may be inaccurate if the user do not fill this gap.

Every time the user chooses an option to solve a data problem, ActStudio will include an information in the log header report explaining what kind of data fix was performed.

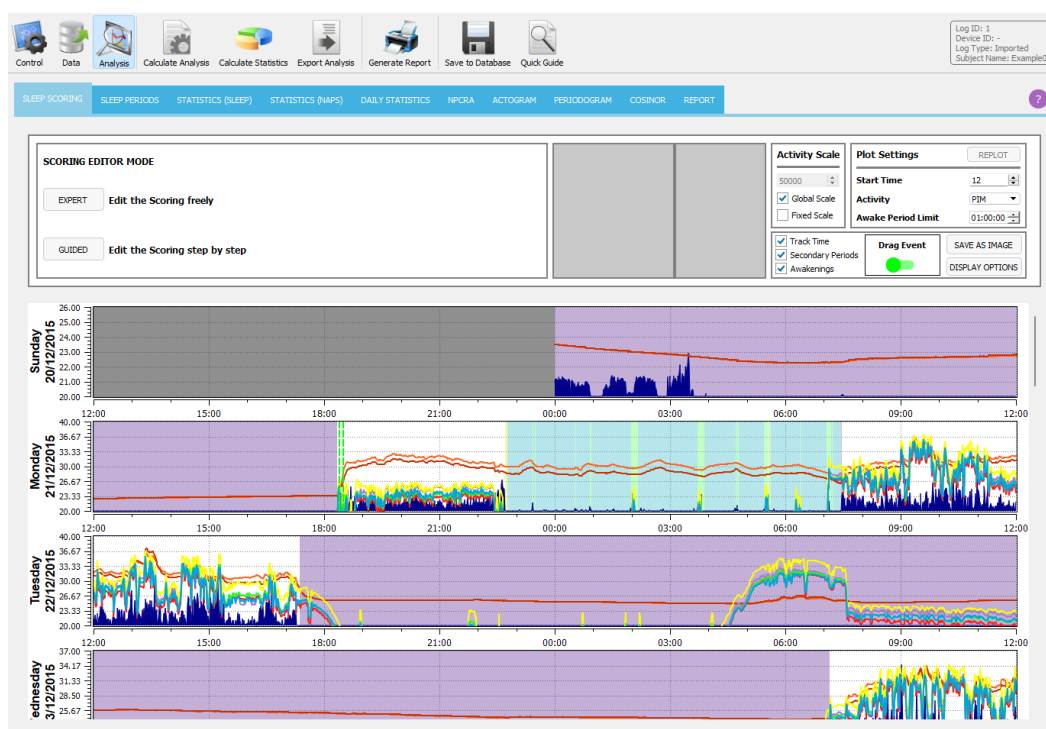
Data Analysis

On this menu the data extracted in the previous steps can be analyzed and additional information can be attached.

Sleep Scoring

The Sleep Scoring can be plotted and edited for publishing on the report. All the states defined in the sleep scoring graph can be edited by interacting with the plots or using the action menu described below.

States defined in the Sleep Scoring will affect the statistics and the other analysis.



Sleep Editor Mode

Select which Editor Mode to start editing the Sleep Scoring plot.

SCORING EDITOR MODE

EXPERT

Edit the Scoring freely

GUIDED

Edit the Scoring step by step

Shortcuts

This section shows the available shortcuts when interacting with the graphs.

When left clicking on a region of the plot where there's neither an event mark nor a region border, a **placeholder mark** will be created; holding left click and dragging will create a **placeholder state**.

After placing a placeholder mark, the marks shortcuts will be highlighted.

After placing a placeholder state, the states shortcuts will be highlighted.

Event	E	Awake	A
Bed Time	B	OffWrist	W
Get Up Time	G	Sleeping	S
Diary	D	Resting	R
Main Bed Time	Shift + B	Onset Latency	O
Main Get Up Ti...	Shift + G	Inertia	I
Main	M		
Nap	N		

Plot Settings

This Menu contains the **Activity Scale** configuration, the **Plot Settings** in which any changes require the plot to be refreshed and **other visual settings**.

Activity Scale

50000

☒ Global Scale
 ☐ Fixed Scale

Plot Settings

RELOT

Start Time 12

Activity PIM

Awake Period Limit 01:00:00

☒ Track Time
 ☒ Secondary Periods
 ☒ Awakenings

Drag Event

SAVE AS IMAGE

DISPLAY OPTIONS

Activity Scale

Sets the scale that will be used to display activity data.

Global Scale	Utilize the same scale on all plots
Fixed Scale	Use the scale set manually by the user, or an automatically calculated scale
No Scale	Uses an automatically calculated scale for each plot.

Plot Settings

Replot Button	Replot the Sleep Scoring graph. Changes in the fields
----------------------	---



	below will have affect after reploting the graph.
Start Time	Select the start time to plot the data (default 12 hours).
Activity	Select the activity data that will be plotted (e.g. PIM, TAT, ZCM).
Awake Period Limit	Select the time limit which awake periods are considered

Other Visual Settings	
Track Time	Enables and disables a tooltip that shows the time at the cursor position on the plot.
Secondary Periods	Used to show or hide the Secondary Sleep periods.
Awakenings	By checking this option, all resting periods that are inside a sleep period will be changed to the sleep state. It will only affect the sleep scoring visualization.
Drag Event Toggle Button	Toggle between being able to drag an Event or a Region with the mouse.
Save As Image Button	Save the entire graph as image (PNG, JPG or BMP).
Display Options Button	Shows/Hides the Sleep Scoring graph legend with the curves, events and states.

Display Options

☐ Activity	☒	☐ Red Light	☒	☐ Melanopic EDI	☐	☐ Event	☒	☐ Sleeping	☒	☐ Editable 1	☒
☐ Temperature	☒	☐ Green Light	☒			☐ Sleep Diary	☒	☐ Resting	☒	☐ Editable 2	☒
☐ Ext Temp.	☒	☐ Blue Light	☒			☐ Algorithm	☒	☐ OffWrist	☒	☐ Editable 3	☒
☐ IR Light	☒	☐ UVA Light	☒			☐ Main Sleep	☒	☐ Onset Latency	☒		
☐ Light	☒	☐ UVB Light	☒			☐ Nap	☒	☐ Inertia	☒		

CURVES	
Activity	Select if Activity data will or will not be shown in the graphs.
Temperature	Select if Temperature data will or will not be shown in the graphs
Ext Temperature	Select if External Temperature data will or will not be shown in the graphs (ActTrust only).
IR Light	Select if IR Light data will or will not be shown in the graphs.
Light	Select if Light data will or will not be shown in the

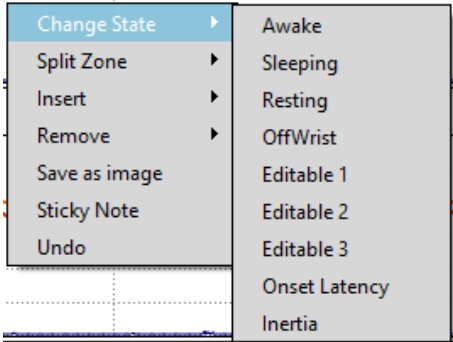
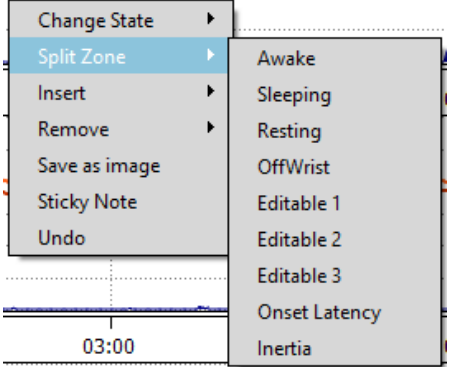
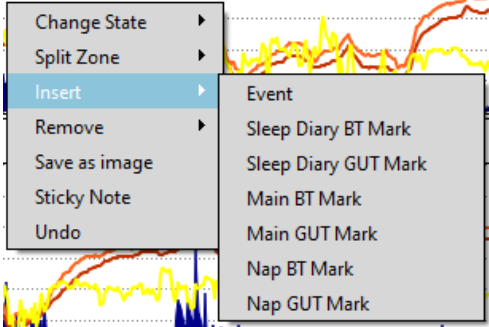
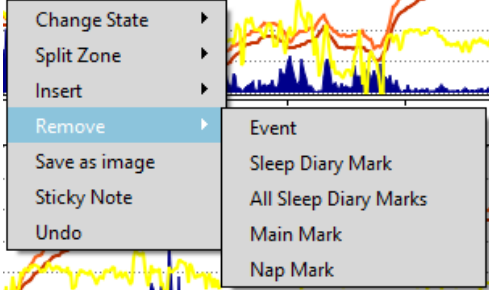


	graphs.
Red Light	Select if Red Light data will or will not be shown in the graphs.
Green Light	Select if Green Light data will or will not be shown in the graphs.
Blue Light	Select if Blue Light data will or will not be shown in the graphs.
UVA Light	Select if Ultraviolet A Light data will or will not be shown in the graphs.
UVB Light	Select if Ultraviolet B Light data will or will not be shown in the graphs.
Melanopic EDI	Select if Melanopic EDI data will or will not be shown in the graphs.(ActLumus only)
EVENTS	
Event	Select if Event data will or will not be shown in the graphs.
Sleep Diary	Select if the Sleep Diary marks will or will not be shown in the graph.
Algorithm	Select if the Algorithm marks will or will not be shown in the graph.
Main Sleep	Select if the Main Sleep marks will or will not be shown in the graph.
Nap	Select if the Nap marks will or will not be shown in the graph.
STATES	
Sleeping	Select if computer calculated Sleeping time will or will not be shown in the graphs.
Resting	Select if computer calculated Resting time will or will not be shown in the graphs.
OffWrist	Select if computer calculated time where the device was not worn will or will not be shown in the graphs.
Onset Latency	Select if Onset Latency time will or will not be shown in the graphs.
Inertia	Select if Inertia time will or will not be shown in the graphs.
Editable 1	These 3 " editable areas " can be used to manually insert some visual information to the graphs. For example, you can insert the time that the user practiced some physical activity. You can easily edit the region name and color by double clicking on the region name. To insert these regions into the graphs use the " Action Menu " explained in the next section.
Editable 2	
Editable 3	



Action Menu

The action menu is shown when the user clicks the right mouse button on the sleep scoring graph.

	Change State: Menu used to change the sleep scoring state where the user has clicked.
	Split Zone: Menu used to split the state zone in the sleep scoring where the user has clicked.
	Insert: Menu used to insert Event marks.
	Remove: Menu used to remove Event marks. The option "Remove > All Sleep Diary Marks" will clear the Sleep Diary

Editing the Sleep Scoring analysis

After selecting a log, proceed by selecting the Editor Mode and then clicking the **START** button.

< SCORING EDITOR MODE : EXPERT

Start Sleep Scoring

Start

If the Log has calculated states, two options will be available, reset or maintain the current states.

< SCORING EDITOR MODE : EXPERT

Loaded Log has calculated states

Reset State

Maintain State

Loaded Log has calculated states	
Reset State	Reset the states that were loaded with the selected log
Maintain State	Maintain the current states

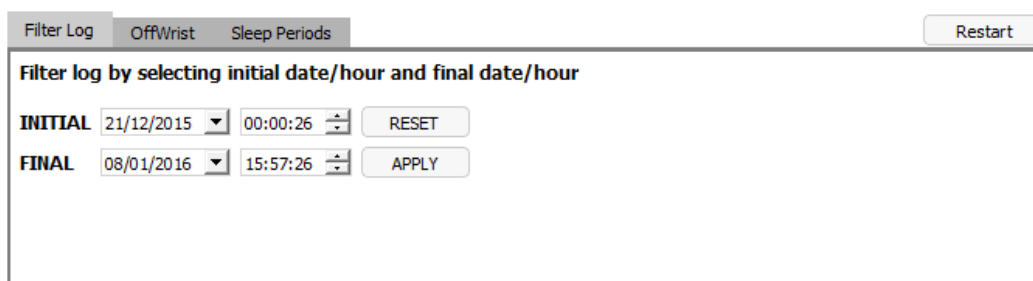
Expert Mode

The Expert Mode contains the **Filter Log**, **OffWrist** and **Sleep Periods** tabs, and the **Restart button**, which will reset any changes and go back to the Scoring Editor Mode selection.

Filter Log

Select initial and final date/time using the fields or the shortcuts.

Note: The log period can be filtered beforehand in the Data Import/Export Page of the Data Menu. The selected period will be maintained and can be filtered further in this tab.



The screenshot shows the 'Filter Log' tab selected. At the top right is a 'Restart' button. Below the tabs, the text reads 'Filter log by selecting initial date/hour and final date/hour'. There are two rows of input fields: 'INITIAL' with a date dropdown (21/12/2015) and a time spinner (00:00:26), and 'FINAL' with a date dropdown (08/01/2016) and a time spinner (15:57:26). Each row has a corresponding button: 'RESET' for the initial field and 'APPLY' for the final field.

Filter Log	
INITIAL	Initial date and time of the sample.
FINAL	Final date and time of the sample.
RESET	Redefine to the period selected in the Data Import/Export page
APPLY	Applies the selected period.
Shortcuts	
Shift + I	Select Initial date/time from the placeholder mark position
Shift + F	Select Final date/time from the placeholder mark position

OffWrist

OffWrist regions can be automatically detected by the chosen algorithm or manually inserted using the shortcut or action menu.



The screenshot shows the 'OffWrist' tab selected. At the top right is a 'Restart' button. Below the tabs, the text reads 'Select the OffWrist regions'. There is a section titled 'Algorithm' containing a dropdown menu with 'Offwrist Algorithm' selected and a 'DETECT' button below it.



Offwrist	
Algorithm	Select which algorithm to use to detect OffWrist regions.
DETECT	Detect OffWrist regions and apply the OffWrist states if there's any
Shortcut	
W	Apply OffWrist state in the selected placeholder state

Sleep Periods

Filter Log
OffWrist
Sleep Periods
Restart

	MAIN	SECONDARY	
Algorithm	CSPD Algorithm	CSPD Algorithm	MAIN
Apply on	Algorithm	Algorithm	SECONDARY
Onset Latency	ActStudio Algorithm	ActStudio Algorithm	
Inertia	ActStudio Algorithm	ActStudio Algorithm	
Awakenings	ActStudio Algorithm	ActStudio Algorithm	Ctrl+A CALCULATE ANALYSIS

Sleep Periods	
Algorithm	Select which algorithm to use to detect the Bed Time and Get up Time of the main and secondary(naps) sleep.
Apply on	Select where the Bed Time and Get up Time will be applied - Algorithm: apply on Algorithm marks - Sleep Diary: apply on Sleep Diary marks
MAIN BUTTON	Detect main sleep Bed Time and Get up Time and apply the Main Sleep marks on the selected "Apply on" field
SECONDARY BUTTON	Detect Nap Bed Time and Get up Time and apply the Nap marks on the algorithm marks
Onset Latency	Select which algorithm to use to detect Onset Latency regions.
Inertia	Select which algorithm to use to detect Inertia regions.
Awakenings	Select which algorithm to use to detect Awakening regions.
CALCULATE ANALYSIS BUTTON	Fill the Main Sleep periods and naps with the sleep state and detect the Onset Latency, Inertia and awakenings for each sleep period and each nap.
Shortcuts	
B	Add Sleep Diary Bed Time
G	Add Sleep Diary Get up Time
D	Add Sleep Diary Bed Time and Get up Time
Shift + B	Add Main Sleep Bed Time
Shift + G	Add Main Sleep Get up Time
M	Add Main Sleep Bed Time and Get up Time
N	Add Nap Bed Time and Get up Time
S	Add Sleep State
O	Add Onset Latency State
I	Add Inertia State
R	Add Resting State

Guided Mode

The Guided Mode is organized in stages which are required to be performed in sequence.

Stages navigation	
RESTART	Restart all the stages
RESET STAGE	Resets the changes made in the current stage
RETURN	Resets the changes made in the current stage and go back to the previous stage.
DONE	Advance to the <u>next</u> stage.

Period selection

Select initial and final date/time using the fields or the shortcuts.

Note: The log period can be filtered beforehand in the Data Import/Export Page of the Data Menu. This stage will maintain the selected period and can be used to further filter the period.

 Period	 OffWrist	 Main Sleep	 Onset Latency	 Inertia	 Sleep Analysis	 Naps
--	--	--	---	---	--	--

Filter log by selecting initial date/hour and final date/hour

INITIAL 21/12/2015 00:00:26

FINAL 08/01/2016 15:57:26

Period Selection	
INITIAL	Initial date and time of the sample.
FINAL	Final date and time of the sample.
RESET	Redefine to the period selected in the Data Import/Export page
APPLY	Applies the selected period.
Shortcuts	
Shift + I	Select Initial date/time from the placeholder mark position
Shift + F	Select Final date/time from the placeholder mark position

OffWrist

OffWrist regions can be automatically detected by the chosen algorithm or manually inserted using the shortcut or action menu.



Period	OffWrist	Main Sleep	Onset Latency	Inertia	Sleep Analysis	Naps

Please select the OffWrist regions

Algorithm

Offwrist Algorithm ▾

DETECT

RESTART

RESET STAGE

RETURN

DONE

Offwrist	
Algorithm	Select which algorithm to use to detect OffWrist regions.
DETECT	Detect OffWrist regions and apply the OffWrist states if there's any
Shortcut	
W	Apply OffWrist state in the selected placeholder state

Main Sleep Period

In this stage, the Main Sleep period will be defined:

- **Step 1: Setting up the Algorithm and/or Sleep Diary Marks:** The Algorithm marks can be automatically detected by the chosen algorithm with the **DETECT** button; the Diary marks can be created in the Sleep Diary page in the Data Menu or manually inserted on the plot.
- **Step 2: Applying the Main Sleep:** The Main Sleep Bed Time and Get up Time can be created using the position of either the **ALGORITHM** or **SLEEP DIARY** marks.
- **Adjusting the Main Sleep:** With the Main Sleep marks created, they can be dragged with mouse to adjust their position.

Period	OffWrist	Main Sleep	Onset Latency	Inertia	Sleep Analysis	Naps

Algorithm

CSPD Algorithm ▾

DETECT

Step 1

Detect the Main Sleep periods using the selected algorithm. Algorithm marks will be automatically applied

Main Sleep

ALGORITHM SLEEP DIARY

Step 2

Start the Main Sleep using the Algorithm or Sleep Diary Marks

RESTART

RESET STAGE

RETURN

DONE

Main Sleep	
Algorithm	Select which algorithm to use to detect the main sleep Bed Time and Get up Time.
DETECT	Detect main sleep Bed Time and Get up Time and apply the algorithm marks.
ALGORITHM	Apply the Main Sleep Marks on the algorithm marks



SLEEP DIARY	Apply the Main Sleep Marks on the Sleep Diary marks
Shortcuts	
B	Add Sleep Diary Bed Time
G	Add Sleep Diary Get up Time
D	Add Sleep Diary Bed Time and Get up Time
Shift + B	Add Main Sleep Bed Time
Shift + G	Add Main Sleep Get up Time
M	Add Main Sleep Bed Time and Get up Time

Onset Latency

Onset Latency regions can be automatically detected by the chosen algorithm or manually inserted using the shortcut or action menu.

✓

Period

✓

OffWrist

✓

Main Sleep

✓

Onset Latency

!

Inertia

!

Sleep Analysis

!

Naps

Automatically detect Onset Latency regions

Algorithm

ActStudio Algorithm

DETECT

RESTART

RESET STAGE

RETURN

DONE

Onset Latency	
Algorithm	Select which algorithm to use to detect Onset Latency regions.
DETECT	Detect Onset Latency regions and apply the Onset Latency states if there's any
Shortcut	
O	Add Onset Latency State

Inertia

Inertia regions can be automatically detected by the chosen algorithm or manually inserted using the shortcut or action menu.

✓

Period

✓

OffWrist

✓

Main Sleep

✓

Onset Latency

✓

Inertia

!

Sleep Analysis

!

Naps

Automatically detect Inertia regions

Algorithm

ActStudio Algorithm

DETECT

RESTART

RESET STAGE

RETURN

DONE

Inertia

Algorithm	Select which algorithm to use to detect Inertia regions.
DETECT	Detect Inertia regions and apply the Inertia states if there's any
Shortcut	
I	Add Inertia State

Sleep Analysis

Automatically detect the Awakenings in the Main Sleep Periods with the chosen algorithm.

✓

Period

✓

OffWrist

✓

Main Sleep

✓

Onset Latency

✓

Inertia

✓

Sleep Analysis

!

Naps

Automatically detect awakenings

Algorithm

ActStudio Algorithm

DETECT

RESTART

RESET STAGE

RETURN

DONE

Sleep Analysis	
Algorithm	Select which algorithm to use to detect Awakenings in the Main Sleep.
DETECT	Detect awakening regions and apply the resting states in the main sleep periods.
Shortcut	
R	Add Resting state

Naps

In this stage, the Secondary Sleep period will be defined:

- **Step 1: Applying the Nap periods:** The Nap marks can be automatically detected by the chosen algorithm with the **DETECT** button.
- **Adjusting the Nap Periods:** With the Nap marks created, they can be dragged with mouse to adjust their position.
- **Step 2: Secondary Sleep Analysis:** Detect Onset Latency, Inertia and Awakening regions on the Nap periods, with the same algorithms used to detect them in the Main Sleep.



✓
Period

✓
OffWrist

✓
Main Sleep

✓
Onset Latency

✓
Inertia

✓
Sleep Analysis

✓
Naps

Algorithm

CSPD Algorithm

Step 1

DETECT

Sleep Analysis

DETECT

Step 2

Detect the Nap periods using the selected algorithm.
Nap marks will be automatically applied

Detect the onset Latency, Inertia and Awakenings of the Naps

RESTART

RESET STAGE

RETURN

DONE

Naps	
Algorithm	Select which algorithm to use to detect the naps Bed Time and Get up Time.
DETECT	Detect naps Bed Time and Get up Time and apply the nap marks.
Sleep Analysis DETECT	Detect Onset Latency, Inertia and Awakening regions and apply the respective states in the nap periods if there's any
Shortcut	
N	Add Nap Bed Time and Get up Time

Scoring Complete

With all the stages completed, the Sleep Scoring analysis is finished. The states and marks can still be edited in the Completed stage.

