



User Guide

ActiGraph wGT3X-BT + ActiLife

Activity Monitor: ActiGraph wGT3X-BT | E.200.6003 | Revision: 5 | Released: 02/18/2020





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Overview



ActiGraph wGT3X-BT

The wGT3X-BT is ActiGraph's flagship activity monitor, used by researchers around the world to capture and record continuous, high resolution physical activity and sleep/wake information.

The wGT3X-BT is a body worn device that measures and records physical movement associated with daily activity and sleep. The wGT3X-BT is intended for use in applications where quantifiable measurement and storage of physical movement is desired.

wGT3X-BT Technical Details

ActiGraph wGT3X-BT activity monitors contain a 3-axis MEMS accelerometer with a dynamic range of +/- 8 G. Acceleration data are sampled by a 12 bit analog to digital converter at user specified rates ranging from 30 Hz to 100 Hz and stored in a raw, non-filtered/accumulated format in the units of gravity (G's). Data are stored directly into a non-volatile flash memory.

Bluetooth® LE

Enables wireless device features (heart rate monitoring, proximity detection) and communication with ActiGraph mobile applications.

Wear time sensor

Automatically detects if a wrist worn device has been removed for simplified compliance monitoring and data cleaning.

Ambient Light Sensor

Provides minute-by-minute light intensity values (in lux) alongside activity information, helpful for examining the relationship between environment and activity and sleep behaviors.

Specifications

Dimensions	3.3 x 4.6 x 1.5 cm	Dynamic range	+/- 8G
Weight	19 grams	Communication	USB, Bluetooth® LE
Sample rate	30-100 Hertz	Water resistance	1 meter, 30 min.
Battery life	25 days*	Wear location	Wrist, waist, ankle, thigh
Data storage/Memory	180 days/4 GB	Warranty	1 year

* Wireless disabled, 30 Hz sample rate

What You'll Need



wGT3X-BT



ActiLife software (version 6.13.3 or higher)



Triangle Tool



USB Cables



Wrist Band

Or



Waist Belt



Heart Rate Monitor (Optional)



USB Charging Hub and Cables (Optional)

1

Install ActiLife software

You must be running ActiLife version 6.13.3 or higher to operate the wGT3X-BT device.

- 1 Go to <https://actigraphcorp.com/actilife> and click the 'Download' button. Follow the prompts to install the ActiLife software on your PC.
- 2 When prompted, enter the ActiLife license key that was provided at the time of purchase to complete the installation.

Note: The ActiLife full version and ActiLife Lite can both be used to initialize and download data from the wGT3X-BT. However, the ActiLife full version is required to view and/or process the collected data.

If you will be using the CentrePoint software platform, see [CentrePoint User Manual](#)



2

Charge the battery

ActiGraph wGT3X-BT devices contain a rechargeable lithium ion battery that should be fully charged before initialization and deployment to subjects. ActiLife will not initialize a device if the battery has dropped below a certain level. It takes approximately three hours to charge a fully depleted battery.

- 1 Unscrew the USB port cover by turning counterclockwise with the triangle tool.
- 2 Connect the wGT3X-BT(s) to a PC using the USB cable.
- 3 While charging, the wGT3X-BT will display a flashing green LED.
- 4 The device(s) is fully charged once the green LED stays on steady.



Charging multiple devices

An ActiGraph approved USB charging hub can be used to charge up to 7 devices simultaneously. Multiple hubs can be used to further increase charging capacity.

- 1 Connect hub to power supply and PC using supplied cables.
- 2 Attach wGT3X-BT devices using supplied USB cables.

Note: A PC and/or software is not required for device charging.

Note: Battery voltage can be checked by opening the ActiLife software, connecting the device, and viewing the 'Battery' column in the grid under the 'Devices' tab. Select 'Refresh' to update the voltage level during charging.

