# Project5 Version 2
# Online Help

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# Basics

Project5 is intended for the creation of pattern-based electronic music using DirectX and VST instruments, Groove clips (ACIDized wave files), standard audio files (wave), and effects. You can play through Project5 using a MIDI controller, or create patterns to play through instruments and effects.

New features include a streamlined user interface, ReWire hosting, a powerful new arpeggiator, numerous editing enhancements, a separate bus pane and tempo track, tap tempo, audio recording, audio playback from disk (no size limit on clips), input monitoring, freezing tracks, real-time Groove triggering, track lanes for layered patterns, Groove clip (ACIDized clip) editing and export, the new PSYN II instrument, and the multi-mode sampling synth (Dimension). Project5 now creates a separate folder for each project's audio data, which is located inside the folder that the project is located in, and is called "[project name] Audio."

Project5's advanced MIDI input filtering system lets you layer and control multiple instruments, or even play along with other musicians at the same time. Because of this MIDI flexibility, you can think of Project5 as a "super-instrument" with multiple layers and sounds, or as an instrument hub where numerous musicians can play together through various MIDI devices.

See:

Tutorials

Anatomy of Project5

Basic Operations

Looping a Project

Changing the Tempo

Changing the Time Signature

## Uninstalling Project5

When you installed Project5, the setup program placed an Uninstall icon in the Start menu. To uninstall Project5, click the Start button and choose ***Programs-Cakewalk-Project5 Version 2-Uninstall Project5 Version 2***. You can also uninstall Project5 from the Windows Control panel as follows:

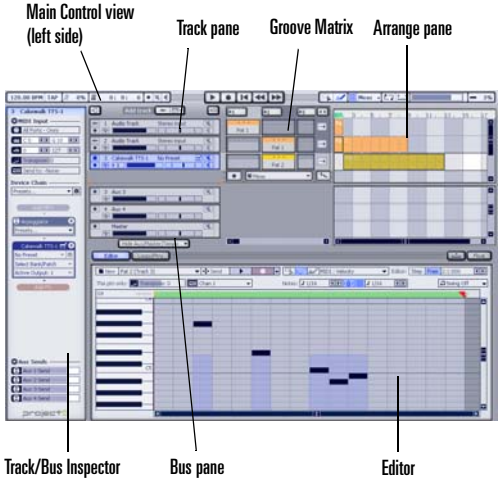
### To Uninstall Project5 Using the Control Panel

1. Click the Start button, and choose Settings/Control Panel.
2. Double-click on the Add/Remove Programs icon.
3. Choose Project5, then click Add/Remove.

Click Yes to confirm that you want to uninstall Project5.

# Anatomy of Project5

This section covers the Project5 user interface.




See:

Main Control View

Track View

Track Inspector

Arrange Pane

Groove Matrix

Bus Pane

The Editor

Loops/Ptns (Patterns) Tab

The Device Browser

Arpeggiator

## Main Control View

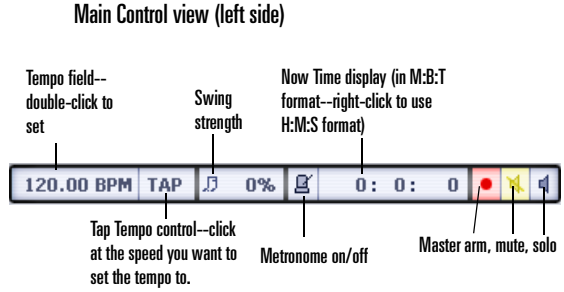
The Main Control view has controls for starting and stopping; tempo; metronome; project name; swing; global mute, solo, and arm; selection; automation; Snap to Grid; looping; master volume; and CPU usage.

The Main Control view is split into three groups of controls.

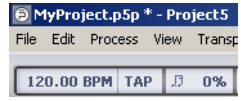
Here's a description of each group of controls:

### Main Control View—Left Side

Here's a picture of the Main Control view controls that are grouped on the left side:




**Song Title**—This is the name of the current project as it was last saved. If you have made any edits since you last saved the file, an asterisk appears at the end of the song title.



**Tempo (BPM) Control**—The Tempo control displays the current tempo, which is displayed in the BPM (Beats Per Minute) field. Tempo automation can be edited in the Editor.

To set the tempo, double-click the BPM field and either type a number, or click the Up/Down arrows to set the tempo. You can also click and drag up/down over the arrows for faster response. See Changing the Tempo for more information.

**Tap Tempo Button**—You can set the tempo in Project5 by clicking the Tap button that's in the Main Control view. Just click the button at the playback speed that you want your project to use. You can also click the Tap button by Remote Control--right-click the Tap button and choose MIDI Remote Control from the context menu, and assign a MIDI note or controller to the Tap button.

**Swing Strength** —The swing strength field sets the amount of swing applied to a selected pattern in the Editor when the swing note-size menu in the Editor is displaying a note size. The amount of swing ranges from 0 to 100%. See Setting Swing for more information.

**Metronome On/Off**—The Metronome On/off button turns a click sound on or off, so you can hear the tempo while you're recording. To set the count-in and other metronome options, use the ***Options-Metronome*** command.

**Now Time Display**—The Now Time display shows the current Now Time as a numerical value. You can choose to display the Now Time in either measures, beats, and ticks (M:B:T) or in SMPTE. To change the display, right-click the display and choose the option on the popup menu.

**Master Arm Button**—This button lights up whenever any track or bus is armed. You can disarm all tracks and buses by clicking the button.

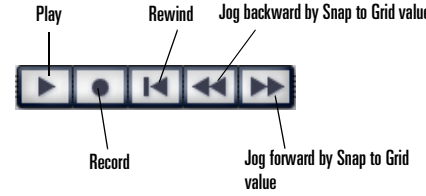
**Master Mute Button**—This button lights up whenever any track or bus is muted. You can unmute all tracks and buses by clicking the button.

**Master Solo Button**—This button lights up whenever any track is soloed. You can unsolo all tracks by clicking the button.

### Transport Controls

The Transport contains the Play, Record, Rewind, Jog Backward, and Jog Forward buttons.

Main Control view (transport section)




The following table gives a brief description of each of the Transport buttons:

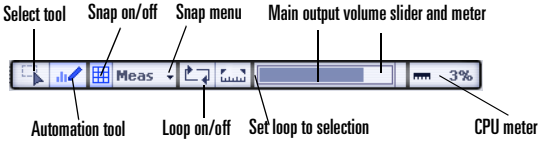
| Button | Description |
|---|---|
| Play | The Play button begins playback at the current Now Time. |
| Record | The Record button begins recording MIDI data to all armed tracks at the current Now Time. |
| Rewind | The Rewind button moves the Now Time to the beginning of your project. |
| Jog Backward | The Jog Backward button nudges the Now Time backward by the current Snap Grid resolution. |

| | |
|---|---|
| Jog Forward | The Jog Forward button nudges the Now Time forward by the current Snap Grid resolution. |

### Main Control View—Right Side

Here's a picture of the Main Control view controls that are grouped on the right side:

Main Control view (right side)




**Selection Tool**—Use this tool to select data in the Arrange pane.

**Automation Tool**—Use this tool to draw automation in the Arrange pane.

**Snap to Grid On/Off Button**—Click this button to turn on or turn off the Snap to Grid in Project5. The resolution of the Snap to Grid button is determined by the setting in the dropdown menu to the right of the Snap to Grid button.

**Snap to Grid Resolution Menu**—Set the resolution of the Snap to Grid in Project5.

**Loop On/Off Button**—Project5 allows you to loop over a section. Enabling the Loop On/Off button displays two markers in the Time Ruler of the Arrange pane that show what time range your project is repeating.

**Set Loop to Selection Button**—Clicking this button creates markers at the beginning and end of the selection. A selection can be either a pattern or several patterns.

**Master Volume Slider and Meter**—Drag this slider to control the main output volume. This slider is a duplicate of the one on the Master track in the Bus pane. The meter to the right of the slider displays the master volume level. If the meter is displaying the red clipping indicator, turn down your loudest track, and click the meter to reset the meter.

**CPU Meter**—The CPU meter displays the current CPU usage on a percent scale.

The Overload indicator lets you know if you have exceeded your computer's CPU. Clicking the number field in the CPU meter resets the audio and MIDI engines of Project5. You can try this if you have any stuck notes or sudden audio problems.

**Show/hide Track Inspector Button**  —Click this button to show or hide the Track Inspector.

**Add Track Buttons** 

—Clicking the left button adds a new audio track below the last track in the Track pane. Clicking the right button opens the Device Browser, which lets you add a new instrument track or device track just above whatever track is highlighted.

**Show/hide Groove Matrix Button**  —Click this button to show or hide the Groove Matrix.

## Track View

The Track view lets you insert instruments, control track and bus parameters, arrange patterns, and create and edit automation for tracks and buses. The Track view provides an overview of your project, and contains the Track pane, the Bus pane, the Groove Matrix, and the Arrange pane.

The Track view also contains the Show Aux/Master/Tempo button, which hides or shows the Bus pane and Tempo Track when you click it.

See:

Track Pane

Track Pane Context Menu

Arrange Pane

Groove Matrix

Bus Pane

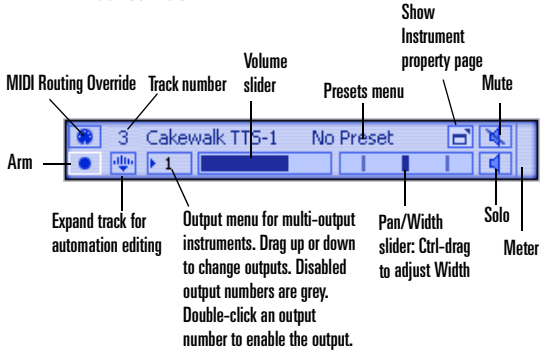
## Track Pane

The Track pane is where you control individual track parameters such as volume, pan, mute, arm, solo, input monitoring, audio inputs, and MIDI routing. You can also create track lanes in the Track pane, so that you can drag overlapping patterns into their own lanes.

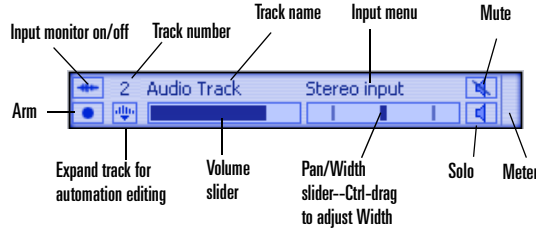
**Note**: double-clicking a track's volume, pan, or width control sets the control to its default value.

Here's a picture of the controls in the Track pane:

MIDI Track Controls




Audio Track Controls




The following two tables describe the parameters in both audio and MIDI tracks in the Track pane:

| Audio Track Parameter... | Description... |
|---|---|
| Input monitor button | If you're recording audio, you can enable this button to hear the instrument or voice that you're recording together with any plug-in effects that are on the armed track. |

| | |
|---|---|
| Track number | This number represents the order the track appears in the Track pane. If you drag an individual track strip to another location, the name of the strip that you drag stays the same but its number changes. |
| Track name | A name for the track that you can edit. Double-click the name to enable editing, and press Enter to save your name change. |
| Input menu | Click this menu to set the audio input to Stereo, Left, Right, or None. Choose None if you want to record automation on the track without recording audio data. |
| Volume slider | Use this slider to adjust the track's volume as it goes to the Master bus. The minimum volume for a track is -INF (no volume) and the maximum volume is 6 dB. |
| Pan slider | Use this slider to change the stereo balance for the track. This value ranges from 100% Left to 100% R. Center is represented by C, which is the default value. |
| Width slider | Ctrl-drag the Pan slider to adjust Width. Width is the perceived distance between the left and right stereo channels. Width ranges from 0 to 120 degrees. 0 degree is effectively mono while 120 degrees is extreme left/right separation. |
| Mute button | Click this button to silence a track. |
| Solo button | Click this button to play only this track and any others that are soloed. |
| Volume meter | Displays the track's volume level. |
| Arm button | Click to arm the track for recording. |
| Show/HIde Automation button | Click this button to expand the track so that there is space below the track in the Arrange pane to view and edit track automation. |

| MIDI Track Parameter... | Description... |
|---|---|

| | |
|---|---|
| MIDI Routing Override button | Clicking this button to the on position forces all live MIDI input through this track only. You can enable the button on multiple tracks by holding the Ctrl key down while you click each button. |
| Track number | This number represents the order the track appears in the Track pane. If you drag an individual track strip to another location, the name of the strip that you drag stays the same but its number changes. |
| MIDI indicator light | Behind the track number is an indicator light that lights up when the track receives MIDI data from either live input or from a pattern in the track. |
| Track name | A name for the track that you can edit. Double-click the name to enable editing, and press Enter to save your name change. |
| Preset menu | If you want to save or load some particular parameter settings of the track's instrument, you can use the Preset menu. An instrument preset does not save effects, effect parameters, or remote control assignments, so if you want to save these along with your instrument's settings, save a device chain instead of a preset. See Loading and Saving Device Chains for more information. |
| Show Instrument Property Page button | Click this button to display the property page of the instrument that is patched into this track. You can also open the property page from the Presets menu, the Track pane context menu (right-click to open this menu), or by double-clicking the track number. |
| Arm button | Click to arm the track for recording. |
| Show/HIde Automation button | Click this button to expand the track so that there is space below the track in the Arrange pane to view and edit track automation. |

| | |
|---|---|
| Output menu | When you load a multi-output instrument into a track, the track displays the Output menu. This menu shows you which output the track controls apply to. You can display controls for a different output by dragging up or down on the menu. To enable an output, double-click its number in the menu so that the number is not grey. |
| Volume slider | Use this slider to adjust the channel's volume as it goes to the Master bus. The minimum volume for a track is -INF (no volume) and the maximum volume is 6 dB. |
| Pan slider | Use this slider to change the stereo balance for the track. This value ranges from 100% Left to 100% R. Center is represented by C, which is the default value. |
| Width slider | Sets the perceived distance between the left and right stereo channels. Width ranges from 0 to 120 degrees. 0 degree is effectively mono while 120 degrees is extreme left/right separation. |
| Mute button | Click this button to silence a track. |
| Solo button | Click this button to play only this track and any others that are soloed. |
| Volume meter | Displays the track's volume level. |

See:

