# *The MotionMonitor xGen Software Guide: Recording Parameters*

This document reviews the process for recording data and addresses common questions associated with the recording process. The Record menu and Activity Player toolbar allow the user to Record (🔴), Stop (🟥), Cancel (⊗) or Edit Recording Parameters (🔧).

Any of these processes can be initiated through the Record menu or the Activity Player toolbar. When not recording, the stop and cancel options will be disabled.
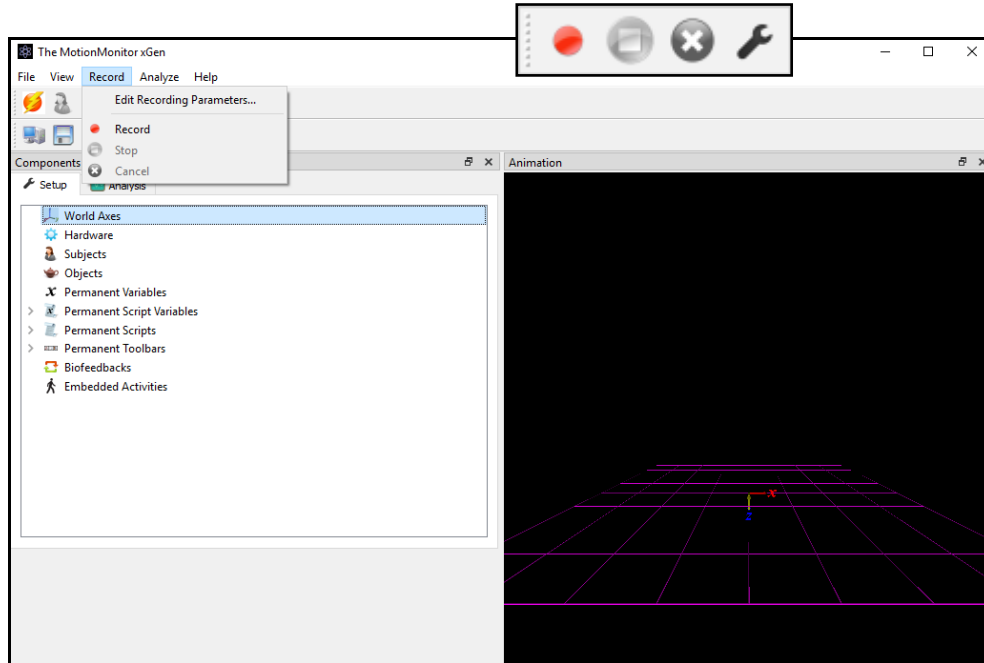
While recording, the Record and Edit Recording Parameters options will be disabled.
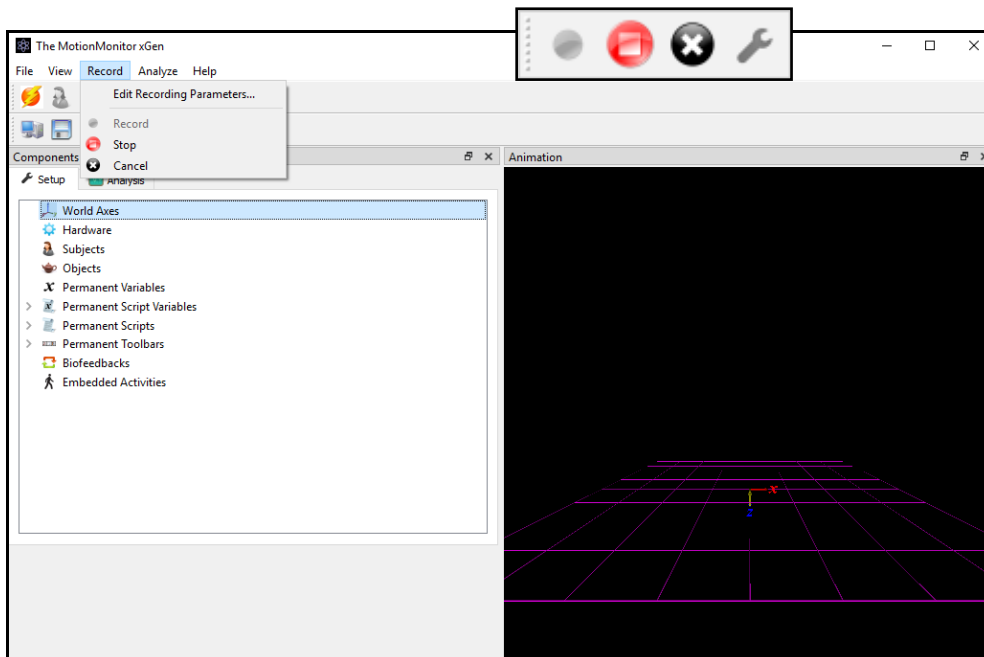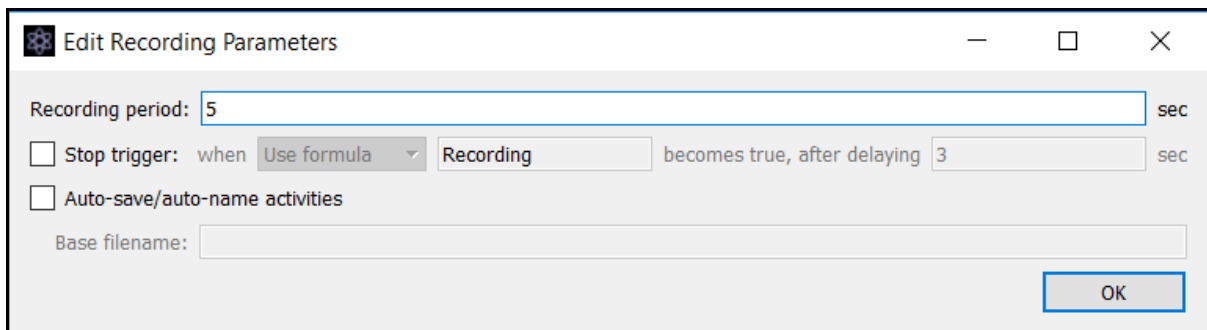
As soon as the recording process is initiated, any activated Hardware devices and cameras listed under the hardware node will begin streaming data into a recording buffer. The process of initiating the recording buffer utilizes additional computer resources and is prioritized above the display of Live data, to help ensure synchronicity between the different hardware devices. As a result, there may be a momentary lapse in the display and calculation of data in the Live window and the transition of Activity Player toolbar icons from enabled to disabled or vice versa. However, raw data streams have already begun to fill the Recording buffer.

