

# Package ‘GENEAcore’

May 7, 2026

**Title** Pre-Processing of 'GENEActiv' Data

**Version** 1.2.0

**Date** 2026-03-30

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## Description

Analytics to read in and segment raw 'GENEActiv' accelerometer data into epochs and events.

For more details on the 'GENEActiv' device, see <<https://activinsights.com/resources/geneactiv-support-1-2/>>.

**License** GPL (>= 2)

**Encoding** UTF-8

**RoxygenNote** 7.3.2

**Imports** changepoint, signal, methods, jsonlite

**Suggests** knitr, rmarkdown, testthat (>= 3.0.0), GENEAread (>= 2.0.10),  
GENEAclassify

**Config/testthat/edition** 3

**VignetteBuilder** knitr

**NeedsCompilation** no

**Depends** R (>= 3.5.0)

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**Repository** CRAN

**Date/Publication** 2026-04-02 13:40:02 UTC

## Contents

aggregate_epochs . . . . .	2
aggregate_events . . . . .	4
apply_AGSA . . . . .	5

apply_calibration . . . . .	6
apply_degrees . . . . .	7
apply_ENMO . . . . .	7
apply_radians . . . . .	8
apply_updown . . . . .	8
binfile_summary . . . . .	9
calc_autocalparams . . . . .	10
check_MPI . . . . .	11
create_coel_atoms_json . . . . .	12
create_MPI . . . . .	12
detect_nonmovement . . . . .	13
detect_transitions . . . . .	14
folder_measures . . . . .	15
geneabout . . . . .	16
geneacore . . . . .	17
geneacore_part1 . . . . .	18
geneacore_part2 . . . . .	19
geneacore_part3 . . . . .	20
geneacore_part4 . . . . .	21
get_UniqueBinFileIdentifier . . . . .	22
MPI_summary . . . . .	23
sample_binfile . . . . .	23
step_counter . . . . .	24

<b>Index</b>	<b>26</b>
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---

aggregate_epochs	<i>Aggregate Epochs</i>
------------------	-------------------------

---

## Description

Aggregate Epochs

## Usage

```

aggregate_epochs(
  time_series,
  measure = "AGSA",
  time = "timestamp",
  sample_frequency,
  duration = NA,
  first_epoch_timestamp = NA,
  fun = mean
)

aggregateEpochs(...)

```

**Arguments**

time_series	Data frame to be aggregated.
measure	Name of the measure columns to be included.
time	Name of the time column.
sample_frequency	Measurement frequency of data.
duration	Time duration to aggregate in each epoch.
first_epoch_timestamp	Time to start the first epoch, defaults to first record.
fun	Function to apply on aggregation, defaults to mean.
...	Additional arguments passed to internal aggregation functions.

**Details**

Wrapper function that calls `aggregate_periods` for epochs (duration of fixed length).

**Value**

Data frame of aggregated epochs.

**Examples**

```
timestamp <- c(
  1619424004, 1619424005, 1619424006, 1619424007,
  1619424008, 1619424009, 1619424010, 1619424011,
  1619424012, 1619424013, 1619424014, 1619424015
)
value <- c(
  0.729614366, 1.729115871, 0.804973546, 2.510181118,
  2.23764038, 0.613203747, 0.681953275, 0.089566943,
  0.021042388, 2.4780338, 2.437488989, 2.632635727
)
data <- data.frame(timestamp, value)
aggregated <- aggregate_epochs(data,
  duration = 5,
  measure = "value",
  sample_frequency = 1,
  first_epoch_timestamp = 1619424005,
  time = "timestamp"
)
```

---

aggregate_events	<i>Aggregate Events</i>
------------------	-------------------------

---

## Description

Aggregate Events

## Usage

```
aggregate_events(
  time_series,
  measure = "AGSA",
  time = "timestamp",
  sample_frequency,
  events = NA,
  start_time = "start",
  end_time = "end",
  fun = mean
)
```

```
aggregateEvents(...)
```

```
aggregatePeriods(...)
```

```
createEventMapping(...)
```

## Arguments

time_series	Data frame to be aggregated.
measure	Name of the measure columns to be included.
time	Name of the time column.
sample_frequency	Measurement frequency of data.
events	Data frame containing the start and end index of each event.
start_time	Name of the column in events containing the start index of the events.
end_time	Name of the column in events containing the end index of the events.
fun	Function to apply on aggregation, defaults to mean.
...	Additional arguments passed to internal aggregation functions.