Track Pane Context Menu

Arrange Pane

Bus Pane

## Track Pane Context Menu

Right-clicking on a track name or number opens the Track pane context menu. The following table describes each of the commands:

| Command... | Description... |
|---|---|
| ***Show Instrument*** (MIDI tracks only) | Displays the property page of the instrument that is patched into this track. |
| ***Insert Instrument*** | This command opens a menu where you can select from a list of the instruments installed on your machine. Selecting an instrument inserts a new instrument/track combination. |

| | |
|---|---|
| ***Replace Instrument*** | Select from a menu of instruments with which you can replace the instrument that you right-clicked. |
| ***Clone Instrument*** | Creates a copy of the track that you right-clicked. |
| ***Create Layer*** | This option creates an auxiliary track below the track you right-clicked. You can drag any overlapping patterns into the auxiliary track so that the patterns are easy to see and edit. The auxiliary track uses the same instrument, volume slider, and pan/width slider as the original track, but has its own mute, solo, arm, and show/hide automation buttons. Auxiliary MIDI tracks have their own MIDI Routing Override button. |
| ***No Ports*** (MIDI tracks only) | This option prevents the instrument from responding to input from your MIDI controller. |
| ***All Ports*** (MIDI tracks only) | This option causes the instrument to respond to a specific MIDI channel that comes in through any MIDI port (interface). If you choose Omni, the instrument responds to any MIDI input on any MIDI port. |
| ***Port "n" (name of port)*** (MIDI tracks only) | This option causes the instrument to respond to a specific MIDI channel that comes in on a specific MIDI port. If you choose Omni, the instrument responds to any MIDI input on the specified MIDI port. |
| ***Audio Input*** *(audio tracks only)* | This option lets you choose an audio input for the track. If there are no options in the menu, you need to use the ***Options-Audio*** command and choose an Input Channel. |
| ***Phase Invert*** *(audio tracks only)* | This command inverts the track's phase. Try this command if you think a track may be experiencing phase cancellation with another track. |

| | |
|---|---|
| ***Freeze Track*** | This option mixes your track and all of its plug-in effects down to an audio pattern, and then disables the instrument and/or effects that are patched into this track. This greatly reduces the load on your CPU, especially if you're freezing a MIDI track. |
| ***Bypass*** | For MIDI tracks: Click this option to open a menu of bypassed outputs. Checkmarks in the menu show which outputs are disabled. Click an output number to enable or disable the associated output.<br><br>For audio tracks: enabling the bypass option in this menu mutes the audio track, and removes the audio track and any plug-ins from the audio stream, reducing the resources that your computer needs to play your project. |
| ***Save as Device Chain*** | This command opens the Save Device Chain dialog, which allows you to save the instrument that you right-clicked along with its settings and effects. |
| ***Delete*** | Deletes the track that you right-clicked. |

See:

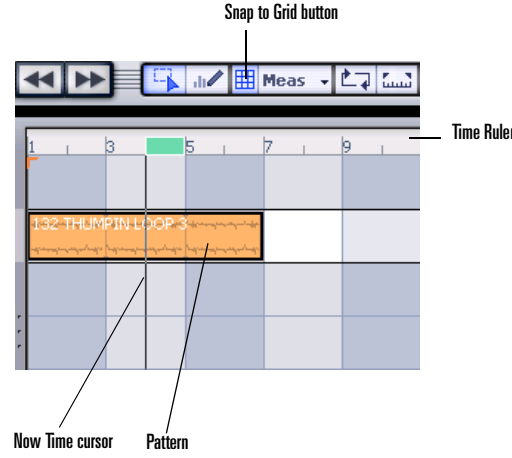
Arrange Pane

Bus Pane

## Arrange Pane

The Arrange pane displays your project's sound patterns on a timeline. Each instrument track or audio track has a corresponding row in the Arrange pane which displays that track's sound patterns.

Here's a picture of the Arrange pane:




The Arrange pane has the following components:

- **Time Ruler**—The Time Ruler is located at the top of

the Arrange pane. The Time Ruler displays your project's timeline in measures, beats and ticks (M:B:T). The Time Ruler conforms to the current time signature, so a song in 3/4 time would have just three beats per measure. The time your project is at on the Time Ruler is called the Now Time. For more information about the Now Time, see The Now Time. For information about setting or changing the time signature, see Changing the Time Signature.

- **Patterns**—Below the Time Ruler, and taking up most of the Arrange pane is the area where each track's MIDI or audio patterns are represented by rectangles. You can click and drag out repetitions of these patterns in addition to moving, cutting and pasting them to other parts of a track or to a different track.
- **Zooming and scrolling controls**—You can drag the scroll bars that are at the bottom and right borders of the Arrange pane to scroll horizontally or vertically, respectively. If you drag the center of the horizontal scroll bar up or down, you can zoom horizontally. Dragging the center of the vertical scroll bar to the left or right zooms vertically. Enabling the Scroll Lock key on your computer keyboard causes the Arrange pane to scroll along with the Now Time cursor.
- **Arrange pane context menu**—Right-clicking over a pattern in the Arrange pane opens the Arrange pane context menu which has the following commands:

| Command... | Description... |
|---|---|
| ***DISK*** | This command displays a popup menu of your Project5 patterns that are on your hard disk. Select a pattern to add it to the Arrange pane at the spot where you right-clicked. |
| ***In Use*** | This command displays a popup menu of the patterns that are already in the Arrange pane. Select a pattern to add it to the Arrange pane at the spot where you right-clicked. |
| ***Not in Use*** | This command displays a popup menu of the patterns that have been used in your project, but are not currently being used. Select a pattern to add it to the Arrange pane at the spot where you right-clicked. |
| ***Groove-Clip Looping*** | If you right-click an audio pattern, this command changes the pattern to a Groove clip (ACIDized wave file). Repeat the command to turn the pattern back into a standard wave file. |
| ***Cut*** | Only available when right-clicking over a channel. This command removes the channel and its data. The channel and its data remain on the clipboard. |
| ***Copy*** | Only available when right-clicking over a channel. This command places a copy of the channel and its data on the clipboard. |
| ***Paste*** | This command pastes cut or copied data at the point of insertion. If you access this command by right-clicking over a channel, the paste appears above that channel. |

| | |
|---|---|
| ***Delete*** | Only available when right-clicking over a channel. This command removes the channel and its data without storing it on the clipboard. |
| ***Merge Selected Patterns*** | Combines selected patterns on the same track into one pattern. |
| ***Split Selected Patterns*** | Splits selected patterns at the Now Time. |
| ***Unlink Selected Patterns*** | Makes selected duplicate patterns into independent patterns. |

See:

Bus Pane

## Groove Matrix

A groove in Project5 is a collection of one or more patterns stacked vertically in the Groove Matrix, one pattern per track. Each groove lasts as long as the longest pattern in that particular groove. The shorter patterns in a groove repeat until the longest pattern in that groove finishes (by default, but you can change this). Each column in the Groove Matrix is made up of cells, which are just pattern holders, one per track. You can drag one pattern into each cell, or leave the cell empty.

The Trigger Snapper menu sets the time lag between when you trigger a groove or cell, and when it starts playing.

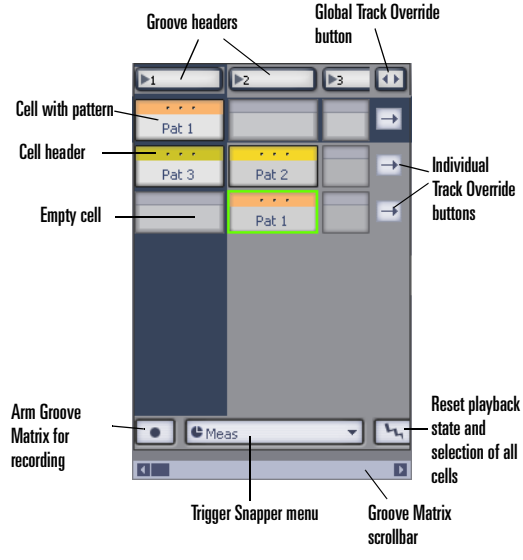
By default, you can play one groove at a time, starting each groove by clicking its header, or by triggering the groove with remote control.

You can record your grooves in the Arrange pane.

The Global Track Override button determines allows you to mute the output of all patterns in the Arrange pane, or mute all patterns in the Groove Matrix, or let all patterns sound. The individual Track Override buttons allow you to mute an individual track's patterns in the Groove Matrix, and/or the Arrange pane.

For more information about the Groove Matrix, see Using the Groove Matrix.

Groove Matrix




## Bus Pane

The Bus pane is located below the Track pane, and contains strips of controls for the master output (main output), the aux buses, and the tempo track. You can hide or show

the Bus pane by clicking the Show/Hide Aux/Master/Tempo button 

that's at the bottom of the Bus pane. The Bus pane, and the part of the Arrange pane that the Bus pane uses, are separated from the Track pane and the upper part of the Arrange pane by a splitter bar. You can drag the splitter bar to resize the Track pane and the Bus pane. Each control strip in the Bus pane contains the following controls:

| Parameter... | Description... |
|---|---|
| Arm button | Click this button to arm a bus strip for automation recording. After you start recording, you can move any of the bus strip's controls, and record the movements as automation. |
| Strip number | This number represents the order the bus appears in the Bus pane. If you drag an individual track strip to another location, the name of the strip that you drag stays the same but its number changes. |
| Bus name | A name for the bus that you can edit. Double-click the name to enable editing (except for the Master bus), and press Enter to save your name change. |
| Mute button | Click this button to silence a bus. |
| Volume meter | Displays the bus's volume level. |
| Volume slider | Drag this slider to adjust the bus volume. The minimum volume for a bus is -INF (no volume) and the maximum volume is 6 dB. |
| Balance/Width slider (balance) | Drag this slider to change the stereo balance for the bus. This value ranges from 100% Left to 100% R. Center is represented by C, which is the default value. You can restore most Project5 controls to their default values by double-clicking them. This slider also controls Width, when you hold the Ctrl key down while you drag. |
| Balance/Width slider (width) | Ctrl-drag (hold the Ctrl key down while you drag) the Balance slider to control Width. Width is the perceived distance between the left and right stereo channels. Width ranges from 0 to 180 degrees. 0 degree is effectively mono while 180 degrees is extreme left/right separation. |

| | |
|---|---|
| Tempo track | You can draw tempo changes in this track with the Automation tool that's in the Main Control view. The slider on the Tempo Track controls what range of tempo is displayed in the Arrange pane. When the slider is all the way to the left, the Arrange pane can display tempos ranging from 0 to 200 bpm. When the slider is all the way to the right, the Arrange pane can display tempos ranging from 0 to 1000 bpm. |

See:

The Editor

Arpeggiator

## The Device Browser

Formerly known as the Patch Browser, the Device Browser displays device chains that are saved on your hard drive. Instead of loading an instrument and some effects, you can load everything at once by loading a *device chain* (formerly known as a patch). A device chain is made up of an instrument, any effects that were loaded with the instrument when the device chain was saved, the parameters for the instrument and effects, and remote control settings for the instrument and effects. The Device Browser appears when you click the right button in the Add Track section that's just above Track 1 in the Track pane.

Here's a picture of the Device Browser:


The Device Browser has the following components:

- The Device Chains button—displays the device chains that are on your hard drive. Clicking the name of a device chain loads it into the currently-selected track.
- The DXi and VSTi Instruments button—displays the DXi, VSTi, and ReWire instruments and applications that are on your hard drive. Clicking the name of an instrument or ReWire application loads it into the currently-selected track.
- Most Recently Used list—at the top of the right column is a numbered list of your most recently used instruments or device chains.

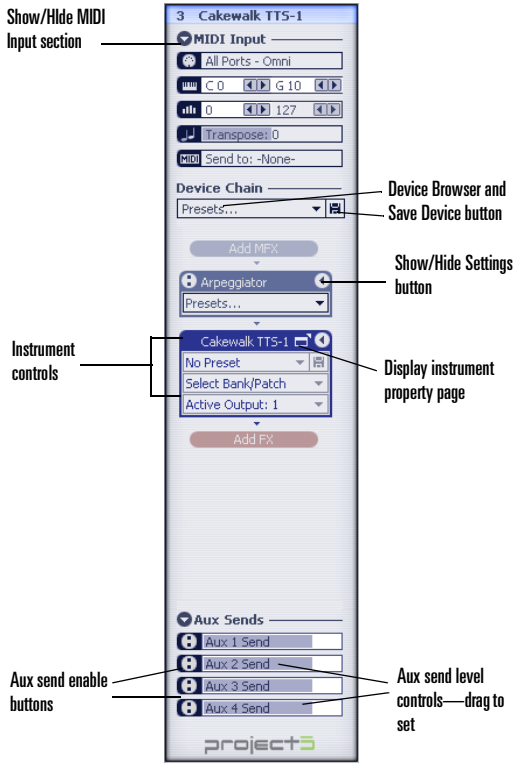
See:

Track Inspector

## Track Inspector

The Track Inspector replaces the old SYN.OPS view. The Track Inspector displays the track information of the track that is currently selected in the Track view. You can show or hide the Track Inspector by clicking the Show/Hide Track Inspector button  that's just left of the Add Track buttons in the Main Control view.

Track Inspector




The Track Inspector is divided into three sections:

## MIDI Input Section

The Input section of the Track Inspector contains:

- The track name (at the very top of the Track Inspector)
- MIDI input port and channel—this menu filters out any live MIDI input that's not on the listed port and/or channel.
- Key range filter—excludes any live MIDI input that's not in the selected range of notes that is bounded by the low note and high note that you select in these two fields.
- Velocity range filter—excludes any live MIDI input that's not in the selected velocity range that is bounded by the lower velocity and higher velocity that you select in these two fields.
- Input transposition field—transposes live input **and patterns** up or down by the positive or negative number of half-steps you enter in this field.
- Send to MIDI channel menu—sets the MIDI channel for patterns in this track, and for incoming notes and data when you're playing live. This menu overrides the MIDI channel menu that's in the Editor, unless this menu is set to ***None***.

**Note**: If you create multiple lanes in a track, each lane has its own instance of the Track Inspector with its own Send to MIDI channel menu. Just highlight each lane in succession to see each lane's Track Inspector. If a lane's Send to MIDI Channel menu is set to None, then each pattern in that lane will play back on the MIDI channel that the pattern contains. Otherwise, patterns play back on the MIDI channel that's listed in that track's Send to MIDI Channel menu in the Track Inspector.

### Device Chain Section

The Device Chain section of the Track Inspector contains the device chain, which displays the instrument and effects that a track uses in the order of their signal flow. **To hide or show the parameter controls** on the instrument or effects, click the Show/HIde Settings button that's on the right end of the titlebar of each instrument or effect.

