



Loomer
Shift Manual

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End User Licence Agreement

Software Licence Agreement for Shift

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Credits

Development Credits

Shift © 2009 Loomer

Developed by Loomer

Tested by Clifton Cameron
 kuniklo
 Scott Simons (rexlapiin)
 taoyoyo

VST PlugIn Technology by Steinberg Media Technologies GmbH. This software is based in part on libpng, zlib, and JUCE.

Requirements

Mac OS X requirements

- Requires Mac OS X v. 10.4 or later
- Intel x86 based processor 1.0Ghz, or above, with SSE
- or
- PPC based processor 1.0Ghz, or above
- 512 MB RAM

Windows requirements

- Windows XP or Windows Vista, or above
- Intel x86 based processor 1.0Ghz, or above, with SSE
- 512 MB RAM

Linux requirements

- Intel x86 based processor 1.0Ghz, or above, with SSE
- 512 MB RAM

The following shared object libraries are required:

- libfreetype
- libasound
- libjack
- libXinerama

Shift Overview

What is Shift?

Shift is a real-time diatonic granular pitch shifting and delay effect. Shift has three independent true stereo delay lines with discrete time, feedback, pan, and volume controls. Each delay line can be set in one of three pitch shifting configurations (Chromatic, Recursive, or Diatonic) and transposed by as much as an octave up or down using both coarse semitone and finely grained cent controls.

In Diatonic mode the accurate and responsive pitch tracker follows any monophonic audio source and tunes the pitch of the delay line harmonies to remain in key and in scale.

Shift's echoes can either be synced to the host tempo (expressing delay times as musical subdivisions of a beat, with each echo exactly in time with the host) or in free-time mode (allowing fine tuning of the delay times, up to 2 seconds.)

Each delay line can be modulated using the straightforward Pitch and Time modulation controls, capable of generating a wide range of sounds from subtle detuning to extreme audio mangling.

True independent stereo processing means that left and right channel separation is preserved. Shift is also capable of running in mono, or even mono to stereo.

With optimized audio algorithms that won't overload your processor, rock-solid stability, and easy integration with any MIDI hardware controller, Shift is ideal for live work. With a simple and intuitive interface, flexible Bank and Program management, and total parameter automation, Shift fits right into your studio environment.

Plug-in vs Standalone

Depending upon your individual studio setup, Shift can either be used as a plug-in component of a host application, or as a standalone application requiring no other dependencies. Generally, by using the host application's routing flexibility, running as a plug-in allows easier integration with existing plug-in effects and instruments. If this integration is not required, the standalone version, without the extra layer of complexity added by the host consuming resources, performs slightly better.

Bank and Program information, as well as MIDI Mapping assignments, are identical in both standalone and plug-in versions. This means any sounds created in one format can be opened in the other.

Shift formats

For the Mac, the following formats are provided:

- Standalone Application
- Audio Unit (AU) Plug-In
- VST Plug-in
- RTAS Plug-In

These formats are available for Windows PC:

- Standalone Application
- VST Plug-in
- RTAS Plug-in

Linux have the following formats:

- Standalone Application
- VST Plug-in

Supported channel configurations

For maximum flexibility, Shift can be used in several possible input and output channel configurations. Shift is a true stereo effect: left and right channel separation is preserved. The following configurations are possible:

- mono to mono (1 input, 1 output)
- mono to stereo (1 input, 2 outputs)
- stereo to stereo (2 inputs, 2 outputs)

Note that some host applications may not support one or more of these configurations; consult your host's documentation for further details.

Installation and Registration

Mac OS X installation

1. Start the installation process by double-clicking the Shift installer application.
2. Read the introduction screen dialog text. Press **Continue** when you are ready to proceed.
3. Read the Licence Agreement. Click **Continue**, then **Agree** to confirm you have read and agree to the licence terms.
4. Select a destination volume into which to install Shift, and then click **Continue**.
5. From the list of installable components, uncheck any formats that you do not wish to install. Click **Continue** to proceed.
6. To complete the installation, press **Install**.

