

Documentation: Stimulator List Mode

Rev. 0, 2019-12-05 initial version

1. Introduction

Stimulator List Mode (SLM) allows the download of a list of predefined **electrode** patterns. The pattern defines which electrodes are to be stimulated with the available stimulators. The patterns are applied one after another after the start signal. The pattern list may be repeatedly applied depending on the **Loop** setting. The currently defined stimulation pulse is applied to each of the patterns.

The SLM is currently available for the following devices:

- MEA2100
- MEA2100-256

The list of electrode patterns is saved in the hardware, so that e.g. a digital input trigger (see 2.) immediately starts the stimulation on the current pattern without any delay.

2. Starting and switching to another pattern

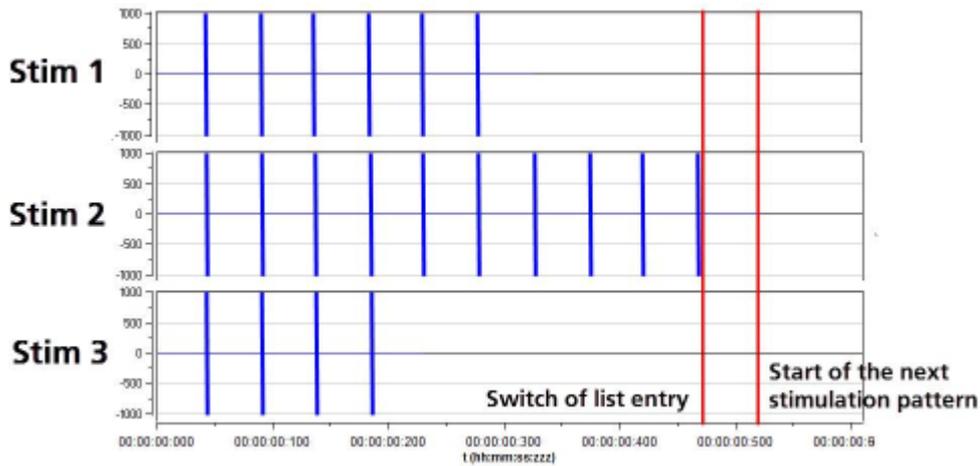
If SLM is active and an electrode pattern is downloaded, the first pattern of the list is applied at the start of the stimulation.

The stimulus pulse is applied when a trigger occurs. The trigger is the one defined for the stimulus pattern (Manual, DacqStart, Digital Input, or Feedback) of the first (green) stimulus. If a trigger occurs while the stimulus pulse is still running, it is ignored. Only the trigger defined for the **first** stimulator can be chosen as the SLM trigger, the selection is disabled for the other stimuli when List Mode is active.

If **Loop** is turned off, the the stimulator is halted until the next start trigger occurs. The next electrode pattern in the list is then preselected and gets applied by the next trigger. If **Loop** is turned on the patterns in the list are automatically applied one after each other.

There must be at least one electrode selected, otherwise the switching to the next pattern does not occur. If the stimulator is stopped manually, then no switch to the next electrode pattern occurs.

If more than one stimulator pattern is downloaded, the duration until the switch to the next pattern happens, is the duration of the **longest** stimulus, even if this pattern does not contain any electrodes. Always all stimulators are started when a list mode pattern is triggered.



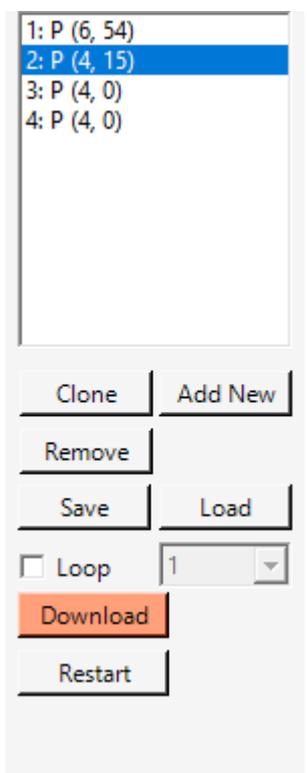
3. Special case: Multi Well MEAs

MEA2100-256

SLM is only available if a single well MEA is selected, this includes the 6-well and 9-well layouts which are handled as a big single well. It is **not** available for the layouts MEA_9Well_MEA2100_256 and MEA_6Well_MEA2100_256 (these are currently only available for the *old* adapter ADPTA)

4. GUI

The **List Mode** can be enabled via the **List Mode** button in the Stimulator GUI. If enabled, a panel is made visible to the right of the electrode layout:



List Entry: The list shows entries in numbered order with the number of selected electrodes for each stimulator in parenthesis. When an entry in the list is selected the electrode pattern on the layout is automatically updated.

Selecting Electrodes: If a pattern is selected in the list, then selecting/deselecting electrodes in the layout automatically updates the list entry.

- **Clone:** add an entry in the list with the same pattern as the currently selected
- **Add New:** add a new entry to the end of the list with an empty electrode pattern
- **Remove:** removes the currently selected entry from the list
- **Save/Load:** Save the pattern list to a file or load from a file. Only pattern files with the same MEA layout can be loaded. Loading overwrites the current list entries.
- **Loop:** determines the switching to the next pattern in the list.
 - turned off: only one pattern is applied, until the next trigger occurs
 - 1: all the patterns in the list are applied once, one after each other
 - 2,3: all the patterns in the list are applied one after each other, then the list is repeated 2 or 3 times
 - infinite: the patterns are applied until the stimulation is stopped
- **Download:** After each change in the GUI the patterns and loop settings must be downloaded in order to be activated on the hardware. The current electrode pattern is reset to the first one in the list.
- **Restart:** Resets the current pattern to the first entry in the list

Load/Save Experiment Setup

If an Experiment setup with List Mode is saved and then loaded, the List Mode list of patterns is not reloaded automatically. The stimulus patterns are loaded though and get downloaded to the hardware when the stimulus is started.

Stimulus pattern

The handling of the **stimulus** pattern is not changed by the List Mode, with one exception: When a pattern with infinite loop is loaded from file and list mode is activated, the infinite loop is set to false. A pattern with infinite duration would prohibit the switching of the electrode patterns.