The Device Chain section has modules that contain the following devices:

- Device Chain menu—use this menu to open the Device Browser, which allows you to choose a device chain for the current track. A device chain is made up of an instrument, effects, parameter settings for the instrument and effects, and remote control assignments for the parameters. Once you've created or edited a device chain, you can click the disk icon to save the device chain for use in other projects.
- Add MFX (Add MIDI effects)—MIDI effects come first in the device chain's signal flow. When you click the Add MFX button to add a MIDI effect, a popup menu of MIDI effects appears, from which you can select one to insert. You can use as many as your computer's processing power can handle. You can change the order of effects by dragging one from a lower position to a higher one
- Arpeggiator—each track gets its own instance of Project5's powerful new arpeggiator. See Arpeggiator for more information.
- Instrument module (or Add Instrument button if no instrument is loaded)—the instrument comes next in the device chain. If no instrument is loaded in this track, you can click the Add Instrument button to open a list of instruments and ReWire applications. Click the name of a device on the list to load it. After an instrument is loaded, you can open the interface of an instrument or ReWire application by double-clicking the name of the instrument or effect in the device chain, or by clicking the Show Property Page button that's just to the right of each instrument or ReWire name in the device chain. The Bank/Patch menu lets you load factory-supplied sounds for the displayed instrument.
- Add FX (Add Audio effects)—audio effects come last in the device chain's signal flow. When you click the Add FX button to add an audio effect, a popup menu of audio effects appears, from which you can select one to insert. You can use as many as your computer's processing power can handle. You can change the order of effects by dragging one from a lower position to a higher one. After an effect is loaded, you can open the interface of the effect by double-clicking the name of the effect in the device chain, or by clicking the Show Property Page button that's just to the right of each effect name in the device chain.

**Note**: the device chain supports mouse wheel scrolling.

### Aux Sends Section

The Aux Sends section of the Track Inspector contains:

- Aux send enable and aux send level controls for the selected track

See:

The Bus Inspector

## The Bus Inspector

When you click an aux or master strip in the Bus pane, the Track Inspector becomes the Bus Inspector. The Bus Inspector only has one control:

### Add FX (Add Audio Effects)

- Effects are displayed according to signal flow, with the earliest effect in the bus's chain displayed at the top. The Add FX button enables you to insert multiple effects into the bus. **To hide or show the controls of**

**the effects**, click the Show Settings button, which is at the right end of the titlebar of each effect.

## The Editor

The Editor is where you create new MIDI patterns (you can also create MIDI patterns by recording in the Track view), edit patterns (including pattern automation), and save patterns to your patterns folders. You can also edit Groove clips in the editor.

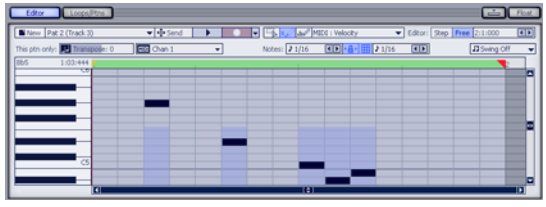
The Editor has three modes:

- Step mode—this mode models a hardware step sequencer, allowing you to create and edit MIDI patterns on a grid. In Step mode, you can draw notes (always of a fixed length) with the mouse and also do Step Recording, but not real-time recording
- Free mode—in this mode, the Editor displays a traditional piano-roll style editing surface, which allows any note length. In Free mode, you can draw notes with the mouse, and also do both Step Recording and real-time recording.
- Groove clip mode—when you double-click a Groove clip (ACIDized clip) in the Arrange pane, the Editor becomes a Groove clip editor.

Click the Step or Free fields in the Editor menu 

to change the Editor to Step mode, or back to Free mode.

Here's a picture of the Editor:



The Editor has the following controls:

### Float/Dock Button 


To Float or Dock the Editor:

- Click the Float/Dock button that's in the upper right corner.

  Or

- Double-click the left border

To Resize the Editor:

- Drag any border or corner.

**Note**: when the Editor is docked, dragging its upper border changes the size of the Arrange pane.

### Show/Hide Button 

Click this button to show or hide the Editor and the Loops/Ptns tab.

### New Pattern Button 


Clicking this button creates a new empty pattern, and automatically loads the pattern into the Arrange pane at the Now time on the selected track. The new pattern is one measure long by default, but you can change this by using the ***Options-Default Step Size for Step Sequencer*** command, together with the ***Options-Default Step Count for Step Sequencer*** command. For example, if you chose a default step size of 16th notes, and a default step count of 32 steps, that would create a pattern of two measures in 4/4 time.

### Pattern Menu 


The Pattern menu, located the in upper left corner of the Editor, displays the name of the current pattern. You can rename the pattern by double-clicking the pattern name.

Clicking the dropdown button in the Pattern menu displays these options:

- ***Open Pattern***—opens the Open Pattern dialog to the default directory for patterns. Navigate to the directory

you want and select a file to open in the Editor.

- ***Save Pattern***—opens the Export Pattern dialog, enabling you to name and save the pattern to the folder where you store patterns.
- ***Duplicate Pattern***—copies the current pattern under a new name, so that any editing you do to the new copy doesn't affect the original.
- ***Automatically send new patterns to track view***—if this option is enabled, every time you click the New Pattern button, Project5 automatically places the new pattern on the highlighted track at the Now Time.
- ***In Use***—opens a menu of patterns that are currently in use in the current project.
- ***Not In Use***—opens a menu of patterns that have been used in the current project, but were deleted from the Arrange pane.

### Send Pattern to Track Button 


Click this button to place the pattern that's currently displayed in the Editor on the highlighted track at the Now Time.

### Pattern Preview Button 

Click this button to play the pattern that's currently displayed in the Editor. The pattern plays back through whatever instrument is currently selected in the Track view. You can set the time where playback begins in the Editor by double-clicking in the Editor's Time Ruler, which moves the Edit Marker to the location you double-clicked.

### Record Pattern Button 

Click this button to record a new pattern by either live or step recording in the Editor.

Click the dropdown arrow on the Record Pattern button to choose recording options. Choose any or all of these three options:

- **Constant Velocity**—when this option is checked, recorded notes are not affected by velocity changes from the MIDI controller. Note velocities are all set to 100.
- **Overwrite**—when this option is checked, current note data is overwritten by new note data.
- **Step Record**—when this option is checked, the recording mode is set to Step Recording. Step Recording means that instead of recording notes that you play at the time the notes were played, Project5 records notes of exactly the same length, one after another, each time you play your MIDI controller, no matter how much time has passed since the last note was entered. The note lengths are determined by the Notes menu setting.

### Tools

The Editor has three tools to help you create and edit patterns.


- The **Select** tool is an all-purpose tool for selecting data, however you can use the Note tool when you just need to select an individual object without dragging it. Pressing T on your keyboard toggles which tool is active (including the Select tool).
- Use the **Note** tool to draw notes in a pattern. The note length menu determines the length of the notes you draw.
- Use the **Automation** tool to draw automation in a pattern. Select an automation parameter to draw or edit in the automation edit menu in the Editor.

### Automation Menu 


The automation menu is just to the right of the Auto tool (Automation tool). Clicking the dropdown arrow on the

automation edit menu displays a menu of automation editing options:

- Outputs—choosing this option displays a menu of parameters that are specific to a particular output of the currently-selected track. If the instrument in the selected track has multiple outputs, the menu will show parameters for each output.
- MIDI—choosing this option displays a menu of standard MIDI continuous controllers that affect all the outputs on the selected track.
- DXi—choosing this option displays a menu of parameters that are specific to the instrument that is loaded into the selected track.
- Effects—choosing this option displays a menu of parameters that are specific to the selected effect on the selected track.
- Arpeggiator—choosing this option displays a menu of parameters that control the Arpeggiator on the current track.

For more information, see Automation.

### Editor Menu


Click the Step or Free fields in the menu to change the Editor to Step mode, or back to Free mode. Also, you can click the left or right arrows in the menu to set the length of the current pattern. See Creating Patterns in Step Mode and Drawing Notes In Free Mode for more information.

### This Ptn Only Menus


By default, all copies of a pattern in the Arrange pane are identical except for their MIDI channel and transposition. The Transpose and MIDI Ch menus allow you to change the transposition and MIDI channel of a particular instance of a pattern. Double-click the instance of the pattern where it appears in the Arrange pane to display the instance for editing.

- Transpose menu—this menu lets you transpose just the current instance of a pattern (the pattern in the Arrange pane that has the black border). The field lists the number of half-steps up (+) or down (-) that the current instance of the pattern is being transposed.

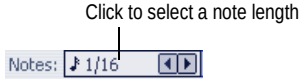
  If you use copies of this pattern in other parts, the Transpose menu is independent for each copy.

  Select a pitch offset for the current instance of the pattern. The range is from -127 to +127 for a MIDI pattern or -24 to +24 for a Groove clip. You can double-click the value, type a number, and press Enter if you don't want to click the up and down arrows. The transposition value is displayed in parenthesis next to the pattern name

- MIDI Ch menu—this menu allows you to choose which MIDI channel that the displayed pattern plays back through, and also sets the channel that the Editor's keyboard display uses when you click the keys. Choosing different MIDI channels for a pattern allows you to access different sounds on different channels of a multi-timbral instrument.

  **Note**: the Track Inspector has a menu for each track or track layer called the Send to MIDI Channel menu. This menu overrides the MIDI channel that you assign to a pattern in the Editor, forcing all patterns on a track or track layer to play on the MIDI channel that's listed in the Send to MIDI Channel menu. To disable the Send to MIDI Channel menu, set the menu to ***None***.

### Notes Menu

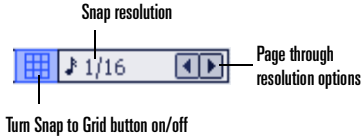



Controls the length of the current step-recorded note, or of notes that you draw with the Notes tool. You can select a new length at any time

### Link

The Link button forces the Snap to Grid button resolution and the Notes menu value to be the same. For example, if you change the Notes menu setting then click the Link button, the Snap to Grid resolution will follow the Note Length setting.

### Snap to Grid




In Free mode, the Snap to Grid setting sets the precision at which notes can be entered and edited, and also sets the time interval that the Now Time moves when you double-click in the Editor's Time Ruler. The Snap to Grid control is **not visible in Step mode**, because the Snap to Grid is always on in that mode, and is set to whatever duration the Notes menu is set to. A snap resolution of 1/2 means that entered notes and notes you drag and drop in the Editor "snap" to the nearest 1/2 note boundary. The snap resolution in the Editor ranges from measures to 1/128th notes. The default is 1/16th. You can override the snap resolution setting by holding the Shift key while dragging notes.

When the Snap to Grid button is disabled, or when you are overriding it, data moves by ticks. Project5 divides each beat into 960 ticks.

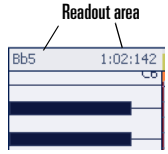
### Swing Note-size Menu


When the swing note-size menu has a note size displayed, patterns of consecutive 8th notes, 16th notes, or 32nd notes play back with a swing feel, instead of a straight feel. You control the strength of the swing effect for each project by dragging the Swing Strength control that's in the Main Control view.

### Keyboard Display

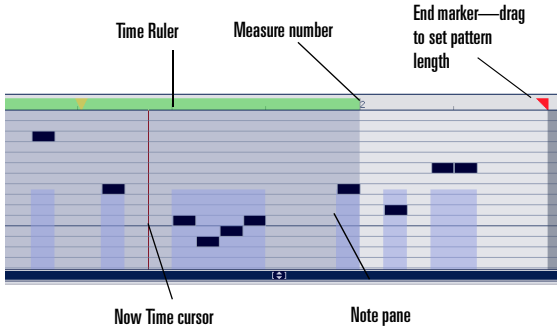
The keyboard display, which is on the left side of the Editor. lights up to show what pitches you're playing on a MIDI keyboard. It also gives you a visual reference for pitches while you're drawing notes with the Note tool.

### Cursor Display




At the very top of the Keyboard Display is the Cursor Display, which shows a readout of the vertical and horizontal coordinates of whatever tool you're using in the Note pane, both while the tool is moving and while it's not.

### Time Ruler




The Time Ruler in Free mode shows measure numbers and beat boundaries. The Now Time cursor (vertical black line) moves through the Note pane during playback to show you where the Now Time currently is in your pattern.

In Step mode, the Time Ruler has no measure numbers. See The Time Ruler in Step Mode for more information.

### Note Pane

This is the pane where you display and edit patterns.

### Zooming and Scrolling

You can zoom and scroll in all modes of the Editor (see Zooming and Scrolling in the Editor).

### The Now Time

The Editor has its own Now Time, which is independent of the Now Time in the Arrange pane. The Editor's Now Time marks the point in a pattern at which playback is taking place, or where playback is currently stopped. The vertical cursor in the Editor is a graphical display of the Editor's Now Time position. You can set the Now Time in the Editor by double-clicking in the Editor's Time Ruler.

### Trans "n" % (in Groove Clip Mode Only)


When you double-click a Groove clip in the Arrange pane, the Editor changes to Groove clip mode, displaying the Groove clip with a series of transient markers. The Trans Detect control senses transients in your audio pattern and assigns a marker at the beginning and end of each transient that it finds. As the you increase the sensitivity (by using larger numbers) smaller transients are detected and the number of markers increases.

### Slice Division Menu (in Groove Clip Mode Only)


The Slices Division menu sets the resolution for the creation of markers, or the "slicing" of the looped clip. This menu uses transients or note lengths, so the settings are:

- Transient Only
- Whole 1/1
- Half 1/2
- Quarter 1/4
- Eighth 1/8
- Sixteenth 1/16
- Thirty-second 1/32

The automatic markers appear at the note resolutions according to the slider setting. At the eighth note setting, there are eight markers per measure.

This control works well for slicing audio that has more subtle changes in volume with few dramatic transients.

The markers in a Groove clip preserve the timing of the audio at that moment. Too few or too many markers can cause unwanted "artifacts" when a Groove clip is stretched.

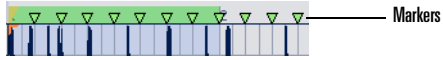
### Restore Markers (in Groove Clip Mode Only)

The Restore Markers tool restores all automatically generated markers to the original position and enables all those that were disabled. Manually created markers remain as is.

### Beats in Clip (in Groove Clip Mode Only)


The number of beats in the clip.

### Transient Markers (in Groove Clip Mode Only)




Project5 uses the transient markers in a clip to stretch or shrink the clip to synchronize to different tempos. Transient markers mark the loudest and most characteristic-sounding parts of the clip, so Project5 tries to leave these parts of the clip alone as much as possible when adjusting tempo. If you want to move markers, you can drag them to new positions, with or without the Snap to Grid button enabled. You can add new markers by double-clicking in the Time Ruler.