## Details

Wrapper function that calls `aggregate_periods` for events (duration of variable length).

## Value

Data frame of aggregated events.

**Examples**

```
timestamp <- c(
  1619424004, 1619424005, 1619424006, 1619424007,
  1619424008, 1619424009, 1619424010, 1619424011,
  1619424012, 1619424013, 1619424014, 1619424015
)
value <- c(
  0.729614366, 1.729115871, 0.804973546, 2.510181118,
  2.23764038, 0.613203747, 0.681953275, 0.089566943,
  0.021042388, 2.4780338, 2.437488989, 2.632635727
)
data <- data.frame(timestamp, value)
event_start <- c(1, 5, 10)
event_end <- c(4, 9, 12)
aggregated_events <- aggregate_events(data,
  events = data.frame(start = event_start, end = event_end),
  measure = "value",
  time = "timestamp",
  start_time = "start",
  end_time = "end",
  sample_frequency = 1,
  fun = sum
)
```

---

apply\_AGSA

*Apply Absolute Gravity-Subtracted Acceleration (AGSA)*

---

**Description**

Apply Absolute Gravity-Subtracted Acceleration (AGSA)

**Usage**

```
apply_AGSA(x)
```

**Arguments**

x                      Calibrated acceleration data frame.

**Value**

Measure column appended to end of calibrated data frame.

**Examples**

```
x <- c(0.14268, 0.21757, -0.529, -0.36383)
y <- c(0.26385, 0.27295, 0.29220, 0.79510)
z <- c(0.27722, 0.20296, 0.35092, 0.27459)
calibrated <- data.frame(x, y, z)
calibrated <- apply_AGSA(calibrated)
```

---

apply_calibration	<i>Apply Calibration</i>
-------------------	--------------------------

---

**Description**

Apply Calibration

**Usage**

```
apply_calibration(sensor_data, cal_params, measurement_device, use_temp = TRUE)
```

**Arguments**

sensor_data	Raw sensor-level data from a bin file in the form (x, y, z, Light, Button, Temp).
cal_params	Calibration parameters for acceleration and light from MPI.
measurement_device	Name of the measurement device used "GENEActiv 1.1", "GENEActiv 1.2" or "GENEActiv 1.3".
use_temp	Allows auto-calibration to be run with and without temperature compensation.

**Details**

Function to apply calibration to sensor-level data from a bin file.

**Value**

Data frame of calibrated sensor data.

**Examples**

```
cal_params <- list(
  scale = c(1.015, 1.017, 1.027),
  offset = c(0.00128, 0.0383, 0.0138),
  temperature_offset = c(0, 0, 0),
  error = NA,
  light_denominator = 48,
  light_numerator = 911
)

rawdata <- data.frame(
  time = c(rep(1726650857, 5)),
  x = c(0.2421875, 0.24609375, 0.25390625, 0.24609375, 0.23828125),
  y = c(-0.04296875, -0.04687500, -0.03515625, -0.03125000, -0.04296875),
  z = c(-0.9453125, -0.9453125, -0.9531250, -0.9531250, -0.9609375),
  light = c(rep(22, 5)),
  button = c(rep(0, 5)),
  temp = c(rep(21.3, 5)),
  volts = c(rep(4.0896, 5))
)
```

```
)  
calibrated <- apply_calibration(rawdata, cal_params, "GENEActiv 1.1")
```

---

apply\_degrees                      *Apply Rotation (Degrees)*

---

**Description**

Apply Rotation (Degrees)

**Usage**

```
apply_degrees(x)
```

**Arguments**

x                      Calibrated acceleration data frame.

**Value**

Measure column appended to end of calibrated data frame.