The components are, by default, installed into the following directories:

- VST plug-in into */Library/Audio/Plug-Ins/VST*
- Audio Unit plug-in into */Library/Audio/Plug-Ins/Components*
- RTAS plug-in into */Library/Application Support/Digidesign/Plug-Ins*
- Standalone application into */Applications*
- Documentation into */Library/Documentation/Loomer*
- Default Bank into */Library/Application Support /Loomer*

Windows installation

1. Start the installation process by double-clicking the Shift installer application, Setup.exe.
2. Read the welcome screen dialog text. Press **Next** when you are ready to continue.
3. Read the Licence Agreement. Click **I Agree** to confirm that you have read and agree to it.
4. From the list of installable components, uncheck any formats that you do not wish to install. Click **Next** to continue.
5. If you have chosen to include the VST plug-in format, select the directory into which it will install. Click **Next** to continue.
6. Select a directory into which the common files will install. The user documentation, default Bank, and the Standalone application (if selected in the the list of components), will be placed in this location. To complete the installation, press **Install**.

Unless any other directories are selected during the installation, the components are installed into the following directories:

- VST plug-in into the VST plug-ins folder, which is, unless configured otherwise, *C:\Program Files\Steinberg\VSTPlugins*
- RTAS plug-in into *C:\Program Files\Common Files\Digidesign\DAE\Plug-Ins*
- Standalone application, documentation and default Bank into *C:\Program Files\Loomer\Shift*

Linux installation

Shift for Linux is distributed as a standard Linux tarball. To install, extract the package using any unarchiving utility; the following command-line invocation will suffice:

```
tar xzvf Shift.tar.gz
```

If you have a Linux VST host and have configured your VST Path, the VST plug-in can be moved into the required directory with the following commands:

```
cd Shift
mv ShiftVST.so $VST_PATH
```

Without the VST Path configured, you will need to ensure that your host uses the Shift directory when searching for VSTs; consult your host's documentation for information on how to do this.

Shift requires the following shared object libraries to be installed:

- libfreetype
- libasound
- libjack
- libXinerama

Without these libraries installed, the application will not launch. Install the libraries using your distribution's particular package management system, such as apt-get; consult your Linux distribution documentation for more information.

Product registration

Having installed Shift, it will run in evaluation mode with the following limitations:

- User created Program and Bank configurations can be saved, but not loaded.
- Audio output will stop after 30 minutes of continuous use. The only way to continue using Shift is to restart the application.
- Output will be periodically interrupted, approximately every minute, by a short moment of silence.

These limitations can be removed by purchasing a licence and registering your licence information into the product. Note that registering Shift on a particular machine will remove the evaluation limitations for all Shift plug-in formats installed on this machine; you don't need to individually register all plug-in formats. Licence information will be in the form of a user name and licence key.

To purchase a Shift licence:

1. Launch Shift. This can be either the standalone application, or as a plug-in.
2. From the **Options** menu, choose **Purchase Shift Licence**. This will launch the shop website, from where a Shift Licence can be purchased by clicking **Add To Cart**, followed by **Checkout**. Follow the on-screen prompts to enter your payment details and confirm your purchase.
3. Once you have purchased Shift, you will receive your licence key information via email. It is important to keep this information safe because you will require the licence key if you ever need to reinstall and re-register Shift.