See Editing Patterns for more information.

## Arpeggiator

P5's arpeggiator lets you play intricate patterns of notes that would otherwise be extremely difficult or impossible to play manually and at speeds and octave ranges that exist beyond the physical limitations of the player or keyboard range.

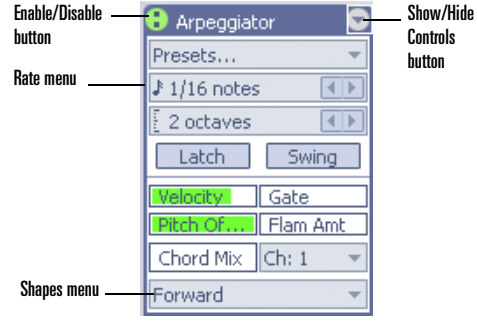
Arpeggiated events are new events that are based on notes that you play on your controller keyboard. The new events are rhythmically and harmonically specified by the arpeggiator's preset, allowing you to "play" an endless variety sophisticated musical passages with simple key pressing.

In addition to note events, the arpeggiator can send parameter automation such as pan, volume, and even effects automation for the current track.

Each P5 track owns an arpeggiator, visually located in the Track Inspector. Running multiple arpeggiators across tracks can help realize exciting melodic and rhythmic textures.

The arpeggiator can be played in real-time so that it is reliable for live performance.

Here's a picture of the Arpeggiator:



**Controls**

The following table describes the controls in the Arpeggiator:

| Control... | Description... |
|---|---|
| Enable/ Disable | Enables/disables the arpeggiator on a given track. This control can be assigned to MIDI RC and modified in real-time during project playback. |
| Preset Control | You can create and edit arpeggiator presets; all user parameters are stored in the preset.<br>• Arpeggiator settings are included in track patches.<br>• Arpeggiator presets can be saved to a file and exchanged with other users.<br>• Arpeggiator files are stored in a shared directory |
| Rate | Adjusts the relative speed of the arp sequence by changing all the note durations by a factor of the current tempo. This control can be assigned to MIDI RC and modified in real-time during project playback. |
| Octave Range | Sets the number of octaves through which the arpeggio will play. A value of 1 means that a held chord will only arpeggiate the notes that are being held within the octave from which the notes are being transmitted. A value of 2 means a held chord will arpeggiate for two octaves. The held chord always represents the bass octave, meaning that the other octaves sound in a higher register.<br>If you specify a range higher than the standard MIDI specifications, the Arpeggiator will repeat the pattern in the highest available octave as necessary.<br>This control can be assigned to MIDI RC and modified in real-time during project playback. |
| Latch | Latch keeps the arpeggio playing after you let go of the keys.<br>Control: Button; this control can be assigned to MIDI RC and modified in real-time during project playback. |
| Swing | Swing is either on or off, as it is with the Editor's Step mode. |
| Velocity | An offset control that adds whatever velocity value you select to the velocities of the notes in the pattern. |
| Gate | Controls whether the notes in the pattern are held to their full value, or are held for shorter or longer durations. |
| Pitch Offset | A transposition control in half-steps, up or down a maximum of 2 octaves. |

| | |
|---|---|
| Flam Amount | If a pattern contains flams, this menu controls how big a difference there is between the attack time of the flam and the note it is attached to. |
| Hold Chord Mix | When 0, simultaneously held notes arpeggiate as single notes. At 50%, simultaneously held notes are heard as a chord in addition to the usual arpeggiated notes, both at equal levels. At 100%, only the held chord is audible.<br>Control: Knob (0 – 100%); this control can be assigned to MIDI RC and modified in real-time during project playback. |
| Ch | MIDI input and output menu—the Arpeggiator only affects input data that's on the MIDI channels listed on this menu, and then the Arpeggiator sends the arpeggiated data out on this channel also. These functions are independent of the Track Inspector's Send to MIDI Channel menu. |
| Shapes | Choosing a shape which specifies the direction in which currently held notes are to be sequenced.<br>The Shape selectors behave as a button radio group, and include the following:<br>• Forward<br>• Reverse<br>• Forward Circle<br>• Reverse Circle<br>• Forward Circle Inclusive<br>• Reverse Circle Inclusive<br>• Inward<br>• Outward<br>• Inward Circle<br>• Outward Circle<br>• As Played<br>• Random<br>• None ( = implicit rhythm mode) |

For a tutorial, see Arpeggiator.

## Loops/Ptns (Patterns) Tab

Replacing the old Patterns Bin is the Loops/Patterns tab. The Loops/Patterns tab allows you to navigate your computer to show patterns, preview them, and drag them into the Arrange pane.

The Loops/Patterns tab has three modes:

- **Explorer mode**—this mode displays your patterns and audio loops in Windows Explorer style. Click the Explore button to enter Explorer mode. The Explorer

mode also displays:

- **Browse mode**—this mode displays your patterns and audio loops in several columns, divided by type. Click the Browse button to enter Browse mode.
- **In Project mode**—this mode displays the **In Use** folder, which shows all the patterns that are currently being used in the Arrange pane, and the **Not In Use** folder, which stores patterns that you have viewed in the Editor or have deleted from the Arrange pane, but are not currently being used in the Arrange pane.

The Loops/Patterns tab also has the following components:

- Create Shortcut button—the Loops/Ptns tab can remember where you browse. Click a folder to make it the current folder, and then click the Create Shortcut button to bookmark the folder.
- Stop Preview button—Stops the playback of a file being previewed.
- Minimize button—click this button to hide the Loops/Patterns tab and the Editor at the bottom of the Project5 user interface.
- Float/Dock button—you can float or dock the Loops/Patterns tab along with the Editor.
- Delete Button—the Delete button deletes the currently selected pattern from the Not In Use or In Use folders.
- Delete Not In Use Patterns Button—the Delete Not In Use Patterns button clears the Not In Use folder of all unused patterns.

Loops/Patterns tab


## Basic Operations

This section covers the most basic tasks in Project5.

See:

Selecting MIDI and Audio Drivers

Opening a Project

Playing a Project

The Now Time

Inserting New Audio or Instrument Tracks

Loading and Saving Device Chains

Loading Patterns

Muting, Soloing, and Arming Tracks

Looping a Project

Changing the Tempo

Changing the Time Signature

Using the Metronome

Saving a Project

Exporting Wave and MP3 Files

## Selecting MIDI and Audio Drivers

When you installed Project5, Project5 asked you to choose the MIDI driver that you want to use to send MIDI data to Project5. A MIDI driver is a small software program that manages the flow of MIDI data between your MIDI interface and your computer. If you have more than one MIDI interface connected to your computer, you need to make sure that the drivers that are enabled (chosen) in Project5 are the ones you're using for your MIDI keyboards and any other MIDI devices you want to use in Project5. If you only have one MIDI input port and therefore only one MIDI input driver, you would obviously enable that driver. Still, it's good to know how to enable different MIDI drivers, especially if you're adding or changing MIDI interfaces, sound cards, or related hardware.

Similarly, if you have more than one audio driver on your computer, you need to make sure that the one that manages the sound card that you use for playback is the one that is enabled in Project5. Otherwise, you won't hear anything when you play your projects.

### To Select MIDI Drivers

1. Use the ***Options-MIDI Devices*** command to open the MIDI Devices dialog.
2. In the Available MIDI Input Devices list, highlight the driver(s) for the MIDI interface(s) that you have connected to your MIDI keyboards or other controllers, and click the Right Arrow button to move it/them to the Active MIDI Input Ports list.
3. Click OK.

You can use multiple MIDI input ports (interfaces) with Project5.

### To Change the Order of MIDI Devices

You may want to change the order of your MIDI devices as they appear in Project5's port menus.

1. Select a device in the Active MIDI Input Ports dialog.
2. Click the Up arrow to move it up or the Down arrow to move it down.

### To Select Audio Drivers, Sample Rate, and Latency

1. Use the ***Options-Audio*** command to open the Audio Options dialog.
2. In the Device menu, select the sound card you want to use for recording and playback.
3. In the Select Input Channel menu, select the input channel you want to use for recording.
4. In the Select Output Channel menu, select the output channel you use for playback. This channel on your sound card should be one that is connected to your amplifier and speakers, so you can hear the sounds Project5 produces.
5. In the Playback Bit Depth fields, Project5 enables the 16 bit option by default (this is standard, CD-quality audio). If you want to use 24-bit playback, choose 24. If you choose 24, you may need to change the Justify field. Consult your sound card's documentation for the proper setting, or just turn down your speakers and try the three options.

   **Note**: the justification setting is not something the user can have a preference for, since it basically

means "how the sound card likes its audio formatted." Each sound card can only understand one of those justification settings. Unfortunately there is no easy way for Project5 to know the format the sound card wishes to receive. This is why it is up to the user to try the various options (of course with volume levels set low for safety) and stick with the one that works. It is strongly suggested that the user keep the setting where the correct playback can be heard.

6. In the Mixing Latency section, drag the Buffer Size slider down to 20 mS, or even less if you're confident your system can handle it. At settings higher than 20 mS, the response time between when you play your keyboard and when you hear the sound from Project5 starts to get too big. If you get distortion from your sound card at 20 mS, you may need to download a new audio driver from your sound card vendor.

   **Note 1:** WDM and ASIO drivers provide the lowest latency in Project5.

   **Note 2:** Actual system latency may not be the latency reported by the slider, and in the case of DSound drivers, this latency is typically about 30 ms higher unless the sound card supports hardware mixing. For more information consult your sound card's documentation.

7. In the Default Settings for New Projects fields, Project5 enables the 44,100 Hz sample rate and 16-bit audio file bit depth options by default (this is standard, CD-quality audio). If you want to use other settings for your particular sound card, choose them now. If you're going to be creating and playing back 24-bit files, choose the 24-bit option.

   **Note**: as soon as you import audio (non-ACIDized audio), or record audio into your project, the sample rate and audio file bit depth of your project are fixed at the settings displayed in the Default Settings for New Projects fields. As soon as this happens, the project settings are displayed in the Current Project Settings field. You can still change the settings in the Default Settings for New Projects fields, but the changes only apply to future projects.

8. Click OK.

**Note**: if you need to create a CD from your project, you can use 24-bit format while you create your project, and choose to export your project in 16-bit format when you export your finished project.

Now that your MIDI and audio drivers are enabled, see:

Opening a Project.

## Opening a Project

Use the ***File-Open*** command to open projects. Project5 comes with sample projects that demonstrate important features.

After you open a project, you can press the Spacebar to start and stop playback. See the following topic for more playback information.

**Note**: by default, when you launch Project5, the last project you worked on opens. You can change this so that Project5 opens an empty project instead, by unchecking the ***Options-Open Last Project At Startup*** option that's in the Options menu.

See:

Playing a Project

## Playing a Project

You can use any of Project5's demo projects to get familiar with the Transport controls.

By default, when you play a project, the Arrange pane does not scroll along with the Now Time cursor. You can change this by enabling the Scroll Lock key on your computer keyboard. Enabling the Scroll Lock key automatically enables the ***Options-Scroll with Now Time*** option, and

vice versa, so that your Scroll Lock key and the ***Options-Scroll with Now Time*** command are always synchronized.

### To Play a Project

- Click the Play button  in the Main Control view (or press the Spacebar).

**Note:** If you experience stutters or glitches during playback, chances are the Buffer Size slider in the Audio Options dialog's Mixing Latency section is set too low for your CPU or sound card to handle. To correct this, select ***Options-Audio*** and increase the buffer size setting by several milliseconds (ms) and try playing your project. Repeat if necessary.

## To Rewind a Project

- Click the Rewind button  in the Main Control view (or press ***w*** on your keyboard).

**Note**: if you want the Arrange pane to scroll to the beginning along with the Now Time cursor, make sure the Scroll Lock key on your computer keyboard is enabled.

### To Stop Playback

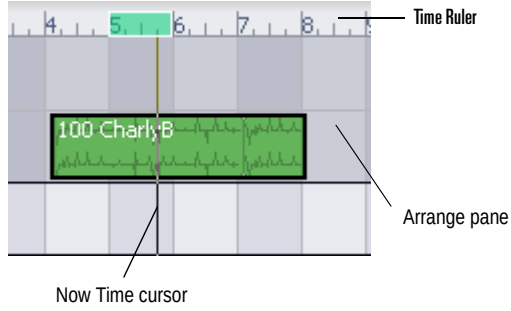
- Click the Stop button  in the Main Control view (or press the Spacebar).

See:

The Now Time

## The Now Time

The Now Time in Project5 marks the point at which playback is taking place, or will begin when playback is started. The Now Time is indicated by a vertical line in the Arrange pane, and by the display in Project5's Main Control view. You can change the display of the Now Time from the Measures/Beats/Ticks format to Hours/Minutes/Seconds or vice versa by right-clicking the Now Time display in the Main Control view, and choosing the option from the popup menu.




The Editor has its own Now Time that is independent of the project's Now Time. The Editor's Now Time is the time where any pattern in the Editor starts to play back when you click the Editor's Preview Pattern button.

### To Change the Now Time in a Project

- During playback or when playback is stopped, click (left-click) in the Time Ruler at the place where you want the Now Time to be.
- When playback is stopped, you can optionally left-click or right-click in the Time Ruler or in the Arrange pane at the place where you want the Now Time to be. The ***Options-Left Click Sets Now Time*** and ***Options-Right Click Sets Now Time*** menu commands allow you to enable either or both of these two options.

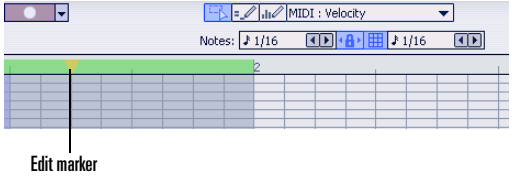
The Snap to Grid setting determines the precision of the placement of the Now Time when you click. You can also change the Now Time using the Transport controls in the Main Control view.

### To Change the Now Time in the Editor

- Double-click in the Editor's Time Ruler where you want the Editor's Now Time to be.

  Or

- Drag the Edit Marker in the Editor to where you want the Editor's Now Time to be.




Now that you can navigate in Project5, see:

Inserting New Audio or Instrument Tracks.

## Inserting New Audio or Instrument Tracks

There are two types of tracks in Project5: instrument tracks and audio tracks. Each instrument track is associated with a single instrument. MIDI patterns play back through instrument tracks, and audio patterns plays back through audio tracks.

### To Insert an Instrument Track

1. In the Main Control view, click the right button in the Add track section.

   The Device Browser appears.