**Examples**

```
x <- c(0.14268, 0.21757, -0.529, -0.36383)  
y <- c(0.26385, 0.27295, 0.29220, 0.79510)  
z <- c(0.27722, 0.20296, 0.35092, 0.27459)  
calibrated <- data.frame(x, y, z)  
calibrated <- apply_degrees(calibrated)
```

---

apply\_ENMO                      *Apply Euclidean Norm Minus One (ENMO)*

---

**Description**

Apply Euclidean Norm Minus One (ENMO)

**Usage**

```
apply_ENMO(x)
```

**Arguments**

x                      Calibrated acceleration data frame.

**Value**

Measure column appended to end of calibrated data frame.

**Examples**

```
x <- c(0.14268, 0.21757, -0.529, -0.36383)
y <- c(0.26385, 0.27295, 0.29220, 0.79510)
z <- c(0.27722, 0.20296, 0.35092, 0.27459)
calibrated <- data.frame(x, y, z)
calibrated <- apply_ENMO(calibrated)
```

---

apply_radians	<i>Apply Rotation (radians)</i>
---------------	---------------------------------

---

**Description**

Apply Rotation (radians)

**Usage**

```
apply_radians(x)
```

**Arguments**

x                      Calibrated acceleration data frame.

**Value**

Measure column appended to end of calibrated data frame.

**Examples**

```
x <- c(0.14268, 0.21757, -0.529, -0.36383)
y <- c(0.26385, 0.27295, 0.29220, 0.79510)
z <- c(0.27722, 0.20296, 0.35092, 0.27459)
calibrated <- data.frame(x, y, z)
calibrated <- apply_radians(calibrated)
```

---

apply_updown	<i>Apply Elevation (UpDown)</i>
--------------	---------------------------------

---

**Description**

Apply Elevation (UpDown)

**Usage**

```
apply_updown(x)
```

**Arguments**

x                      Calibrated acceleration data frame.

**Value**

Measure column appended to end of calibrated data frame.

**Examples**

```
x <- c(0.14268, 0.21757, -0.529, -0.36383)
y <- c(0.26385, 0.27295, 0.29220, 0.79510)
z <- c(0.27722, 0.20296, 0.35092, 0.27459)
calibrated <- data.frame(x, y, z)
calibrated <- apply_updown(calibrated)
```

---

binfile\_summary                      *Bin File Summary*

---

**Description**

Bin File Summary

**Usage**

```
binfile_summary(input, recursive = TRUE, identifier_mapping_record = NULL)
```

**Arguments**

input                      Bin file path - single bin file or folder of bin files.  
recursive                      TRUE applies the operation to all nested elements.  
identifier\_mapping\_record                      File path of the exported identifier\_mapping\_record CSV file.

**Details**

Wrapper function that calls create\_summary for bin files only.

**Value**

Data frame of bin file or MPI summary.

---

calc\_autocalparams      *Calculate Auto-calibration Parameters*

---

### Description

Function to calculate auto-calibration parameters from known still points from a bin file that create a unitary sphere.

### Usage

```
calc_autocalparams(
    binfile,
    binfile_path,
    output_folder,
    sphere_points,
    use_temp = TRUE,
    spherecrit = 0.3,
    maxiter = 500,
    tol = 1e-13
)
```

### Arguments

binfile	Text lines read from an open connection to a bin file.
binfile_path	Path to the bin file to be processed.
output_folder	Path to the folder containing GENEAcORE run outputs and Measurement Period Information (MPI) files.
sphere_points	List of points that populate a unitary sphere and their associated temperature in the form (x,y,z,temp).
use_temp	Allows auto-calibration to be run with and without temperature compensation.
spherecrit	The minimum required acceleration value for each axis in both directions to ensure sufficient range of non-movement positions for auto-calibration to be reliable.
maxiter	The maximum number of sphere fit iterations attempted during auto-calibration to converge.
tol	The limit of incremental sphere fit improvements before auto-calibration is considered complete.

### Value

List of auto-calibration parameters within the measurement period information (MPI).