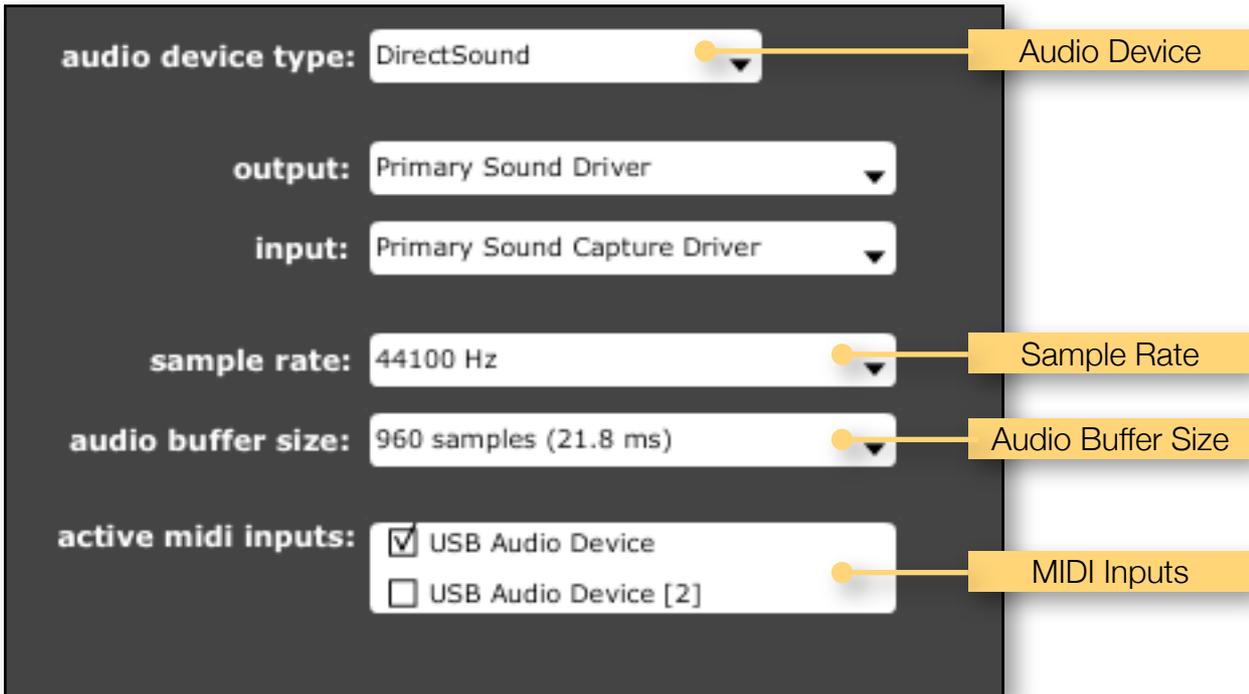
To register your copy of Shift:

1. Choose **Enter Shift Licence** from the **Options** menu.
2. Enter your name in the **Name** field. This must match exactly the name that was used to purchase your Shift licence, including capitalization of letters.
3. Enter your licence key in the **Licence Key** field. This must match exactly the licence that you received when you purchased Shift, including any hyphens.
4. Press **OK** to confirm that your name and corresponding licence key have been entered. You will be informed that the application must be restarted in order for registration changes to take effect. If you are currently running the standalone application, close and relaunch it. If Shift is currently running as a plug-in, remove it from the host and add a new instance of it.
5. Shift should now be registered. If the label on the bottom of the interface still reads Unregistered Evaluation, you must have entered the licence information incorrectly. Go back to step 1, paying careful attention that the name and licence key entered match exactly the licence information in the registration email.

Audio and MIDI Configuration

Setup Audio and MIDI

When running Shift as a Standalone application, you will need to setup your audio and MIDI interfaces. Note that when running as a plug-in, audio and MIDI routing is provided by the hosting application; consult the host's documentation for details. To open the Audio & MIDI Configuration dialog, select **Audio & MIDI Configuration** under the **Options** menu. The



following dialog will be displayed:

From this dialog, the following details of your Audio and MIDI setup can be configured:

- **Audio Device.** Select the Audio Device you want to use from the list of available devices. Certain devices tend to perform better than others, so if multiple devices are available, you should favour: on Mac, using Core Audio; on Windows, using ASIO; on Linux, using JACK.
- **Sample Rate.** The Sample Rate dictates the overall quality of the audio output. Using a lower Sample Rate will reduce the presence of high-frequency components. Higher Sample Rates should therefore be preferred. However, be aware that the CPU Usage is directly proportional to the Sample Rate. A good compromise between quality and CPU Usage is 44100Hz, which is the Sample Rate of CD audio. Select the Sample Rate you require from the available list.