2. At the top of the browser, click either the Device Chains button if you want to load an instrument and effects, or click the DXi and VST Instruments button if you want to add only an instrument.

3. Choose an instrument or device chain from the menu, or from the Most Recently Used numbered list that appears in the upper right corner of the Device Browser after you've inserted at least one instrument.

Project5 inserts the instrument or device chain that you chose into the new track.

Another way to insert an instrument is to right-click in the Track pane, select ***Insert Instrument*** from the popup menu, or select ***Insert from Device Chain*** if you want to add an instrument and related effects.

### To Insert an Audio Track

- In the Main Control view, click the left button in the Add track section.

  Or

- Right-click in an empty area of the Track pane, select ***Insert Audio Track*** from the popup menu.

Project5 adds an audio track at the bottom of the Track pane.

See:

Loading and Saving Device Chains

## Loading and Saving Device Chains

A device chain consists of an instrument (software synthesizer), any audio and MIDI effects inserted in the instrument's signal chain, the parameter settings of the instrument and effects, and any remote control assignments you make to the instrument or effects. After you create or edit a device chain, you can save a device chain file to disk for use in other projects.

You can open the Device Browser from either the Add track section of the Main Control view, or from the Track Inspector. If you open the Device Browser from the Track Inspector, clicking the name of a device chain in the Device Browser loads that device chain into the currently-

selected track. If you open the Device Browser from the Add track section, clicking the name of a device chain in the Device Browser loads that device chain into a new track.

### To Load a Device Chain from the Track Inspector

1. Select the track whose instrument or device chain you want to replace.
2. In the Track Inspector, click the dropdown arrow in the Device Chain section to open the Device Browser.
3. In the Device Browser, choose the instrument or device chain that you want to load.

Project5 loads the selected instrument or device chain into the selected track.

To add, replace, or delete instruments and effects, or change their parameters, see Changing Instruments and Effects, and Controlling Device Chain Parameters.

Project5 loads the selected device chain into the current track.

If you make any changes to the device chain, and think you might want to use the same device chain in another project, use the following procedure to save the device chain.

### To Save a Device Chain

1. In the Track Inspector, in the Device Chain menu,

   click the Save Device Chain button  to open the Save Device Chain dialog (jump to step 2, below).

   Or

1. In the Track pane, right-click the track that contains the device chain you want to save, and choose ***Save as Device Chain*** from the popup menu.
2. Navigate to the folder where you want to store the device chain, type a name for the device chain, and click Save.

Project5 saves the current instrument and its settings, together with the current effects and their settings.

The instrument, effect and Remote Control settings for the track are saved in the device chain file.

See:

Loading Patterns

## Loading Patterns

To load a pattern, find the name of the pattern in the Loops/Patterns tab, and drag the pattern to the time and location you want in the Arrange pane. The Loops/Patterns tab displays both MIDI and audio patterns.

The Loops/Patterns tab has three modes:

- **Explorer mode**—this mode displays your patterns and audio loops in Windows Explorer style. Click the Explore button to enter Explorer mode. The Explorer mode also displays:
- **Browse mode**—this mode displays your patterns and audio loops in several columns, divided by type. Click the Browse button to enter Browse mode.
- **In Project mode**—this mode displays the **In Use** folder, which shows all the patterns that are currently being used in the Arrange pane, and the **Not In Use** folder, which stores patterns that you have viewed in the Editor or have deleted from the Arrange pane, but are not currently being used in the Arrange pane.

You can preview patterns by clicking the preview button that's on the left side of each pattern name.

You can also load a pattern by displaying it in the Editor (use the ***Open Pattern*** command in the Editor's pattern menu, which is just right of the New Pattern button). By default, the Editor loads any new pattern you create into the highlighted track at the Now Time. You can change this behavior by unchecking the ***Automatically Send New Patterns to Track View*** option that's in the Editor's pattern

menu. If you uncheck this option, you can send patterns to the Arrange pane from the Editor by clicking the Send button that's just right of the pattern menu. You can also drag the Send button to the location where you want the pattern to go.

See:

Muting, Soloing, and Arming Tracks

## Muting, Soloing, and Arming Tracks

Each of Project5's tracks has a mute button, solo button, and an arm button.

Project5 also has master mute, solo, and arm buttons that will unmute, unsolo, or disarm all tracks simultaneously. Whenever any tracks are muted, the master mute button lights up; whenever any tracks are soloed, the master solo button lights up; and whenever any tracks are armed, the master arm button lights up. Note that clicking the master buttons will only turn single-track buttons *off*, not on.

Single track mute, solo, and arm buttons


Main Control view (left side) master mute, solo, and arm buttons


### To Mute or Unmute a Track

- Click the track's mute button.

### To Solo or Unsolo a Track

- Click the track's solo button.

### To Arm or Disarm a Track

- Click the track's arm button.

### To Unmute, Unsolo, or Disarm all Tracks

- Click the master mute, solo, or arm buttons, respectively.

See:

Looping a Project

## Looping a Project

You can use the Looping controls in the Project5 toolbar to loop all or part of a project.

### To Loop a Project

1. In the Project5 toolbar, click the Loop On/Off button.
2. In the Time Ruler, drag the beginning and ending loop markers to the loop boundaries that you want. The Snap to Grid setting determines what beat boundaries are available: for example, if the Snap to Grid is set to ***Measure***, you can't drop the loop markers between measure boundaries.
3. Click the Play button to loop your project.

You can also set loop boundaries by selecting one or more patterns in the Arrange pane, and then clicking the Set Loop to Selection button.

**Note**: if you record audio while looping (loop recording), when you stop recording, Project5 puts each loop take on an extra track lane. See Recording Audio for information about audio recording.

See:

Changing the Tempo

## Changing the Tempo

Project5 has controls for changing the tempo of the whole project, or for changing the tempo at any point in the project. The Tempo control, located in the main toolbar, changes the tempo of the whole project. If you want to add tempo changes, or vary the tempo during the project, use the Tempo Track in the Bus pane.

### To Change the Tempo Using the Tempo Control

- In the Main Control view, click the Tempo control and drag up to increase the tempo, or down to decrease the tempo.

  Or

- If you want to change the tempo more precisely, double-click the Tempo control, type a new number (you can use up to two decimal places, or none at all), and press Enter.

### To Draw Tempo Changes in the Tempo Track

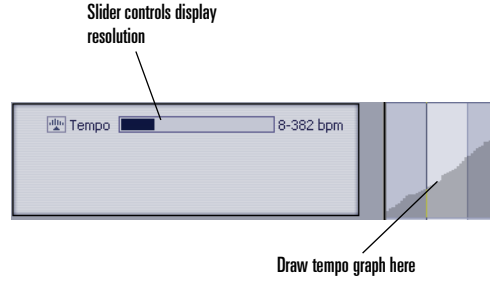
1. In the Main Control view, click the Automation tool  .

   The Track and Bus panes expand to allow automation editing.

2. Display the Bus pane (click the Show Aux/Master/Tempo button), and if necessary, drag the vertical scroll bar that's on the right edge of the Bus pane down to display the Tempo track.

3. Set the Snap to Grid menu to a value that will allow you to draw tempo changes at the intervals you want, or turn off the Snap to Grid button.

4. In the Bus pane in the Tempo Track, use the Automation tool to draw a tempo graph. The slider on the Tempo Track controls what range of tempo is displayed in the Arrange pane. When the slider is all the way to the left, the Arrange pane can display tempos ranging from 8 to 200 bpm. When the slider is all the way to the right, the Arrange pane can display tempos ranging from 8 to 1000 bpm.




**Tip**: to draw straight lines in the Tempo Track, hold down the Shift key while you drag the Automation tool.

See:

Changing the Time Signature

## Changing the Time Signature

By default a new project in Project5 is in 4/4 time. Maybe that's all you'll ever use, but Project5 lets you change the time signature for your project. You can change the time

signature for the whole project or make a change at any point in your project.

### To Change the Time Signature for the Whole Project

1. Select ***Edit-Change Time Signature*** from the Project5 menu.

   Or

   Right-click in the Time Ruler in the Arrange pane and select ***Change Time Signature***.

   The Change Time Signature dialog appears.

2. In the Change Time Signature dialog, set the number of beats you want per measure and the note value of each beat.

3. Click OK.

### To Change the Time Signature at a Specific Measure

1. Select ***Edit-Insert Time Signature*** fro the Project5 menu.

   Or

   Right-click in the Time Ruler in the Arrange pane and select ***Insert Time Signature*** to open the Insert Time Signature dialog.

2. In the At Measure field, choose the measure where you want to insert the new time signature.

3. In the Beats per Measure and Beat Value fields, set the number of beats you want per measure and the note value of each beat, respectively.

4. Click OK.

See:

Using the Metronome

## Using the Metronome

The metronome allows you to hear the tempo during recording and/or playback.

### To Use the Metronome

1. In the Project5 Main Control view, click the

   Metronome on/off button  to turn on the metronome.

2. If you want the metronome to count in before recording begins, use the ***Transport-Count-in On/Off*** command. When the command is enabled, a checkmark appears next to the command.

3. To set the number of beats in the count-in, use the ***Options-Metronome*** command to open the Metronome Properties dialog, and choose the number of count-in beats in the Count in # of Beats field. You can also adjust the metronome sound in this dialog. Click the Help button in the dialog to get an explanation of all the options.

4. Click OK to close the Metronome Properties dialog.

See:

Saving a Project

## Saving a Project

Project5 projects are saved with the extension .P5P.

### To Save a Project

1. Select ***File-Save As*** from the Project5 menu.

   The Save As dialog appears.

2. Navigate to the folder where you want to save your project.

3. Enter a name for your project.

4. Click the Save button.

For projects that contain recorded audio, Project5 creates a separate folder for each project's audio data, which is located inside the folder that the project is located in, and is called "[project name] Audio." If you want to create a backup copy of your project, make sure to copy both the project file (extension .P5P), and the project's audio folder.

## Exporting Wave and MP3 Files

You can export all or part of a project as a wave or MP3 file, to burn to CD, send over the Internet, or import back into one of Projct5's samplers.

**Note**: You must activate your MP3 encoder before it will become available as a Project5 export option. Information on how to activate Project5's MP3 encoder is located on the Project5 Owner's Page on the Cakewalk web site. In Project5's Help menu, select the Owner's Page option to visit the site (***Help-Project5 Owner's Page***).

### To Export Your Finished Project

1. Make sure your levels are set, effects are inserted the way you want, and no tracks that you want in the mix are muted. If you only want a few tracks to go in the mix, you can solo those tracks.
2. Use the ***File-Export*** command to open the Export Audio dialog.
3. In the Save In field, navigate to the folder where you want your exported project file to be.
4. In the File Name field, type the name of the file.
5. In the Save as Type field, choose Wave files or MP3 files.
6. If you chose Wave files, choose a Bits per Sample value (CD quality is 16 bits).
7. Choose a Sample Rate (if you chose Wave files, CD quality is 44,100 Hz).
8. If you want to leave room in the file for the sound of any effects that may still be sounding when the project stops playing, choose a value in the Effects Tails field of up to 99 seconds (usually a couple of seconds is enough—play the end of your project and listen for when all the sound stops after the last note).
9. If you have a looped region in your project, and you only want that section in your exported file, enable the Export Looped Region Only checkbox. If you're not exporting an MP3 file, skip to step 15.
10. If you chose MP3 files, drag the Quality/Speed slider to strike a balance between sound quality and bandwidth—higher quality increases file size and download times.
11. If you chose MP3 files, choose a Bit Rate—128 is a good-quality MP3 bit rate, 320 approaches CD quality, 80 creates fast downloads, etc.
12. If you chose MP3 files, choose a Stereo Mode from these options:
    - Mono—this option creates a standard mono file for minimum bandwidth.
    - Stereo—this option creates a standard stereo file.
    - Joint Stereo—not a full stereo file, but most files will sound just as good, and at smaller bandwidth. If stereo separation is important for this particular file, choose Stereo or Mid/Side instead.
    - Mid/Side Stereo—preserves most of the stereo effect of a file but at lower bandwidth. Not too useful at bit rates above 128 kbs.
13. Enable High Pass/Low Pass Filters—these filters decrease your file size by eliminating frequencies that people don't usually hear anyway.

14. ID3 Tag—clicking this button opens the ID3 Tag dialog, where you can enter identifying information that is stored in your MP3 file and can be read by most MP3 players and similar hardware.
15. Click the Save button to finish exporting your file.

# Tutorials

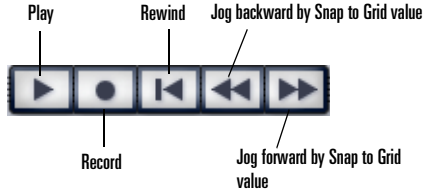
This series of tutorials gives you a quick hands-on demonstration of Project5's major features. For a more detailed introduction, please see the Basics section of the online help. You can open the online help from the Help menu or by pressing F1 on your computer keyboard. Use the Contents tab, the Index tab, or the Search tab to find the information you need. Many help topics are context-sensitive, meaning that if you press F1 while a particular dialog, menu, or part of the interface has the focus (meaning it was the last thing you clicked, or held the mouse over), an appropriate help topic appears.

See Playing a Project to proceed.

## Playing a Project

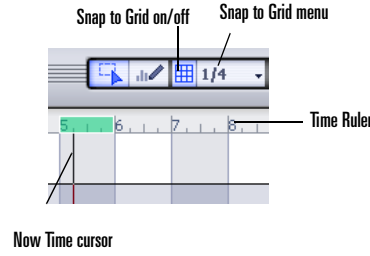
We'll be looking at File1.p5p during the first part of our tutorial, so if this file isn't open already, use the ***File-Open*** command to open it. It's located in the Project5 Version 2/Tutorials folder (Program Files/Cakewalk/Project5 Version 2/Tutorials).

Once the file is open, **press the Spacebar to start playback**. Pressing the Spacebar also stops playback. You can rewind the file by pressing ***W*** on your keyboard, or by clicking the Rewind button in the Transport.




If you don't hear anything when you play the file, make sure your speakers or headphones are turned up, and if you're still not hearing anything, see the online help topic There's No Audio in the Troubleshooting section.

Notice that while the file is playing, the Now Time cursor moves to the right, to show at what time in the project playback is taking place. You can easily move the Now Time by clicking in the Time Ruler or by pressing the Ctrl+Page Up and Ctrl+Page Down keys on your keyboard. The Time Ruler displays the number of each measure in your project. When you click in the Time Ruler, the precision of the distance that the Now Time moves when you click is controlled by the Snap menu.




Next, see Looping a Project.