Battery life specifications

The wGT3X-BT has several features that impact battery life when enabled. Estimated battery life for common device configurations are as follows:

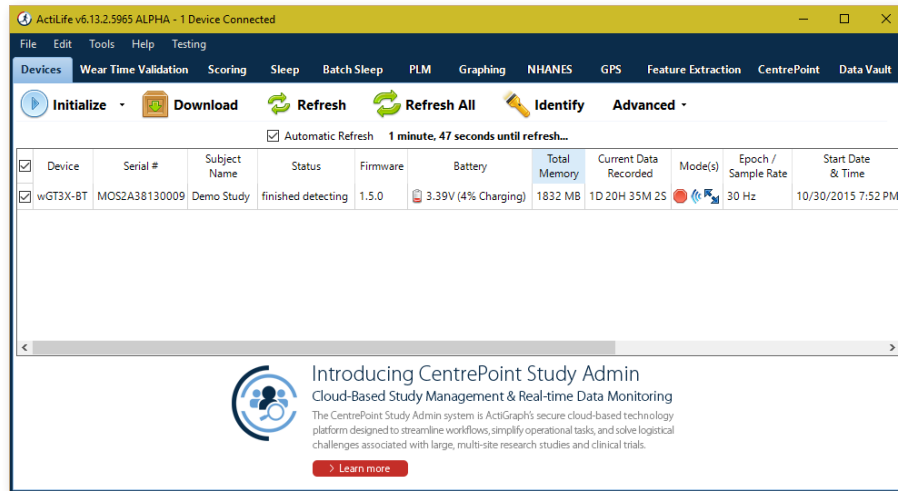
Common Initialization Modes	Expected Battery Life (Days)
30Hz Raw, Idle Sleep Mode Enabled	27.0
30Hz Raw, Idle Sleep Mode Disabled	20.5
30Hz Raw, Idle Sleep Mode Enabled, BLE Enabled - No HR	14.5
30Hz Raw, Idle Sleep Mode Enabled, BLE On with Heart Strap (8hr/day)	12.5
80Hz Raw, Idle Sleep Mode Enabled	25.0
80Hz Raw, Idle Sleep Mode Disabled	18.5

Note: These estimates are based on average device usage parameters. More frequent use of wireless communication will result in reduced battery life.

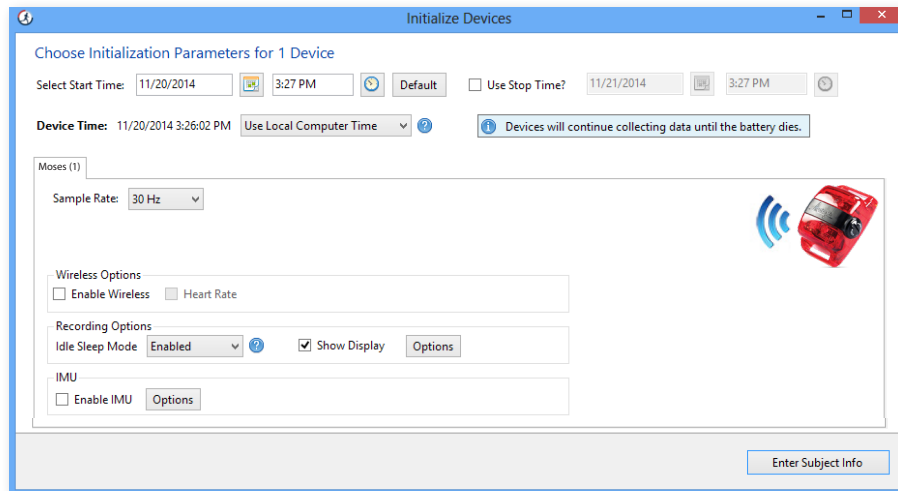
Setup & Initialization

This section describes how to configure the wGT3X-BT and begin collecting data.

- 1 Open the ActiLife software.
- 2 Connect the wGT3X-BT to the PC using the USB cable. The monitor(s) will appear in the grid under the 'Devices' tab.



- 3 Select 'Initialize.' A submenu will open to display several initialization options.
- 4 Select 'Regular Initialization' from the submenu. A dialog box will open to display the initialization parameters listed below. The most commonly used initialization parameters are pre-selected as system defaults.



Initialization Parameters

- **Start and Stop Times**

Enter the dates and times when the device should start and stop collecting data. If no start time is selected, the system defaults to two minutes ahead of the current time. If no stop time is selected, the device will continue to collect data until the battery is depleted, the memory capacity is full, or it is downloaded and reinitialized.

Setup & Initialization (Continued)

- **Device Time**

Set device to local computer time or atomic time.

