

## Kai's Articulation Tool Version 2, November 2005

This Articulation Tool provides an integrated framework for an intuitive use of large sample libraries from within Logic. It allows the user to access, while playing and using assignable physical controllers, all the sampled articulations and variations required to reproduce the versatile sound character of a (recorded) natural, acoustic instrument, then record the midi information on a single track for direct scoring and convenient post-production. The image below shows the entire articulation tool as it appears on screen.



Fig. 1

### I. Introduction

The availability of multi-gigabyte sample libraries allows one to approximate natural instruments and even whole orchestras to an extremely detailed degree by means of combining and performing numerous individual recordings (samples). However, the sheer number of different articulations and variations per instrument, each instantiated on an individual sampler instrument and then recorded on individual tracks, makes the present working process quite cumbersome and complicated, and does not permit the user to play a sampler instrument with all of the required articulations in real time thus requiring a large amount of post-processing. It prevents a convenient way of editing the musical content and in particular, does not allow one to work in an intuitive way with a score. And, the musical information is not presented in a concise form that allows an instant overview.

The purpose of the *Articulation Tool* is to overcome all these limitations and provide a framework in which all available articulations and variations of an instrument can be instantly accessible and playable in real time and can be recorded on a single track in the arrange window. These tracks are immediately displayed and arranged by Logic in the form of a score in the score window. All articulations can be freely loaded and processed in individual sampler instances, while the Articulation Tool provides a convenient way to access them.

### II. Concept

Although the functional range of the EXS24 mkII is still rather restricted, Logic's environment with its nearly unlimited midi processing capabilities largely compensates for these shortcomings. (The environment is a general framework designed to alter midi events such as notes, controllers, etc. and is designed in the style of an electrical circuit diagram with cables connecting certain objects that perform transformations on thru-going midi events. See Logic's manual for more details).

One major shortcoming of the EXS is that it allows only one instrument with its collection of samples per sampler instance (per track in the arrange window). There is however, a nice method to circumvent this restriction within the environment using a certain object called a *channel splitter*. This object directs a midi event to a different destination depending on the received midi channel number associated with the event.

By connecting the outputs of the channel splitter to EXS instances each with a different articulation loaded, struck notes play different articulations according to the midi channel on which they are sent. This way the information required to indicate which articulation is played is stored in the note events themselves as midi channel numbers and no additional control events are needed, nor do they unintentionally appear in the generated score as notes with many ledger lines. Moreover, it is very easy to later change articulations in Logic's editors by changing the note's assigned midi channel number.

To use this scheme for an entire orchestra you need a channel splitter for each acoustic instrument or section of the orchestra, and you need to have a cable connection (created in the environment) to each EXS instance (i.e. each articulation, each EXS instrument). This method has already been proposed by and for use with the Vienna Symphonic Library (VSL) and there is a corresponding manual describing the process that can be downloaded from the user area of their web site.

Their method is a good start since it allows the user to control all articulations – up to 16 per splitter – of an acoustic instrument from a single track. However, this older method requires the user to set the midi channels one at a time *after* the event in the post-production phase and forces one to “program” the music rather than play it during performance.

This is where the Articulation Tool comes into play. The main thing it does is to *set* the midi channel of incoming notes from a keyboard sending on one midi channel to another midi channel, thus effectively selecting the articulation that is played and recorded by these notes (key strikes on your keyboard) before they arrive at the EXS instance. Using the integrated *Alternation Section*, the switching of articulations can also be pre-recorded in series and subsequently triggered automatically while playing. This allows one to play complicated pieces of music with many articulation changes in real time, directly capturing the artistic details and nuances of a live performance that are otherwise extremely hard to reproduce after the event.

In addition, the Articulation tool acts as a “control center” for accessing your sound library and allows you to configure all your physical controllers by mapping them – like keys, faders, buttons and pedals – to facilitate access and control. To this end, the Articulation Tools allows you to specify both a *control key range* – i.e. a region of keys on one of your keyboards – and a *switch controller range* – i.e. a range of consecutive controller numbers which can include switch pedals like the standard “piano trio” or assignable buttons found on many current keyboard controllers. The control elements of these ranges can be assigned to an extensive list of possible destinations that include:

- a selection of the different articulations for each orchestral instrument
- control of all the functions of the included *Alternation Section*
- control of the *VSL Performance Tool* in an improved and integrated way.