## Looping a Project

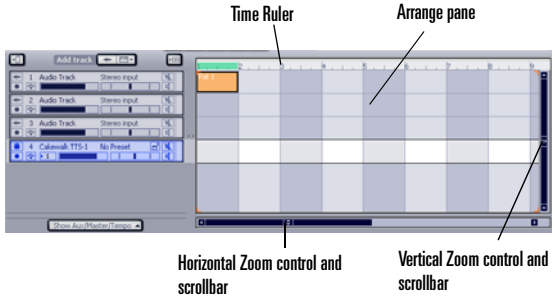
If you want to repeat a section of the project over and over (called **looping**), there are a couple of ways to accomplish this:

- Click the Loop On/Off button to turn it on, and then drag the loop markers to the end and the beginning of the section you want to loop over.

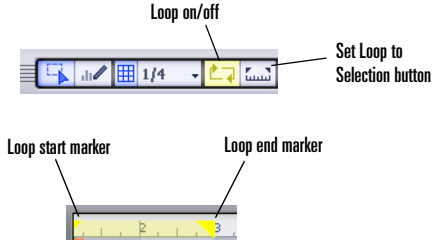
  Or

- Click a pattern that's in the Arrange pane to select it, and then click the Set Loop to Selection button.

Let's loop over measures 1 to 3 so we can try out some patterns. First, let's zoom in far enough so you can see the measure numbers in the Time Ruler easily: find the Horizontal Zoom control that's at the bottom of the Arrange pane, and drag it upward to zoom in.




Rewind (press ***W*** on your keyboard), click the Loop On/Off button so that it's lit up, and then drag the second loop marker in the Time Ruler to measure 3.




Next, see Choosing MIDI Patterns.

## Choosing MIDI Patterns

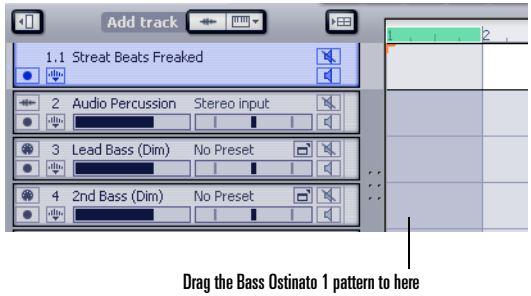
Now that our project file is set up to loop over measures 1 to 3, let's try out some new MIDI patterns.

1. Start playing the project, and then click the "2nd Bass (Dim)" track (track 4) to make sure it's the active track.
2. To preview some bass patterns through that track, let's display the Loops/Patterns tab in Browse mode: click the Loops/Ptns tab, then click its Browse button. This displays your pattern folders in columns.
3. Click Bass in the first column. Try clicking on different genres in the middle column, and then start previewing the patterns that appear in the right-most column by clicking each pattern's Preview button (see graphic).
4. Find the pattern named Bass Ostinato 1.

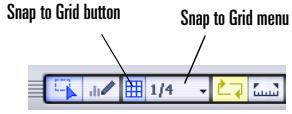
Notice that the patterns preview through the current track and in sync with the project while the project is playing back.

If you cannot find ""Bass Ostinato 1" in the pattern browser, click on the button labeled "In Project" (top left of the view), then click on the "Not in use" folder.

Once you find a pattern you like, simply drag it to the place in the track where you want it. For this tutorial, drag the Bass Ostinato 1 pattern to the beginning of track 4 and release the mouse.




The value in the **Snap to Grid** menu determines whether a dragged pattern lines up with a measure boundary, beat boundary, or no boundary at all. For example, if you want a dragged pattern to line up with a measure boundary, set the Snap menu to Measure. If you want the pattern to line up with a beat boundary, set the Snap to Grid menu to Quarter Note. If you don't want the dragged pattern to line up with a precise boundary, click the Snap to Grid button to turn it off (grey).




Next, see Copying MIDI Patterns.

## Copying MIDI Patterns

Let's copy our MIDI pattern so that it fills up measures 1 to 37:

1. Make sure that the Snap menu is set to Measure.
2. Move the cursor over the end of the MIDI pattern that you dragged to Track 4 so that the cursor turns into the slip-edit tool:  .
3. Drag the end of the pattern to the beginning of measure 37 and release the mouse. Project5 "rolls out" enough copies of the pattern to fill the space.

Next, see Using Audio Loops.

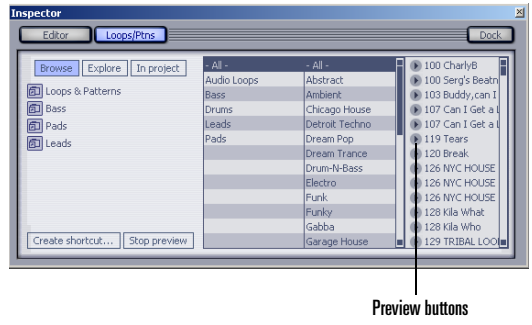
## Using Audio Loops

Project5 can play both ACIDized audio loops, and non-ACIDized loops. ACIDized loops play back at your project's tempo.

Let's preview some audio loops:

With the project playing, start previewing audio loops:

In the first column of the Loops/Patterns tab, click Audio Loops, then click Funky in the next column, and then start previewing the patterns in the Funky folder by clicking each pattern's Preview button (see graphic). Since these loops are ACIDized, the patterns preview in sync with the project while the project is playing back.



Once you find a pattern you want to use, simply drag it to an audio track where you want to place the pattern, or drag the pattern to an empty space below the last track strip. Dragging a pattern to an empty space below the last track strip will create a new audio track for you.

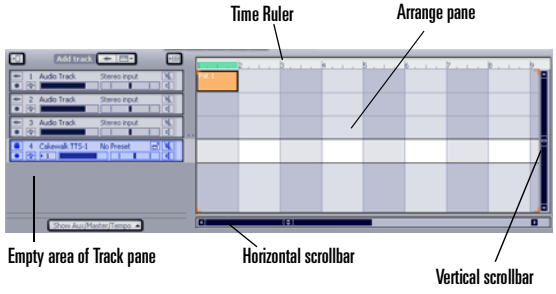
Next, see Adding Instruments and Tracks.

## Adding Instruments and Tracks

Clicking the Add New Instrument Track button in the Add Track section allows you to add an instrument and track above the current (highlighted) track.

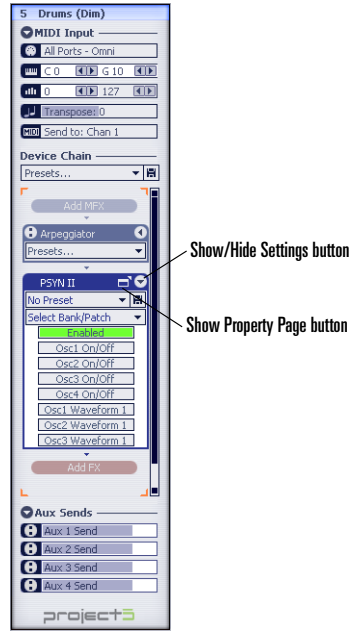
Let's add a track below the last track instead:

Right-click the empty space below the last track, and choose ***Insert Instrument-PSYN II*** from the popup menu. You may have to drag the scrollbar that's on the right side of the Arrange pane downward to expose the empty area of the Track pane:




Project5 adds an instrument and track below the last track.

The Track Inspector (see next graphic) displays some controls for the instrument in the currently-highlighted track . You can see all of the instrument's controls by clicking the Show Property Page button that's at the right end of the instrument's name in the Track Inspector.




If you change a parameter, and decide you want to undo the change, you can press ***Ctrl+Z*** to undo. You can press ***Ctrl+Z*** as many times as you want to undo edits in the reverse order that you made them (the last edit you made is the first one that you undo, etc.). When you save your project, any changes you make to instrument or effects parameters are saved with the project. If you want to use a particular group of instrument and effects settings that you've come up with in other projects, you can save these as a device chain. A device chain is made up of an instrument, any effects patched into that instrument's track, the

parameter settings for the instrument and effects, and any remote control assignments you've made to the instrument or effects.

When you've created some settings you might want to use in other projects, you can save them by selecting the Save As Device Chain command on the track strip's right-click popup menu.

Next, see Using Effects.

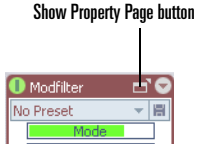
## Using Effects

Project5 supports DX effects, and can use VST effects after you register them with the included VST adapter (***Start-Programs-Cakewalk-Cakewalk VST Adapter 4-Cakewalk VST Adapter 4*** command).

Let's add an effect to our PSYN II track:

1. Click the PSYN II track to highlight it.
2. In the Track Inspector, just above the Aux Sends section, click the Add FX button to display the popup menu of available effects.
3. For this tutorial, choose ***Project5-Modfilter***.

   Project5 adds the Modfilter effect just below PSYN II in the Track Inspector.
4. Find the Show Property Page button on the Modfilter titlebar, and click the button to open the Modfilter property page.



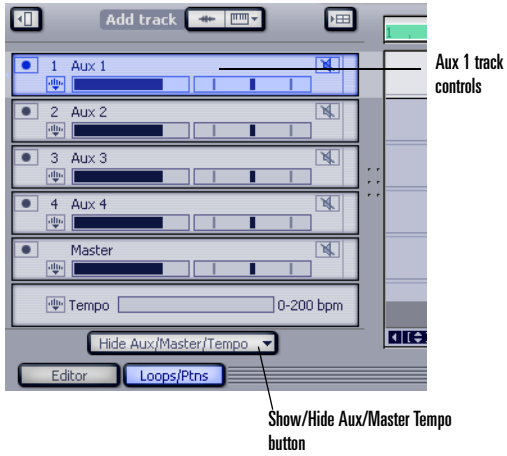

5. Choose a preset from the Presets window, or configure the Modfilter parameters yourself. If you press F1, a help file appears which explains the controls in the Modfilter.
6. Close the Modfilter property page.

You can add more effects by clicking the Add FX button again. The order of effects in the Track Inspector illustrates the signal flow, starting at the top. You can reorder the effects by dragging the name of an effect from a higher location to a lower one. You can replace or delete an effect by right-clicking the effect and choosing options from the popup menu.

Next, see Using Aux Buses.

## Using Aux Buses

If you have two or more tracks that can use the same effect with the same parameter settings, you can save a lot of CPU power by adding the effect to an aux bus and sending the two (or more) tracks through the aux bus.



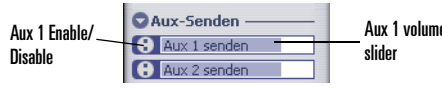

**Note**: Individual effects on tracks (inserts) are pre-fader. Aux send controls are post-fader.

Let's add an effect to an Aux bus:

1. In the Track view, click the Show Aux/Master/Tempo button to display the Bus pane.
2. Click the Aux 1 track controls to highlight Aux 1.
3. In the Track Inspector (it's actually a Bus Inspector at this moment), click the Add FX button to add an effect.
4. Adjust the effect, and repeat steps 3 and 4 if you want to add more effects to this Aux bus.

Now let's send a track's signal through Aux 1:

1. In the Track view, click the Hide Aux/Master/Tempo button to hide the Bus pane.
2. Click an instrument track's controls to highlight the track, and in the Track Inspector, in the Aux Sends section, click the Aux 1 enable button that's just left of the Aux 1 volume slider to send the track signal through Aux 1.




3. Drag the Aux 1 volume slider to adjust the level.

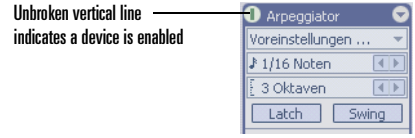
You can send the track through more Aux buses by clicking Aux enable buttons, and adjusting the corresponding Aux volume sliders.

Next, see Arpeggiator.

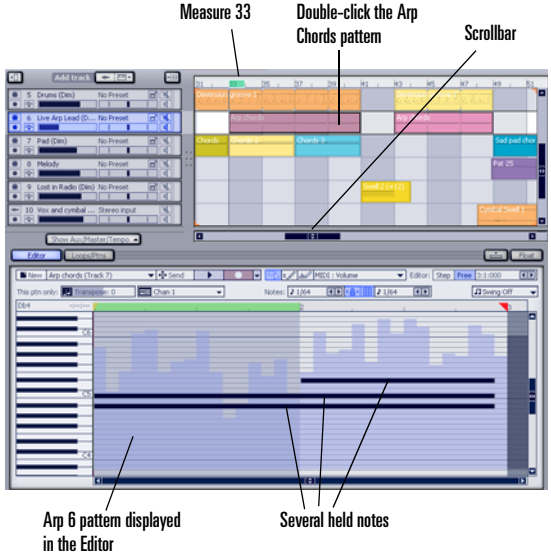
## Arpeggiator

Let's try out Project5's powerful new arpeggiator. One arpeggiator device appears on every instrument track, located in the Track Inspector just above the instrument's controls. In this project, the arpeggiator is being triggered by MIDI notes in a pattern. Let's check it out:

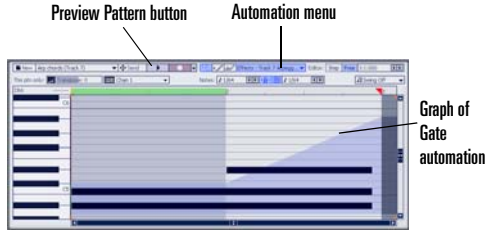
1. Click on track 6, "Live Arp Lead (Dim)". You'll notice the arpeggiator is enabled in the track inspector.




2. In the Arrange pane, drag the horizontal scrollbar to display measure 33, and double-click the track 6 pattern named Arp Chords. Double-clicking the pattern displays the pattern in the Editor. Notice that the pattern consists of several held notes.




3. Click the Preview Pattern button in the Editor to hear how the pattern sounds through the arpeggiator.
4. Press the Spacebar to stop previewing the pattern.

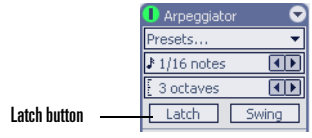



Notice that patterns may contain arpeggiator automation. In this case the pattern contains Gate automation, which controls how short or long arpeggiated notes are played. As the pattern plays through, the individual note lengths become longer toward the end, creating an interesting musical effect. You can see the Gate automation by opening the Editor's automation menu and selecting Arpeggiator-In Use-Gate.