✓
Period

✓
OffWrist

✓
Main Sleep

✓
Onset Latency

✓
Inertia

✓
Sleep Analysis

✓
Naps

Sleep Scoring completed

EXPERT MODE

Maintain current states and go to Expert Mode

RESTART

RESET STAGE

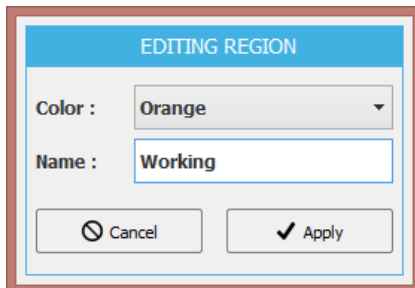
RETURN

DONE

The option to switch to the Expert Mode will be available.

Editing an Editable Area

To edit an editable area just double click on the name or color of the editable region (in the curves menu) and the following window dialog will be shown:

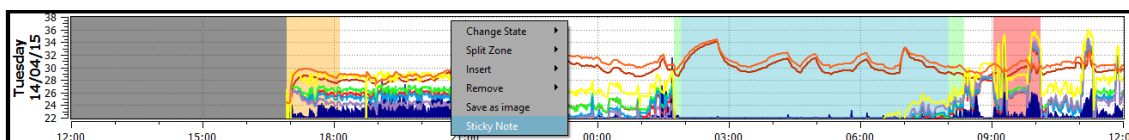


The "EDITING REGION" dialog box contains two input fields: "Color" with a dropdown menu showing "Orange" and "Name" with a text box containing "Working". At the bottom are "Cancel" and "Apply" buttons.

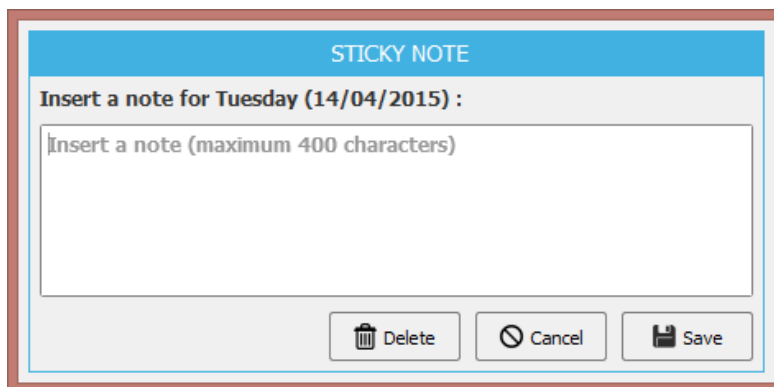
You can select a color using the "**Color**" field and insert a name for this editable region using the "**Name**" field. When you finish your edition, just click on the "**Apply**" button to apply the changes to that editable region.

Sticky Notes

You can include a sticky note for any day in the plot area. To do so, just right-click on the desired day in the sleep scoring graph and select the "**Sticky Note**" option in the "**Action Menu**".



A new dialog window will be shown to manage the sticky note.

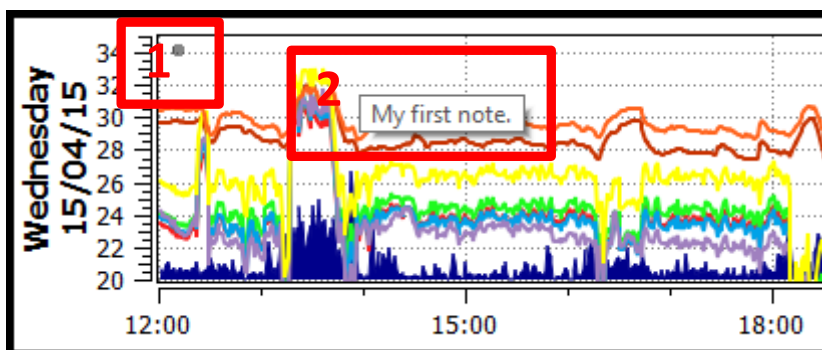


The "STICKY NOTE" dialog box prompts the user to "Insert a note for Tuesday (14/04/2015) :". It features a large text area for the note, with a placeholder text "Insert a note (maximum 400 characters)". At the bottom are "Delete", "Cancel", and "Save" buttons.

This window can be used to insert, edit or delete a note for the selected day. By inserting a note and clicking on the "**Save**" button it will include the note into the selected day.



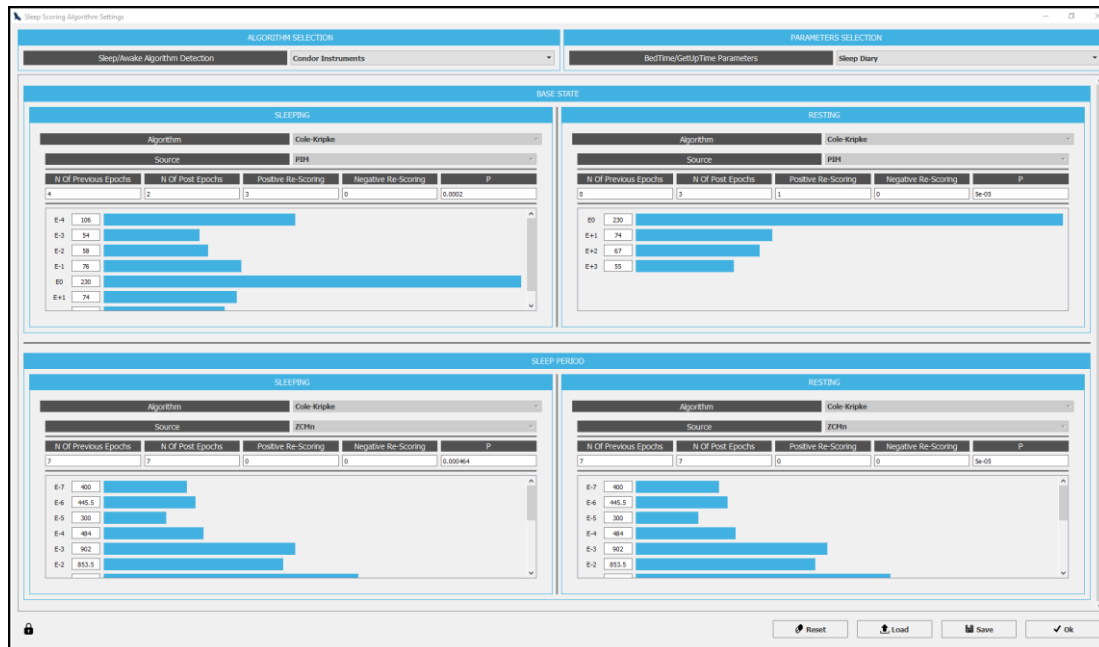
When you include a sticky note into a graph it will receive a little point on the left upper corner (1) and it will also show a tooltip with the note content when you stop with the mouse cursor on it (2).



Note: to delete a sticky note you must follow the same process described to insert a note, however, in the "**Sticky Note**" window dialog you must click on the "**Delete**" button.

Sleep Scoring Settings

The sleep scoring settings window can be used to configure the sleep scoring algorithms and the respective parameters.



SELECTION OF ALGORITHM

The Base State is used to calculate the bed times and get up times and the Sleep Period is used to calculate the sleep/rest states inside the bed times and get up times.

Sleep/Awake Algorithm Detection

Note that all options use the same algorithm called CIColeKripke which was developed based on the Cole-Kripke work entitled *Automatic sleep/wake identification from wrist activity* [1]. To know more about this algorithm please contact us by the e-mail: contato@condorinst.com.br

Condor Instruments: this option will use the Condor Instruments algorithm with default parameters (which uses the PIM and ZCMn data).

Condor Instruments 2: a variation of the Condor Instruments option with different default parameters.

Cole-Kripke(legacy): this option will use the default parameters proposed by Cole-Kripke. The user can edit the parameters (use for compatibility with ActStudio prior to version 1.0.15).

Cole-Kripke(revised): this option will use the default parameters proposed by Cole-Kripke. The user can edit the parameters.

Custom: this option will use the same algorithm (CIColeKripke) and will enable the user to change all the



	parameters None: this option will not use any algorithm to define the sleep scoring, and will only use the parameters to define the sleep state.
SELECTION OF PARAMETERS	
Bed Time/Get Up Time Parameters	Sleep Diary: this option will use the sleep diary to define the bed time and get up time. If the sleep diary is empty it will use the Condor Instruments algorithm to define these parameters. Event Button: this option will use the events (from the event button) to define the bed time and get up time. If the events vector is empty it will use the Condor Instruments algorithm to define these parameters. Condor Instruments: this option will define the bed time and get up time based on the selected algorithm (base state) and the Condor Instruments algorithm.

SLEEPING	
Algorithm	This option is not in use at the moment.
Source	The data source to be used to define the sleeping state.
N of Previous Epochs	The number of previous epochs to be considered in the algorithm to determine the state of the current epoch.
N of Post Epochs	The number of post epochs to be considered in the algorithm to determine the state of the current epoch.
Positive Re-Scoring	The Positive Re-Scoring is used to determine how many followed epochs will be considered to the algorithm determine that the state has changed.
Negative Re-Scoring	The Negative Re-Scoring is also used to determine how many followed epochs will be considered to the algorithm determine that the state has changed.
P	The P is a constant used to multiply the epochs.
E	Each "E" value corresponds to the weight of each epoch that will be used in the algorithm. The "E0" value corresponds the weight of the current epoch.
These options are used in the Cole-Kripke algorithm and the Custom algorithm. Detailed explanations about these parameters can be found in the following work: "Automatic sleep/wake identification from wrist activity" [1].	

RESTING	
Algorithm	This option is not in use at the moment.
Source	The data source to be used to define the resting state. This option is used in the Cole-Kripke algorithm and the Custom algorithm.
N of Previous Epochs	The number of previous epochs to be considered in the algorithm to determine the state of the current epoch.
N of Post Epochs	The number of post epochs to be considered in the



	algorithm to determine the state of the current epoch.
Positive Re-Scoring	The Positive Re-Scoring is used to determine how many followed epochs will be considered to the algorithm determine that the state has changed.
Negative Re-Scoring	The Negative Re-Scoring is also used to determine how many followed epochs will be considered to the algorithm determine that the state has changed.
P	The P is a constant used to multiply the epochs.
E	Each "E" value corresponds to the weight of each epoch that will be used in the algorithm. The "E0" value corresponds the weight of the current epoch.
These options are used in the Cole-Kripke algorithm and the Custom algorithm. Detailed explanations about these parameters can be found in the following work: " <i>Automatic sleep/wake identification from wrist activity</i> " [1].	

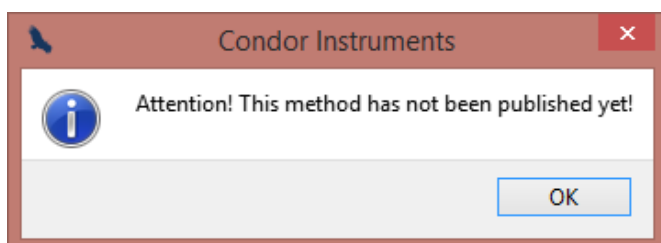
BUTTONS	
Reset	This button will reset the settings to the default options. Note: these options will not be saved until the user press the "Save" button.
Load	This button will load the settings already saved.
Save	This button will save the current settings as the default settings. When ActStudio starts, these settings will be loaded automatically.
Ok	Just used to close the window.

References:

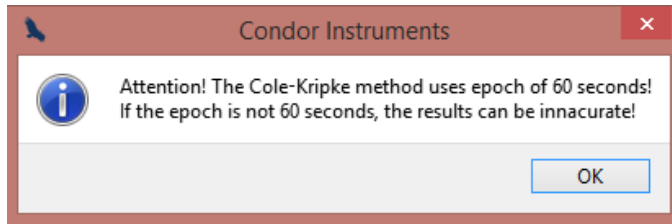
[1] Cole, R. J., Kripke, D. F., Gruen, W., Mullaney, D. J., & Gillin, J. C. (1992). Automatic sleep/wake identification from wrist activity. *Sleep*, 15(5), 461-469.

When selecting an algorithm in the "**Selection of Algorithm**" menu, may be shown an information message explaining about each method.

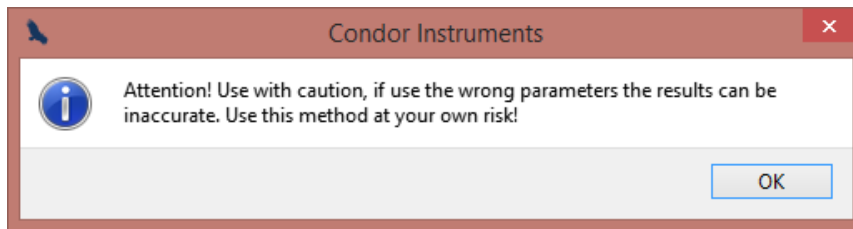
Condor Instruments:



Cole-Kripke:



Custom:

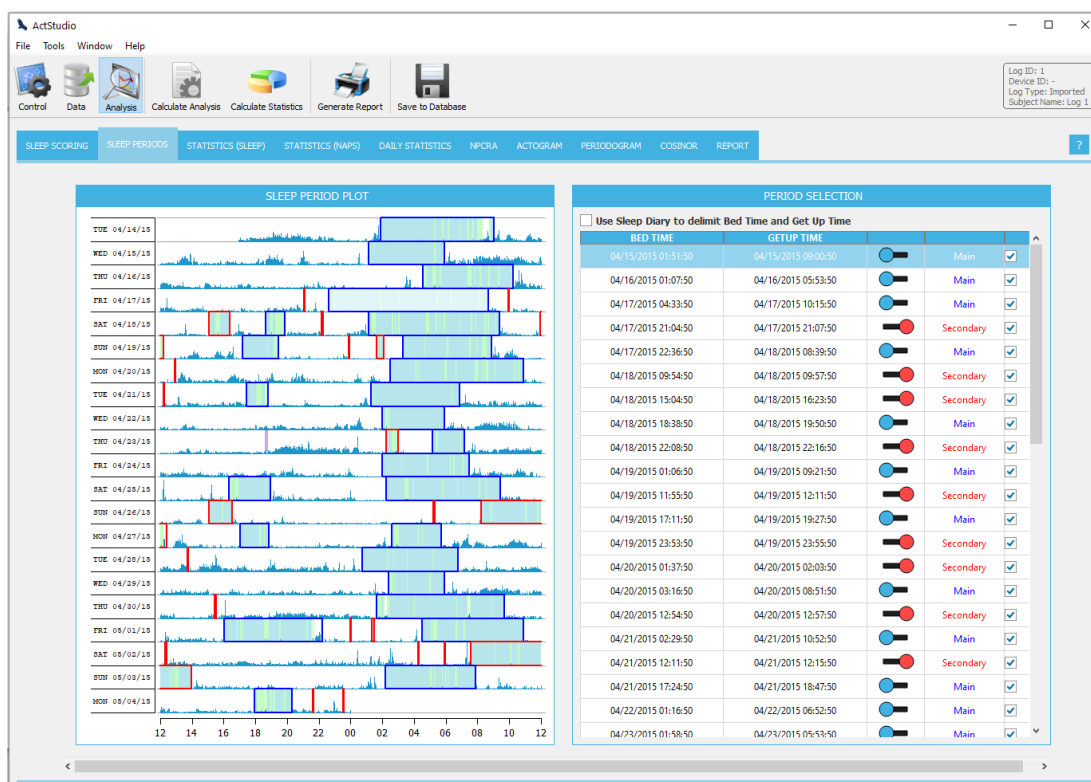




Sleep Periods

In the Sleep Periods page, all the sleep periods calculated by the Sleep Scoring will be shown on the **Sleep Period Plot** and listed on the **Period Selection**.

Each period will be considered either Main(blue) or Secondary(red) according to the parameters set in the Light/Dark Phase page in the Data Menu. Each Sleep Period can be edited, toggling its type between Main and Secondary and enable or disabled. Main Sleep Periods will be shown in the Statistics(Sleep) page and Secondary Sleep Periods will be shown in the Statistics(Naps) page.



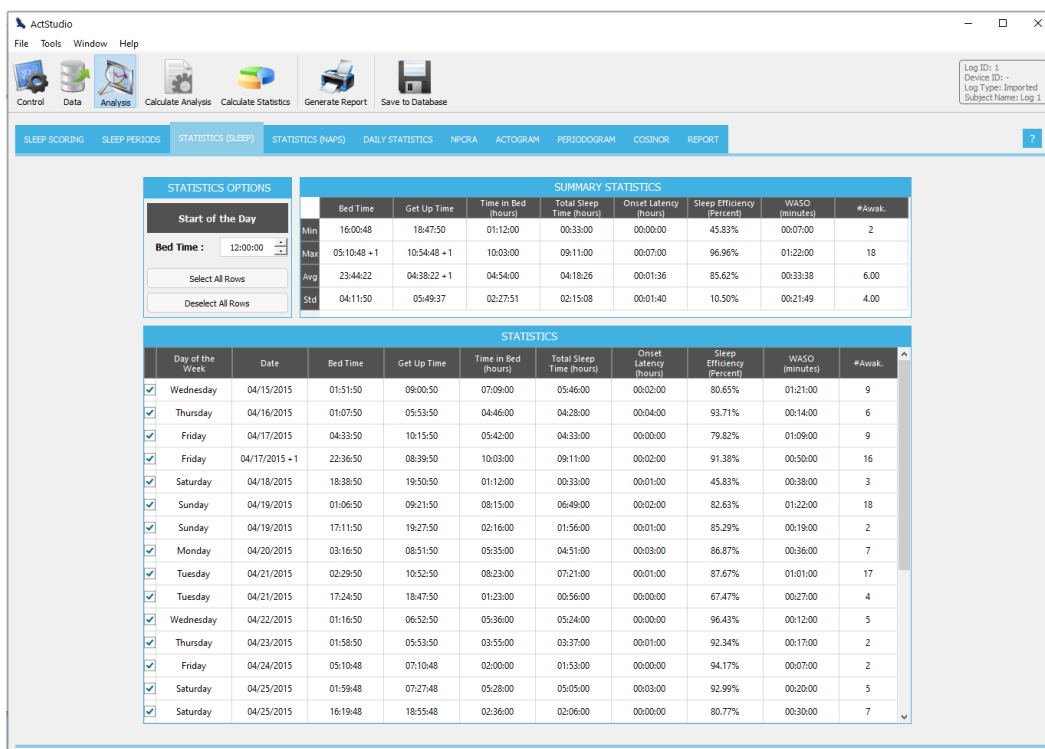
PERIOD SELECTION

Use Sleep Diary to delimit Bed Time and Get Up Time	This option will update the sleep periods with the exact points for Bed Time and Get Up Time from the Sleep Diary.
Bed Time	Date and Time of the sleep period Bed Time.
GetUp Time	Date and Time of the sleep period Get up Time.
State Buttons	The state buttons next to the GetUp Time column toggle the type of the respective period to Main or Secondary.
Period Type	Whether the respective period is Main or Secondary.
Checkboxes	The checkboxes next to the Period Type column are used to enable or disable the respective period, disabled periods will not be considered in the Statistics pages.

Statistics (Sleep)

This page will calculate and show the daily analyses of sleep performance. The statistics are automatically updated when changing some region/state in the sleep scoring graph or editing the sleep period types in the Sleep Periods page, but you can use the Calculate Statistics button in the main Menu to refresh the statistics information and make sure it was updated. **Note:** on the date column, dates that have a symbol (e.g., +1) on the right, means that the sleep time began in one day and ended in another day.

The Statistics (Sleep) page will receive the Main Sleep Periods set in the Sleep Periods page.



STATISTICS OPTIONS

Start of the Day

Bed Time : 12:00:00

Select All Rows

Deselect All Rows

SUMMARY STATISTICS

	Bed Time	Get Up Time	Time in Bed (hours)	Total Sleep Time (hours)	Onset Latency (hours)	Sleep Efficiency (Percent)	WASO (minutes)	#Awak.
Min	16:00:48	18:47:50	01:12:00	00:33:00	00:00:00	45.83%	00:07:00	2
Max	05:10:48 +1	10:54:48 +1	10:03:00	09:11:00	00:07:00	96.96%	01:22:00	18
Avg	23:44:22	04:38:22 +1	04:54:00	04:18:26	00:01:36	85.62%	00:33:38	6.00
Std	04:11:50	05:49:37	02:27:51	02:15:08	00:01:40	10.50%	00:21:49	4.00

STATISTICS

	Day of the Week	Date	Bed Time	Get Up Time	Time in Bed (hours)	Total Sleep Time (hours)	Onset Latency (hours)	Sleep Efficiency (Percent)	WASO (minutes)	#Awak.
☒	Wednesday	04/15/2015	01:51:50	09:00:50	07:09:00	05:46:00	00:02:00	80.65%	01:21:00	9
☒	Thursday	04/16/2015	01:07:50	05:53:50	04:46:00	04:28:00	00:04:00	93.71%	00:14:00	6
☒	Friday	04/17/2015	04:33:50	10:15:50	05:42:00	04:33:00	00:00:00	79.82%	01:09:00	9
☒	Friday	04/17/2015 +1	22:36:50	08:39:50	10:03:00	09:11:00	00:02:00	91.38%	00:50:00	16
☒	Saturday	04/18/2015	18:38:50	19:50:50	01:12:00	00:33:00	00:01:00	45.83%	00:38:00	3
☒	Sunday	04/19/2015	01:06:50	09:21:50	08:15:00	06:49:00	00:02:00	82.63%	01:22:00	18
☒	Sunday	04/19/2015	17:11:50	19:27:50	02:16:00	01:56:00	00:01:00	85.29%	00:19:00	2
☒	Monday	04/20/2015	03:16:50	08:51:50	05:35:00	04:51:00	00:03:00	86.87%	00:36:00	7
☒	Tuesday	04/21/2015	02:29:50	10:52:50	08:23:00	07:21:00	00:01:00	87.67%	01:01:00	17
☒	Tuesday	04/21/2015	17:24:50	18:47:50	01:23:00	00:56:00	00:00:00	67.47%	00:27:00	4
☒	Wednesday	04/22/2015	01:16:50	06:52:50	05:36:00	05:24:00	00:00:00	96.43%	00:12:00	5
☒	Thursday	04/23/2015	01:58:50	05:53:50	03:55:00	03:37:00	00:01:00	92.34%	00:17:00	2
☒	Friday	04/24/2015	05:10:48	07:10:48	02:00:00	01:53:00	00:00:00	94.17%	00:07:00	2
☒	Saturday	04/25/2015	01:59:48	07:27:48	05:28:00	05:05:00	00:03:00	92.99%	00:20:00	5
☒	Saturday	04/25/2015	16:19:48	18:55:48	02:36:00	02:06:00	00:00:00	80.77%	00:30:00	7

STATISTICS OPTIONS

Bed Time	The start time of the day to be considered in the calculation of the Bed Time parameter in the Summary Statistics. Its default value is equal to the start time of the Sleep Scoring.
Select All Rows	Select all rows (checkboxes) in the Statistics Table and updates the Summary Statistics.
Deselect All Rows	Deselect all rows (checkboxes) in the Statistics Table and updates the Summary Statistics.