- **Sample Rate**

Select the device sampling rate ranging from 30 to 100 Hz. The sample rate is the number of times per second that the activity monitor will record data. Note that higher sampling rates will result in higher data fidelity, but will reduce the device storage capacity and battery life.

- **LED Options**

- **Unchecked**

Disables the green LED.

- **Delay Mode LED**

The green LED will flash until the selected start time occurs. The light will stop flashing once the device begins collecting data.

- **Data Collection LED**

The green LED will flash during data collection.

- **Wireless LED**

The blue LED will flash during wireless Bluetooth communication (wireless must be enabled).

Note: Increased LED usage will result in decreased battery life

Note: A red LED will flash to indicate low battery regardless of selected LED options.

- **Wireless Options**

- **Enable Wireless**

Activates Bluetooth® functionality.

- **Heart Rate**

Capture heart rate data when device is used with compatible Bluetooth® heart rate monitor. Note that wireless must be enabled to activate heart rate data collection.

- **Recording Options**

- **Idle Sleep Mode**

When enabled, the device enters a low power state after experiencing 10 seconds of inactivity in order to preserve battery life. Any subsequent activity will awaken the device. No data loss is incurred.

5 Complete the initialization parameters form and select '**Enter Subject Info**'

6 Enter subject name, biometric information, and wear position details into the grid. Note that a subject name is required for initialization, but other biometric and wear details can be entered during download or data analysis.

Setup & Initialization (Continued)

- 7 Select '**Initialize 1 Device.**' A progress bar in the devices grid will indicate when the initialization process is completed.
- 8 After initialization is complete, unplug the wGT3X-BT and replace the USB cap by turning clockwise with the triangle tool. **Be careful not to overtighten.**
- 9 The device will begin collecting data when the selected start time elapses and will continue to collect data until the stop time occurs (if selected), the battery is depleted, or the device is downloaded and reinitialized.

Note: If the start time elapses before the initialization process is complete, an error message will appear. Simply select the 'Default' button in the Start Time section to reset the default start time and then select 'Initialize 1 Device.'

Note: Multiple devices can be initialized simultaneously using one or more ActiGraph approved charging hubs. In this case, all devices will be programmed with the same initialization parameters and the Subject Info grid will display serial numbers of all connected devices for assignment.

1

Wearing the wGT3X-BT

The wGT3X-BT is typically worn at the waist or on the non-dominant wrist using one of our compatible belts or wrist straps. The appropriate wear location is dependent on specific research objectives and will be outlined in the study protocol.

Note: The device must be worn at the wrist location to obtain accurate readings from the wear time sensor.

Note: The device must be worn at the wrist location to obtain accurate sleep score information.



Waist worn devices

- 1 Remove the clip at one end of the elastic waist belt.
- 2 Thread the belt through the wings on each side of the wGT3X-BT so the belt lies flat against the back side of the device.
- 3 Replace the clip and adjust the length as needed.
- 4 The subject should be instructed to fasten the belt snugly around the waist and position the wGT3X-BT in line with the armpit and knee with the USB port cover facing up.



Wrist worn devices

- 1 From above the device, insert the thin end of the wear time wrist strap into one of wGT3X-BT wings with the velcro side facing out. Pull until the thick end of the wrist strap catches in the wing.
- 2 Insert the thin end into the opposite wing to create a loop. The strap should not cover the back of the device.
- 3 Secure and adjust the wrist strap by folding the excess length outward and fastening to the velcro.
- 4 The subject should be instructed to wear the device strapped securely to the non-dominant wrist with the ActiGraph logo facing up when viewed like a wrist watch.

Note: The wGT3X-BT can also be worn at the ankle, thigh, chest or other location for specialized research applications. However ActiGraph does not offer specific wear accessories for these locations at this time.