### III. Setup

1. Include the Articulation Tool into your setup.

Copy the Articulation Tool from the screen set no. 9 of the corresponding song and paste it in the *Click & Ports* layer within the environment of your Autoload song or VSL template. Cable it in the midi path between the *Physical Input* (to Recordings &

Thru) and the *Sequencer Input* as shown in Fig. 2. (To record midi data, every Logic song must have a connection from the Physical Input to the Sequencer Input).

Include an environment window showing the Articulation Tool in one of your screen sets for easy access. You need only *one* Articulation Tool per song which, due to the above routing, affects midi events before they enter Logic's sequencer and thereby works for every instrument you select in the arrange window.

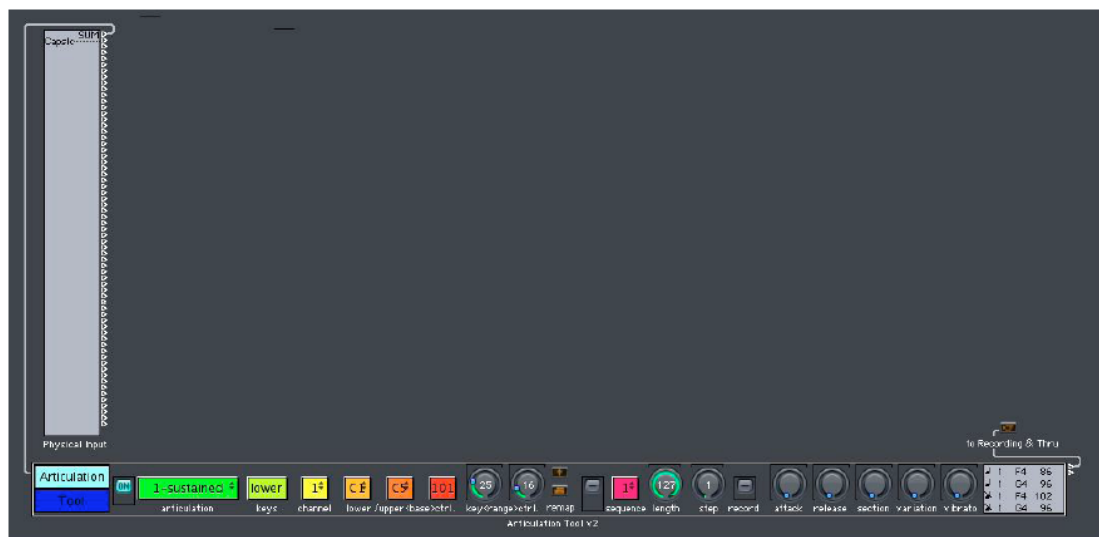


Fig. 2: Articulation Tool inserted and routed in environment window

## 2. Adjust the Articulation tool to your midi hardware.

First, set the channel parameter of the Articulation Tool to match the *Send* midi channel of the physical controller (e.g. a keyboard) that you want to use for choosing articulation changes. There are four main types of hardware setups:

- a. If you have **a separate (extra) 2 octave keyboard**, then . . .
  - adjust the *lower base* to the base note of your keyboard (if necessary) and have a look at the key assignments in the appendix.
- b. If you have **a range of 8 or 16 midi buttons on your keyboard**, then . . .
  - make them send on channels 101 to 108 or from 101 to 116 so you can change the corresponding articulations by pressing a button thus changing midi channel prior to playing a note. (You can also make the Articulation Tool accept the controllers your buttons transmit by default. See the remap function).
- c. If you have **a single keyboard and a sustain pedal**, then . . .
  - set *key range* to 12, *ctrl. range* to 1 and *base ctrl.* to 64. Now you can use the first octave (left part in the appendix) and the sustain pedal to switch between two different ranges in order to be able to access the full key range of all instruments (see below).
- d. If you have **only a single keyboard**, then . . .
  - set *key range* to 12, and have a look at the *remap* function, in order to set one key of the *control key range* to the destination *toggle key range* (destination 17).

## 3. Instantiate and connect the EXS sampler instances you want to use.

Now, instantiate and connect the EXS sampler instances you want to use to the channel splitter(s).

If you **already use channel splitters as track objects**, then . . .

you only have to change the articulation names in the *articulation* text menu to meet your desired working habits or present conventions. (See the description of the *articulation* menu in the next section).