STATISTICS

In the statistics table are shown the sleep statistics calculated based on the sleep/rest states generated by the sleep scoring analysis.



Each sleep/rest period is represented by one row in the statistics table. To understand how each parameter is calculated in the statistics table, refer to the ActStudio Methods report.

SUMMARY STATISTICS

The Summary Statistics show the minimum, maximum, average and standard deviation values of each parameter from the statistics table. Note that the Summary Statistics are calculated based only on the selected rows from the Statistics table. At the first column of each row is provided a check box to select or unselect the respective row. Note that as the Bed Time and Get Up Time are time values they are calculated based on the Start of the Day field defined in the STATISTICS OPTIONS menu.



Statistics (Naps)

The Statistics (Naps) page works exactly as the Statistics (Sleep) page but will receive the Secondary Sleep Periods set in the Sleep Periods page.

STATISTICS OPTIONS		SUMMARY STATISTICS							
Start of the Day		Bed Time	Get Up Time	Time in Bed (hours)	Total Sleep Time (hours)	Onset Latency (hours)	Sleep Efficiency (Percent)	WAO (minutes)	#Awake
Min		12:11:50	12:15:50	00:02:00	00:00:00	00:00:00	0.00%	00:00:00	0
Max		11:55:50 + 1	13:58:48 + 1	06:24:00	05:43:00	00:05:00	100.00%	00:38:00	9
Avg		22:50:55	23:29:29	00:38:33	00:31:28	00:00:55	64.50%	00:04:31	0
Std		06:58:50	07:33:27	01:27:08	01:16:39	00:01:24	37.23%	00:10:33	1.00

	Day of the Week	Date	Bed Time	Get Up Time	Time in Bed (hours)	Total Sleep Time (hours)	Onset Latency (hours)	Sleep Efficiency (Percent)	WAO (minutes)	#Awake
☒	Friday	04/17/2015	21:04:50	21:07:50	00:03:00	00:00:00	00:00:00	0.00%	00:00:00	0
☒	Saturday	04/18/2015	09:54:50	09:57:50	00:03:00	00:03:00	00:00:00	100.00%	00:00:00	0
☒	Saturday	04/18/2015	15:04:50	16:23:50	01:19:00	00:56:00	00:05:00	70.89%	00:18:00	1
☒	Saturday	04/18/2015	22:08:50	22:16:50	00:08:00	00:06:00	00:02:00	75.00%	00:00:00	0
☒	Sunday	04/19/2015	11:55:50	12:11:50	00:16:00	00:06:00	00:00:00	37.50%	00:10:00	1
☒	Sunday	04/19/2015	23:53:50	23:55:50	00:02:00	00:00:00	00:00:00	0.00%	00:00:00	0
☒	Monday	04/20/2015	01:37:50	02:03:50	00:26:00	00:23:00	00:00:00	88.46%	00:03:00	1
☒	Monday	04/20/2015	12:54:50	12:57:50	00:03:00	00:03:00	00:00:00	100.00%	00:00:00	0
☒	Tuesday	04/21/2015	12:11:50	12:15:50	00:04:00	00:00:00	00:00:00	0.00%	00:00:00	0
☒	Friday	04/24/2015	02:15:48	02:58:48	00:43:00	00:20:00	00:00:00	46.51%	00:00:00	0
☒	Sunday	04/26/2015	15:02:48	16:32:48	01:30:00	01:20:00	00:03:00	88.89%	00:07:00	2
☒	Monday	04/27/2015	05:11:48	05:17:48	00:06:00	00:06:00	00:00:00	100.00%	00:00:00	0
☒	Monday	04/27/2015	08:14:48	12:23:48	04:09:00	03:28:00	00:04:00	83.53%	00:37:00	4
☒	Tuesday	04/28/2015	13:43:48	13:46:48	00:03:00	00:00:00	00:00:00	0.00%	00:00:00	0
☒	Thursday	04/30/2015	15:25:48	15:31:48	00:06:00	00:00:00	00:00:00	0.00%	00:00:00	0

STATISTICS OPTIONS

Bed Time	The start time of the day to be considered in the calculation of the Bed Time parameter in the Summary Statistics. Its default value is equal to the start time of the Sleep Scoring.
Select All Rows	Select all rows (checkboxes) in the Statistics Table and updates the Summary Statistics.
Deselect All Rows	Deselect all rows (checkboxes) in the Statistics Table and updates the Summary Statistics.

STATISTICS

In the statistics table are shown the sleep statistics calculated based on the sleep/rest states generated by the sleep scoring analysis. Each sleep/rest period is represented by one row in the statistics table. To understand how each parameter is calculated in the statistics table, refer to the ActStudio Methods report.

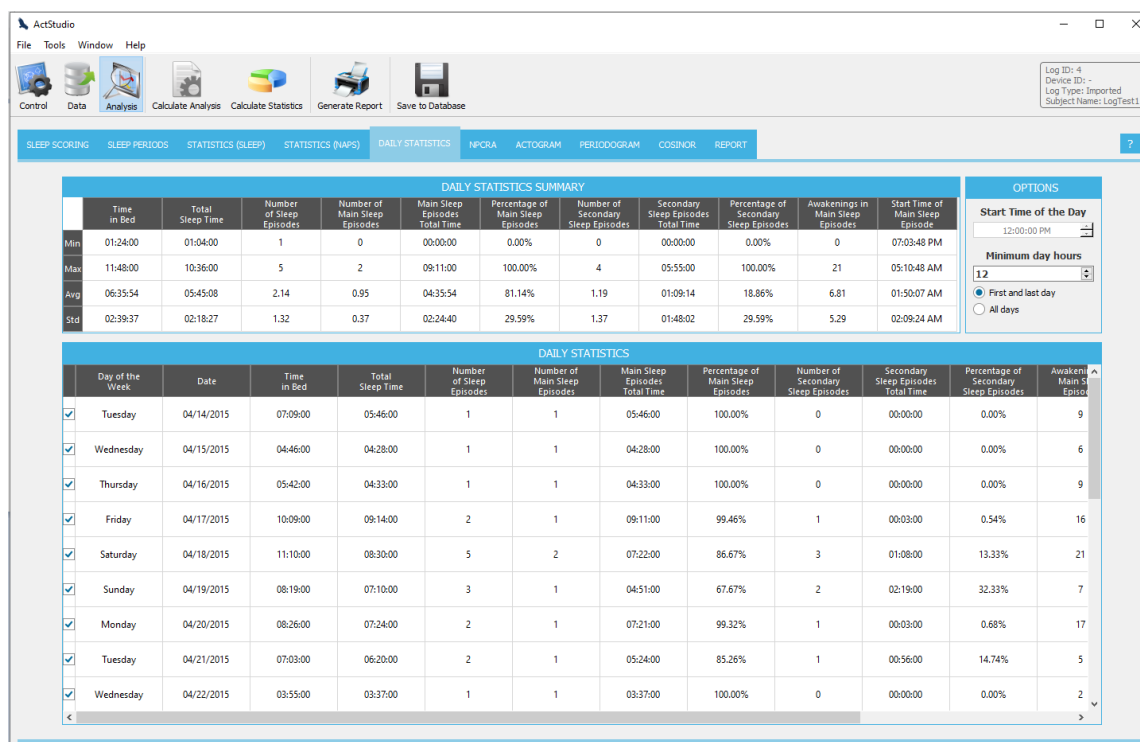
SUMMARY STATISTICS

The Summary Statistics show the minimum, maximum, average and standard deviation values of each parameter from the statistics table. Note that the Summary Statistics are calculated based only on the selected rows from the Statistics table. At the first column of each row is provided a check box to select or unselect the respective row. Note that as the Bed Time and Get Up Time are time values they are calculated based on the Start of the Day field defined in the STATISTICS OPTIONS menu.

Daily Statistics

The statistics from the Daily Statistics analysis are calculated based on the results of the Statistics analysis. It gets the results from the statistics table and the parameters defined in the Light/Dark Phase page and calculates the values for the main sleep episodes and secondary sleep episodes for each day.

Note: the daily statistics uses all data (rows) from the statistics table, not just the selected rows.



DAILY STATISTICS	
Day of the Week	Shows the day of the week based on the date.
Date	Shows the date that represents each day, according to the parameter "bed time" from the statistics table.
Time in Bed	Total time in bed of the day.
Total Sleep Time	Total sleep time of the day.
Number of Sleep Episodes	The number of sleep episodes that start (bed time) in the same day.
Number of Main Sleep Episodes	The number of sleep episodes that are considered as main sleep episodes based on the parameters defined in the Light/Dark Phase page.
Main Sleep Episodes Total Time	The total sleep time of the main sleep episodes, based on the parameters defined in the Light/Dark Phase page.
Percentage of Main Sleep Episodes	The percentage of the main sleep episodes of each day (Main Sleep Episodes Total Time / Total Sleep Time).



Number of Secondary Sleep Episodes	The number of sleep episodes that are not considered as main sleep episodes based on the parameters defined in the Light/Dark Phase page.
Secondary Sleep Episodes Total Time	The total sleep time of the secondary sleep episodes, based on the parameters defined in the Light/Dark Phase page.
Percentage of Secondary Sleep Episodes	The percentage of the secondary sleep episodes of each day (Secondary Sleep Episodes Total Time / Total Sleep Time).
Awakenings in Main Sleep Episodes	The total number of awakenings in the main sleep episodes.
Start Time of the Main Sleep Episode	The start time (bed time) of the main sleep episode of each day, based on the parameters defined in the Light/Dark Phase page. Reminder: the main sleep episode is the longer sleep episode of the day.

DAILY STATISTICS SUMMARY

The "**Daily Statistics Summary**" table shows the **Minimum**, **Maximum**, **Average** and **Standard** deviation values for all the columns in the "**Daily Statistics**" table. Note that the Daily Statistics Summary is calculated based only on the selected rows from the Daily Statistics table. At the first column of each row is provided a check box to select or unselect the respective row.

OPTIONS

Start Time of the Day	This field is used to set the " Start Time of the Day " that is used in the " Start Time of the Main Sleep Episode " calculation in the " Daily Statistics Summary " table.
Minimum day hours	This field is used to select how many hours of activity a day must have to be considered in the Daily Statistics table. Days with less hours of activity will be unchecked.
First and last day, All days	Filter which days will be affected by the Minimum day hours field.

NPCRA

This page will calculate the NPCRA functions: M10, L5, RA, Intradaily Variability (IV) and Interdaily Stability (IS).

The NPCRA functions were developed based on the research entitled "Alterations in the circadian rest-activity rhythm in aging and Alzheimer's disease." from Witting *et. al.*, 1990.

- The **M10** is calculated by the average value of followed 10 hours of greatest activity.
- The **O_M10** (onset M10) is the start date and time of the M10 period.
- The **L5** is calculated by the average value of followed 5 hours of lower activity.
- The **O_L5** (onset L5) is the start date and time of the L5 period.
- The **RA** (Relative Amplitude) is calculated by the following formula:

$$RA = \frac{M10 - L5}{M10 + L5}$$

- The **IV** (Intradaily Variability) function is calculated by the following formula:

$$IV = \frac{N \sum_{i=2}^N (X_i - X_{i-1})^2}{(N - 1) \sum_{i=1}^N (X_m - X_i)^2}$$

- The **IS** (Interdaily Stability) function is calculated by the following formula:

$$IS = \frac{N \sum_{h=1}^p (X_h - X_m)^2}{p \sum_{i=1}^N (X_i - X_m)^2}$$

All calculations were developed based on the work:

Witting W, Kwa IH, Eikelenboom P, Mirmiran M, Swaab DF. Alterations in the circadian rest-activity rhythm in aging and Alzheimer's disease. *Biol Psychiatry* 1990;27:563-72.



PERIOD AND DATA SELECTION

Field used to select the period and the data that will be used in the calculation.

Initial Date	Select the initial date.
Initial Time	Select the initial time.
Days	Select how many days will be used in the calculation.
Data	Select what data will be used in the calculation (e.g. PIM, TAT, ZCM).
Summary Results	By checking this option, the results will be shown summarized.
Entire Period	This checkbox is used to select the entire period. When checked it will disable another fields related to the period selection (initial date, initial time, days).
Calculate	This button is used to calculate the NPCRA functions.

M10 AND L5 PARAMETERS

Field used to select some parameters to the NPCRA functions.

Zero OffWrist (ZO)	In the calculation, considers the points that are marked as "OffWrist" as zero.
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Without OffWrist (WO)	Do not use the points that are marked as "OffWrist" in the calculation.
Max OffWrist M10	Maximum time for consider the "OffWrist" points in the calculation. For example, if the Max OffWrist M10 is 30 minutes and some period of data has more than 30 minutes of "OffWrist" points, this period will not be used in the calculation.
Max OffWrist L5	Maximum time for consider the "OffWrist" points in the calculation. For example, if the Max OffWrist L5 is 30 minutes and some period of data has more than 30 minutes of "OffWrist" points, this period will not be used in the calculation.

IV PARAMETERS

Method 1	This method does not use any OffWrist value in the calculation. One point of OffWrist is enough to consider all period as OffWrist. For a more detailed explanation, please refer to the ActStudio Methods report.
Method 2	This method calculates the average of all the values of a period. Calculates the average of all points that are not OffWrist in the period. For a more detailed explanation, please refer to the ActStudio Methods report.

IS PARAMETERS

Method 1	This method does not use any OffWrist value in the calculation. One point of OffWrist is enough to consider all period as OffWrist. For a more detailed explanation, please refer to the ActStudio Methods report.
Method 2	This method calculates the average of all the values of a period. Calculates the average of all points that are not OffWrist in the period. For a more detailed explanation, please refer to the ActStudio Methods report.

STATISTICS

This field shows the minimum, maximum, average and standard deviation of the M10, Onset M10, L5, Onset L5 and RA results. The table can be exported as a text or csv file by clicking the right mouse button on it and selecting the option "**export**".

IV AND IS

This field will show the results of the IV and IS calculation. The first column show the title of the result and the second column show the result itself. Can be exported as text or csv.

The IV and IS reference bars represents the IV 60 and IS 60 values.

The bars can be saved as image. To do so, just click the right mouse button on it and selecting the option "**Save as Image**".

M10

Shows the M10 results in a graph. Can be saved as image

L5

Shows the L5 results in a graph. Can be saved as image

RA

Shows the RA results in a graph. Can be saved as image

ONSET

Shows the Onset M10 and Onset L5 in a graph. Can be saved as image

ACTOGRAM

Shows an Actogram graph depicting the L5 with red regions and the M10 with blue regions. Can be saved as image.

AVERAGE DAY

Shows the M10, L5 and RA for the average day. Can be exported as text or CSV.

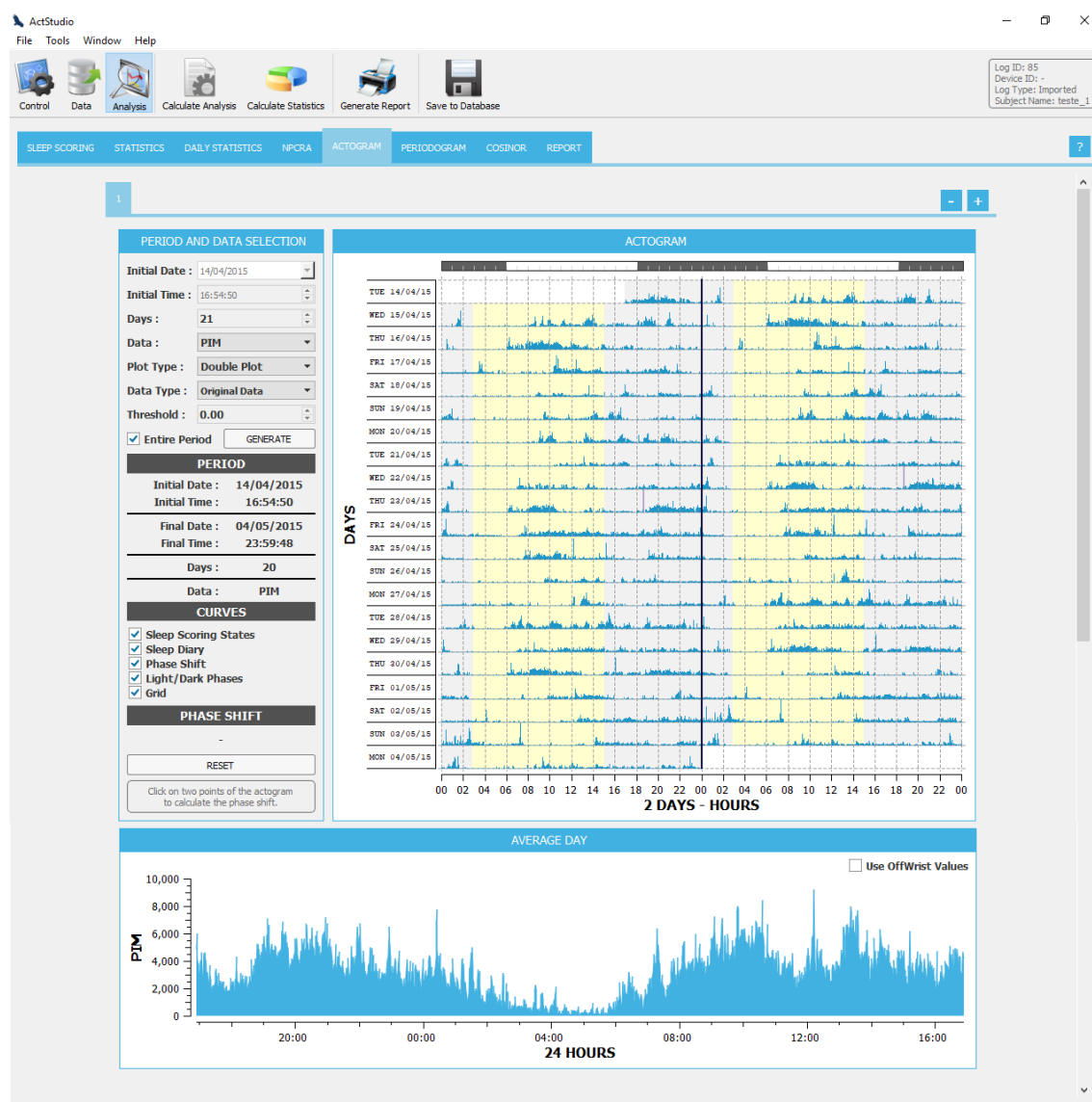
AVERAGE DAY PLOT

Shows two average days in sequence and the average day M10 and L5, in blue and red respectively. Can be saved as image.



Actogram

The Actogram shows a time series along two time axes. The X axis represents the period (24 hours – single plot or 48 hours – double plot) and the Y axis represents the selected data in days. The actogram will also print the sleep scoring states (if the sleep scoring was calculated), the sleep diary (if the user has entered some values) and the light/dark phases.



PERIOD AND DATA SELECTION

Fields used to select the period and the data that will be used to generate the actogram and the average day.

Initial Date	Select the initial date.
Initial Time	Select the initial time.
Days	Select how many days will be used to generate the actogram.



Data	Select what data will be used in the actogram (e.g. PIM, TAT, ZCM).
Plot Type	• Double Plot: this option will plot two days (side by side) per line. • Single Plot: this option will plot only one day per line.
Data Type	• Original Data: it will plot the original data in the actogram. • Binary: it will plot a bar only for the values higher than the threshold. • Normalized: it will plot the original data without outliers. The normalize function removes the values above the average. • Greyscale: it will plot a grayscale spectrogram. It uses the simple moving average and the average itself to remove the outliers
Threshold	This parameter is only used to the binary plot type. In the binary plot type, the bar will only be plotted if the original value is higher than the threshold.
Entire Period	This checkbox is used to select the entire period. When checked it will disable another fields related to the period selection (initial date, initial time, days).
Generate	This button is used to generate the actogram.
PERIOD	
In this field will be shown the selected parameters (date, time, days and data).	
CURVES	
Sleep Scoring States	Show or Hide the Sleep Scoring States in the graph.
Sleep Diary	Show or Hide the Sleep Diary in the graph.
Phase Shift	Show or Hide the Phase Shift in the graph.
Light/Dark Phases	Show or Hide the Light/Dark Phases.
Grid	Show or Hide the Grid
PHASE SHIFT	
By clicking on two points of the Actogram the Phase Shift will be calculated.	
Label	Shows the result of the "Phase Shift" calculation (each day).
Reset Button	Reset the Phase Shift calculation.

ACTOGRAM	
In this field will be plotted the Actogram. The Actogram graph can be saved as image. To do so, just click the right mouse button on it and selecting the option "Save as Image". The bar above the Actogram graph represents the day and night periods. It is painted based on the parameters defined in the Light/Dark Phase page.	