The arpeggiator is also a useful device for live performance because it affects MIDI input. Let's experiment with live input by doing the following:

1. On track 6, click the MIDI Routing Override button to make sure we receive MIDI input on this track only.

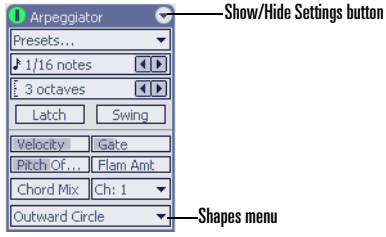

2. In the Track Inspector (make sure Track 6 in the Track pane is highlighted in blue so that the correct track is displayed in the Track Inspector), click the Latch button in the arpeggiator module; this causes notes that you play on the MIDI controller to hold.




3. Hold down two or more notes on your MIDI controller then release the keys. A series of arpeggiated events

should be playing now, without any further input from you.

4. Now try listening to a few different “shapes” by selecting various presets from the bottom-most menu in the arpeggiator (you can ignore “Rhythms” for the moment).




5. Hold down a different set of notes on your MIDI controller; the new notes replace those that were previously latched.

6. When you are done, click the Latch button again to disable it.

You can manipulate arpeggiator output in other ways by adjusting various parameters on the arpeggiator device. However, the most significant capability of the arpeggiator is its ability to apply algorithmic variations on your input as well as MIDI-based patterns, which you can load via the arpeggiator’s top-most Presets control. Let’s try it now:

1. Click on the arpeggiator’s Presets control and select ***Load Preset***.

2. Navigate to Rhythms, and select any pattern.

3. Hold down a note on your MIDI controller.

Notice that a rhythmic pattern plays through the instrument. The pattern’s first note begins on whichever key is currently being held. Also note that the preset’s shape is set to Rhythms Only. This means that the MIDI data will be played exactly as it appears in the file.

Next, see Remote Control.

## Remote Control

You can control many of Project5’s features and functions from your MIDI controller. If you need help connecting a MIDI controller to Project5, please see the online help topic Connecting a MIDI Keyboard.

You can control the parameters of many instruments and effects with remote control, as well as many of Project5’s buttons and sliders, creating almost limitless ways to continuously change the mix and content of your project’s sounds as your project plays.

First let’s assign a PSYN II parameter to the first control field in the Track Inspector:

1. Click a PSYN II track to highlight the track.

2. In the Track Inspector, right-click on the first control field to display a menu of parameters that you can control by dragging in this field.


3. From the popup menu, choose ***Osc2 Sublevel-Filter 1 Keyb-Filter 1 Cutoff***.

   Project5 assigns the filter 1 cutoff parameter to the first control field, and lists the assigned parameter in the Assigned section of the popup menu.

4. Open the PSYN II property page (click the Show Property Page button that's at the right end of the PSYN II titlebar in the Track Inspector), drag the property page so that it doesn't block the Track Inspector, and then drag the first control field in the Track Inspector (the control field should be labeled Filter 1 Cutoff). The Cutoff knob in the FLT section of the PSYN II property page should move as you drag the control field back and forth.

Now let's assign a knob or slider on your MIDI controller to control the first field in the Track Inspector:

1. Right-click the first control field in the Track Inspector and choose ***MIDI Remote Control*** from the popup menu.

   The MIDI Remote Control dialog appears.

2. In the Mapped Parameters list, make sure that PSYN II Filter I Cutoff is highlighted, then click the Learn button that's at the bottom of the dialog.

3. Move the knob or slider on your MIDI keyboard that you want to use to control the filter cutoff.

4. Click Stop Learning, and then click OK.

Now move the knob or slider on your MIDI keyboard that you had Project5 "learn," and watch the Cutoff knob in the PSYN II property page move.

Next, see Using Device Chains.

## Using Device Chains

In Project5 the term "device chain" refers to an instrument, any effects inserted into the instrument's track, the parameter settings of the instrument and effects, and any remote control assignments you've made to the instrument and/or effects.

As noted earlier, when you save your project, any changes you make to instrument or effects parameters are saved with the project. If you want to use these changes in other projects, you can save these as a device chain by right-clicking a track's controls in the Track pane and choosing ***Save as Device*** from the popup menu. Device chains that you save in Project5's Device Chains folder (Program Files/Cakewalk/Project5 Version 2/Device Chains) show

up in the Device Browser so you can load them at any time.

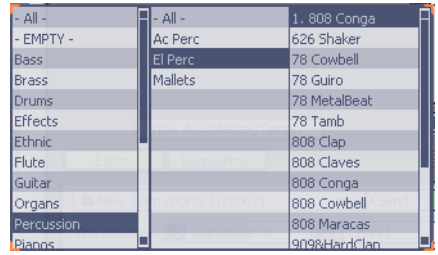
Let's load a device chain from the Device Browser into Track 11:

1. Click anywhere in Track 11's controls in the Track pane to make it the current track.

   The Track Inspector displays Track 11's device chain and aux send controls.

2. Open the Device Browser by clicking the Choose Device button that's in the Track Inspector.


3. In the Device Browser, for this tutorial, click Percussion in the first column, then click El Perc in the second column, then click 808 Conga in the third column.




Project5 loads the 808 Conga device chain. Notice in the Track Inspector that the instrument in this device chain is the P5antom. If you pick a different percussion device chain, that device chain might use a different instrument.

Play the 808 Conga device chain from your MIDI keyboard if you have one connected. You may need to click the MIDI Routing Override button on Track 11 to hear only Track 11. You can also click the Loops/Ptns tab, click Drums in column 1, click one of the drum styles in column 2, and then preview some drum patterns in column 3 by clicking their Preview buttons, which are on the left end of each name in column 3.

Next, see Recording Audio.

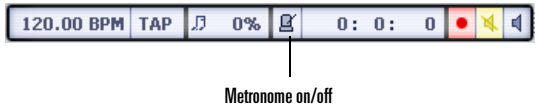
## Recording Audio

1. Open the Audio Options dialog by using the ***Options-Audio*** command.

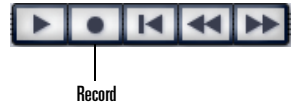
2. In the Select Input Channel field, choose the audio input you want to record into. Click OK.

3. Plug your instrument or microphone into the audio input you selected (or plug your pre-amp or mixer into that input, if your instrument or mic is connected to a pre-amp or mixer).
4. Add an audio track by right-clicking the empty space below Track 11, and selecting Insert Audio Track from the popup menu.
5. In the audio track, click the Arm button so that it's enabled (red), and also click the track's Input Monitor button so that it's enabled (blue).


6. Play your instrument and observe the meter in the armed track. Use your sound card's software mixer (or hardware controls, if it has them) to adjust the input volume so that the meter almost peaks when you play the loudest volume that you plan to record.
7. If you want to hear the Metronome while you're recording, click the Metronome button in the Main Control view to enable it (it turns blue when enabled).




8. If you want the metronome to do a count-in before you start recording, make sure that the ***Transport-Count-in On/Off*** command has a checkmark next to it in the Transport menu. Use the ***Options-Metronome*** command to open the Metronome Properties dialog to choose a Count-in duration in the Count-in # of Beats field.
9. After you close the Metronome dialog, click the Record button to start recording, and play your instrument.




10. Press the Spacebar to stop recording.

Project5 displays your recorded data in the audio track. Rewind and play back what you recorded. You can press ***Ctrl+Z*** to erase what you recorded if you're not satisfied.

Next, see Automation.

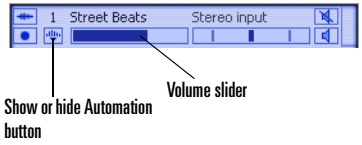
## Automation

Automation means to record the movement of a fader, knob, or other "control" so that the next time you play your project, that control moves automatically. You can use Remote Control to move the control while you're recording. You can also draw and edit automation with the Automation tool in either the Arrange pane or the Editor. You can put automation into **patterns** and reuse the patterns in any place in your project where you want an automation command to go.

Project5 allows you to automate track controls, pattern parameters, aux buses, the main bus, effects parameters, and instrument parameters. When you export your finished project, Project5 uses all your automation data to create your final mix.

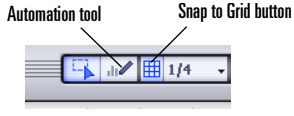
Let's add some volume automation to Track 1 of our tutorial file:

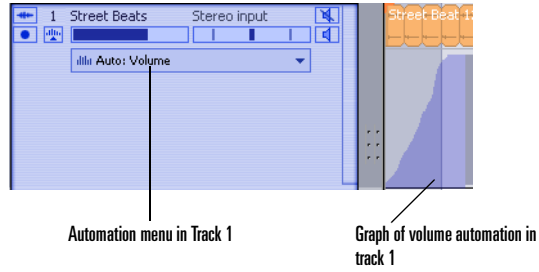
1. Arm Track 1.
2. Move the Now Time to where you want to start recording. Let's record at the beginning: press ***W*** on your keyboard to rewind.
3. Drag the volume slider in Track 1 all the way to the left, so that we can create a fade-in.



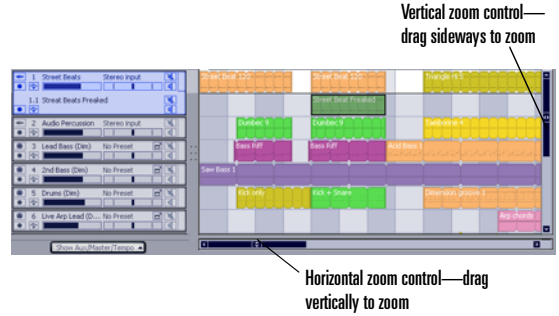

4. Click the Record button in the Main Control view to start recording.
5. While you're recording, drag the volume slider in Track 1 to the right until the tooltip says 0.7 dB.
6. Stop recording (press the Spacebar).

Rewind, and play back Track 1: watch the volume slider move the way that you moved it while you were recording. Click the Show/Hide Automation button in Track 1 to show the automation you just recorded. You can edit the automation with the Automation tool. **Turn the Snap button off** in the Main Control view so you can draw smoother curves. To display different kinds of automation in a particular track, click the dropdown arrow in the track's Automation menu, and choose the kind of automation you want to draw or edit.




You may need to drag the vertical zoom control to display the automation data at a convenient size.




Next, see Setting Up a Velocity Drum Track.

## Setting Up a Velocity Drum Track

There are numerous ways to set up drum tracks in Project5 using the various instruments and drum patterns. Let's take a look at the Velocity drum sampler. The Velocity drum sampler is a multi-output sampler that lets you drag

in new sound files, edit and mix them, and build a drum set from scratch, or by editing one of the included drum sets.

Let's load a factory-supplied drum set, and then edit it:

1. Insert the Velocity instrument into a track, and open its property page.
2. Let's load the AfroCuban 1 set: in the Bank section of the Velocity property page, click the Load button, and in the VELOCITY Banks folder, select AFROCUBAN1.P5D. Click the Open button to load the set.

Let's preview a pattern through this set:

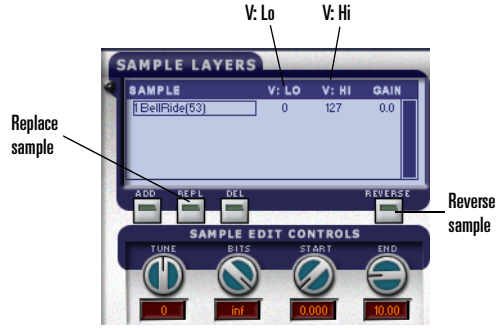
- In the Loops/Patterns tab, click the Drums column, then the All column, and find ChiHse2_drm. Click its preview button to hear the pattern played through Velocity.

Notice that each pad in Velocity lights up when the pad is played. Go ahead and click the other pads to hear the samples that are assigned to them. You can trigger each pad with the MIDI note that's listed at the top of each pad. You can change each pad's assigned note by dragging up or down on the note name.

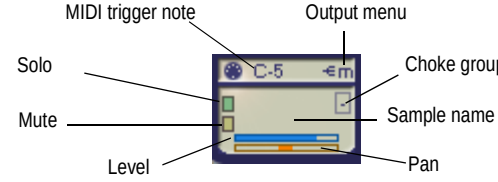
Let's replace the sample that's assigned to pad 14 (CNGAOS01):

1. Click pad 14 to select it.
2. In the Sample Layers section of the property page, click the REPL button to open the Select A Sound File dialog.
3. In the Jungle folder, select BELLRIDE53.WAV, and click Open to load it.

While pad 14 is selected, you can use any of the sample editing controls to edit the sample (reverse, tune, bits, loop, amp eg, pitch eg, filter). You can also drag samples to pads from the Windows Explorer, and set what velocity range each sample responds to by dragging the V:LO and V:HI numbers that appear on the Sample Layers screen when each sample is selected.




Each pad also has controls for mute, solo, volume, pad, output, and choke group. Choke group means that any pad in the group that is currently sounding will stop playing when any other member of the group is played. This feature is used primarily for hi-hat samples.




Let's send pad 9 (FNKBL224 sample) to output 2 and add an effect to it:

1. In pad 9, find the Output menu control in the upper right corner of the pad, and drag it up so that it is set to 2.

2. In the Track Inspector Output menu, click ***Bypass-Enable All Outputs***., then in the same menu, choose ***Active Output-Out 2***.

3. Click the Add FX button, and select ***Project5-Tempo Delay***.

4. In the Tempo Delay property page, try the default setting. For this tutorial, make sure the Tempo Sync field is set to 1/2 D.

If you like this particular drum set, you can click the Save button in the Velocity interface (it's in the Bank section), and save the new set under a new name.

You can save your instrument and effect settings as a device chain, by right-clicking the Velocity track and choosing ***Save As Device Chain*** from the popup menu.

Next, see Using Grooves.

## Using Grooves

A groove in Project5 is a collection of one or more patterns stacked vertically in the Groove Matrix, one pattern per track. You can play grooves in any order you want, repeating any groove as many times as you want. Each groove lasts as long as the longest pattern in that particular groove. The shorter patterns in a groove repeat until the longest pattern in that groove finishes (by default, but you can change this). Each column in the Groove Matrix is made up of cells, which are just pattern holders, one per track. You can drag one pattern into each cell, or leave the cell empty.

By default, you can play one groove at a time, starting each groove by clicking the groove's header, or by triggering the groove with a MIDI note or remote control.

You can record grooves into the Arrange pane, triggering each groove when you want it to start. Our tutorial file was actually built from grooves, which you can examine in the Groove Matrix.