**Examples**

```
binfile_path <- system.file("extdata/10Hz_calibration_file_20Nov25.bin", package = "GENEAcore")
output_folder <- tempdir()
con <- file(binfile_path, "r")
binfile <- readLines(con, skipNul = TRUE)
close(con)
MPI <- create_MPI(binfile, binfile_path, output_folder)
nonmovement_list <- detect_nonmovement(binfile, binfile_path, output_folder)
MPI <- calc_autocalparams(
  binfile, binfile_path, output_folder,
  nonmovement_list$non_movement$sphere_points
)
```

---

check\_MPI

*Print out a summary of MPI file(s)*

---

**Description**

Function to print out a summary of an MPI (Measurement Process Information) file, or all MPI files found if a directory path is supplied.

**Usage**

```
check_MPI(input, print_output = TRUE)
```

**Arguments**

input	Fully qualified path to a MPI file or a directory containing MPI files, the directory is searched recursively.
print_output	Boolean to print MPI summary to console.

**Examples**

```
## Not run:
check_MPI("fully qualified path to a directory structure containing MPI files")
check_MPI("fully qualified path to a MPI file")

## End(Not run)
```

---

```
create_coel_atoms_json
```

*Create COEL Behavioural Atoms JSON*

---

### Description

Creates per-participant rest activity and behavioural bout atoms and a payload

### Usage

```
create_coel_atoms_json(data_folder)
```

### Arguments

`data_folder` Folder that contains raw data bin files for which bouts have been created for.

---

```
create_MPI
```

*Create Measurement Period Information*

---

### Description

Create Measurement Period Information

### Usage

```
create_MPI(binfile, binfile_path, output_folder, out_rds = TRUE)
```

### Arguments

`binfile` Text lines read from an open connection to a bin file.  
`binfile_path` Path to the bin file to be processed.  
`output_folder` Folder to write MPI file in.  
`out_rds` Allows RDS output to be saved during MPI creation.

### Details

Function to create measurement period information (MPI) from a GENEActiv bin file

### Value

List of measurement period information.

**Examples**

```

binfile_path <- system.file("extdata/10Hz_calibration_file_20Nov25.bin", package = "GENEAcore")
con <- file(binfile_path, "r")
binfile <- readLines(con, skipNul = TRUE)
close(con)
output_folder <- tempdir()
MPI <- create_MPI(binfile, binfile_path, output_folder, out_rds = FALSE)

```

---

detect\_nonmovement      *Detect Non-movement*

---

**Description**

Detect Non-movement

**Usage**

```

detect_nonmovement(
  binfile,
  binfile_path,
  output_folder,
  still_seconds = 120,
  sd_threshold = 0.013,
  temp_seconds = 240,
  border_seconds = 300,
  long_still_seconds = 120 * 60,
  delta_temp_threshold = -0.7,
  posture_changes_max = 2,
  non_move_duration_max = 12 * 60 * 60
)

```

**Arguments**

binfile	Text lines read from an open connection to a bin file.
binfile_path	Path to the bin file to be processed.
output_folder	Path to the folder containing GENEAcore run outputs and Measurement Period Information (MPI) files.
still_seconds	The number of seconds included in the rolling standard deviation calculation of non-movement from 1Hz downsampled data.
sd_threshold	The threshold applied to the rolling standard deviation of mean acceleration standard deviation of 1Hz downsampled data to determine non-movement.
temp_seconds	The number of seconds included in the rolling temperature difference calculation for non-wear, which also determines the shortest detection duration.
border_seconds	The maximum number of seconds between non-movement events for them to be combined into the same period.

long\_still\_seconds  
 The number of seconds for any single non-movement event beyond which the whole period is classed as non-wear.

delta\_temp\_threshold  
 The threshold applied to the rolling temperature difference to determine non-wear.

posture\_changes\_max  
 The maximum number of adjoining non-movement events that make up a single period of non-wear less than the maximum non-move duration.

non\_move\_duration\_max  
 The number of seconds beyond which non-movement events are automatically classed as non-wear.

### Details

Function to detect non-movement events, non-wear events and sphere points from a 1Hz downsampled bin file.

### Value

List of sphere points, non-movement events and non-wear events.