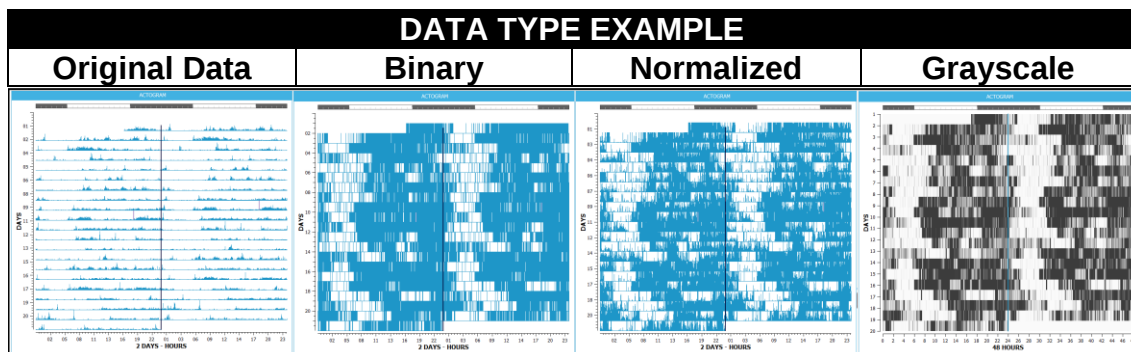
AVERAGE DAY	
In this field will be plotted the data from the average day, calculated based on the selected parameters. The average day graph can be saved as image. To do so, just click the right mouse button on it and selecting the option "Save as	



Image".

Use OffWrist Values

By checking this option, the OffWrist values will be converted to zero and used in the average calculation. When this option is unchecked the average day will be calculated only using values that are not OffWrist.



IMPORTANT

The light/dark phases will be printed based on the parameters defined in the Light/Dark Phase page.

When using the temperature or light to generate the Actogram the raw data will be normalized, even when using the Original Data option. The temperature will be normalized to the range between the minimum and maximum temperature sampled, and the light will be normalized applying a natural logarithm to remove light peaks and improve the data visualization.

Periodogram

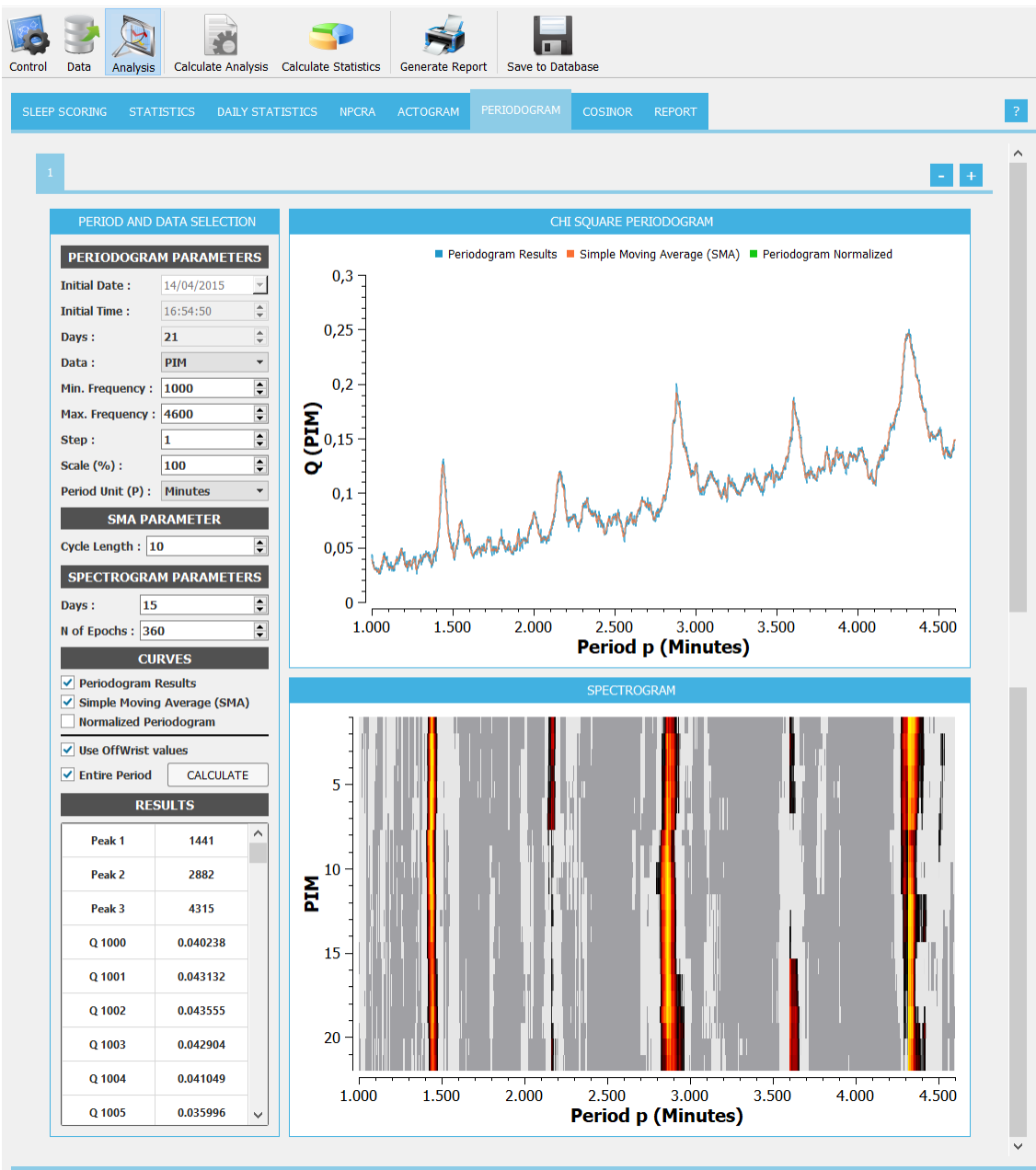
The periodogram was developed based on the Sokolove Matlab function which in turn was created based on the work entitled "The Chi Square Periodogram: Its Utility for Analysis of Circadian Rhythms" of Sokolove and Bushell, 1978.

The periodogram is calculated based on the following formula:

$$Q_p = \frac{[\sum_{h=1}^p (M_h - M)^2]/p}{[\sum_{i=1}^N (X_i - M)^2]/N}$$

The function was modified to compute the values between the range 0 and 1, and was developed based on the following work:

Sokolove, Phillip G., and Wayne N. Bushell. "The chi square periodogram: its utility for analysis of circadian rhythms." *Journal of Theoretical Biology* 72.1 (1978): 131-160.



PERIOD AND DATA SELECTION

Field used to select the parameters that will be used at the periodogram generation.

PERIODOGRAM PARAMETERS

Initial Date	Select the initial date.
Initial Time	Select the initial time.
Days	Select how many days will be used to generate the periodogram.
Data	Select what data will be used to generate the periodogram (e.g. PIM, TAT, ZCM).
Min. Frequency	Represents the range of the calculation. For example, if the Min. Frequency is 600 and the Max. Frequency is 900, the results of the calculation are between this range of frequency (Q600~Q900), based on the step parameter.



Max. Frequency	Represents the range of the calculation. For example, if the Min. Frequency is 600 and the Max. Frequency is 900, the results of the calculation are between this range of frequency (Q600~Q900), based on the step parameter.
Step	Step of the periodogram calculation. For example, if the Minimum Frequency is 600 and the Step is 5, then the first result will be Q600, the second result will be Q605, the third result will be Q610 and so on.
Scale	Change the graph scale to enhance visualization.
Period Unit (p)	Used to define the measurement unit of the periodogram results (Seconds, Minutes or Hours).
SIMPLE MOVING AVERAGE PARAMETER	
Cycle Length	The cycle length is basically the number of epochs that will be used at the mean calculation to generate the Simple Moving Average (SMA) curve. For example, if the Cycle Length is equal 10, then the function will calculate the average every ten points and put the result on the SMA curve (e.g. the first point will be the average of the points 1~10, the second point will be the average of the points 2~11, and so on).
SPECTROGRAM PARAMETERS	
Days	Sets how many days will be used to calculate each line of the spectrogram. For example, the Days are defined as 10 and the Number of Epochs is 60 (suppose the epoch is 60 seconds), then the function will calculate the periodogram for the period 10/10/2015 00:00:00 ~ 20/10/2015 00:00:00, then it will advance based on the number of epochs and repeat the process for the second line, in this case will calculate the periodogram for the period 10/10/2015 01:00:00 ~ 20/10/2015 01:00:00.
Number of Epochs	The Number of Epochs as previously described, is used to advance in the calculation for each line.
CURVES	
Periodogram Results	Select if the Periodogram Results curve will or will not be shown in the graph.
Simple Moving Average	Select if the Simple Moving Average curve will or will not be shown in the graph.
Normalized Periodogram	Select if the Normalized Periodogram curve will or will not be shown in the graph.
GENERAL OPTIONS	
Use OffWrist Values	Checked: the periodogram will use the OffWrist values (as zero) in the calculation. Unchecked: the periodograma will not use the OffWrist values in the calculation.
Entire Period	This checkbox is used to select the entire period. When



	checked it will disable another fields related to the period selection (initial date, initial time, days).
Calculate	This button is used to calculate the NPCRA functions.

RESULTS

This field is used to show the peak values calculated by the periodogram and to show each result value (Q) from the periodogram curve. This table can be saved as TXT or CSV. To do so, just click the right mouse button on it and select the option "Export".

CHI SQUARE PERIODOGRAM

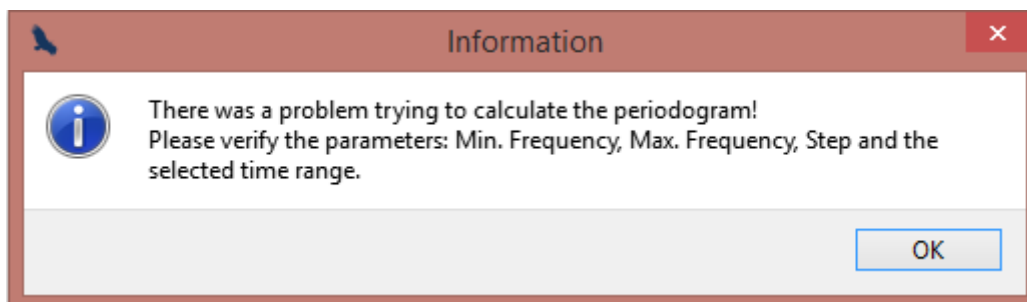
This field is used to plot the Periodogram Results curve, the Simple Moving Average curve and the Normalized Periodogram curve. The Periodogram graph can be saved as image. To do so, just click the right mouse button on it and selecting the option "Save as Image".

SPECTROGRAM

This field is used to show the Spectrogram calculated based on the periodogram calculation and the parameters already described. The Spectrogram graph can be saved as image. To do so, just click the right mouse button on it and selecting the option "Save as Image".

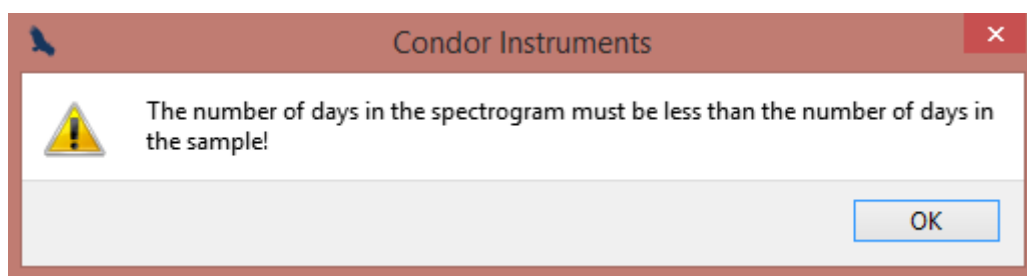
As the spectrogram is generated by calculating many periodograms, it is computational expensive. Depending on the number of days in the sample it can take a few seconds to be generated.

When calculating the Periodogram analysis, ActStudio may show some of the following alert messages:



Usually, this message appears when the user selects a short time period, but it can also happen when the min. frequency, max. frequency or step do not match with the selected time period.

Another alert message that can be shown in the Periodogram analysis is related to the Spectrogram calculation.



This message usually is shown when the user selects a number of days in the "Spectrogram Parameters" that are equal or higher than the days selected in the "Periodogram Parameters", so the spectrogram cannot be generated.



Cosinor

The Cosinor analysis uses the least squares method to fit a sine wave to a time series. Cosinor analysis is often used in the analysis of biologic time series that demonstrate predictable rhythms.

The Cosinor analysis was developed based on the Cosinor Matlab function, that can be found at the following link:

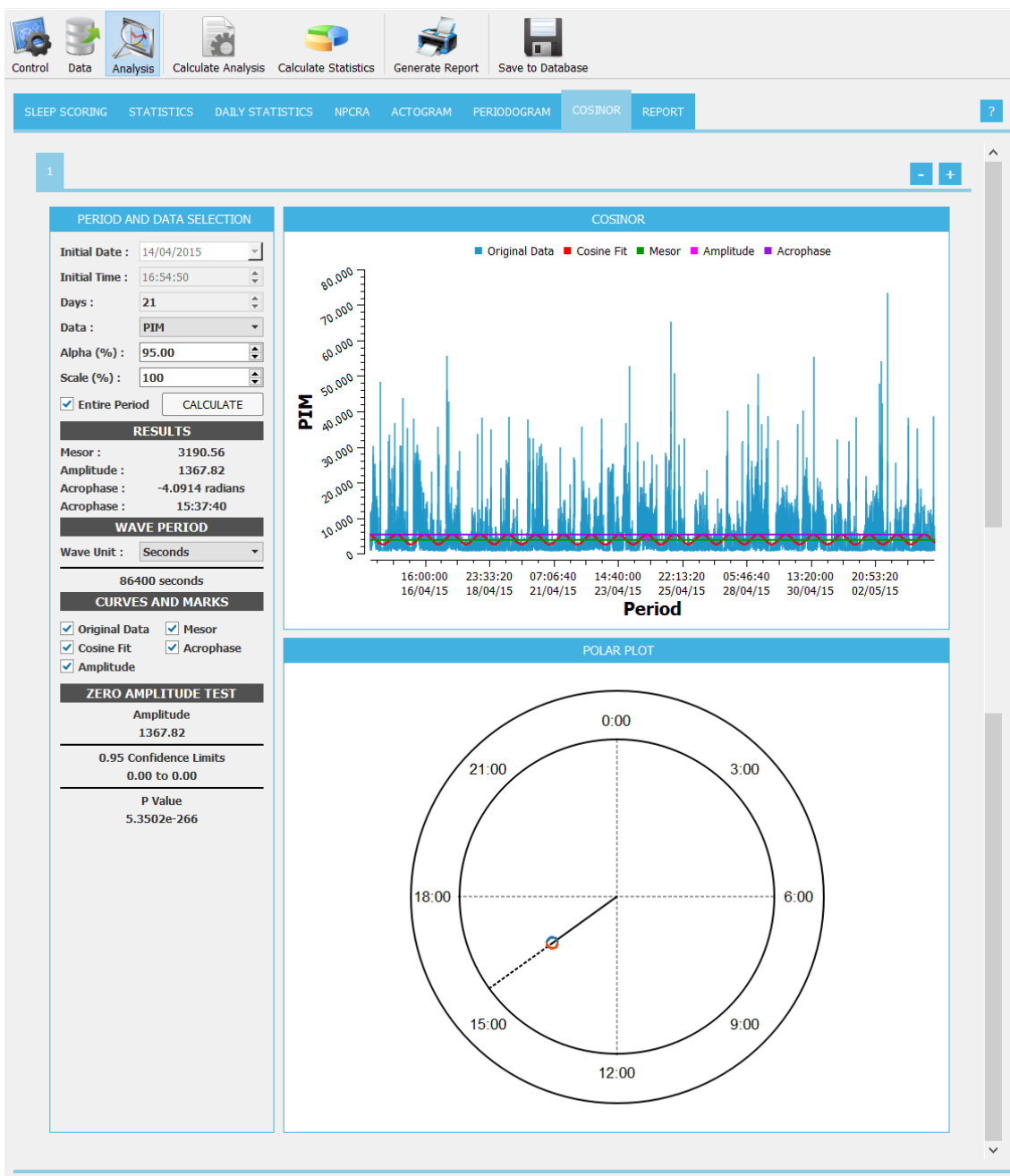
<http://www.mathworks.com/matlabcentral/fileexchange/20329-cosinoranalysis/content/html/cosinor.html>

The Matlab function follows the cosinor analysis of a time series as outlined by Nelson et al. "Methods for Cosinor-Rhythmometry" *Chronobiologica*, 1979.

Nelson, W., et al. "Methods for cosinor-rhythmometry." *Chronobiologia* 6.4 (1979): 305.

More information about the cosinor method can be found in the "Cosinor-based rhythmometry" review:

Cornelissen, Germaine. "Cosinor-based rhythmometry." *Theoretical Biology and Medical Modelling* 11.1 (2014): 1.



PERIOD AND DATA SELECTION

Field used to select the period and the data that will be used in the calculation.

Initial Date	Select the initial date.
Initial Time	Select the initial time.
Days	Select how many days will be used in the calculation.
Data	Select what data will be used in the calculation (e.g. PIM, TAT, ZCM).
Alpha	Used for confidence interval calculations. Usually set to be 95% (0.05) which corresponds to 0.95 of confidence limits.
Scale	Change the graph scale to enhance visualization.

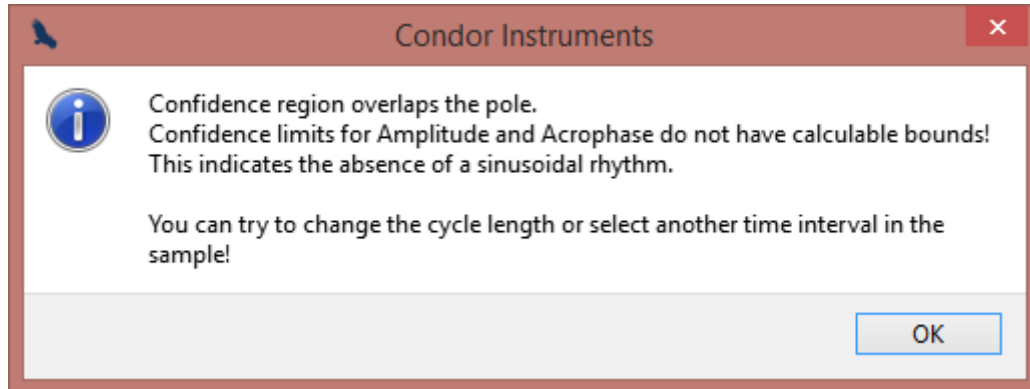


Entire Period	This checkbox is used to select the entire period. When checked it will disable another fields related to the period selection (initial date, initial time, days).
Calculate	This button is used to calculate the Cosinor analysis.
RESULTS	
Mesor	Shows the Mesor result, that is the average cycle value.
Amplitude	Shows the Amplitude result. Half the distance between peaks of the fitted waveform.
Acrophase	Shows the Acrophase result, that is the time point in the cycle of highest amplitude (in radians).
WAVE PERIOD	
The wave period represents the seconds of a complete wave cycle.	
Wave Unit	Used to define the wave measurement unit (Seconds, Minutes, Hours and Time).
CURVES	
Original Data	Select if the Original Data curve will or will not be shown in the graph.
Mesor	Select if the Mesor curve will or will not be shown in the graph.
Cosine Fit	Select if the Cosine Fit curve will or will not be shown in the graph.
Acrophase	Select if the Acrophase curve will or will not be shown in the graph.
Amplitude	Select if the Amplitude curve will or will not be shown in the graph.
ZERO AMPLITUDE TEST	
Amplitude	Amplitude is half the distance between peaks of the cosine fit.
Confidence Limits	The confidence limits are the probability that the true value of the parameters will be found within an interval defined by probability "alpha".

COSINOR	
This field is used to show all the curves already described (original data, mesor, cosine fit, acrophase and amplitude). The Cosinor graph can be saved as image. To do so, just click the right mouse button on it and selecting the option "Save as Image".	

POLAR PLOT	
This field is used to show the Cosinor Polar Plot. The Cosinor Polar Plot can be saved as image. To do so, just click the right mouse button on it and selecting the option "Save as Image".	

The following message can be shown when the user tries to calculate the Cosinor analysis:



This message represents that the confidence limits for Amplitude and Acrophase do not have calculable bounds. Usually, this message is related to the "Cycle Length" parameter. Changing the "Cycle Length" may solve this problem.

Tab System

Using the tab system you can generate multiple analysis from the same raw data. **For example:** you can generate a periodogram analysis using the PIM as the data parameter and another one using the TAT as the data parameter.

You can create and remove tabs using the plus and minus signs at the top right corner of the analysis page.



By clicking on the plus button a new tab will be created at the end of the current tabs. By clicking on the minus button the last tab will be removed.

All tabs are independent and all analyzes will be printed in the report, based on the options selected in the report settings.

With this feature, it is possible to generate multiple analyzes using the same raw data and varying its parameters to compare the results obtained.

Analysis that are able to use the tab system: NPCRA, Actogram, Periodogram and Cosinor.

Note: it is possible to create at most 5 tabs of the same analysis.



Report

Here it is possible to include wearer information's and doctor conclusions. All that information will be included in the PDF report file.

SLEEP SCORINGSTATISTICSDAILY STATISTICSNPCRAACTOGRAMPERIODOGRAMCOSINORREPORT?

TRIAL INFORMATION

Subject ID :

Date of Birth :

01/01/2000

Age :

Gender :

None

Body Part :

Left Wrist

Requesting Physician :

Recording Period :

14/04/2015 16:54:50 - 04/05/2015 23:59:48 - 20 days

Select Physician

Load Fields

Clear Fields

Report Settings

INDICATIONS FOR USE

SUMMARY STATISTICS

	Bed Time	Get Up Time	Time in Bed (hours)	Total Sleep Time (hours)	Onset Latency (hours)	Sleep Efficiency (Percent)	WASO (minutes)	#Awak.
Min								
Max								
Avg								
Std								

INTERPRETATION

REPORT

Page used to insert some relevant information about the subject and the data sampled.