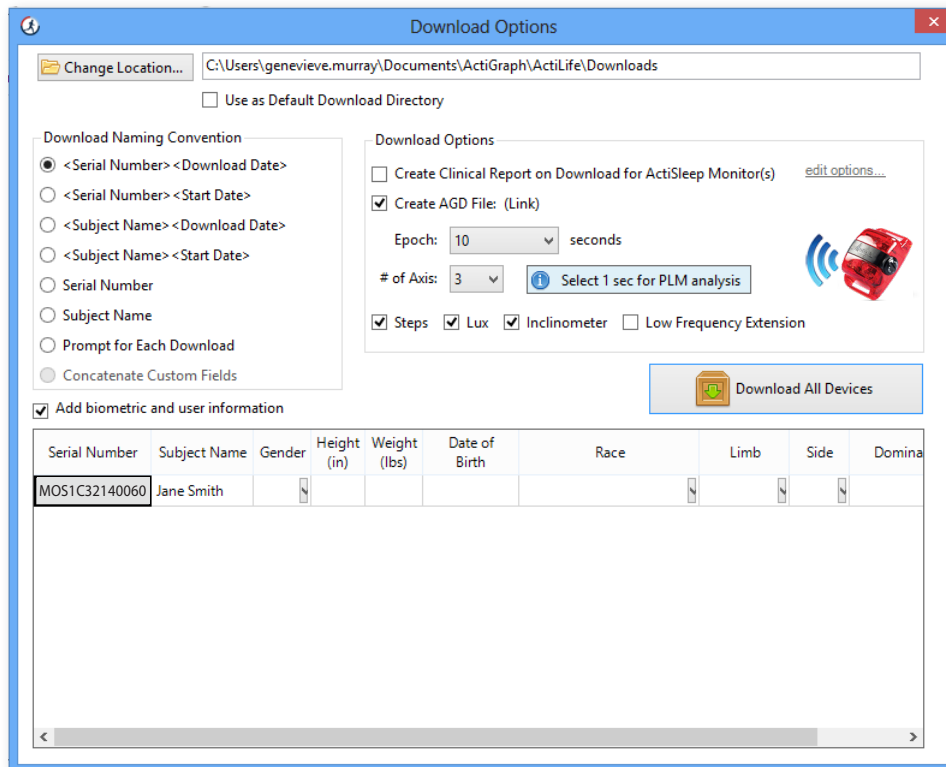
Heart Rate Monitor

To collect heart rate information, the '**Heart Rate**' option must be enabled during initialization and a compatible Bluetooth® wireless heart rate monitor is required. Unsnap the heart rate transmitter from the chest strap, position the transmitter in the center of the sternum, and snap back into place. Adjust the strap so that it is secure across the breast bone. The wGT3X-BT will automatically begin collecting heart rate information when in range of the chest strap.

Note: Application of a water-based lubricant between the skin and transmitter can improve conductivity and reliability of the heart rate signal.

Downloading the Data

- 1 Open the ActiLife software.
- 2 Connect the wGT3X-BT to the PC using the USB cable. The monitor will appear in the grid under the 'Devices' tab.
- 3 Verify the box in front of the device is checked and select 'Download' from the taskbar menu.
- 4 A dialog box will open to display the download options listed below. The most commonly used download parameters are pre-selected as defaults.



- a File download location
Select where downloaded files will be saved.
- b Download naming convention
Provides a list of file name formats.
- c Download Options:
 - Create Clinical Report
A customizable PDF report containing summary data will be automatically generated on download. Subject measures and scoring algorithms can be selected by clicking 'edit options.'

Downloading the Data (Continued)

- **Create AGD File**

An AGD file, required for data scoring, will be automatically created on download.

- **Epoch:** Select the desired epoch length for the AGD file. The epoch length represents the amount of time the raw acceleration data is summed after the filter is applied.

- **# of Axis:** Select which axes of data should be included in AGD file.

Note: 1 Axis=Y; 2 Axis=X,Y; 3 Axis=X,Y,Z

- **Steps:** Select to include step count data in AGD file.

- **Inclinometer:** Select to include positional data (standing, sitting, or lying down and when the device has been removed) based on device orientation in the AGD file.

Note: The wGT3X-BT must be worn at the hip or attached to the upper thigh for accurate inclinometer readings.

- **Low Frequency Extension:** Select to apply low frequency filter extension to AGD file.

Note: The Low Frequency Extension option should only be used in very specific use cases where physical activity is at such a low level that it might otherwise be eliminated with our normal filter. An example would be very slow shuffling movements, common in elderly populations.

- d **Biometric and User Information**

Subject biometric information can be entered and/or edited. Fields will be pre-populated if this information was entered during initialization.

- 5 Once Download Options are selected, click '**Download All Devices.**' The dialog box will close and a progress bar will appear under the '**Status**' column in the grid.

