## Phillips Respironics Actiwatch - Use

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# Purpose

This protocol describes the use of the Phillips Respironics Actiwatch for the collection of sleep data through actigraphy and light sensing, as well as scoring support for ecological momentary assessment (EMA).

# Device features

The Phillips Respironics Actiwatch is a wearable medical device which features:

* Actigraphy for monitoring circadian rythms and other sleep parameters
* Light sensing in both white and color channels
* Theoretical 60-day recording duration without charging or data offload
* Epoch lengths of (15s, 30s, 1m, 2m, or 5m)
* Scheduled reminders (shake and sound) along with an interface for subjects to enter up to 2 momentary scores (rating sleep quality, pain, etc.)
* Utilizes Actiware software for offline sleep characterization

The Actiwatch is essentially a "black-box" from the subject's perspective, requiring very little maintenance but also offering effectively no live feedback. However, its integration with the relatively feature-rich Actiware software offers more in-depth analysis than commercial sleep trackers such as the Polar or FitBit smartwatches.

Data output formats include:

* Actiware database viewer, which features auto-annotated plots for actigraphy, light, and score data, as well as custom intervals and a variety of statistics for activity, wakefulness, rest, and sleep intervals, light exposure and intensity, and off-wrist time.
* Actiware export files in .CSV format, tabulating all of the data above.

# Assignment of responsibilities

A principal operator should be assigned for the maintenance, setup and data- retrieval on each Actiwatch.

Operator(s):  
Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Init\_\_\_\_\_\_ Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Init\_\_\_\_\_\_

# Required equipment and supplies

* Phillips Respironics Actiwatch
* Phillips Actiware software (provided with the Actiwatch)
* USB Micro B transfer cable

# Methods and procedures

## Initial configuration

* Install the Actiware software on your computer and open it. Create a new database by going to "File", "Database", "New..." and following the instructions. *It is highly recommended to create a new database for each project, rather than using the supplied demo database.*
* Connect the Actiwatch Spectrum Plus to the computer using the USB Micro-B cable. (There is a small sliding panel on the bottom side of the watch which conceals the USB port.) From the Communications menu in Actiware, select "Actiwatch Console..." and wait for the console to finish checking the connection with the watch. From the list of devices that is shown, select "Actiwatch Spectrum Plus", then click Configure.
* If the watch has been used previously, you may be prompted to retrieve the data in memory. *If you choose not to retrieve this data, it will be erased when the watch is reconfigured.*
* If the subject doesn't yet exist in the database, click "New subject" and fill in the appropriate fields in the form. Otherwise, select the existing subject from the database. Next, select the collection epoch length. *Note that while 2m and 5m epochs are available, it is recommended to use 1m or less, as the Actiware software can't analyze epochs longer than this.* Select start date and time, the duration of data collection in weeks, the time zone (be aware that there is no automatic Daylight Savings correction on the Actiwatch). Select what data channels to log (activity, light, scores), and additional configuration options as desired. Pay attention to the setting which determines whether taking the watch off causes periodic reminder beeps. This can be annoying and should only be enabled if the subject is required to wear the watch constantly!
* To configure reminders and subjective scores, click Advanced. Here you can schedule audible and vibratory reminders to enter a score, and set which of two scores (A or B) are available.
* When finished, click the Configure button. A confirmation message appears stating that configurations have been selected and prompting you to continue. Confirm by clicking "Erase and Continue". You will see a progress bar followed by a message that configuration is complete.

# Schedule of repeating tasks

## Maintenance

* **Cleaning** Clean the Actiwatch with alcohol in between collection periods.
* **Sleep mode:** Sleep mode causes the device to be put into low-power mode to preserve battery life and for long term storage. It is activated in the Actiware software after data retrieval (see "Data retrieval" below).  
  *Be sure to fully charge the device (approximately 2 hours) before storing the device for an extended period.*
* **Charging:** If storing for long periods, checking and recharging the battery every 5 months will help maintain performance. Do not let the device go uncharged for significantly longer than this, or you risk lockout, which requires manufacturer service to correct.  
  Do not let the watches charge for too too long. After charging and configuration, remove them from the charger. This will prevent a small risk of configuration corruption.

# Data retrieval

* **To download the data to the Actiware database:**  
  Connect the Actiwatch to the computer using the USB Micro-B cable. From the Communications menu, select "Actiwatch Console..." and wait for the console to finish checking the connection with the watch.  
  Select "Actiwatch Spectrum Plus", then "Retrieve". When prompted, save the data.   Select whether to continue the collection period, set up a new subject, or put the watch to sleep for later use. (See "Maintenance" for information on sleep mode.)
* **To export the data from the Actiware database:**  
  From the database tree on the left side of the Actiware window, select the subject and the date of data acquisition, then double-click the analysis you wish to export. You will see the analysis plots appear in the middle window.  
  Click "File", "Export...". Answer the prompts to de-identify the subject, then save the .CSV file to the folder of your choice.

# Data processing

Data analysis using the Actiware software is explained in detail in the Actiware reference tutorial (under "Help", "Contents...") and in the SOP "AppOrService\_Actiware" *(pending)*.

# Revisions

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| --- | --- | --- |
| **SOP Revision #** | **Date** | **Description of change(s)** |
| 171002 | 10/02/2017 | First version |