Subject ID	Relevant identification about the subject (e.g.: name).
Date of Birth	Date of birth of the subject.
Age	Shows the subject age (read only).



Gender	Field used to select the gender of the subject.
Body Part	This field is used to select the Body Part where the actimeter was used to collect the data. If the "none" option was selected, this field will not be shown in the report.
Requesting Physician	name of the requesting physician.
Recording Period	Field used to show the recorded period (read only).
Select Physician	Opens the physician selection window to load the trial information fields.
Load Fields	Loads the last field values (it does not load the requesting doctor).
Clear Fields	Clears all the editable fields
Report Settings	Open the Report Settings page.
INDICATIONS FOR USE	This field is used to insert some relevant information about the actimeter use for a specific subject.
SUMMARY STATISTICS	Here you can see the summary statistics (the same Summary Statistics that is shown in the Statistics page).
INTERPRETATION	Field used to insert some relevant interpretation of the data sampled.

Physician Selection

The screenshot shows a web form titled "TRIAL INFORMATION". It contains several input fields and buttons. The "Subject ID" field has the value "Test 1". The "Date of Birth" field has a dropdown menu showing "20/03/2000". The "Age" field has the value "18". The "Gender" field has a dropdown menu showing "Male". The "Body Part" field has a dropdown menu showing "Left Wrist". The "Requesting Physician" field has the value "Physician 1 - 12345". The "Recording Period" field has the value "23/04/2015 00:00:50 - 23/04/2015 23:59:48". At the bottom of the form, there are four buttons: "Select Physician" (highlighted with a red box), "Load Fields", "Clear Fields", and "Report Settings".

The Select Physician button from the trial information will open the Physician Selection window, where you can select and manage a Physician record in the database:



PHYSICIAN SELECTION	
Displays the physicians registered in the database (you can filter the records by ID, name or identifier).	
Manage Records Button	Opens the Physician Information window.
Select Record Button	Loads a record in the trial information (records can be selected by double-clicking).
Close Button	Closes the Physician Selection window.

The Manage Records button from the Physician Selection opens the Physician Information window where you can add, delete, and edit records.



Physician Form

PHYSICIAN INFORMATION

ID :

*Name :

Identifier :

Filter :

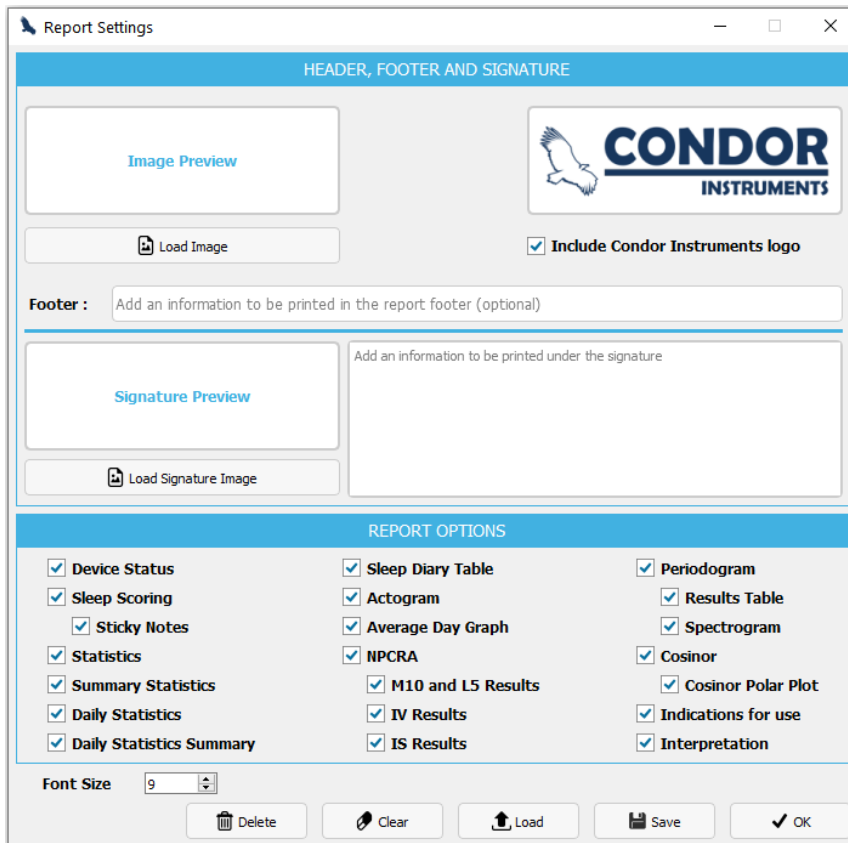
ID	NAME	IDENTIFIER
3	Physician 1	12345

Tips: Fields with asterisk are required. Double-click the record to select it for editing.

PHYSICIAN INFORMATION	
In the Physician Form it's possible to select the records from the table for editing (you can filter the records by any of the fields in the table).	
ID	Current record ID (read only).
Name	Physician's name.
Identifier	Physician's identifier.
Delete Button	Deletes the selected record.
Clear Button	Cleans the selected record fields.
Select Button	Selects a record for editing.
Insert/Update Button	Adds a new record or updates an edited record.
Close Button	Closes the Physicians Form window.

Report Settings

Here it is possible to configure some report parameters, such as insert a logo and footer.



HEADER, FOOTER AND SIGNATURE

Field used to put a logo at the header and a message at the footer (e.g. address).

Image Preview	Used to select a logo by clicking the Load Image button (supported formats PNG, JPG and BMP).
Condor Instruments	Used to include the Condor Instruments Logo in the header(optional)
Footer	Used to write some footnote, for example, the address.
Signature Preview	Used to select a signature by clicking the Load Signature Image button (supported formats PNG, JPG and BMP).
Text Field	Used to write an informative text under the signature image.

REPORT OPTIONS

Field used to define which information must be printed in the report (PDF). Only the checked options will be included in the report. It has all fields checked by default.

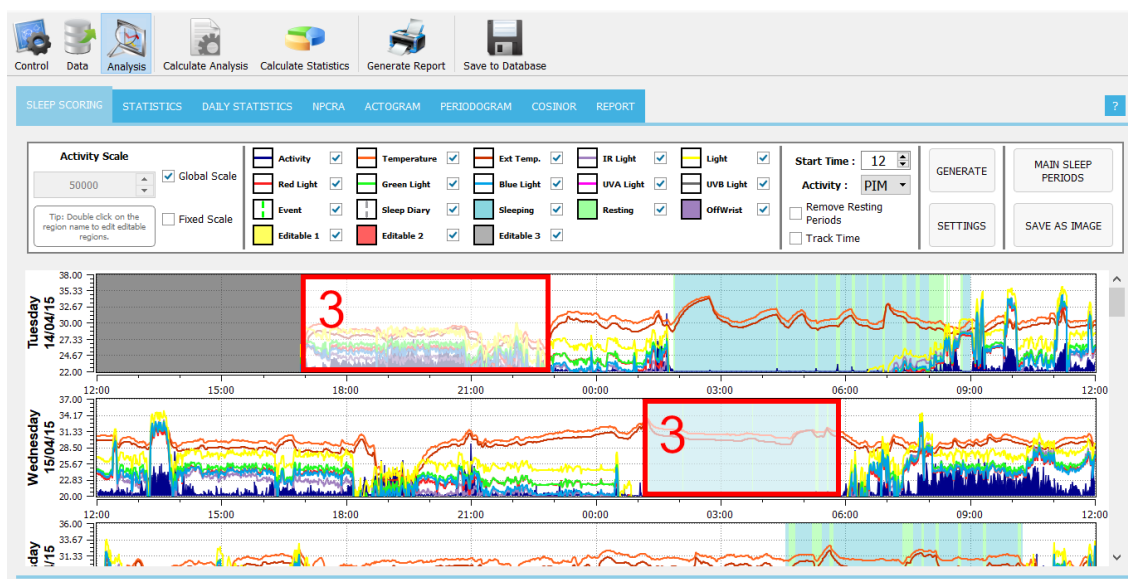
Font Size	Select report text font.
Delete	Delete the logo image and the footer text saved as default.



Clear	Clear the form fields.
Load	Load the default logo image and the footer text.
Save	Save the logo image and the footer text as default.
Ok	Button used only to close the Report Settings window.

Making a Report

1. Extract or load the data to be analyzed.
2. Go to the Sleep Scoring page and verify the data.
3. If necessary, all the areas (off wrist, sleep, rest) can be edited and reassigned. **Note:** only the selected curves/regions/events will be shown in the report legend.



4. The statistics and daily statistics should be automatically calculated when the Sleep Scoring is generated.
5. On the statistics page, you can select what statistics (rows) should or should not be printed in the report.
6. Generate all needed analyzes, for example: Actogram, Periodogram, Cosinor.
7. On the report page, insert all relevant data about the subject.



TRIAL INFORMATION

Subject ID:

Date of Birth: Age: Gender: Body Part:

Requesting Physician:

Recording Period:

INDICATIONS FOR USE

SUMMARY STATISTICS

	Bed Time	Get Up Time	Time in Bed (hours)	Total Sleep Time (hours)	Onset Latency (hours)	Sleep Efficiency (Percent)	WASO (minutes)	#Awake
Min	12:11:50	12:11:50	00:02:00	00:00:00	00:00:00	0.00%	00:00:00	0
Max	11:55:50	10:54:48	10:03:00	09:11:00	00:07:00	100.00%	01:22:00	18
Avg	12:17:00	09:37:33	02:46:45	02:16:57	00:01:45	75.00%	00:10:00	3.66

INTERPRETATION

8. On the Report Settings page, select the options that will be shown in the report.

Report Settings

HEADER, FOOTER AND SIGNATURE

☒ Include Condor Instruments logo

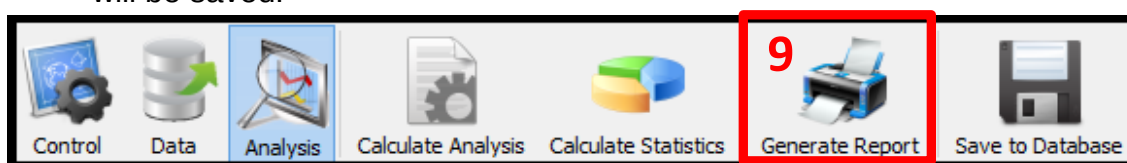
Footer:

REPORT OPTIONS

☒ Device Status	☒ Sleep Diary Table	☒ Periodogram
☒ Sleep Scoring	☒ Actogram	☒ Results Table
☒ Sticky Notes	☒ Average Day Graph	☒ Spectrogram
☒ Statistics	☒ NPCRA	☒ Cosinor
☒ Summary Statistics	☒ M10 and L5 Results	☒ Cosinor Polar Plot
☒ Daily Statistics	☒ IV Results	☒ Indications for use
☒ Daily Statistics Summary	☒ IS Results	☒ Interpretation

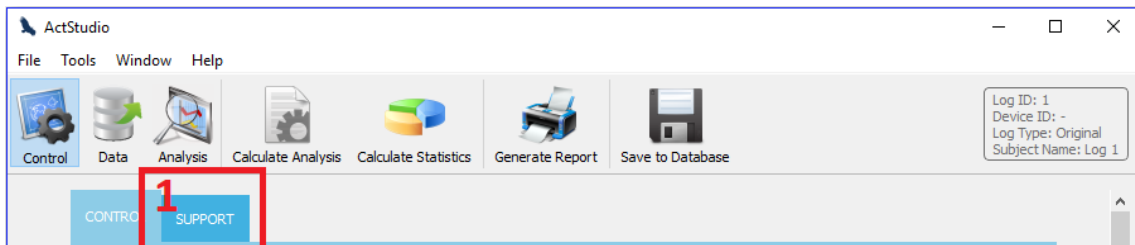
Font Size:

9. Click on the print report button and select the location where the report will be saved.

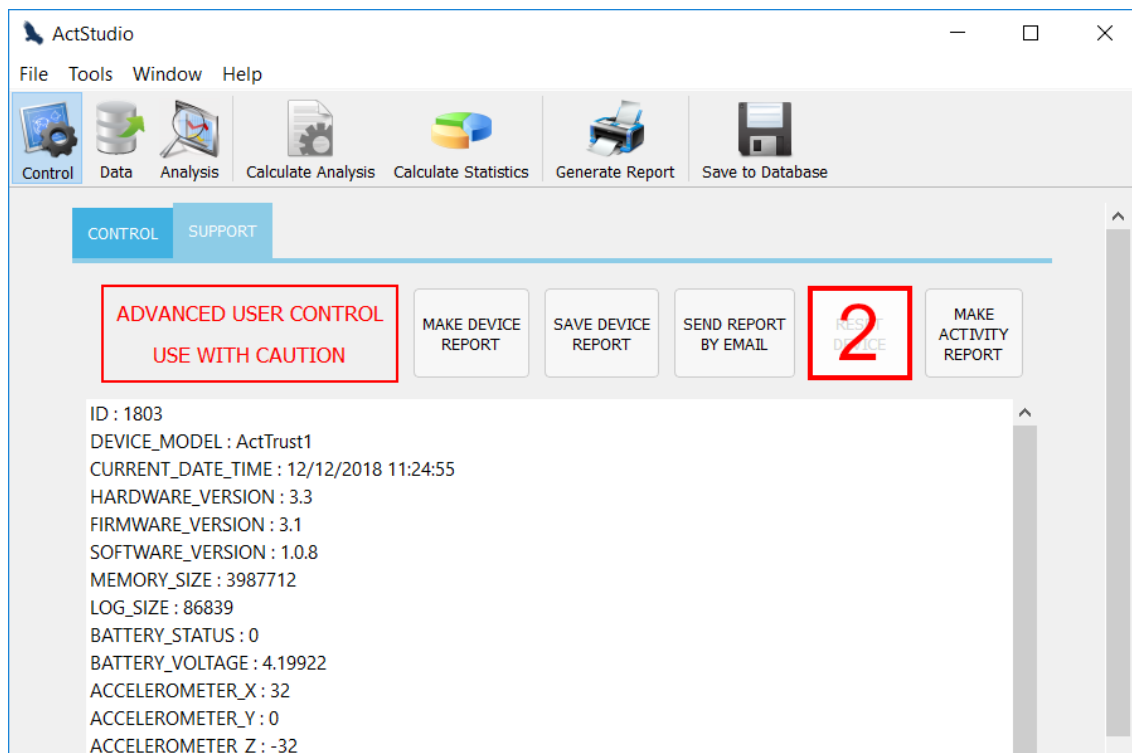


Rebooting ActTrust

1. In the **Control** Menu, Navigate to the **Support** Tab.

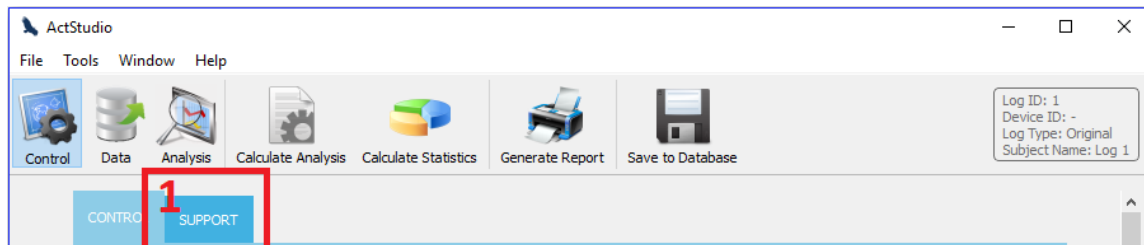


2. Press the **RESET DEVICE** button and wait.

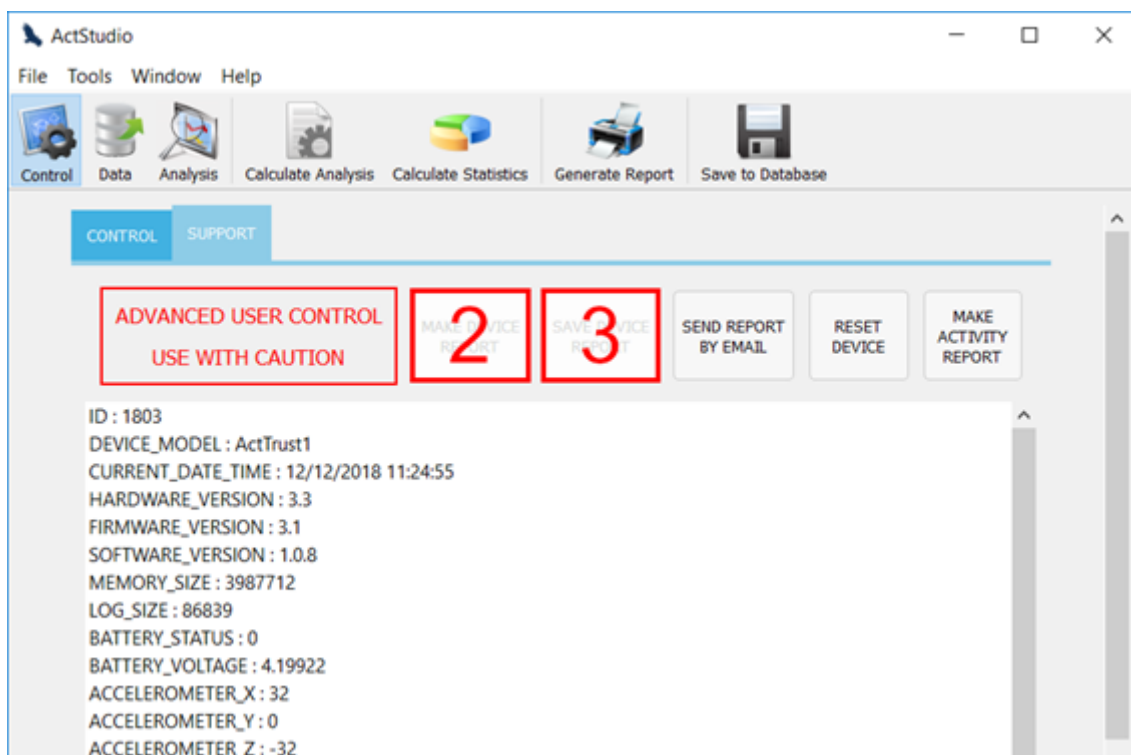


Generating an ActTrust Report

1. Navigate to the **Support** Tab.



2. Press the **MAKE REPORT** button and wait for the report to be generated and displayed in the text box.
3. Press the **SAVE REPORT** button and select the file name and location where the report will be saved.



Making an Activity Report

1. Navigate to the **Support** Tab.
2. Press the **MAKE ACTIVITY REPORT** button, fill in your contact details (optional), and press **Generate Report**.
3. A file is generated containing the software activity information. The location of the saved file is opened in a folder on your computer, showing a highlighted file entry.

☐	Name	Date modified	Type	Size
☐	activitylog_20210919195754.actlog	9/19/2021 7:57 PM	ACTLOG File	139 KB
☐	activitylog_20210919200008.actlog	9/19/2021 8:00 PM	ACTLOG File	139 KB
☐	activitylog_20210923200145.actlog	9/23/2021 8:01 PM	ACTLOG File	160 KB
☒	activitylog_20210923200415.actlog	9/23/2021 8:04 PM	ACTLOG File	160 KB

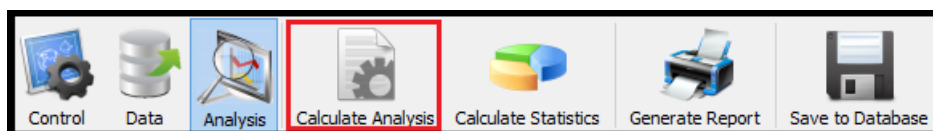
4. E-mail the highlighted file to Condor support, or follow instructions provided by the Support team.

Important Tips

Some useful tips that may facilitate ActStudio use.

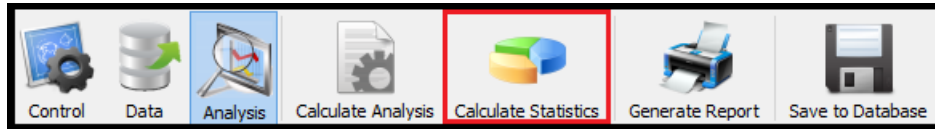
Calculate Analysis

You can calculate all the analysis functions at once by clicking the Calculate Analysis button in the Main Menu. If you do not modify the parameters in the analysis functions, it will calculate the analysis with the default parameters.



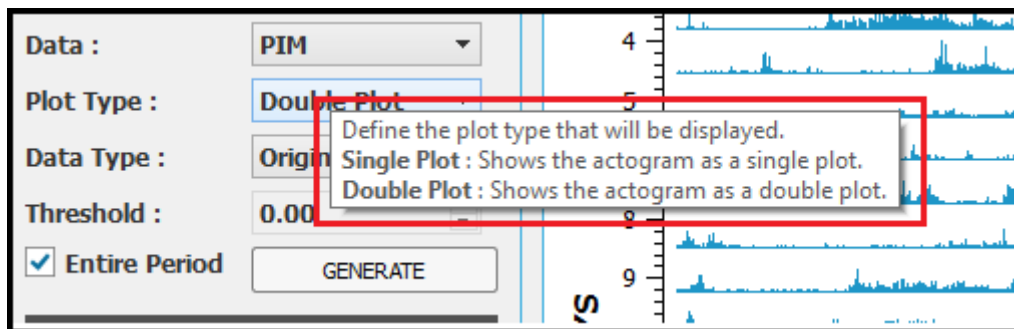
Calculate Statistics

The statistics are updated automatically, but if you want to make sure that the statistics are updated press the Generate Statistics button.