- 6 When the download is complete, a '**finished downloading**' link will appear. Click this link to reveal options to view data, export the raw data file, and navigate to the download folder.

- 7 Data has now successfully been downloaded from the wGT3X-BT and can be cleaned and scored using the analysis tools in ActiLife.

Note: Collected data will remain on the wGT3X-BT device until it is reinitialized.

For more information on data scoring and analysis using the ActiLife software, download the [ActiLife User's Manual](#)

Cleaning

The wGT3X-BT should be cleaned after each deployment using an alcohol-based solution or wipe. Belts and wrist straps should be laundered.

Storage

In order to maximize battery life, ActiGraph recommends devices be stored in a partially charged state (40 – 60% battery capacity is ideal) in low ambient temperatures. The device should never be stored lower than -20°C or higher than 40°C.

1

Regulatory statements

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received including interference that may cause undesired operation. Changes or modifications not expressly approved by ActiGraph, LLC will void the user's authority to operate the equipment under FCC regulations.

- *FCC Part 15.107 – AC Conducted Emissions*
- *FCC Part 15.109 – Radiated Emissions*
- *FCC Part 15.207 – Modular Transmitter AC Line Conducted Emissions*
- *FCC Part 15.249 – Radiated Emission Limits of Intentional Radiators*

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- *Reorient or relocate the receiving antenna*
- *Increase the separation between the equipment and receiver*
- *Connect the equipment into an outlet on a circuit different from that to which the receiver is connected*
- *Consult the dealer or an experienced radio/TV technician for help*

2

Regulatory symbols



CAUTION: Do not simultaneously wear and charge, service, or provide any maintenance on the product.

CAUTION: Transporting or operating this product outside of the temperature range of -20C to 40C could lead to dangerous conditions.

CAUTION: Modification to ActiGraph products are not permitted and will void all warranties if tampered and/or modified. Do not modify the product in any way.

CAUTION: Do not swallow any part of this product. If a piece has been swallowed, contact your local poison control hotline or seek medical attention as soon as possible.

NOTICE: No precautions need to be taken in the event of changes in the performance of the product.

NOTICE: Product does not have any contraindication(s)

NOTICE: Only use a USB 2.0 cable to connect to the device. Only use ActiGraph approved USB hubs to charge the device. Do not connect the device via the USB 2.0 port to anything else but a computer and ActiGraph approved USB hub.



Emergo Europe
Prinsessegracht 20
2514 AP The Hague
The Netherlands

Authorized Representative in European Community

Indicates the authorized representative in the European Community.

AUSTRALIAN SPONSOR

Emergo Australia
Level 20, Tower II
Darling Park
201 Sussex Street
Sydney NSW 2000
Australia

ActiGraph's Australia Sponsor

Indicates ActiGraph's authorized Australian Sponsor.



Catalog Number

Indicates the manufacturer's catalogue number so that the medical device can be identified for reordering.



CE Symbol

By affixing the CE marking to a product, a manufacturer declares that the product meets all the legal requirements for CE marking and can be sold throughout the EEA. ActiGraph's products abide with the Medical Device Directive 93/42/EEC and Radio Equipment Directive 2014/53/EU.



Brazil National Telecommunications Agency (ANATEL) Homologação Number.

This equipment operates on a secondary basis, that is, not entitled to protection from harmful interference, even for stations of the same type, and may not cause interference to systems operating on a primary basis.



Consult Instructions for Use

Indicates the need for the user to consult the instructions for use.



Serial Number

Indicates the manufacturer's serial number so that a specific medical device can be identified.



Manufacturer

ActiGraph is the medical device manufacturer and is located at 49 E. Chase Street, Pensacola, Florida 32502.



Temperature Limit

Indicates the temperature limits to which the medical device can be safely exposed.



Recycle: Electronic Equipment

Indicates the medical device should not be disposed of in the trash. Contact ActiGraph Customer Service regarding the disposal of these products.



Lithium Ion (EU)

Indicates the lithium ion battery within the device should not be disposed of in the trash. Contact ActiGraph Customer Service regarding the disposal of these batteries.



ActiGraphCorp.com

Please contact our Customer Support Team with any questions or for additional information about operating the ActiGraph wGT3X-BT.

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U.S. federal law restricts this device to sale by or on the order of a physician.