Please note, the recording buffer is independent from the Live buffer or Live Period defined in the Hardware parameters panel under the Setup Components tab. The Live Period determines the buffer period for the display and calculation of data for real time purposes.

The recording process will continue until the Stop or Cancel recording icons have been selected or the stop trigger event has been received. Selecting the Stop icon (⬤) or menu item will result in the recording immediately stopping and an activity opening. The Stop icon overrides any Stop trigger and delay that is configured under "Edit Recording Parameters". Selecting the Cancel icon (⬤) or menu item will result in the recording immediately stopping, with any data in the recording buffer being discarded. As was the case with starting a recording, while the activity data are being opened, saved, or canceled, there may be a momentary lapse in the display and calculation of data in the Live window.

The recording period and stop trigger can be configured through the "Edit Recording Parameters" dialog, as seen below.

The Recording period is the maximum length of time that will be captured in an activity. The recording period plus a few extra frames, to allow for proper data alignment, is the recording buffer. When recording video data there is approximately 2 seconds of additional video data at the start of the capture. This may be observed as an additional lag when initiating a recording, but it ensures that enough video frames are captured for proper alignment. The recording buffer is a circular buffer. When this buffer fills, the oldest data in the buffer will get overwritten by the most current data. As a result, any recorded activities will be up to, but not over, the length of time specified in the "Recording period" field of the Edit Recording Parameters dialog.