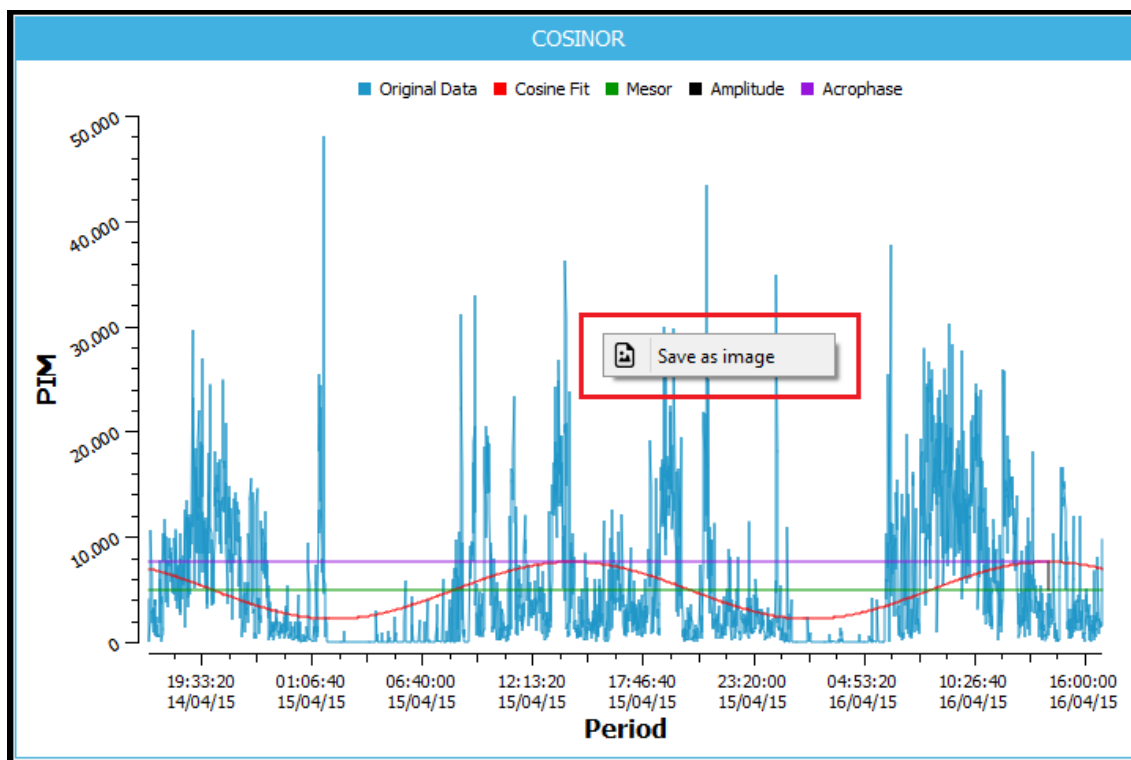
Quick Tips

If you do not know the meaning of some field, just position the mouse cursor over the field that a quick tip will be shown.



Export Graphs

Every graph can be saved as image (PNG, JPEG or BMP), by right-clicking the mouse on it and selecting the **Save as Image** option.



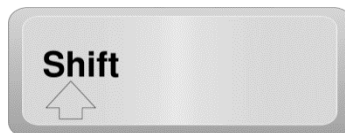
Export Data Tables

Every data table can be saved as a CSV or TXT file, by right-clicking the mouse on it and selecting the **Export** option.

RESULTS	
M10 (ZO)	8723.0250
ONSET M10 (ZO)	16/04/2015 05:56:50
L5 (ZO)	57.6700
ONSET L5 (ZO)	29/04/2015 00:42:48
RA (ZO)	0.9869
M10 (WO)	8723.0250
ONSET M10 (WO)	16/04/2015 05:56:50
L5 (WO)	57.6700
ONSET L5 (WO)	29/04/2015 00:42:48
RA (WO)	0.9869
IV AVERAGE CASE 1	0.6838

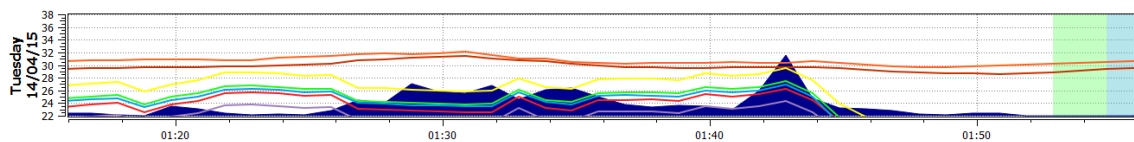
Zoom on Graphs

You can zoom in almost any graphs. Just hold the Shift key:

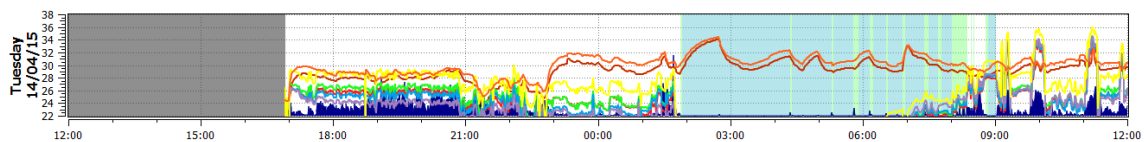


and perform zoom in and zoom out using the **mouse scroll**.

Zoom In:



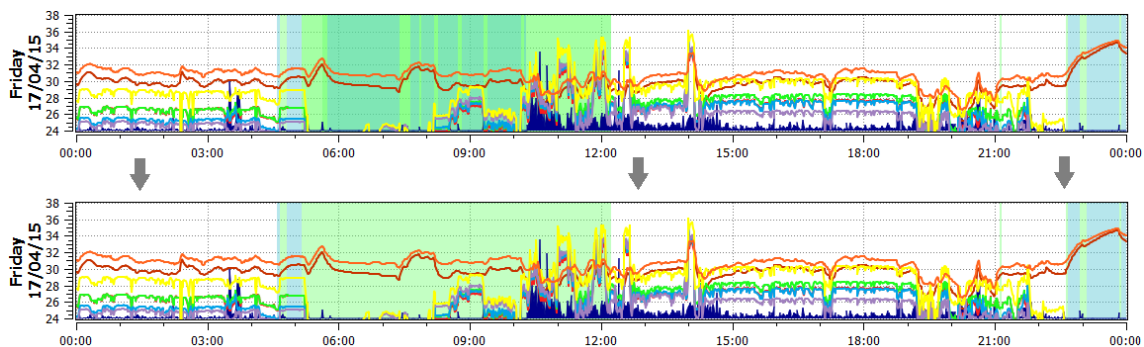
Zoom Out:



Editing Multiple Regions

You can edit multiple regions by holding the **Shift** key and using the **drag and drop** system in the **Sleep Scoring** graph. When dropping the region (**mouse release**), all regions overwritten will be replaced by the 'dominant' region.

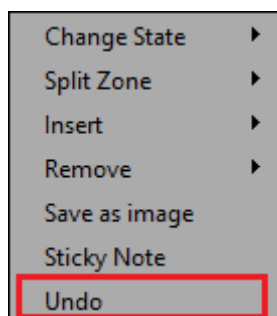
For example:



Undo Region Changes

If you edit a region and want to undo the last change you can use **CTRL+Z** on Windows or **Command+Z** on OS X to perform this. The last region change made will be undone.

You can also access the undo option by the drop down menu:



Note that the undo option will only be available when some change has been made in the Sleep Scoring regions.

Note: to work properly, make sure the graph has the focus (by clicking on any part of it) before undoing the changes.

Scroll Bar Hidden on OS X

If you are using some newest version of **OS X**, maybe you are having some trouble with the scroll bar on ActStudio. It happens because on the new versions of **OS X** the option to hidden until activated by use is the default option.

To change this option, please follow the step-by-step shown below.

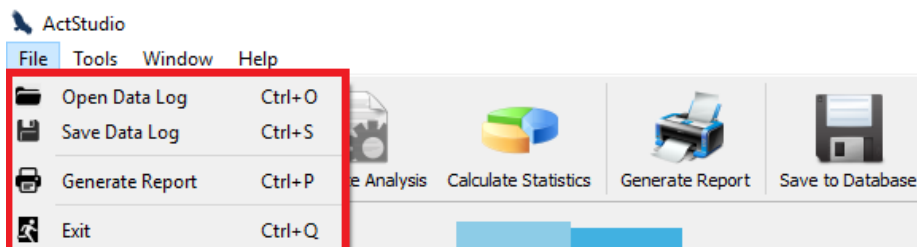
It will make the scroll bars always display when there is content within windows that must be scrolled to access:

1. Launch "**System Preferences**" from the Apple menu.
2. Click on the "**General**" settings panel.
3. Look for "**Show scroll bars**" and select the radio box next to "**Always**".
4. Close out of "**System Preferences**" when finished.

Scrollbars are instantly visible with this change, and they will be now always visible anytime there is a scrollable portion of a window.

File Menu

Using the file menu you can perform quick operations such as: open a log file, save a log file, generate a report and exit **ActStudio**.

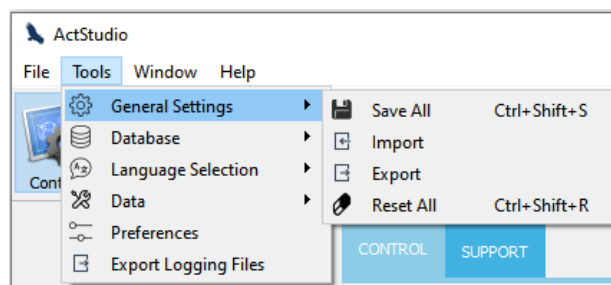


It was also provided shortcut keys to quickly access these operations:

- **Ctrl+O** (Windows) or **Command+O** (OSX): Open a log file.
- **Ctrl+S** (Windows) or **Command+S** (OSX): Save a log file.
- **Ctrl+P** (Windows) or **Command+P** (OSX): Generate report.
- **Ctrl+Q** (Windows) or **Command+Q** (OSX): Exit ActStudio.

General Settings

You can manage ActStudio general settings using the "**General Settings**" menu:



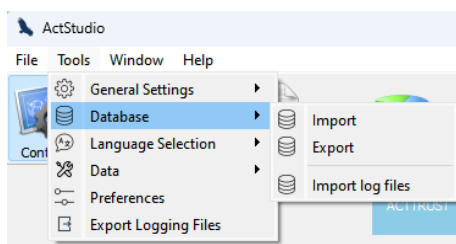
You can Save All Settings, Import Settings (INI file format), Export Settings or Reset All Settings (it will also reset the Sleep Scoring Algorithm Settings and the Footer content from the Report Settings page).

It was also provided shortcut keys to quickly access these operations:

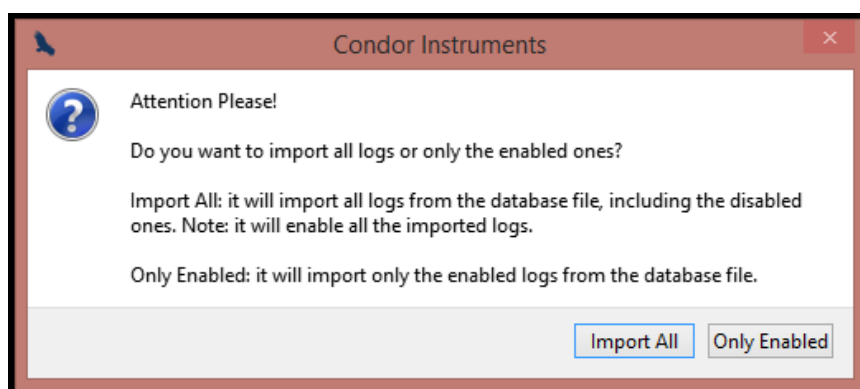
- **Ctrl+Shift+S** (Windows) or **Command+Shift+S** (OSX): Save all ActStudio settings.
- **Ctrl+Shift+R** (Windows) or **Command+Shift+R** (OSX): Reset all ActStudio settings.

Database Menu

You can easily import and export database files by using the database menu.



When importing a database file you will see the following message:



Here you can choose if want to import all logs or want to import only the enabled logs. **Note:** when selecting the "**Import All**" option, all logs will be imported as **enabled** logs, including the disabled ones.

Copying the Database

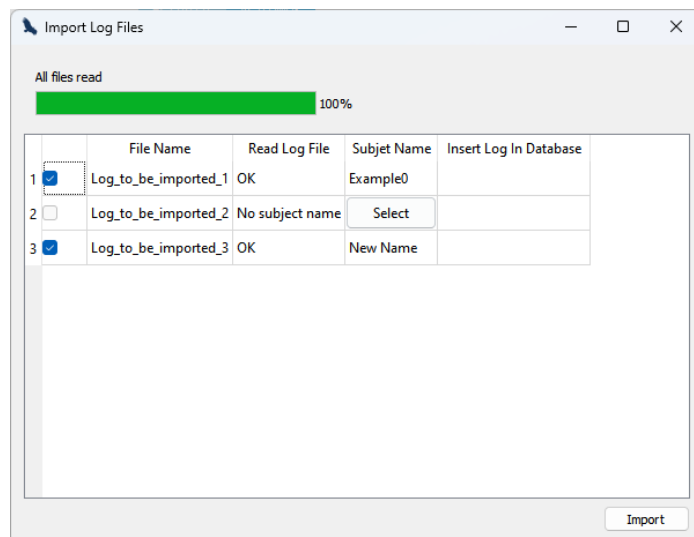
ActStudio software is portable; it can run without need of installation (it can, for example, be run from a pen drive). The database, however, is stored on your computer (not in the **ActStudio** folder), so if the **ActStudio** portable folder is copied to another computer, the logs you saved will not be available there.

To solve this issue, the database can be exported and imported. You can easily do that using the **Database Menu** (refer to the previous topic). The database file name is **ActStudio.db**; when it is exported, it can be saved to a pen drive or other portable device, as well as to the **ActStudio** folder. The exported file is a copy of the local or public database in use, so the origin database is not changed in this operation.

To use the database on another computer, just import the database file using the **Database Menu**. If the computer already has an **ActStudio** database in use, the imported data will be inserted into the existing database. All exported logs will be available on the new computer.

Import Log Files

To Import logs directly into the database without having to import a database file or opening one by one in the Data Menu, the **Import Log Files** option can be used to select multiple log files to read and insert in the Database.



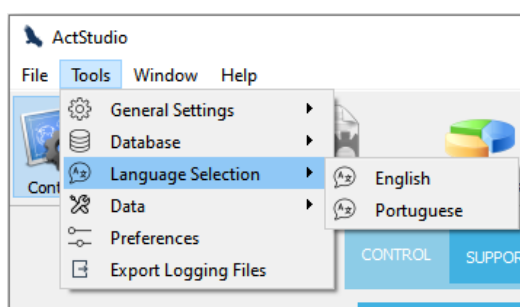
After selecting the logs files to import, they will be read and appear in a list.

Import Log Files	
Check box column	Only selected rows will be imported
File Name	Name of the file to be imported
Read Log File	Status of the reading process of the file
Subject Name	Subject name detected in the file report. Note: Subject names which doesn't exist in the current database will be created as new patients. Note: Files with no Subject name will have the option to select a patient name from the current database, Logs with no Subject Name cannot be selected to import.
Insert Log In Database	Status of the Insertion process of the log in the database
Import Button	Click the Import Button after reading all the files to begin inserting the selected files as logs in the database

Language Selection

If your operating system is configured with Portuguese regional settings, ActStudio will automatically choose this language as default; otherwise, it will select the English language.

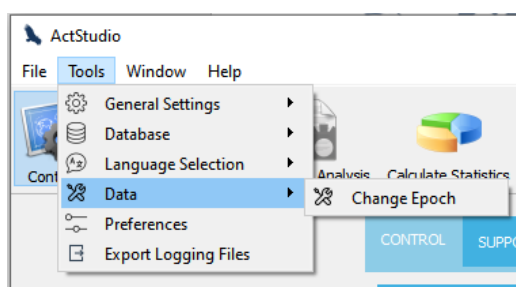
You can easily change the language using the “**Language Settings**” menu:



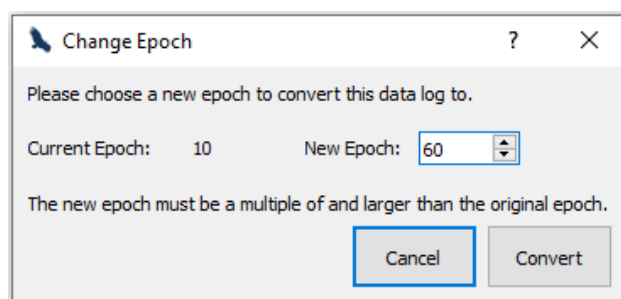
Note: the selected language will only be applied when ActStudio is restarted.

Data

In the Data Menu the selected data log can be configured.



Change Epoch

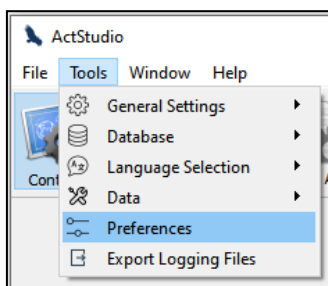


When opening the Change Epoch window, the desired epoch will be shown in the "new epoch" field. It's only possible to convert the epoch to a multiple value and higher than the actual.

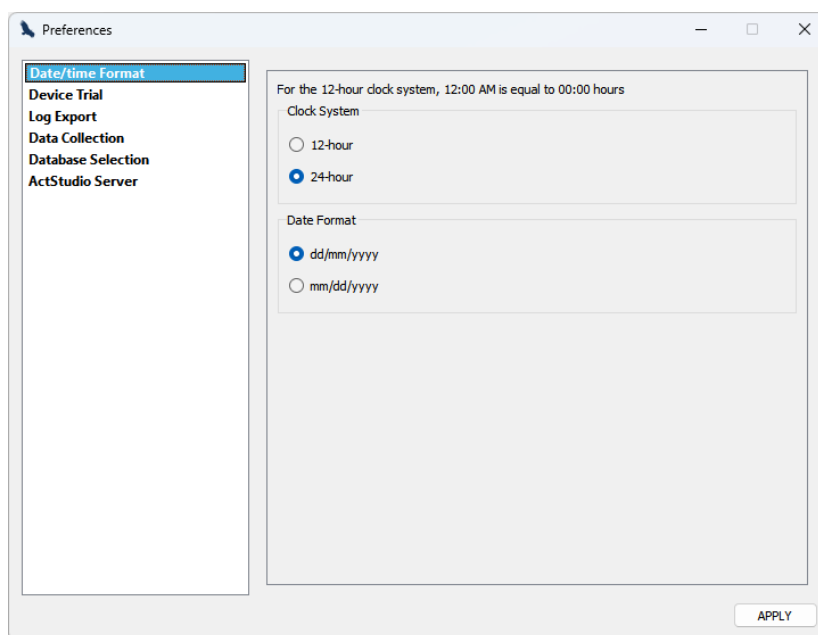
It's not possible to undo this action. Saving the log in the database before applying a new epoch is recommended.

Preferences

The Preferences Window provides convenient options for the user, they are defined when starting the ActStudio and can be changed at any time by accessing the "Tools" -> "Preferences" menu.



In the Preferences Form you can choose which options to use and apply the selected options immediately by click the **APPLY** button.



PREFERENCES – DATE/TIME FORMAT

CLOCK SYSTEM	• 12-hours: Uses the 12-hours clock system with the AM/PM notation for every time display in the ActStudio. • 24-hours: Uses the 24-hours clock system (00:00 to 23:59) for every time display in the ActStudio.
DATE FORMAT	• dd/mm/yyyy: Uses the “day/month/year” date format for every date display in the ActStudio. • mm/dd/yyyy: Uses the “month/day/year” date format for every date display in the ActStudio..



Device Configurations

Mode

PIM/TAT/ZCM ▾

Interval (seconds)

60

TAT Threshold

1024

UV Sensor

☒

Trial options

☐ Save log after reading

☐ Ask me where to save the log

Select directory

The log will be saved in C:/

PREFERENCES – DEVICE TRIAL	
DEVICE CONFIGURATIONS	• Mode: Activity sampling mode. • Interval: Sampling interval (in seconds between 1 and 86400). • TAT Threshold: TAT Threshold, it is recommended to use 1024. • UV Sensor: Enable or disable the device UV Sensor, when disabled, device will not collect UVA and UVB data after disconnecting from the dock (Only for ActTrust2 devices with firmware 1.4 or higher).
TRIAL OPTIONS	• Save log after reading: Save the log in a .txt file after the Finish Trial operation. • Ask me where to save the log: Show a dialog for the user to choose a location for the .txt file. • Select directory button: Select a default directory where the .txt file will be saved.



ActTrust Report data

The ActTrust device data can be sent automatically to Condor Instruments after reading it when finishing a trial.

All collected data is anonymous, any information related to the patient will not be sent.

Note: internet connection is required to send data.

☐ Send device report to Condor Instruments, after reading the ActTrust.

PREFERENCES – DATA COLLECTION

ACTTRUST REPORT DATA

Send device report to Condor Instruments, after reading the ActTrust:

With this option enabled, the ActTrust report will be automatically sent to Condor Instruments every time after the Finish Trial reading process is done.



The screenshot shows a 'Database Selection' preferences window. It has two main sections: 'Local' and 'Remote'. The 'Local' section is selected with a radio button. Under 'Local', there is a dropdown menu set to 'Private'. The 'Remote' section is unselected. Below these, there is a 'Database type' dropdown set to 'PostgreSQL'. Further down are input fields for 'Host', 'Port', and 'Database name'. A 'User information' section contains fields for 'User' and 'Password', followed by a 'Test Connection' button. At the bottom, an 'SSL' section has fields for 'Key', 'Certificate', and 'CA', each with a corresponding '...' button to the right.

PREFERENCES – DATABASE SELECTION	
LOCAL	• Private: Each operating system user has automatically access to his own private database; this database is also inaccessible to other users. • Public: The public database can be accessed by any user. Private and public databases have their own separate data set. Data can be imported from a users' private database to the public database, and vice-versa; refer to the "Database Menu" section for more information
REMOTE	• Database Type: Select which database the ActStudio is going to connect to • Host: Where the database is hosted • Port: port used to connect to the database • Database Name: Database instance name
USER INFORMATION	• User: Username required to connect • Password: User password
Test Connection button	Tests the database connection with the current parameters.
SSL	Fields for selecting the key, certificate and certificate authority(optional) files if the server you're trying to connect requires ssl connection.