### Examples

```
binfile_path <- system.file("extdata/10Hz_calibration_file_20Nov25.bin", package = "GENEAcore")
con <- file(binfile_path, "r")
binfile <- readLines(con, skipNul = TRUE)
close(con)
output_folder <- tempdir()
MPI <- create_MPI(binfile, binfile_path, output_folder)
MPI <- detect_nonmovement(binfile, binfile_path, output_folder)
```

---

detect\_transitions      *Detect Transitions*

---

### Description

Detect Transitions

### Usage

```
detect_transitions(
  measurements,
  minimum_event_duration = 5,
  x_cpt_penalty = 18,
  y_cpt_penalty = 25,
  z_cpt_penalty = 16,
  cut_time_24hr = "15:00"
)
```

**Arguments**

measurements	The downsampled measurements to calculate changepoint transitions.
minimum_event_duration	The minimum interval between changepoint transitions.
x_cpt_penalty	The manual penalty value applied in the PELT changepoint algorithm for the x axis, see <a href="#">cpt.var</a> .
y_cpt_penalty	The manual penalty value applied in the PELT changepoint algorithm for the y axis, see <a href="#">cpt.var</a> .
z_cpt_penalty	The manual penalty value applied in the PELT changepoint algorithm for the z axis, see <a href="#">cpt.var</a> .
cut_time_24hr	Time in 24h to split days up by.

**Details**

Function to detect mean and variance changepoints in 1Hz acceleration data from a bin file.

**Value**

List of time and index of each transition.

---

folder_measures	<i>Daily Measures for Data Folder</i>
-----------------	---------------------------------------

---

**Description**

Daily Measures for Data Folder

**Usage**

```
folder_measures(
  data_folder,
  measure_type = c("activity", "sleep", "both"),
  minimum_valid_hours = 22,
  include_participant_info = FALSE,
  identifier_mapping_record = NULL
)
```

**Arguments**

data_folder	Folder that contains raw data bin files to process or path to single bin file.
measure_type	The type of daily measure summary to generate.
minimum_valid_hours	Minimum hours of wear time in a 24-hour day to be considered a valid day for reported measures.

`include_participant_info`

If TRUE, appends participant information extracted from the bin file to both the activity and sleep measures.

`identifier_mapping_record`

File path of the exported `identifier_mapping_record` CSV file.

### Details

Wrapper to process and output daily activity measures aggregate for all bin files in the data folder

### Value

Daily aggregated activity measures (.csv)

---

geneabout

*GENEAbout*

---

### Description

GENEAbout function which performs the following tasks for each available day:

- Assign bout classifications to events only
- Reports aggregated daily activity and sleep measures
- Creates COEL v2.0 Behavioural Atoms JSON

### Usage

```
geneabout(data_folder = data_folder, control = list())
```

### Arguments

`data_folder` Folder that contains raw data bin files to process or path to single bin file.  
`control` Named list of optional settings for geneacore functions.

### Details

Control options (all optional):

**timer** Logical. Default FALSE. Print elapsed times of each processing step.

**minimum\_valid\_hours** Integer. Default 22. Minimum hours of wear time in a 24-hour day to be considered a valid day for reported measures.

**save\_daily\_bouts** Logical. Default FALSE. If TRUE, daily bouts are saved as RDS files and CSV files (if `output_csv` is set to TRUE). If FALSE, only a single RDS file containing bouts for all processed days is saved.

**coel\_json** Logical. Default FALSE. Exports bouts as COEL behavioural atoms in JSON format. For each bin file in the data folder, behavioural bout atoms and rest activity atoms are produced. Additionally, aggregated JSON files are created in the `Batch JSON outputs` subfolder.

**identifier\_mapping\_record** String. Default NULL. If a file path to the exported identifier\_mapping\_record.csv is provided, encrypted participant IDs in the activity and sleep measures will be replaced with their corresponding mapped identifiers.