If you **haven't used channel splitters yet**, then . . .

you have to create a template. To do this, create a channel splitter for each orchestral instrument (track) you intend to use and cable its outputs to EXS instances (up to 16 per channel splitter) with the desired articulations of the instrument loaded as shown in Fig. 3. Have a look at the third screen set of the *Articulation Tool v2* song where this has already been done as an example for a few instruments. Simply copy (in the environment window) the lowest row of objects as often as you need, then move the objects further below (still in the environment window) to separate them visually for making adjustments later.



Figure 3: Channel splitter routing scheme with inserted Performance Keys Tool

4. Finally, insert the track instruments in the arrange window and play!

## IV. Articulation Tool

### 1. Articulation Section

There are three ways to change articulations, namely via program change messages, switch controllers, and keys. Although program change messages work as expected and may seem most natural, they are somewhat disadvantageous since it usually takes too long to enter a 2 digit number and an enter command before each articulation change, and do this during playing.

If your controller has a row of 8 or 16 assignable buttons, this would be a good way to perform articulation switches. Keyboards with a good action, however, usually don't have that many additional controllers. Therefore, the standard method would be to use key strikes for this task.

Probably, the ideal case is to have a small, second (2 octaves) keyboard for switching articulations and for other control purposes. With a single keyboard it is a bit less convenient, since generally, the instruments of an orchestra cover the entire 88 key range of a master keyboard leaving no unused keys that can be dedicated entirely to the task of switching articulations. In order to enable the articulation selection by keys on a single keyboard, the Articulation Tool provides for switching between two separate control key ranges appropriate for instruments with high and low ranges. These two ranges can be toggled by an assignable key or switch controller which and must be done manually since there is no way for the Articulation Tool to “know” whether an instrument with a high or low has been selected in the arrange window. The control elements of the *Articulation Section* are:

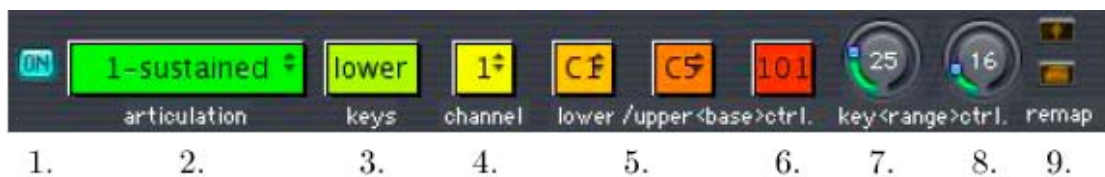


Fig. 4: Articulation Section

1. *on/off* switch for the articulation selection.
2. *articulation* shows the currently active articulation. Articulations are much more conveniently selected by midi events in which case this drop down menu is only used as a “current status” display. However, the various articulation names can also be selected with the mouse. Double clicking the articulation display menu opens the text menu. (You may need to double-click several times until it actually does open) and you can then type in different articulation names in order to adapt them according to your preferences. Note that this only affects the display, whereas the actually played articulation depends on which articulation is loaded in the EXS instance cabled to the corresponding output of the cable splitter. You may wish to change the menu names to match the articulation instances you personally have chosen. See also the *remap* function below to assign keys or buttons to enable the selection of articulations in this manner.

Warning: In Logic 7.0 and probably also in the previous versions there is a bug which causes Logic to crash hard when you double click a text menu! A workaround for changing the articulation names in this case is to unpack the Articulation tool macro, make the changes and pack it again. In Logic 7.1 and higher, however, the bug is fixed and double clicking is safe.

3. *keys* is mainly shown to keep track of which of the two key ranges is currently active, since they are usually controlled by midi events. They can however, also be selected with the mouse.
4. *channel* sets the midi channel on which midi events received are interpreted as control events. This parameter is particularly useful in combination with a second keyboard.
5. *lower/upper base* selects the lowest key of the *control key range* (which always starts with C) for the lower and upper region respectively. If you want a fixed, non-switching *control key range*, set the same base key for both ranges or simply do not switch between them from your keyboard.
6. *base ctrl.* selects the lowest controller number of the *switch controller range* which allows you to control the same range of possible destinations as can be controlled by keys. Switch controllers can be used in addition to any assigned

keys which allows one to take advantage of all available physical controllers. Switch controllers could be switch pedals (as e.g. a sustain pedal) or midi buttons as found on many current controllers, and are associated with controller numbers above 64 according to the midi standard.