- **Audio Buffer Size.** The Audio Buffer Size governs latency; a smaller buffer means that Shift will respond more quickly to MIDI messages and Parameter changes. However, a smaller Audio Buffer Size will require more CPU Usage. Select the required Audio Buffer Size from the available list. Using too small of an Audio Buffer can overload your computer to the extent that audible clicks are heard. In this case, increase the Audio Buffer Size until clicks are no longer present..
- **MIDI Inputs.** Check any MIDI Input devices that you want to use with Shift.

Program Management

Parameters, Programs and Bank

You can modify the audio output that Shift produces by setting the value of *Parameters*. Each Parameter, such as Delay Time, Feedback, or Highpass, will affect a specific element of the sound. The state of all Parameters are collectively called a *Program*. Programs are given a suitable name, displayed in the Menu Bar, to describe the sound they produce.



Programs are grouped together into a *Bank*. You can only load a single Bank at a time. Although there is no requirement or limitation on how Programs are grouped, it is often useful to collect related Programs together, for example: a Bank of percussion sounds, a Bank containing sounds required to perform a specific set-list.

Selecting Programs within a Bank

There are several ways of selecting a Program within a Bank:

- **Menu Bar Previous and Next Controls.** If you wish to browse quickly through all the Programs within a Bank, you can do so using the the Previous and Next controls.
- **Program Select Control.** The Program Select Control will display a list of all programs contained within a Bank. The required program can be selected from this list.
- **Program Change MIDI Messages.** You can change programs by using MIDI Program Change commands. This requires a MIDI keyboard or a control surface with the ability to send MIDI Program Change commands; consult your controller's documentation for details. If using Shift as a plug-in, this functionality is dependent upon the host correctly forwarding MIDI messages to the plug-in; check the documentation provided with your host for details.
- **Host Application Program Management.** If Shift is being used as a plug-in, the host may provide a mechanism to change the currently selected Program. The operation of this is entirely host dependent, and varies greatly from host to host; check the documentation provided with your host for details



File Management

If you wish to keep any changes to a Program, it will need to be stored in the current Bank. A program that needs storing is marked by an asterisk (*) suffix beside its name. Any changes will be lost if you change the currently selected Program without first storing it. The steps required to store a Program depend upon where you want to save it:

- To store the Program changes over the current version of itself in the bank:
 1. Click **Store**. Notice that the asterisk disappears, indicating that the Program no longer has any outstanding changes that require storing.
- To store the Program changes to a different position in the Bank:
 1. Click **Store To**. All the Programs within the Bank will be displayed in a list.
 2. Click on the required Program to overwrite it. Notice that the asterisk disappears, indicating that the Program no longer has changes that require storing, and that the newly stored Program is now selected.

To permanently keep Banks and Programs you have created, you will need to save them as files. Banks can be saved in their entirety, or you can save individual Programs from within a Bank. When Shift is closed, any unsaved changes to a Bank will be lost.

To save an entire Bank to a file:

1. Under the **File** menu, choose **Save Bank...**
2. Choose a location and enter a filename for the Bank.

To save a Program to a file:

1. Select the Program you want to save
2. Under the **File** menu, choose **Save Program...**
3. Choose a location and enter a filename for the Program.

To load a saved Bank from a file:

1. Under the **File** menu, choose **Open...**
2. Browse to the location and select the required Bank file.

To load a saved Program from a file:

1. Decide where in the Bank you want the Program to be loaded.
2. Select this Program.
3. Under the **File** menu, choose **Open...**
4. Browse to the location and select the required Program file

Create a new Bank

Select **New Bank**, under the **File** menu, to create a new Bank. All Programs within the Bank will be in their initialized state.

Create a new Program

Select **New Program**, under the **File** menu, to create a new Program. This Program will be in its initialized state.