### Examples

```
## Not run:
controls <- list(minimum_valid_hours = 4, timer = TRUE, coel_json = TRUE)
geneabout("path/to/folder", controls)

## End(Not run)
```

---

geneacore

*GENEAcore Main Wrapper*

---

### Description

GENEAcore function that wraps the functionalities of geneacore\_part1 to geneacore\_part4. GENEAc core function which performs the following tasks for each valid day:

- Checks and reads the data file and creates the Measurement Period Information (MPI)
- Downsamples the file to 1Hz and detects periods of non movement
- Calculates auto calibration parameters for the device
- Samples daily raw bin file data and saves as daily RDS files
- Reads and saves button press timestamps to the Measurement Period Information (MPI)
- Applies calibration parameters to raw data
- Identifies transitions for events processing only
- Performs aggregation by event and/or epoch
- Calculate steps, if option selected
- Calculate non-wear coverage and rest coverage of events and/or epochs
- Assign bout classifications to events only
- Reports aggregated daily activity and sleep measures
- Consolidates daily epochs or bouts outputs into a single file

### Usage

```
geneacore(data_folder = data_folder, control = list())
```

### Arguments

**data\_folder** Folder that contains raw data bin files to process or path to single bin file.

**control** Named list of optional settings for geneacore functions.

## Details

Control options (all optional):

**cut\_time\_24hr** String. Default "15:00". Time in 24h to split days up by.

**output\_epochs** Logical. Default FALSE. Create epoch outputs.

**epoch\_duration** Integer. Default 1. Specify duration of fixed epochs.

**output\_events** Logical. Default TRUE. Create event outputs.

**output\_steps** Logical. Default FALSE. Calculate step counts and stepping rate during epoch processing. Steps are always calculated during events processing.

**output\_csv** Logical. Default FALSE. Allows CSV output to be saved during epoch and event processing.

**timer** Logical. Default FALSE. Print elapsed times of each processing step.

**multisession** Integer vector of length 2. Default c(1, 1). Controls day split when running function across multiple R sessions. The first value is the current session number and the second is the total number of sessions. The default processes all days in a single session.

**required\_processing\_hours** Integer. Default 0. Hours of wear time in a 24-hour day to be considered a valid day to be processed.

## Examples

```
## Not run:
controls <- list(output_csv = TRUE, required_processing_hours = 4, timer = TRUE)
geneacore("path/to/folder", controls)

## End(Not run)
```

---

geneacore\_part1

*GENEAcore Part 1*

---

## Description

GENEAcore function which performs the following tasks:

- Checks and reads the data file and creates the Measurement Period Information (MPI)
- Downsamples the file to 1Hz and detects periods of non movement
- Calculates auto calibration parameters for the device

## Usage

```
geneacore_part1(data_folder = data_folder, control = list())
```

## Arguments

**data\_folder** Folder that contains raw data bin files to process or path to single bin file.

**control** Named list of optional settings for geneacore functions.

**Details**

Control options (all optional):

**cut\_time\_24hr** String. Default "15:00". Time in 24h to split days up by.

**timer** Logical. Default FALSE. Print elapsed times of each processing step.

**Value**

Measurement Period Information (.rds, .json) and 1Hz downsampled data (.rds)

**Examples**

```
## Not run:
controls <- list(output_csv = TRUE, required_processing_hours = 4, timer = TRUE)
geneacore_part1("path/to/folder", controls)

## End(Not run)
```

---

geneacore\_part2

*GENEAcore Part 2*

---

**Description**

GENEAcore function which performs the following tasks for each valid day:

- Samples daily raw bin file data and saves as daily RDS files
- Reads and saves button press timestamps to the Measurement Period Information (MPI)

**Usage**

```
geneacore_part2(data_folder = data_folder, control = list())
```

**Arguments**

**data\_folder** Folder that contains raw data bin files to process or path to single bin file.

**control** Named list of optional settings for geneacore functions.

**Details**

Control options (all optional):

**required\_processing\_hours** Integer. Default 0. Hours of wear time in a 24-hour day to be considered a valid day to be processed.