The user has the ability to define recording parameters based on an event in the data, the "Stop trigger". In addition, they can define a delay period before or after that event, so that the event can be used to trigger the start, stop or user-determined location within an activity. When enabled, the "Stop trigger" is looking for when a specified condition becomes TRUE. The condition can be selected by using formulas or drop-lists and can be a Boolean variable or when any expression becomes TRUE. For instance, an expression could be "*mag(BertecPlate1.Force) > 20*" which would trigger the recording when the total force on a force plate exceeds 20 Newtons. When the Stop trigger condition becomes TRUE, the software will stop the recording after waiting for the specified delay period. Please see "Appendix A" below for some examples of common use.

The "Auto-save/auto-name activities" checkbox allows for activities to automatically be saved using a base filename with an appended number at the end. The procedure then automatically proceeds to the next recording. Activities will be saved to the C:\ProgramData\Innsport\TMM_xGen\MotionMonitor\User*UserID*\Activities directory. If the auto-save/auto-name procedure is interrupted or stopped, the user will be prompted with a message that "A set of activities labeled '*base filename*' already exists" and will then be given the option to append to or overwrite the existing files when initiating the next recording.

Alternatively, an activity can be saved using the File|Save Activity or File|Save Activity As menu items or the icons by the same names in the Main Toolbar within an Activity. When using Save Activity, the activity will save to the C:\ProgramData\Innsport\TMM_xGen\MotionMonitor\User*UserID*\Activities directory using the default name indicated in the title bar for the Activity. When using Save Activity As, a file-browse dialog will open where the directory and file name for saving the activity can be specified.

Activities will inherit the properties from the Live window (i.e. the Workspace/Analysis settings from the Live Window) but will open in a completely independent window. Analyses can be loaded within an activity to change what variables are computed and displayed, filter settings and report or export settings, among other things. More information on Workspaces and Analysis files can be found in the video tutorial for [Understanding Components and Analyses](#).

It is important to note that the more Animation windows and Graphs that are displayed and plots that are enabled, the more resources that will be required by the computer. So, it is recommended that these be kept to a minimum of what is necessary while recording. Analyses can be saved and loaded to control which Animations and Graphs are displayed in post processing. Similarly, since Activities will open in their own windows, it's important not to not lose track of how many Activities may be open at once when recording data, as each open activity will limit computer resources available for the Live window and new recordings.

There are 2 default Boolean variables that can be advantageous for Recording purposes. These are "Recording" and "Capturing" and they do not need to be added as a variable within the application. These variables are almost identical in that they are both TRUE during recording and FALSE at all other times. However, Recording remains TRUE while certain "cleanup" tasks associated with the recording are being completed. For most all applications, these variables can be used interchangeably. When these Booleans are used as the Stop trigger, the Stop trigger condition immediately becomes TRUE at the start of recording and the recording will automatically terminate after the specified delay.

There are also 2 default Time variables that are automatically created within each Activity, "InitialTime" and "FinalTime". These variables refer to the beginning and end of an Activity, respectively, and are very useful when defining Time variables or using Operators within a formula field. Many Operators, such as integration, average, minimums and maximus require elements for defining a BaseTime, StartTime or EndTime.
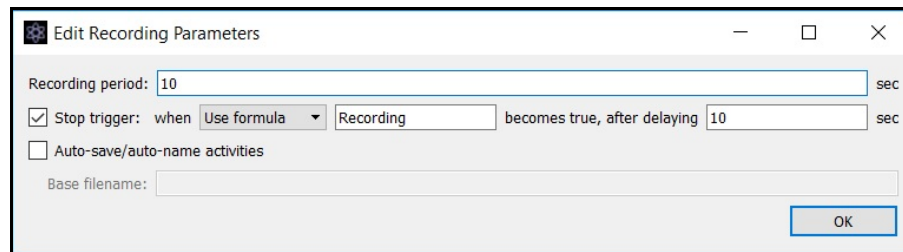
Appendix A

Recording Period and Delay after Stop Trigger

The Recording parameters can be configured to work with Stop triggers that provide additional control over the data acquisition process. Six common approaches to configuring capture parameters using a Stop trigger are shown below.