Compare a changed Program to the original Program

Often you'll want to compare a Program that you have amended to see if it is actually an improvement on the original. Pressing the **A | B** button temporarily reverts a changed Program back to its original state. Pressing the **A | B** button a second time returns to the changed Program. This method allows you to easily contrast the Program changes you have made to the original Program.

MIDI Controller Mapping

MIDI controllers

Instead of configuring a Program using a mouse, you can change any Parameter values using a MIDI keyboard or a control surface. This is done by mapping each Parameter to a *MIDI Continuous Controller (CC)*. A Parameter can only be mapped to a single MIDI controller; the same MIDI control can, however, be mapped to several different Parameters.

MIDI Controller mappings are global; once defined, the same mapping assignments will be used by all Shift Programs. This means that you only need define mappings once for your particular controller.

Display current MIDI controller mappings

To view the current MIDI controller mappings:

1. Enter MIDI Learn Mode by choosing **Start MIDI Learn** under the **Options** menu. Each Parameter's mapped MIDI controller will now be displayed beside it in yellow text. Parameters without any mapping will be labelled -.
2. When you have finished viewing the MIDI controller mappings, choose **Stop MIDI Learn** under the **Options** menu.



Assign MIDI controllers to controls

To map a MIDI controller to a Parameter:

1. Enter MIDI Learn Mode by choosing **Start MIDI Learn** under the **Options** menu.
2. Click on the Parameter you wish to map to a MIDI controller.
3. Turn your MIDI controller. The Parameter should now be labelled with the MIDI CC number of this controller.
4. You can now either:
 - Map another Parameter by repeating these steps from Step 2.
 - Finish mapping Parameters by choosing **Stop MIDI Learn** under the **Options** menu.

Remove MIDI controller mappings from controls

To remove a mapped MIDI controller from a Parameter:

1. **Enter MIDI Learn Mode** by choosing Start MIDI Learn under the **Options** menu.
2. Click on the Parameter from which you wish to remove the mapping. This Parameter will become unmapped, and the CC number label on the Parameter will disappear to reflect this.
3. You can now either:
 - Remove the mapping from another Parameter by repeating these steps from Step 2.
 - Finish removing Parameter mappings by choosing **Stop MIDI Learn** under the **Options** menu.

Using Shift

Shift can be used as either an insert or send effect. When used as an insert effect, Shift is placed directly in a host's audio channel. As a send effect, Shift is placed in a host's auxiliary or bus channel, and a portion of the original signal is fed into the effect. Consult your host's documentation to find out how to add a plug-in as either an insert or as a send effect.

Interface



Input & Output

The **Input & Output** section controls balance the audio levels of signals as they enter and leave Shift. The **In Gain** control is used to boost or lower the input signal. An input signal that is too quiet can be amplified by increasing the **In Gain**. Likewise, a signal that is too loud can be attenuated by reducing it. The **Diatonic Pitch Detection** works best on a clean, loud (but not clipped) signal.

The **Out Gain** controls the overall loudness of Shift's audio output. An output signal that is too quiet can be amplified by increasing the **Out Gain**. Likewise, a signal that is too loud can be attenuated by reducing it.

The **VU Meters** can be used to provide visual cues to the current levels: the louder the signal, the higher the meter will register. Too loud of an output will produce digital clipping, a usually undesirable form of distortion. When this occurs, the meter will display a red warning indicator. Click the meter to reset the warning display.

Diatonic Pitch Detection

Diatonic Pitch Detection is a process in which the input audio signal is analyzed and pitch information extracted. This is used to tune the delay line transpositions to ensure that delays remain in scale.

For example, when in the key and scale of C Major, if **Delay 1** is set to **Diatonic Thirds** playing a C will produce an E (a Major Third interval, or 4 semitones). However, playing a D will produce an F harmony (a Minor Third interval, or 3 semitones.)