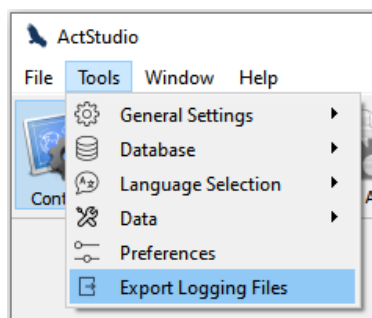


PREFERENCES – ACTSTUDIO SERVER	
VIEW SERVER LOGS	Opens the file explorer at the folder where the Server log files are stored

Export Logging Files

Select a folder to export the following files:

- actlog files with user activity logs
- DatabaseVerification.log, file with database connection log
- log_error.txt, file with user activity logs that were not saved to the database.



Selected Log Information

When you select a database log from the Log List page, you will see the following Log Information in the right upper corner:

Log ID: 90
Device ID: 01016
Log Type: Original
Subject Name: Mary

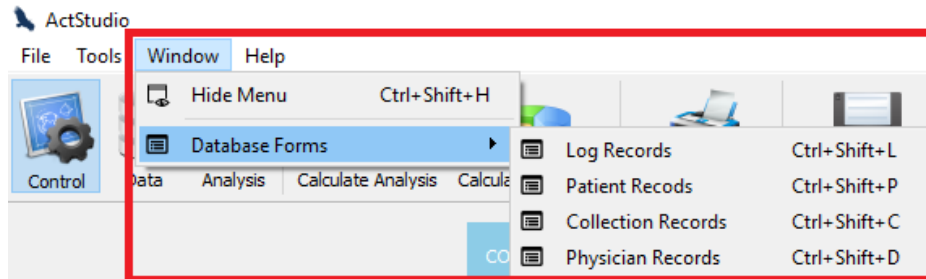
This information is related to the log that you are editing. It shows basically what log are you editing (log ID, device ID and subject name) and what kind of log is this (original, imported or edited log).

Blocking RESET button for hardware 3.4

The RESET button from the SUPPORT page is blocked during 2 minutes when erasing the device memory (only for hardware version 3.4). It is necessary because the device can not be reset before erasing the entire memory which takes about 2 minutes to be completely erased.

Window Menu

In the window menu you can hide the AcStudio menu bar and open the patient, collection and Physician forms to access their records in the database



Shortcut key to hide the menu bar:

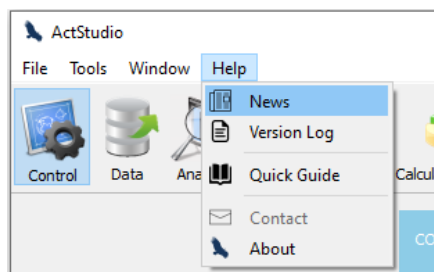
- **Ctrl+Shift+H** (Windows) ou **Command+Shift+H** (OSX): Hide menu bar

Shortcut keys to quickly access the database records:

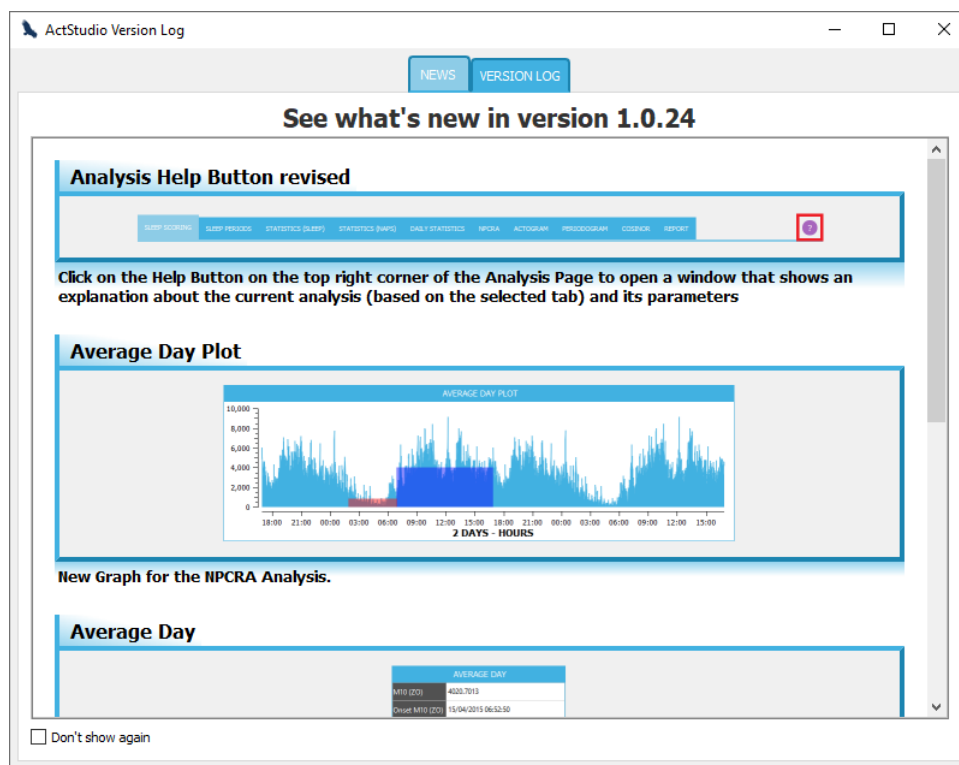
- **Ctrl+Shift+L** (Windows) or **Command+Shift+L**: (OSX): Access Log Records.
- **Ctrl+Shift+P** (Windows) or **Command+Shift+P**: (OSX): Access Patient Records.
- **Ctrl+Shift+C** (Windows) or **Command+Shift+C**: (OSX): Access Collection Records.
- **Ctrl+Shift+D** (Windows) or **Command+Shift+D**: (OSX): Access Physician Records.

News

When a new version of the ActStudio is opened, the **News** window will show the recent updates. The News window can also be opened by clicking on the **"News"** option in the **"Help"** menu:



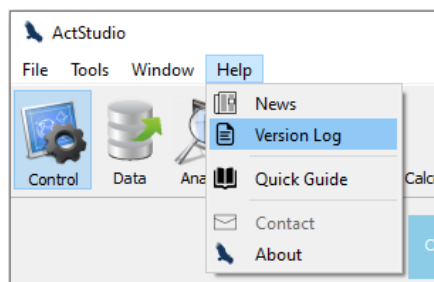
The News Window (showing the updates for the 1.0.24 version):



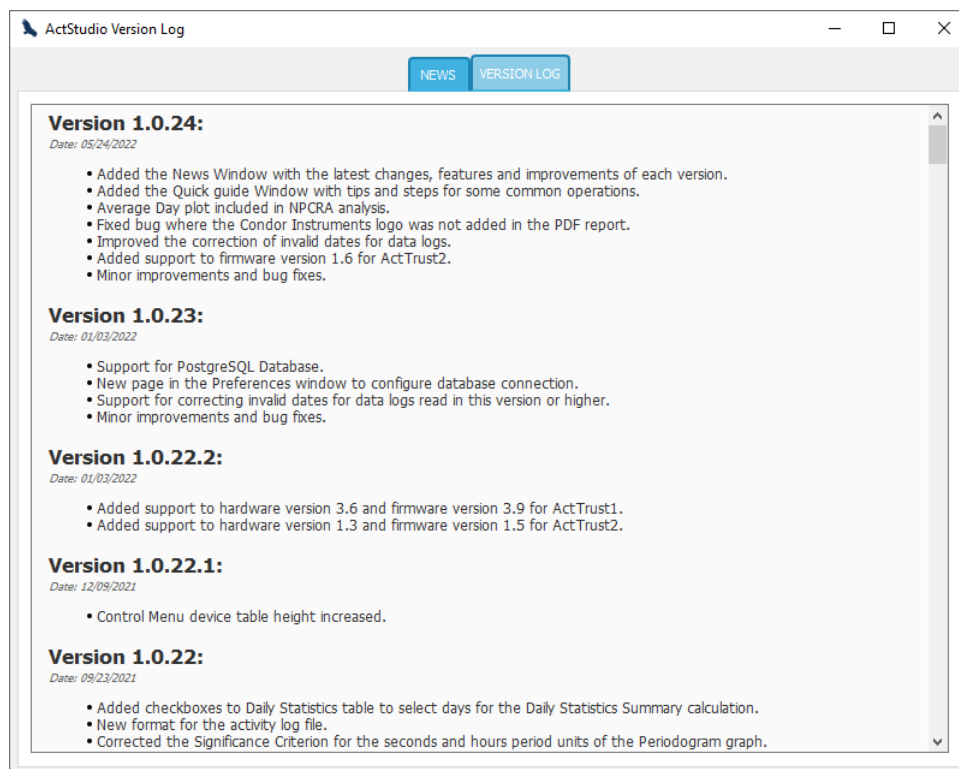
Check the **Don't show again** check box to not show this window the next time the ActStudio is opened.

Version Log

You can see a log of all ActStudio versions by clicking on the "Version Log" in the menu "Help":



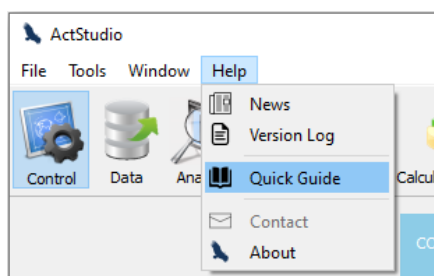
The following page will be shown:



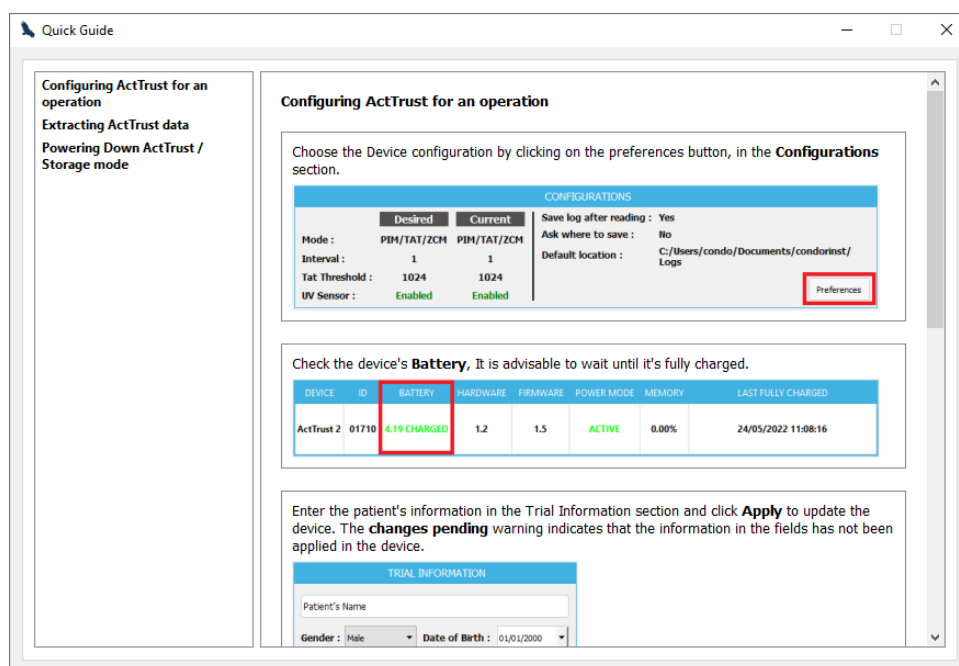
In the "ActStudio Version Log" page you can see the version number, the date that the version was released and all changes that were included.

Quick Guide

The Quick Guide Window contains a guide for some common operations

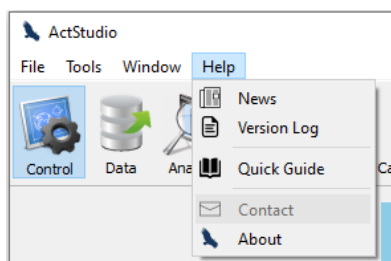
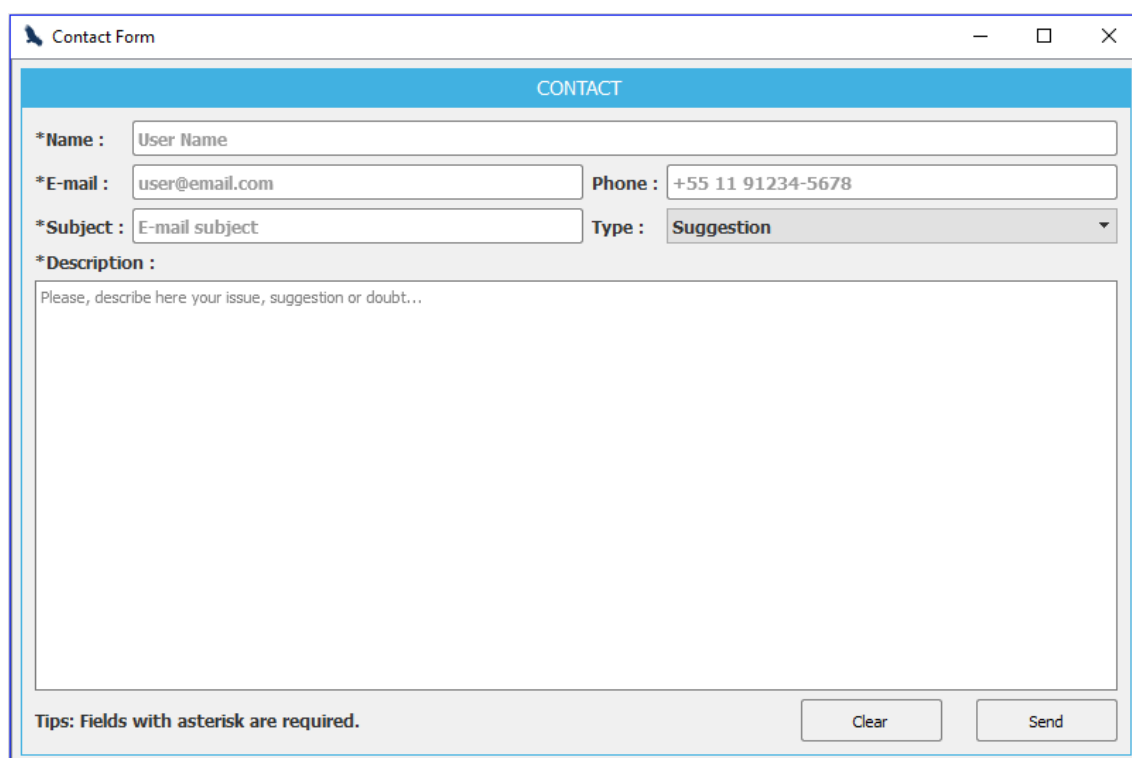


The following window will be shown:



Contact

The **Contact** section of the **Help** menu opens an e-mail form, where the user can contact Condor Instruments to report issues, send suggestions, etc.

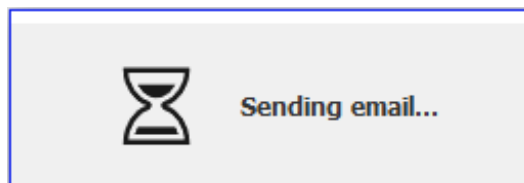
The Contact Form window contains the following fields and controls:

- *Name :** Text input field with "User Name" entered.
- *E-mail :** Text input field with "user@email.com" entered.
- Phone :** Text input field with "+55 11 91234-5678" entered.
- *Subject :** Text input field with "E-mail subject" entered.
- Type :** Dropdown menu with "Suggestion" selected.
- *Description :** Large text area with the placeholder text "Please, describe here your issue, suggestion or doubt...".
- Tips:** "Fields with asterisk are required."
- Buttons:** "Clear" and "Send".

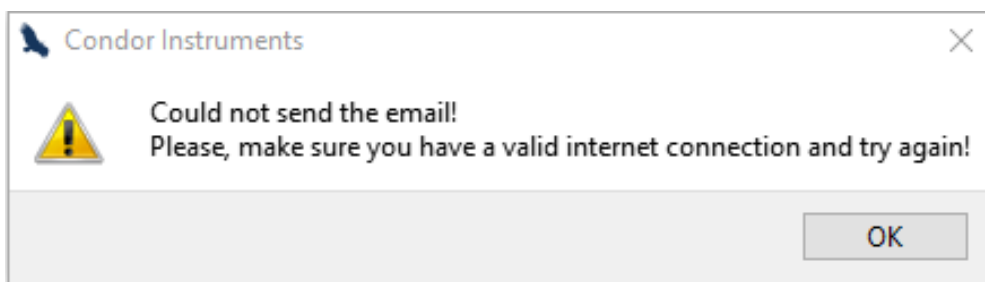
CONTACT	
Name	Name of the user.
E-mail	User e-mail for contact.
Phone	User phone number.
Subject	E-mail.subject.
Type	E-mail type; the type is classified in: Suggestion, Bug, Doubt, Device Report, and Other (the Device Report type is automatically selected when the user sends the Report via email at the the Support Tab).
Description	E-mail description.

CLEAR	Clear all the form fields.
SEND	Send the e-mail to Condor Instruments.

The following message will appear when trying to send the email:



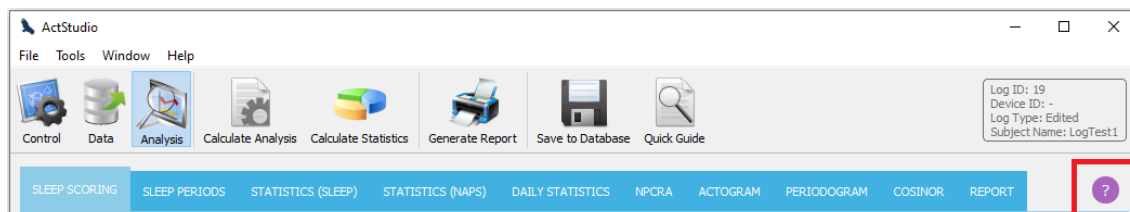
You will receive the following warning in case the attempt fails:



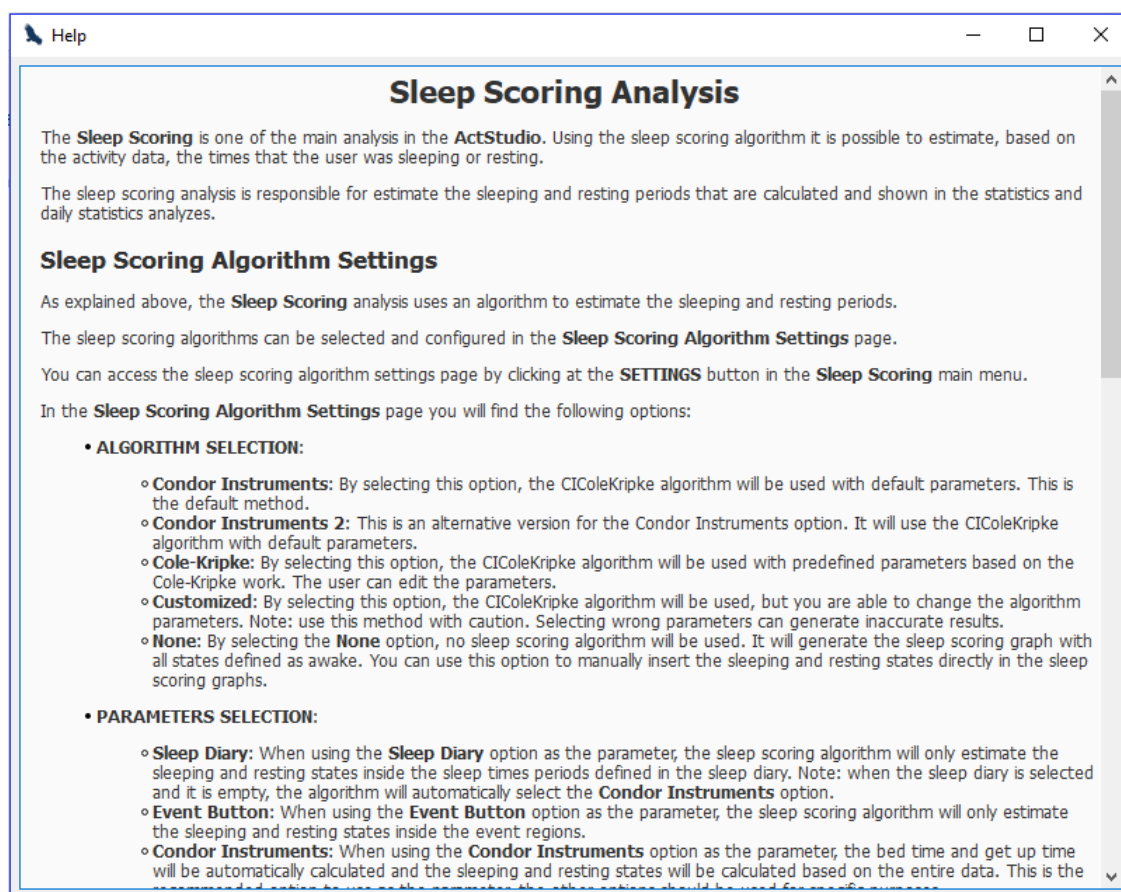
If the email is successfully sent you will receive a Successful notification

Help Button

It was included a new **Help Button** that helps the user by providing information about the parameters and features of each analysis tab.

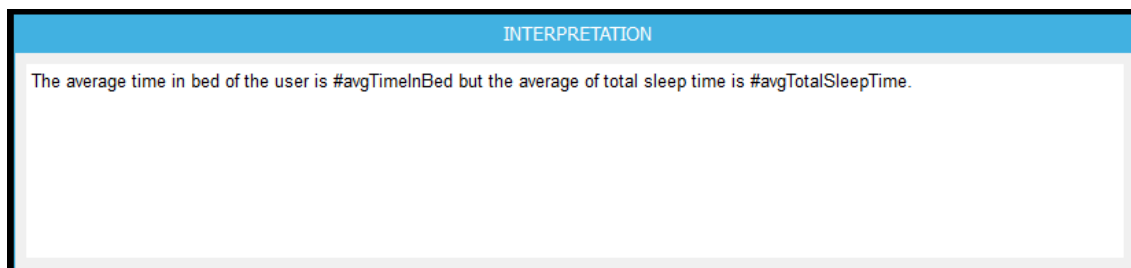


By clicking on the **Help Button** a new window will be shown explaining about the current analysis (based on the selected tab) and its parameters.