7. *key range* specifies the number of successive keys that form the *control key range* used to perform control actions.
8. *ctrl. range* specifies the number of successive midi controllers that form the *switch controller range* and perform control actions. To be specific, possible actions can be selected by switch controllers sending controller numbers between *base ctrl.* and *base ctrl. + ctrl. range - 1*.
9. The *remap* function allows you to customize your physical controllers for use of the Articulation Tool. It has two parts given by the transformers with a “fader” and a “notes” icon. Double clicking the icons opens the corresponding transformer window where you can adjust the map in the lower part of the window. The upper “fader”-transformer allows you to remap any controller number on the selected channel, represented by the corresponding element of the map, to any other, represented by the height of the column. This allows you to change the controller numbers of incoming controllers and in particular to map different controllers to a range of consecutive controller numbers in order to establish the *switch controller range* of the tool. The second part represented by the notes icon works similar to Logic’s key commands window and allows you to assign both the keys of the *control key range* and the midi controllers of the *switch controller range* to various actions like switching articulations, controlling functions of the tool or sending specific midi events. The difference to the key command window is that in the *remap* window, you assign the actions to the keys respective switch controllers and not vice versa. Moreover, the sources and destinations appear only as numbers instead of plain text. The keys of the *control key range* starting from the respective base key encoded as C=1, C#=2, and so on, and the controllers of the *switch controller range* starting from the selected *base ctrl.* number, are mapped to the possible actions encoded as numbers. Destinations 1 to 16 correspond to the selection of the respective articulation whereas higher numbers perform other actions including the control of the *Vienna Symphonic Library Performance Tool*. The complete list of the available destinations and their corresponding numbers as well as the default settings are given in the appendix.

## 2. Alternation Section

The *VSL Alternation Tool* selects articulations via additional note events (key switches) and is not compatible with the method of encoding the articulation directly in the midi channel. This Articulation Tool, therefore, also includes an improved *Alternation Section*.



Fig. 5: Alternation Section

It has four articulation sequences and looks more restricted than the VSL tool due to its limited number of control elements, but actually works the same way. However, it is much more intuitive and more easily accessible. Compared to the unfavorable access offered by the VSL-tool through the edit menu of the EXS instrument editor and the inconvenient handling via mouse, this Alternation Section is always visible and all its functions can be controlled by assignable physical controllers. The alternation mode in the Articulation Tool works like a tape recorder. You can simply press record and play your line once with the corresponding control keys that change the articulations you desire. The tool stores the articulation changes and performs them sequentially at any later time – advancing from one articulation to the next, triggered by the key strikes of the tones you want to sound – so you can concentrate on performing the music and not the articulation changes. In particular, all functions can be controlled by keys. These are in detail:

- a. *on/off* switch for the alternation function. Double clicking returns to the start of the sequence.
- b. *sequence* selects one of four available articulation sequences. Each sequence features up to 127 steps and is independent of the others, i.e. any changes in one sequence do not affect other sequences which thus can be used to store often used alternation patterns (e.g. the alternation of two different staccato versions). Moreover, there are key-commands for each sequence so that you can change sequences while playing, in the same way as with the *VSL Alternation Tool*.
- c. *length* sets the length of the repeated alternation sequence which can contain up to 127 steps.
- d. *step* displays or selects the current (i.e. next to be played) step number.
- e. *record* enables recording of an articulation sequence by playing key strikes which correspond to control changes.

There are no further controls to set the alternation sequence since this can be done simply by playing!

Performing using an alternation sequence:

By pressing single keys (monophonic, non-control notes) the tool jumps as usual from one articulation to the next and cycles through the sequence. You see the articulation that will be played next and the corresponding step number in the *articulation* and *step* displays. You can always change the current articulation simply by pressing the corresponding control key or button on your controller, to select an alternative articulation. The articulation display changes to the new articulation without progressing to the next step. As soon as you play an ordinary note, the new articulation is

played and then stored in the articulation sequence, then the step counter progresses.

Recording or altering an alternation sequence:

When the record mode is enabled, however, articulations are not changed by those stored in the sequence in each step, but are erased each time you press a control key or button. However, every time you press a key without a preceding control key, the currently active articulation is stored. This means that you can “program” a sequence just by playing – as you would do without the tool – in a first run and skip the control keys, afterwards concentrating on the music!

The Articulation Tool can also be used for polyphonic playing. However, compared to the VSL-tool, this articulation tool uses the respective number of steps for each note of a polyphonic chord.

### 3. Continuous controller section.

The five pan pots on the right are for future extension and have no effect so far.