Diatonic pitch detection is a complex process that requires a cleanly played, monophonic (one note at a time) signal. The detection will struggle to deduce the pitch of very noisy signals. Pitch detection can be a very CPU intensive activity, particularly when confronted with ambiguously pitched or noisy material. If glitches become apparent in the audio stream when using diatonic pitch detection, you should allow Shift more CPU resources by freezing or bouncing any other intensive tracks in your arrangement. Consult your host's documentation for the steps required for this.

The **Channel** parameter selects which stereo input channel to analyze for pitch information. **Left** or **Right** should be chosen depending upon which channel has the cleanest signal. **Mix** can be used in cases where the signal moves across the stereo panorama, but this can be less accurate if the left and right input channels are significantly different.

The **Tracking** parameter refines the responsiveness of the pitch detection algorithm. The default value of **8** will perform well for most audio sources, but certain materials may require slightly different values. A **Tracking** of **1** will mean that the detection works very fast but is more sensitive to pitch deviations and input noise. A **Tracking** of **15** gives a more relaxed detection, but can also generate slight glissando as it moves between detected notes.

The **Key** and **Scale** controls tell the detector which key and scale to use to generate harmonies. These should be set to the key and scale of the audio input. The following keys can be selected: **C, C#, D, D#, E, F, F#, G, G#, A, A#, B**. The following scales can be selected: **Major (Ionian), Dorian, Phrygian, Lydian, Mixolydian, Natural Minor (Aeolian), Locrian, Harmonic Minor**.

Diatonic pitch detection is only used when one of more delay lines are set to Diatonic mode.

Dry Signal

The **Dry Volume** controls the relative loudness of the original unprocessed signal. Turning this control to its lowest value will turn the dry signal completely off, meaning that only the wet, processed, signal will be heard. This configuration is particularly useful when using Shift as a send/return effect and do not want the original signal to be heard.

Delay 1, 2, & 3

Each delay line can be configured into one of three different modes. The selected mode specifies which pitch shifting algorithm is used and to where in the audio signal the delayed signal is fed back.

In **Chromatic** mode, the pitch can be transposed by as much as an octave upwards or downwards. Transposition is chosen using semitones and cents. The delay feeds back into itself, which means all echoes have the same pitch transposition.

In **Recursive** mode, the pitch can be transposed by as much as an octave upwards or downwards. Transposition is chosen using semitones and cents. The delay feeds back into the pitch shifter, which means each consecutive echo is also transposed.

In **Diatonic** mode, the pitch can be transposed by as much as an octave upwards or downwards. Transposition is chosen using diatonic intervals. The delay feeds back into itself, which means all echoes have the same pitch transposition. Read the section on Diatonic Pitch Detection for more information.

The **Transpose** and **Detune** controls select the interval by which the signal will be pitch shifted. Transpose is either specified in semitones (in **Chromatic** and **Recursive** mode) or in diatonic intervals (in **Diatonic** mode). **Detune** allows for finer grained control of the transposition by tuning by **+/- 50 cents**.

The **Time** parameter controls the length of time between repeats. When **Sync** is turned on, the delay time is based upon musical note divisions and will be in step with the host tempo. With **Sync** off, the time delay is expressed in milliseconds.

The **Feedback** parameter controls the proportion of the signal to be fed back into the delay line. As the value increases, the delayed signals volume will increase. At higher values, it is possible to create a wall of sound using delays that don't decrease in volume when they are fed back into the delay line.

The **Pan** parameter allows the delay line to be balanced in the stereo panorama. Choose **C** to keep the signal centered, **L1%** to **L100%** to place the signal to the left (where **L1%** is slightly left of centre, and **L100%** is to the extreme left). Use **R%1** to **R100%** to place the signal to the right (where **R1%** is slightly right of centre, and **R100%** is to the extreme right).

The **Volume** controls the relative loudness of the delay line signal. Turning this control to its lowest value will turn this delay line signal completely off.