The use of the recording buffer and Stop trigger can be advantageous for several reasons, including that it can allow for the experimenter to be away from the computer while the recording is being captured, it eliminates the need for the experimenter to click or press a button to coincide with a physical event, it automatically aligns each recording to a pre-determined event, and it allows for the subject to perform the desired movement at their "own pace", and thus more naturally i.e. they don't have to wait for a "Go" command or other signal from the experimenter.

The Stop trigger cannot be used as a means for controlling when data collection begins and ends. Its use can only be registered by the software once during a given recording.

1) An automatic termination after delay can be configured by using the default "Record" Boolean variable as the Stop trigger. After the specified delay has been reached after the initiation of the recording, the recording will stop.
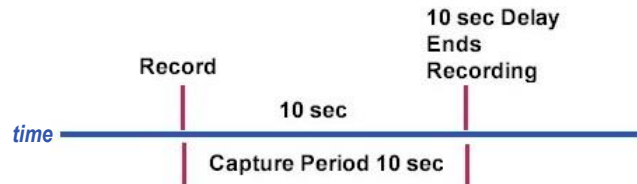

In the settings displayed above, if Auto-save/auto-name is enabled, pressing the Record button a single time will initiate repeated collections of data with lengths equal to the Recording period.

2) Using a contingent trigger such as a force plate threshold or other event marker will cause collection to terminate after completion of the specified delay. If the delay and recording period are the same, all activities will be aligned to the trigger in the first frame of data.
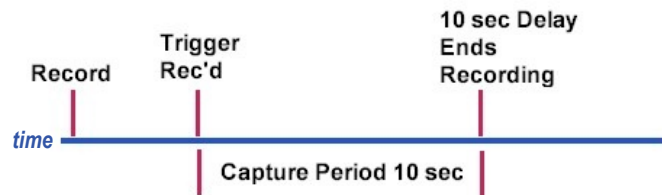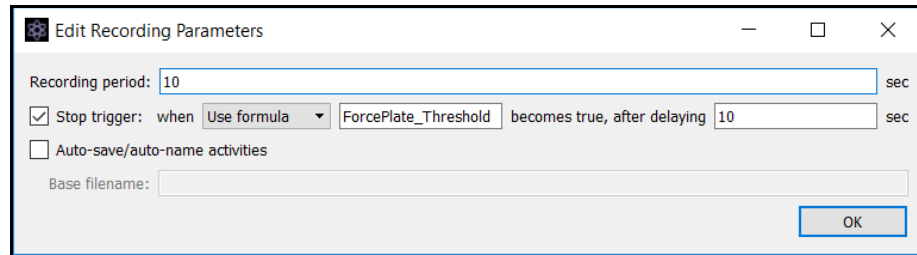