Using variables in the INTERPRETATION

Now it is possible to use variables in the **INTERPRETATION** field from the **REPORT** page. These variables are related to the **SUMMARY STATISTICS** table.



When generating the report, the variables (hashtags) will be converted to the corresponding values from the **SUMMARY STATISTICS** table.

Remember that you can save the **INTERPRETATION** field value in **ActStudio** settings. So now it is possible to create a default interpretation text based on the results from the summary statistics.

Below is presented a list of variables that can be used in the **INTERPRETATION** field. These variables are related to each result shown in the **SUMMARY STATISTICS** table:

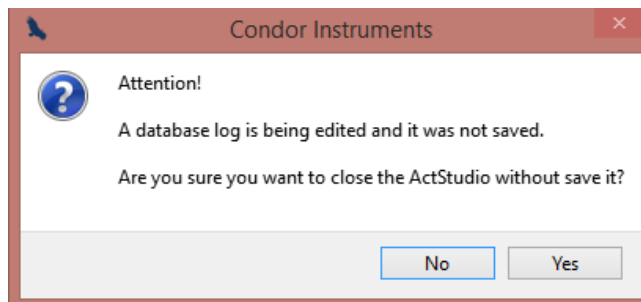
Minimum Values	Maximum Values	Average Values	Standard Deviation Values
#minBedTime	#maxBedTime	#avgBedTime	#stdBedTime
#minGetUpTime	#maxGetUpTime	#avgGetUpTime	#stdGetUpTime
#minTimeInBed	#maxTimeInBed	#avgTimeInBed	#stdTimeInBed
#minTotalSleepTime	#maxTotalSleepTime	#avgTotalSleepTime	#stdTotalSleepTime
#minOnsetLatency	#maxOnsetLatency	#avgOnsetLatency	#stdOnsetLatency
#minSleepEfficiency	#maxSleepEfficiency	#avgSleepEfficiency	#stdSleepEfficiency
#minWaso	#maxWaso	#avgWaso	#stdWaso
#minAwakenings	#maxWaso	#avgAwakenings	#stdAwakenings

Other variables:

#under85SleepEfficiency
#over30MinLatency
#initialPeriodDate
#finalPeriodDate
#onWristPercentage
#daysUnderRecommendedSleepTime
#over19HoursActivity

ActStudio Exit Message

If you try to close ActStudio when you are editing a database log that was not saved yet, you will see the following message:



If you select the “**No**” option, ActStudio will not be closed and you can finish your edition and click on the “**Save to Database**” button from the main menu to save it into the database. Otherwise, if you select the “**Yes**” option ActStudio will be closed and you will lose the current edition of the selected log.

ESET Endpoint Antivirus issues

Recently, some users reported issues related to the ESET Endpoint Antivirus. The ESET Endpoint Antivirus has a feature that is used to block the communication with external devices (e.g. ActTrust). It blocks the communication between ActStudio and ActTrust, and the data cannot be extracted from the device.

This feature is configurable and you can allow the ActTrust device to not be blocked. If you have the ESET Endpoint Antivirus installed and you are having communication problems with the ActTrust, please enable the ActTrust communication in the ESET Endpoint settings. If you do not know how to do this, please contact the ESET Endpoint Antivirus support. If even so, you cannot change the ESET Endpoint to allow the ActTrust communication, you can disable the antivirus by your own risk.

Troubleshooting

Most problems with the ActTrust can be resolved quickly following the guidelines in this chapter. If the problem persists, please contact Condor Instruments personnel to receive new guidelines.

My ActTrust is beeping every one minute

When the charge of the battery of your ActTrust device is very low, it starts beeping every minute to inform you that soon it will enter in storage mode to ensure that it will not operate at unreliable conditions. To solve this problem, recharge your ActTrust and it should stop beeping.

I push the events button, but I'm not hearing any beep

This can be caused mainly by two reasons. The first is due to a low battery charge of the ActTrust. The second is the possibility that the device is in power down mode. In both cases, connect your device to your computer using the dock interface. Wait at least 5 minutes and follow the procedure described in this manual to reset the device. Disconnect it from the dock and check if the problem persists.

When connecting the ActTrust on the computer a message appears on ActStudio software

The procedure will depend on the message itself.

If the message **"Device With Low Battery"** shows up, allow the battery to charge for a few minutes and follow the procedure described in this manual to reset the ActTrust.

If the message **"Error With Device State"** show up, follow the procedure described in this manual to generate a report and save the document to a

known location. After saving the report, try restarting the device. If the problem persists, please contact Condor Instruments personnel to receive new guidelines. If contacting by email, please attach the report generated by ActStudio.

The numbers that appear in ActStudio seems strange

This may be due to a problem initializing the device when the battery charge is too low. Connect the device at the ActDock, wait a few minutes to make sure the battery has a safe charge level and follow the procedure described in this manual to reset the ActTrust. If the problem persists, please contact Condor Instruments personnel.



ActTrust Specifications

General Specifications

Weight Without Band	19g
Weight With Band	38g
Dimensions	47mm x 31mm x 12mm
Ambient Conditions	• Operation Temperature: 0 °C a 60 °C (32 °F a 140 °F) • Storage and transport Temperature: -20 °C a 60 °C (-4 °F a 140 °F) • Operation, Storage and Transport Pressure: 0 a 2500hPa • Operation, Storage and Transport Humidity: 0 a 98%
Memory size	4MB
Sampling Period	3 Months (Using 60s epoch)
Battery Life	3 Months (Using 60s epoch)
Battery type	Rechargeable Li-ion
Water Resistance	IP67
Sampling Interval	Settable from 1s to 86400s
Sensors	Accelerometer Wrist Temperature Light
Communication	USB using a dock as interface
Activity Processing Modes	PIM, TAT e ZCM
Electromagnetic Compatibility	The product complies with all applicable electromagnetic compatibility requirements (EMC) according to IEC60601-1-2, for residential, commercial and light industry environments. For details, see " Manufacturer's declaration - Electromagnetic Immunity and Emission"

Accelerometer

Axes	3
Resolution	12 bits
Sampling Rate	25Hz



Temperature Sensors

Precision	+/-0.5°C (20°C to 40°C)/ 1°C For other values
Operating Range	0°C – 70°C

Light Sensor

Spectrum	Red, Green, Blue and Inferred
Observations	Measures the intensity of each spectrum individual and the total light intensity
Operation interval	0.01 - 8388.61µW/cm²
Precision	10% a 10µW/cm² (typical)

Notes:

- The manufacturer reserves the right to change these specifications without notice.

Applicable Standards

Standard	Description
IEC60601-1:2006	Medical electrical equipment – Part 1: General requirements for basic safety and essential performance.
IEC60601-1-2:2007	Medical electrical equipment – Part 1-2: Collateral standard: Electromagnetic compatibility – Requirements and tests
IEC60601-1-11:2010	Medical electrical equipment – Part 1-11: Collateral standard: Requirements for medical electrical equipment and medical electrical systems used in the home healthcare environment.



Manufacturer's declaration - Electromagnetic Immunity and Emission

The medical electrical equipment needs special precautions regarding electromagnetic compatibility (EMC) and needs to be installed and put into service according to EMC information contained herein.

Manufacturer's declaration – Electromagnetic Emission

The product is suitable for use in a specific electromagnetic environment. The customer and/or the user of the product should assure that it is used in an electromagnetic environment as described below.

Emission Test	Compliance	Electromagnetic Environment Guidance
RF-Emission (Radio frequency) CISPR11	Group 1	The product use RF energy only for its internal function. Therefore, its RF emissions are very low and not likely to cause any interference in nearby electronic equipment.
RF-Emission (Radio frequency) CISPR11	Class B	The product is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purpose.
Harmonic emissions IEC 61000-3-2	Do not Apply	
Voltage fluctuations / flicker emissions IEC 61000-3-3	Complies	

Manufacturer's declaration – Electromagnetic Immunity I

The product is suitable for use in a specific electromagnetic environment. The customer and/or the user of the product should assure that it is used in an electromagnetic environment as described below.

Immunity Test	IEC 60601-1-2 Level	Compliance Level	Electromagnetic Environment Guidance
Electrostatic discharge (ESD) IEC 61000-4-2	± 6 kV contact ± 8 kV air	± 6 kV contact ± 8 kV air	Floor should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %
Electrical fast transient/bursts IEC 61000-4-4	± 2 kV for power supply lines ± 1 kV for input/output lines	Do not Apply	The device is recharged via computer, is not subject directly to the power source
Surge IEC61000-4-5	± 1 kV differential mode ± 2 kV common mode	Do not Apply	The device is recharged via computer, is not subject directly to the power source
Voltage dips, short interruptions and voltage variations on power supply input lines IEC61000-4-11	<5% U_T (>95% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles <5% U_T (>95% dip in U_T) for 5 sec	Do not Apply	The device is recharged via computer, is not subject directly to the power source
Power frequency(50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

NOTE 1: U_T is the mains (AC) voltage before apply test levels



Manufacturer's declaration – Electromagnetic Immunity II

The product is suitable for use in a specific electromagnetic environment. The customer and/or the user of the product should assure that it is used in an electromagnetic environment as described below.

Immunity Test	IEC 60601-1-2 Level	Compliance Level	Electromagnetic Environment Guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz a 80 MHz	3 Vrms	Portable and mobile RF communications equipment should be used no closer to any part of the product, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance: $d = 1,17 \sqrt{P}$ $d = 0,35 \sqrt{P}$ 80 MHz a 800 MHz $d = 0,70 \sqrt{P}$ 800 MHz a 2.5 GHz where P is the maximum output power rating of the transmitter in Watt (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m) Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey ^a, should be less than the compliance level ^b in each frequency range Interference may occur in the vicinity of equipment marked with the symbol described lateral. 
Radiated RF IEC 61000-4-3	3 V/m 80 MHz a 2,5 GHz	3 V/m	

Note 1: At 80 MHz and 800MHz, the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, people and animals.

a -Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered, if the measured field strength in the location in which the product is used exceeds the applicable RF compliance level above, the product should be observed, additional measures may be necessary, such as reorienting or relocating the product

^b - Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 10 V/m.

Manufacturer's declaration – Recommended Separation Distances between portable and mobile HF- communications equipment and the product

The product is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the product can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the product – according on output power and frequency of the communications equipment – as recommended in the following table.

Rated maximum output power of transmitter in watts (W)	Separation distance according to the frequency of transmitter in meter (m)		
	150 kHz a 80 MHz $d = 1,17 \sqrt{P}$	80 MHz a 800 MHz $d = 0,35 \sqrt{P}$	800 MHz a 2.5 GHz $d = 0,7 \sqrt{P}$
0,01	0,12	0,04	0,07
0,1	0,37	0,11	0,22
1	1,17	0,35	0,7
10	3,70	1,11	2,21
100	11,70	3,50	7,0

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

Note 1: At 80 MHz and 800MHz, the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, people and animals.

Environmental information

This device should be disposed in accordance with the rules and regulations of the country in which the disposal takes place. For more information about the disposal of products, please contact the representative of the Condor or specialized distributor in your area, or visit our website at www.condorinst.com.



ActLumus Specifications

General Specifications

Weight Without Bracelet	12g
Weight With Bracelet	31g
Dimensions	33,5 mm x 26,5 mm x 13mm
Environmental conditions	• Operating conditions: 0°C to 50°C (32 °F to 122 °F) • Storage Temperature : -20 °C to 50 °C (-4 °F to 122 °F) • Operating Pressure, Storage and Transportation: 480 to 780mmHg • Operating Humidity, Storage and Transportation: 10 to 90%
Memory	8MB
Sampling Time	1 month (60s sampling interval)
Battery Time	1 month (60s sampling interval)
Battery type	Rechargeable Li-ion
Tightness	IP67
Sampling Interval	60s
Sensors	Accelerometer Skin temperature Spectral Light + Photon + Melanopic Off-Wrist
Communication	Bluetooth
Activity logging modes	PIM, TAT e ZCM
Electromagnetic compatibility	The product meets all applicable electromagnetic compatibility (EMC) requirements in accordance with IEC60601-1-2 for home, commercial, and light industry environments. For more details see "Manufacturer's Guide and Statement — Immunity and Electromagnetic Emissions."
Power voltage	3,7V c.c.

Accelerometer

Axes	3
Resolution	12 bits
Sampling Rate	25Hz

Temperature Sensors



Precision	+/-0.5°C (20°C to 40°C)/ 1°C For other values
Operating Range	0°C – 70°C

Light Sensor

Spectrum	Photopic, Melanopic and Spectral
Observations	It takes the intensity of each of the 10 channels and makes a combination to get melanopic, photopic and total light.
Operating interval	1 – 100.000 Lux
Precision	10% to 1,000 Lux (typical)

Notes:

- The manufacturer reserves the right to change these specifications without prior notice

Applicable Standards

Pattern	Description
IEC60601-1:2006	Electrical medical equipment - Part 1: General requirements for basic safety and essential performance.
IEC60601-1-2:2014	Electrical medical equipment - Part 1-2: Collateral Standard: Electromagnetic compatibility - Requirements and tests.
IEC60601-1-11:2010	Electrical medical equipment – Part 1-11: Collateral standard: Requirements for electrical medical equipment and electrical medical health systems used at home.



Manufacturer's guide and statement — Immunity and electromagnetic emissions

Medical electrical equipment requires special precautions regarding the Electromagnetic Compatibility (CEM) and also needs to be installed and put into operation according to the information regarding the EMC contained in this document.

Guide and Manufacturer's Declaration - Electromagnetic Emissions

The device is intended for use in the electromagnetic environment specified below. It is advisable that the purchaser or user of the device ensures that it is used in such an environment.

Emissions test	Adhesion	Electromagnetic environment - guide
RF emissions (Radio frequency) CISPR11	Group 1	The device only uses radio frequency energy for its inner workings. For this reason, RF emissions are very low and are unlikely to cause interference to electronic equipment in their vicinity.
RF emissions (Radio frequency) CISPR11	Class B	The device is suitable for use in all locations, including homes and locations connected directly to the low-voltage public network that provides power to
Harmonic emissions IEC 61000-3-2 Fluctuations in voltage/ Emissions with jitter IEC 61000-3-3	Does not apply Accordingly	Domestic purposes.

Guide and Manufacturer's Declaration - Electromagnetic Immunity

The device is intended for use in the electromagnetic environment specified below. It is advisable that the purchaser or user of the device ensures that it is used in such an environment.

Immunity test	Test level IEC 60601-1-2	Compliance level	Electromagnetic environment - guide
Electrostatic Discharge (DES) IEC 61000-4-2	± 8 kV Per contact ± 2 kV, ± 4 kV, ± 8 kV, ± 15 kV Via or	± 8 kV Per contact ± 2 kV, ± 4 kV, ± 8 kV, ± 15 kV Via or	The floors should be made of wood, concrete or ceramic. If the floors are covered by synthetic material, the relative humidity should be at least 30%.
Fast/salvac electrical transients IEC 61000-4-4	± 2 kV for power supply lines ± 1 kV for input/output lines	Does not apply	The device is charged via computer and is not directly subject to the power supply network
Outbreaks IEC 61000-4-5	± 1 kV line(s) the line(s) ± 2 kV line(s) solo	Does not apply	The device is charged via computer and is not directly subject to the power supply network
Voltage outages, short interruptions and voltage variations in the input lines of the power supply IEC 61000-4-11	<5% Ut (>95% drop in Ut) during 0.5 cycle 40% Ut (60% drop in Ut) for 5 cycles 70% Ut (30% drop in Ut) for 25 cycles <5% Ut (>95% drop in Ut) during 5	Does not apply	The device is charged via computer and is not directly subject to the power supply network
Magnetic field generated by the frequency of the electrical network (50/60 Hz) IEC 61000-4-8	30 A/m	30 A/m	Magnetic fields in the frequency of the power supply network should have levels characteristic of a typical location in a typical hospital or commercial environment.

NOTE 1: Ut is the voltage of alternating current before applying the t level



Guide and Manufacturer's Declaration - Electromagnetic Immunity

The device is intended for use in the electromagnetic environment specified below. It is advisable that the purchaser or user of the device ensures that it is used in such an environment.

Immunity test	Test level IEC 60601-1-2	Compliance level	Electromagnetic environment - guide
RF driven IEC 61000-4-6	3 Vrms 150 kHz a 80 MHz	3 Vrms	Mobile or portable RF communication equipment should not be used at smaller distances from any part of the device, including cables, than the recommended separation distance calculated by the equation applicable to the transmitter frequency. Recommended separation distance $d = 1,17 \sqrt{P}$
Irradiated RF IEC 61000-4-3	10 V/m 80 MHz a 2,7 GHz	10 V/m	$d = 0,35 \sqrt{P}$ 80 MHz a 800 MHz $d = 0,70 \sqrt{P}$ 800 MHz a 2.5 GHz Where P is the maximum declared level of transmitter output power in Watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). The field intensity from fixed RF transmitters, determined by an electromagnetic survey of field ^a , is less than the compliance level for each frequency range Interference may occur in the vicinity of equipment marked with the following symbol:

NOTE 1: At 80 MHz and 800 MHz, the highest frequency range is applicable.

NOTE 2: These guidelines may not apply to all situations. Electromagnetic propagation is affected by the absorption and reflection of structures, objects and people.

a - The field intensity of fixed transmitters, such as base stations for radio phones (cellular /wireless), terrestrial mobile radios, amateur radio, broadcasting broadcasts (AM and FM) and television, cannot, in theory, be accurately predicted. To evaluate the electromagnetic environment caused by fixed RF transmitters, an electromagnetic inspection of the site should be carried out. If the field strength value at the location where the device is being used exceeds the applicable RF compliance level mentioned above, the device should be checked for proper operation. If unusual performance is observed, additional measures may be required, such as changing the position or installation location of the device.

^b - In the frequency range between 150 kHz and 80 MHz, the field intensity should be less than 10 V/m.



Guide and Manufacturer's Statement - RF Immunity

Test frequency [MHz]	Band [MHz]	Service	Modulation	Maximum power [W]	Distance [m]	Immunity test level (V/m)
385	380-390	TETRA 400	18Hz pulse modulation	1,8	0,3	27
450	430-470	GMRS 460,FRS 460	FM $\pm$ 5 kHz deviation 1kHz sine	2	0,3	28
710	704-787	LTE Band 13, 17	Pulse modulation 217 Hz	0,2	0,3	9
745						
7480						
810						
870	800-960	GSM 800/900, TETRA 800, iDEN 820, CDMA 850, Banda LTE 5	Pulse modulation 18 Hz	2	0,3	28
930	1700 -1990	GSM 1800; CDMA 1900; GSM 1900; DECT; Banda LTE 1, 3, 4, 25; UMTS	Pulse modulation 217 Hz	2	0,3	28
1720						
1845						
1970						
2450	2400-2570	Bluetooth, WLAN 802.11 b/g/n, RFID 2450, Banda LTE 7	Pulse modulation 217 Hz	2	0,3	28
5240	5100 - 5800	WLAN 802.11 a/n	Pulse modulation 217 Hz	0,2	0,3	9
5500						
5785						

Recommended separation distances between portable and mobile RF communications equipment and the device

The device is intended for use in an electromagnetic environment in which RF irradiation disturbances are controlled. The purchaser or user of the device can help prevent electromagnetic interference by keeping the minimum distance between mobile or portable RF communications equipment (transmitters) and the device, as recommended below, according to the maximum output power of the communications equipment.

Maximum rated transmitter output power (W)	Separation distance according to transmitter frequency (m)		
	150 kHz a 80 MHz $d = 1,17 \sqrt{P}$	80 MHz a 800 MHz $d = 0,35 \sqrt{P}$	800 MHz a 2.5 GHz $d = 0,7 \sqrt{P}$
0,01	0,12	0,04	0,07
0,1	0,37	0,11	0,22
1	1,17	0,35	0,7
10	3,70	1,11	2,21
100	11,70	3,50	7,0

For transmitters whose maximum output power is not indicated above, the *recommended separation distance d* in meters (m) can be determined using the equation applicable to the transmitter frequency, where *P* is the maximum output power of the transmitter in Watts (W) according to the transmitter manufacturer.

NOTE 1: At 80 MHz and 800 MHz, the separation distance is applicable for the highest frequency range.

NOTE 2: These guidelines may not apply to all situations. Electromagnetic propagation is affected by the absorption and reflection of structures, objects and people.

Essential Performance

Within normal operation the ActLumus equipment must show the accelerometer, light sensor and temperature sensors every 1 (one) minute and should store the collected data within its non-volatile flash memory.

Failuresrelatedto Electromagnetic Disturbances

In case the device suffers a failure related to electromagnetic disturbances it is expected that the device will presentloss of data associated with reset events.

Environmental information

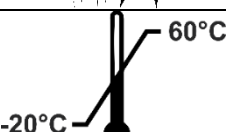
This device must be disposed of in accordance with the laws and regulations of the country in which the disposal takes place. For more information on product disposal, please contact your Condor representative or specialist distributor in your area, or visit our website at www.condorinst.com.

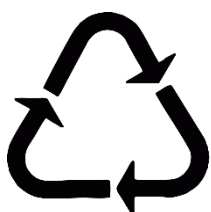
Maintenance Related to Electromagnetic Perturbations

The Device does not require any maintenance related to electromagnetic disturbances during its expected service life.



Symbols

 	General attention warning
	Read the operation instructions
	Recyclable material
	Weee – Waste Eletrical and Eletronic Equipment
	Dispose at appropriate site
	Temperature Limits
	Applied part type BF
	Fabrication batch
	Year of fabrication



Manufactured by Condor Instruments

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