**timer** Logical. Default FALSE. Print elapsed times of each processing step.

**Value**

Daily raw data sample of x, y, z, Light, Button, Temperature and Voltage (.rds)

**Examples**

```
## Not run:
controls <- list(output_csv = TRUE, required_processing_hours = 4, timer = TRUE)
geneacore_part2("path/to/folder", controls)

## End(Not run)
```

---

geneacore\_part3

*GENEAcore Part 3*

---

**Description**

GENEAcore function which performs the following tasks for each valid day:

- Applies calibration parameters to raw data
- Identifies transitions for events processing only
- Performs aggregation by event and/or epoch
- Calculate steps, if option selected
- Calculate non-wear coverage and rest coverage of events and/or epochs

**Usage**

```
geneacore_part3(data_folder = data_folder, control = list())
```

**Arguments**

**data\_folder** Folder that contains raw data bin files to process or path to single bin file.  
**control** Named list of optional settings for geneacore functions.

**Details**

Control options (all optional):

**output\_epochs** Logical. Default FALSE. Create epoch outputs.

**epoch\_duration** Integer. Default 1. Specify duration of fixed epochs.

**output\_events** Logical. Default TRUE. Create event outputs.

**output\_steps** Logical. Default FALSE. Calculate step counts and stepping rate during epoch processing. Steps are always calculated during events processing.

**output\_csv** Logical. Default FALSE. Allows CSV output to be saved during epoch and event processing.

- timer** Logical. Default FALSE. Print elapsed times of each processing step.
- multisession** Integer vector of length 2. Default `c(1, 1)`. Controls day split when running function across multiple R sessions. The first value is the current session number and the second is the total number of sessions. The default processes all days in a single session.
- required\_processing\_hours** Integer. Default 0. Hours of wear time in a 24-hour day to be considered a valid day to be processed.

### Examples

```
## Not run:
controls <- list(output_csv = TRUE, required_processing_hours = 4, timer = TRUE)
geneacore_part3("path/to/folder", controls)

## End(Not run)
```

---

geneacore\_part4

*GENEAcore Part 4*

---

### Description

GENEAcore function which performs the following tasks:

- Consolidates daily epochs or bouts outputs into a single file

### Usage

```
geneacore_part4(data_folder = data_folder, control = list())
```

### Arguments

`data_folder` Folder that contains raw data bin files to process or path to single bin file.

`control` Named list of optional settings for geneacore functions.

### Details

Control options (all optional):

- output\_epochs** Logical. Default TRUE. Create epoch outputs.
- epoch\_duration** Integer. Default 1. Specify duration of fixed epochs.
- output\_events** Logical. Default TRUE. Create event outputs.
- output\_csv** Logical. Default FALSE. Allows CSV output to be saved during epoch and event processing.

### Value

Consolidated epochs and/or bouts output (.rds/.csv)

**Examples**

```
## Not run:
controls <- list(output_csv = TRUE, minimum_valid_hours = 4, timer = TRUE)
geneacore_part4("path/to/folder", controls)

## End(Not run)
```

---

`get_UniqueBinFileIdentifier`

*Generate Unique Bin File Identifier*

---

**Description**

Generate Unique Bin File Identifier

**Usage**

```
get_UniqueBinFileIdentifier(binfile)
```

**Arguments**

`binfile`           Text lines read from an open connection to a bin file.

**Details**

Function to create a `UniqueBinFileIdentifier` from a GENEActiv bin file.

**Value**

Single string identifier.

**Examples**

```
binfile_path <- system.file("extdata/10Hz_calibration_file_20Nov25.bin", package = "GENEAcore")
con <- file(binfile_path, "r")
binfile <- readLines(con, skipNul = TRUE)
close(con)
UniqueBinFileIdentifier <- get_UniqueBinFileIdentifier(binfile)
```

---

MPI_summary	<i>MPI Summary</i>
-------------	--------------------

---

**Description**

MPI Summary

**Usage**

```
MPI_summary(input, recursive = TRUE, identifier_mapping_record = NULL)
```

**Arguments**

input	MPI path - single MPI file or folder of MPI files.
recursive	TRUE applies the operation to all nested elements.
identifier_mapping_record	File path of the exported identifier_mapping_record CSV file.

**Details**

Wrapper function that calls create\_summary for MPI only.

**Value**

Data frame of MPI summary.