Modulation

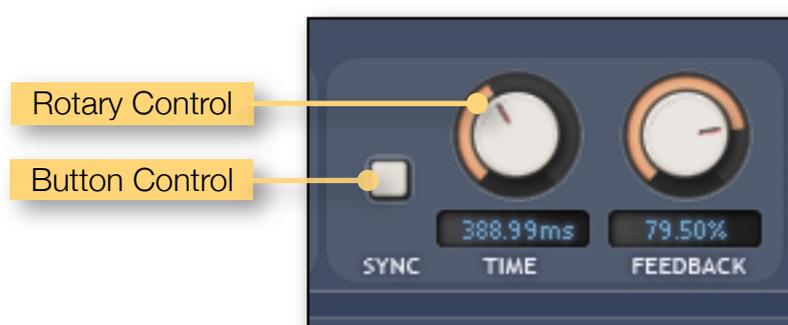
The **Modulation** controls are used to add time varying changes to Shift. A modulation LFO (low frequency oscillator) produces a constantly wavering signal that can be routed, at various depths, to the delay time and pitch shift amount of each delay line.

The **Rate** parameter controls the speed of the LFO. When **Sync** is turned on, the rate is based upon musical note divisions and will be in step with the host tempo. With **Sync** off, the rate is expressed in Hertz, or cycles per second.

For each delay line, the LFO can be routed to the pitch transposition using the **Pitch Mod** control, or to the delay time using the **Time Mod** control. When the **Pitch Mod** or **Time Mod** controls are set to their minimum value (of 0.00 semitones, or 0.00%, respectively), the LFO will have no affect on the delay line. Increasing the value of these controls increases the amount of modulation depth. This makes the modulation more prominent.

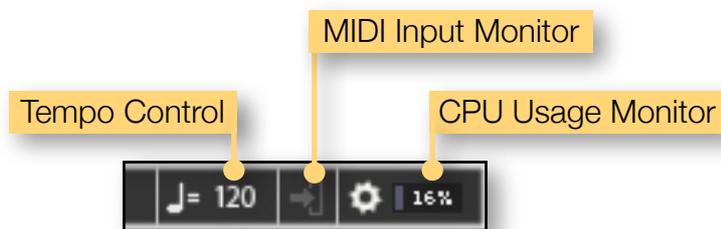
Control types

- Click on a **rotary control** and drag either upwards to increase the value, or downwards to decrease it. Hold down *shift* and drag to make smaller and more precise changes. Hold down *ctrl* and click to return the control to its default value. Rotary controls can also be changed by hovering the mouse cursor over a control and scrolling the mouse-wheel up or down.
- Click on a **button control** to toggle its value between On and Off. Hold down *ctrl* and click to return the control to its default value.



Status Display

Status Display information is displayed at the bottom right area of the Shift interface:



CPU Usage monitor

The CPU Usage monitor displays the percentage of processor resources dedicated to producing the audio output. The total processor resources on a computer are limited, so when Shift increases its CPU usage, there will be less CPU resources remaining for other plug-ins and applications. CPU Usage will differ depending on which Program is currently loaded, how that particular Program is configured, and how many voices are being played.

A value of 100% indicates that your computer is running at maximum capacity and will not have enough processing power remaining for anything else. You might notice audio output become temporarily glitchy, or that the user interface becomes sluggish. There are several methods for resolving this:

- Choose a different Program that has less CPU Usage.
- If running in Standalone mode, you can increase the latency or decrease the sample rate. See section *Setup Audio & MIDI*.
- Reduce the number of voices in the current Program.
- If your host offers Freeze or Offline processing, you might be able to render the audio output in non-realtime.

MIDI input monitor

The MIDI monitor flickers to show that a MIDI Message has been received. You can use this to confirm that your MIDI controller is configured correctly for Shift.

Tempo control

The Tempo control only appears when running Shift in Standalone mode; when running as a plug-in, the host application will provide the tempo for Shift. The Tempo control displays the current Tempo, in beats per minute (bpm). It can be changed by either:

- Double-clicking the tempo control, typing the required bpm and pressing return.
- Clicking on the tempo control and dragging either upwards to increase the tempo, or downwards to decrease the tempo.