3) If the delay time is less than the recording period, all activities will be aligned to the trigger with the trigger appearing within the capture period. In this case all trials are 12 seconds long and contain the event marker or trigger at 2 seconds into the activity. If the trigger is received before 2 seconds, the activity would be less than 12 seconds long.
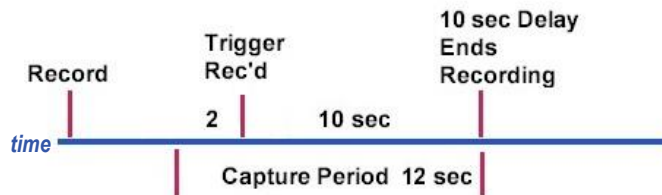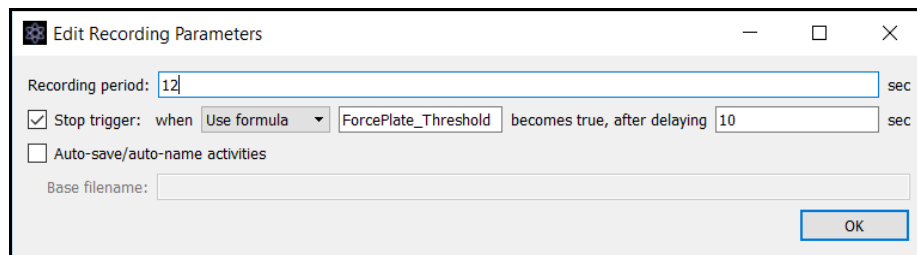
4) If the delay is longer than the recording period, all activities will be aligned to the trigger but the trigger signal will not appear in the data stream. Each activity will be 8 seconds long for the example shown below.
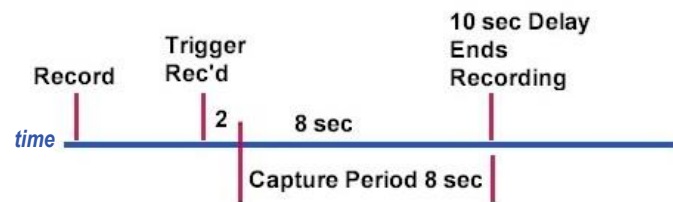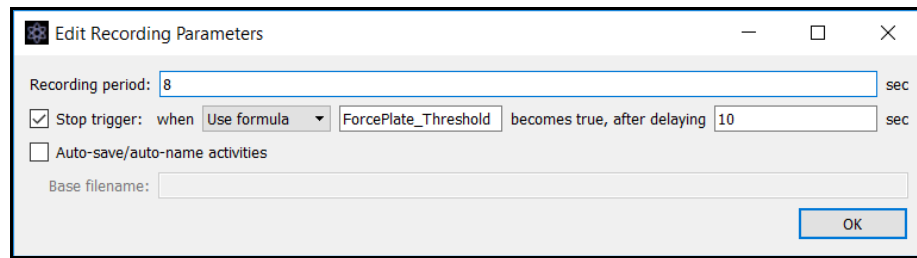
5) If the time from pressing Record to the occurrence of the trigger when added to the delay time is short relative to the recording period, activities may be of varying lengths but all will be aligned from the end of the activity. The settings below could result in activities that range from 10 to 20 seconds in length (ex. 12 seconds below) and will be aligned at 10 seconds from the end of the activity.
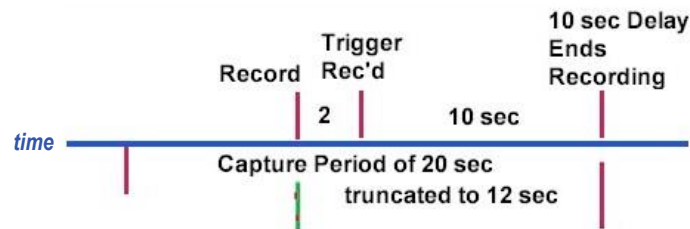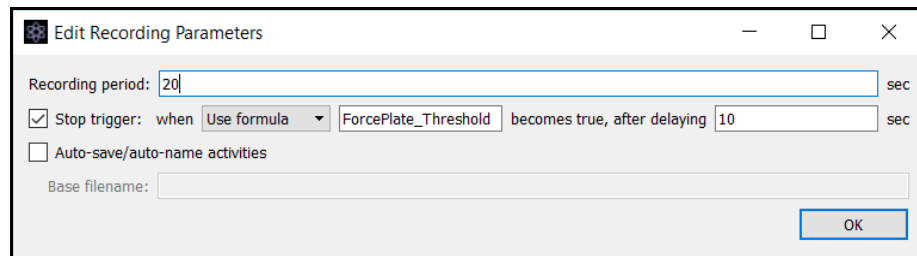
6) If the delay is set to 0 seconds, the recording will end as soon at the trigger is received. The settigns below would result in activities that range from 0 to 10 seconds in length and will be aligned from the end of the activity.