---

sample_binfile	<i>Sample Bin File</i>
----------------	------------------------

---

**Description**

Sample Bin File

**Usage**

```
sample_binfile(
  binfile,
  binfile_path,
  output_folder,
  start_time = NULL,
  end_time = NULL,
  downsample = TRUE,
  output_csv = FALSE,
  save_raw = FALSE
)
```

**Arguments**

binfile	Text lines read from an open connection to a bin file.
binfile_path	Path to the bin file to be processed.
output_folder	Path to the folder containing GENEAcCore run outputs and Measurement Period Information (MPI) files.
start_time	Time stamp to start the data read, default start of file.
end_time	Time stamp to end the data read, default end of file.
downsample	Logical to determine whether to downsample the file, default TRUE.
output_csv	Allow outputs of bin file sampling to be saved as CSV.
save_raw	Save raw sampled data as RDS for quicker reprocessing, default FALSE.

**Details**

Function to read in a GENEActiv bin file with option to downsample to 1Hz. This can read the whole of the file or just a portion of it by setting the start\_time and end\_time parameters.

**Value**

List of 1Hz downsampled data or raw sample data.

**Examples**

```
binfile_path <- system.file("extdata/10Hz_calibration_file_20Nov25.bin", package = "GENEAcCore")
output_folder <- tempdir()
con <- file(binfile_path, "r")
binfile <- readLines(con, skipNul = TRUE)
close(con)
measurements <- sample_binfile(binfile, binfile_path, output_folder)
```

---

step\_counter

*Step Counter*


---

**Description**

Function to calculate the number and variance of the steps in the data.

**Usage**

```
step_counter(
  step_data,
  sample_frequency = 100,
  filter_order = 2,
  boundaries = c(0.5, 5),
  Rp = 3,
  step_hysteresis = 0.05,
```

```

  fun = c("GENEAccount", "mean", "sd", "stepdiff")
)

stepCounter(...)

```

### Arguments

step_data	The data to use for calculating the steps. This should be a vector of acceleration values.
sample_frequency	The sampling frequency of the data, in hertz, when calculating the step number (default 100).
filter_order	single integer, order of the Chebyshev bandpass filter, passed to argument n of <a href="#">cheby1</a> .
boundaries	length 2 numeric vector specifying lower and upper bounds of Chebychev filter (default c(0.5, 5) Hz), passed to argument W of <a href="#">butter</a> or <a href="#">cheby1</a> .
Rp	the decibel level that the cheby filter takes, see <a href="#">cheby1</a> .
step_hysteresis	The hysteresis applied after zero crossing of the bandpass filtered y-axis signal.
fun	character vector naming functions by which to summarize steps. "count" is an internally implemented summarizing function that returns step count.
...	Additional arguments passed to internal aggregation functions.

### Value

Returns a vector with length fun.

### Examples

```

d1 <- sin(seq(0.1, 100, 0.1)) / 2 + rnorm(1000) / 10 + 1
Steps4 <- step_counter(d1)
length(Steps4)
mean(Steps4)
sd(Steps4)
plot(Steps4)

```

# Index

aggregate\_epochs, 2  
aggregate\_events, 4  
aggregateEpochs (aggregate\_epochs), 2  
aggregateEvents (aggregate\_events), 4  
aggregatePeriods (aggregate\_events), 4  
apply\_AGSA, 5  
apply\_calibration, 6  
apply\_degrees, 7  
apply\_ENMO, 7  
apply\_radians, 8  
apply\_updown, 8

binfile\_summary, 9  
butter, 25

calc\_autocalparams, 10  
cheby1, 25  
check\_MPI, 11  
cpt.var, 15  
create\_coel\_atoms\_json, 12  
create\_MPI, 12  
createEventMapping (aggregate\_events), 4

detect\_nonmovement, 13  
detect\_transitions, 14

folder\_measures, 15

geneabout, 16  
geneacore, 17  
geneacore\_part1, 18  
geneacore\_part2, 19  
geneacore\_part3, 20  
geneacore\_part4, 21  
get\_UniqueBinFileIdentifier, 22

MPI\_summary, 23

sample\_binfile, 23  
step\_counter, 24  
stepCounter (step\_counter), 24