In addition, this section includes a monitor window to the far right (which *is* active) that shows the output of the tool. You might notice that the tool usually generates several “note off” events associated with each given note. This is to ensure that you can change to a new articulation while notes playing the previous articulation are still active and sounding. These duplicate note-off events are not recorded and do not appear in Logic’s sequences.

## V. Performance keys tool

The *Performance Tool* of the Vienna Symphonic Library responds to control notes. These are very low (or high) notes that do not overlap with the range of the corresponding instrument. Unfortunately, these notes usually appear in the score and strongly affect the visual image, making it rather useless.

The Articulation Tool however, deals with these control events in a way so that they do *not* appear as notes in the score. Instead, they appear as midi controller indication in sequences and thereby do not affect the score at all. These midi controllers can be transformed into the correct control notes afterwards by the simple *Performance Keys Tool* before they reach the sampler instances. Therefore, it is necessary to use a midi instrument instead of the channel splitter as a track instrument and insert the *Performance Keys Tool* in between as shown in Fig. 3. Finally, with this method the *Performance Tool* destinations are included in the freely assignable *control ranges* of the Articulation Tool. See the list in the Appendix.

## VI. Working with a template

When using the channel-splitter method for a large sample library like the Pro Edition or Opus 1/2 with many dozens of different instruments, you will end up with a corresponding number of channel splitters connected to literally hundreds of audio objects. An audio object is generally like a slot where you can insert an audio instrument by selecting it with the *Channel* parameter in the audio object’s parameter box in the environment. Since Logic currently offers only 128 audio

instruments (in which the actual EXS instances are instantiated) it is not possible to fill all audio objects *and* have a dedicated active EXS instance for each articulation of each instrument waiting ready to load the corresponding sound. This limitation only allows, for example, an average of three articulations for each of 42 symphonic instruments. However, such a setup is neither necessary nor useful, because due to memory restrictions it is not anyway possible to load everything at the same time and, in addition, even *unused* EXS instances use processing power and memory. Therefore, EXS instances of unused articulations should be removed from the corresponding audio objects by setting them to *off* (the fader module in the environment becomes a featureless gray rectangle. See Fig. 4). Or, stated in other words, you should select and turn *on* the audio object associated with an articulation, *only* when you actually want to use it. This allows a very convenient working method. Logic stores all information of an audio instrument – including the loaded sampler instrument – even if the audio instrument is not assigned to any audio object. Furthermore, it automatically loads the corresponding sound if you assign an audio instrument to an audio object and frees the memory when you remove it.

Using this method, you can set up your most frequently used articulations (usually many more than would fit into memory at the same time) in fixed audio instruments, and simply insert the audio instrument to the matching audio object when you need to use the articulation. For this purpose it is useful to include the corresponding instrument number in the articulation's audio object name so that you know which one to assign later. If you are a user of Opus 1, try to select the instrument numbers which are offered as an example for the first few articulations in the *Articulation Tool v2* song, to see how the whole scheme works.

For all less often used articulations you have to reserve a few “shared” audio instruments. For these articulations the inclusion into a song is a two step process: first, assigning the audio instrument and second, loading the EXS instrument.

Another very handy thing is to have a dedicated screen set to assign and load instruments. By linking an arrange window with an environment window that shows all the audio instruments for the articulations of a given instrument and by giving it a proper size, you can link and see the content of the both windows. Thereby, you can simply select an instrument in the arrange window and immediately access all its audio instruments in the environment window. An example of a corresponding screen set is given in screen set no. 2 of the *Articulation Tool v2* demo song.

Finally, for mix down and effects it can be very useful to combine all articulations of an instrument on a dedicated bus.

## V. Appendix

### 1. Default settings:

These are the default settings for the control key range and the switch controller range. These assignments should be viewed as a suggestion because everything can be set up according to your preferences, work habits and the available physical controllers. See the remap function for details.



to the proper notes needed to control the functions of the VSL Performance Tool.

- c31 performance legato release (finally converted to A0)
- c32 performance legato ghost (finally converted to C1)
- c33 performance legato repetition (finally converted to D1)
- c34 performance repetition skip first on (finally converted to A1)
- c35 performance repetition skip first off (finally converted to A#1)
- c36 performance repetition jump to last (finally converted to B1)

Finally

    this software is freeware . . .  
    . . . however, should you find that it improves the work with your sample library and increases your output, then remember how much you paid for the samples and have a look at [www.unicef.org](http://www.unicef.org). Every contribution helps.

Thanks!