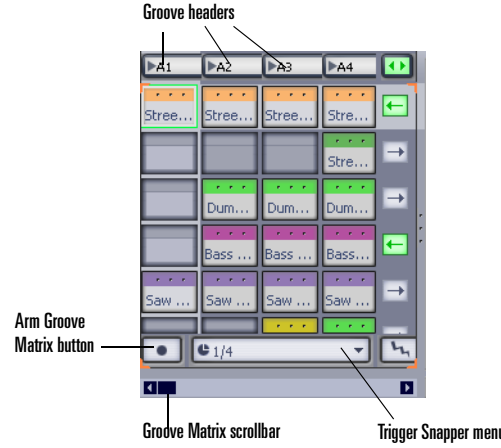
Let's rebuild part of our tutorial file:

1. Save a new copy of the tutorial file under the name of FileGroove.p5p: use the ***File-Save As*** command to do this.

2. In FileGroove.p5p, display the Groove Matrix by clicking the Show Or Hide Groove Matrix button .

3. For this tutorial, let's remove the patterns from the Arrange pane: click one of the patterns to select it, then use the ***Edit-Select All*** command to select all the patterns, then press the Delete key.

4. The Trigger Snapper menu sets the time lag between when you trigger a groove, and when the groove starts playing, Let's click the menu and set it to ***Change on Measure***.




5. Click the header on groove A1 to hear it play.

6. Press the Spacebar to stop playback.
7. Let's rebuild some of our tutorial file: click the Arm Groove Matrix button to enable it.
8. Start recording by clicking the header on groove A1. Project5 starts playing groove A1, and starts recording.
9. Just before you want groove A2 to start playing, click the header on groove A2. When the Now Time reaches the next measure boundary (remember, the Trigger Snapper menu is set to change on Measure), groove A2 starts playing/recording, and groove A1 stops.
10. Click other groove headers when you want them to start playing. You can trigger multiple grooves by holding down the Ctrl key while you click.
11. When you're finished recording, press the Spacebar to stop. Rewind, and listen to what you recorded. You can press ***Ctrl+Z*** to erase the recording.

Notice that when you play groove A2, groove A1 stops playing.

Instead of playing the grooves by clicking the groove headers, we can trigger the groove headers with remote control:

1. Right-click the groove header of groove A1, and choose ***MIDI Remote Control*** from the popup menu.
2. In the MIDI Remote Control dialog, click the Learn button, play a note on your MIDI keyboard (if it's connected to your computer), and then click Stop Learning. Click OK.
3. Repeat steps 1 and 2 with the groove header of groove A2, but use a different MIDI note as a trigger.

Now you can start groove A1 by playing a MIDI note, and you can switch to groove A2 by playing a different MIDI note (recorded MIDI notes will not trigger a groove). You can set the lag time between when you trigger a groove, and when it starts playing by choosing options in the Trigger Snapper menu in the Groove Matrix. Notice that when you trigger a groove, but it hasn't started playing yet, it blinks. A groove that is playing appears green.

You can record the output of the Groove Matrix as audio and/or MIDI data (audio patterns record as audio, MIDI patterns record as MIDI), with or without any patterns that are in the Arrange pane.

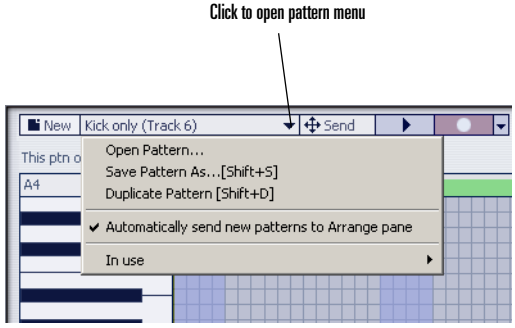
See Recording Grooves for more information.

Next, see Exporting Patterns.

## Exporting Patterns

You can use MIDI patterns from Project5 in other Cakewalk programs, such as SONAR and Kinetic.

To export a pattern, simply save it in one of Project5's Patterns folders, or any place you want to save it (display the pattern in the Editor, and use the ***Save Pattern As*** command from the Pattern menu dropdown). If the pattern has already been saved (if it came with Project5, or you created it), you don't have to save it again. Then import it into another Cakewalk program, such as SONAR, by using the ***File-Import-MIDI*** command, and choosing P5 Pattern in the Files of Type field.




Next, see Exporting Wave and MP3 Files.

## Exporting Wave and MP3 Files

You can export all or part of a project as a wave or MP3 file, to burn to CD, send over the Internet, or import back into one of Project5's samplers.

**Note**: You must activate your MP3 encoder before it will become available as a Project5 export option. Information on how to activate Project5's MP3 encoder is located on the Project5 Owner's Page on the Cakewalk web site. In Project5's Help menu, select the Owner's Page option to visit the site (***Help-Project5 Owner's Page***).

### To Export Your Finished Project

1. Make sure your levels are set, effects are patched the way you want, and no tracks that you want in the mix are muted. If you only want a few tracks to go in the mix, you can solo those tracks.
2. Use the ***File-Export*** command to open the Export Audio dialog.
3. In the Save In field, navigate to the folder where you want your exported project file to be.
4. In the File Name field, type the name of the file.
5. In the Save as Type field, choose Wave files or MP3 files.
6. If you chose Wave files, choose a Bits per Sample value (CD quality is 16 bits).
7. Choose a Sample Rate (if you chose Wave files, CD quality is 44,100 Hz).
8. If you want to leave room in the file for the sound of any effects that may still be sounding when the project stops playing, choose a value in the Effects Tails field of up to 99 seconds (usually a couple of seconds is enough—play the end of your project and listen for when all the sound stops after the last note).
9. If you have a looped region in your project, and you only want that section in your exported file, enable the Export Looped Regions Only checkbox.
10. If you chose MP3 files, drag the Quality/Speed slider to strike a balance between sound quality and bandwidth—higher quality increases file size and download times.
11. If you chose MP3 files, choose a Bit Rate—128 is a good-quality MP3 bit rate, 320 approaches CD quality, 80 creates fast downloads, etc.
12. If you chose MP3 files, choose a Stereo Mode from these options:
    - Mono—this option creates a standard mono file for minimum bandwidth.
    - Stereo—this option creates a standard stereo file.
    - Joint Stereo—not a full stereo file, but most files will sound just as good, and at smaller bandwidth. If stereo separation is important for this particular file, choose Stereo or Mid/Side instead.

- Mid/Side Stereo—preserves most of the stereo effect of a file but at lower bandwidth. Not too useful at bit rates above 128 kbs.

13. Enable High Pass/Low Pass Filters—these filters decrease your file size by eliminating frequencies that people don't usually hear anyway.
14. ID3 Tag—clicking this button opens the ID3 Tag dialog, where you can enter identifying information that is stored in your MP3 file and can be read by most MP3 players and similar hardware.
15. Click the Save button to finish exporting your file.

Project5 exports your project.

Next, see ReWiring to SONAR.

## ReWiring to SONAR

ReWire is a software format that allows two audio applications to synchronize their transports and share audio data. Project5 can function as either a ReWire client or host, and works with any application that supports ReWire.

Let's try running Project5 as a client of SONAR, which has been a ReWire host since version 2:

1. Always open your ReWire host first, so launch SONAR.
2. In SONAR, use the ***Insert-ReWire Devices*** command to display a menu of installed ReWire devices.
3. Choose ***Project5 Version 2*** from the menu.

   The Insert DXi Synth Options dialog appears.
4. For this tutorial, in the Create These Tracks section, choose ***First Synth Output (Audio)***, and in the Open These Windows section, choose ***Synth Property Page***. Click OK.

SONAR creates an audio track called Project5 Version 2 Main L/Main R, and opens the Project5 interface.

Now you have an audio track in SONAR that uses Project5's Master track as its input. You can now monitor and /or record Project5's main output on a stereo track in SONAR. The transports of both applications are now synchronized—running the transport in either application does the identical operation in the other application, except for recording, which is independent. SONAR controls the tempo, ignoring any tempo data in Project5. Sound card latency is determined by SONAR.

You can make any of Project5's buses and tracks available as audio inputs to SONAR. In Project5's Audio Options dialog (***Options-Audio*** command), you can choose what buses and tracks to expose as ReWire outputs from Project5. Just remember though, that creating these outputs uses a lot of memory, so only create the number that you know you will use. These buses and tracks show up as audio inputs in SONAR, and are numbered starting with the Master track, then the aux buses, then the instrument and/or audio tracks in the order that they appear in Project5's Track view. If you want to automatically create audio tracks for all these inputs in SONAR, check the ***All Synth Outputs*** option in SONAR's Insert DXi Synth Options dialog when you insert Project5.

# New Features

New features include a streamlined user interface, ReWire hosting, a powerful new arpeggiator, numerous editing enhancements, a separate bus pane and tempo track, tap tempo, audio recording, audio playback from disk (no size limit on clips), input monitoring, freezing tracks, real-time Groove triggering, track lanes for layered patterns, Groove clip (ACIDized clip) editing and export, the new PSYN II instrument, and the multi-mode sampling synth (Dimension).

## User Interface

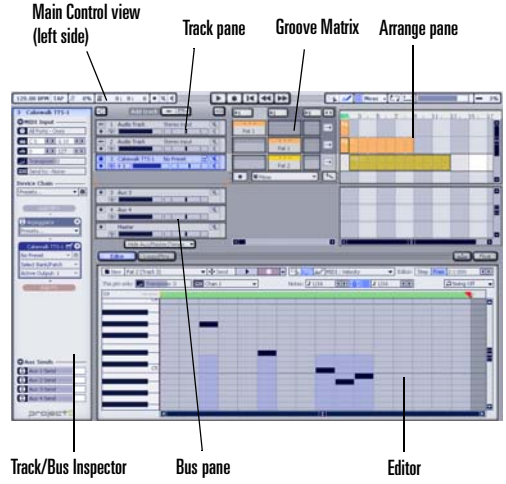
Project5's user interface has been rearranged for quicker workflow. Some components have new names. The Tracker is now called the **Arrange pane**. The controls for the master bus, the aux buses, and the new **Tempo Track** are now in the new **Bus pane** instead of in the Main Control view. The Bus pane is just below the Track pane in the Track view (the Track view includes the Track pane, the Bus pane, the Arrange pane, and the Groove Matrix). You can show or hide the Bus pane by clicking the Show/Hide Aux/Master/Tempo button. The Tempo Track provides a dedicated place to edit tempo changes, replacing the tempo editing mode that was in P-SEQ.

The old SYN.OPS view is now the **Track Inspector**, which is located to the left of the Track view. You can hide or show the Track inspector by clicking the Show/Hide Track Inspector button  that's just left of the Add Track buttons. The Track Inspector becomes the Bus Inspector when you click a bus in the Bus pane.

The old P-SEQ view is now called the **Editor**, and is located along the bottom of the Project5 interface. You can dock, float, and resize the Editor, or float it and drag it to another monitor if you want. A horizontal splitter bar between the Editor and the Track view provides control over the vertical size ratio.

The Pattern Bin has been replaced by the **Loops/Patterns tab**, which can be undocked and resized along with the Editor.

The new **Groove Matrix** provides a place to arrange groups of patterns into grooves, and then trigger each group for live playback and/or recording. You can hide or show the Groove Matrix by clicking the Groove Matrix button  that is just to the right of the Add Track buttons.



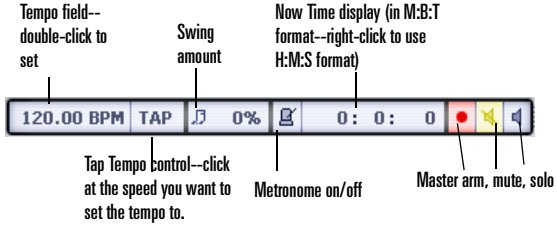

See:

Main Control View

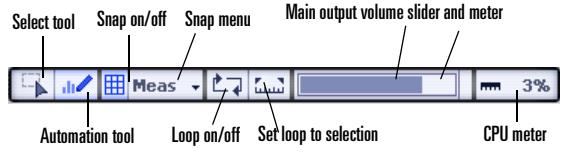
## Main Control View

The **Main Control view** stretches across the top of the interface, and has a new look:

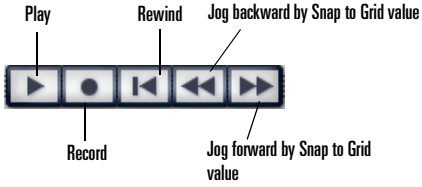
Main Control view (left side)




Main Control view (right side)




Main Control view (transport section)



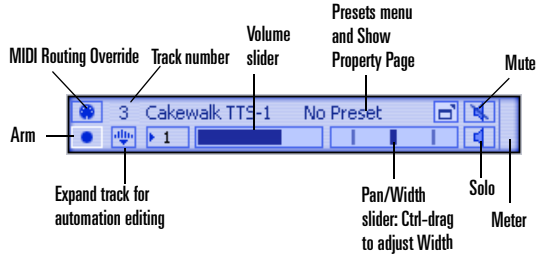

See:

Track Controls

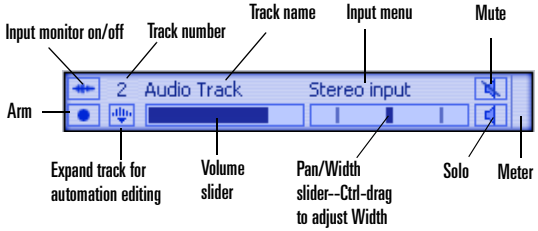
## Track Controls

The **track controls** have been updated:

MIDI Track Controls



Audio Track Controls



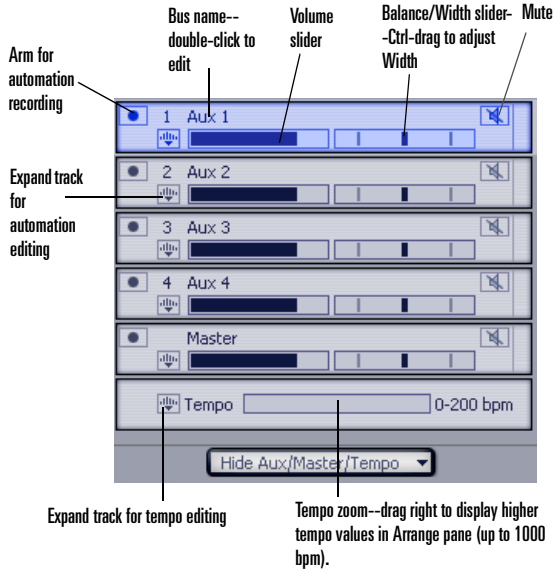

See:

Bus Pane and Tempo Track

## Bus Pane and Tempo Track

The Master bus and the Aux buses have new controls, and the new Tempo Track allows you to draw tempo changes with the Automation tool.

Bus pane and Tempo Track




See:

Changing the Tempo

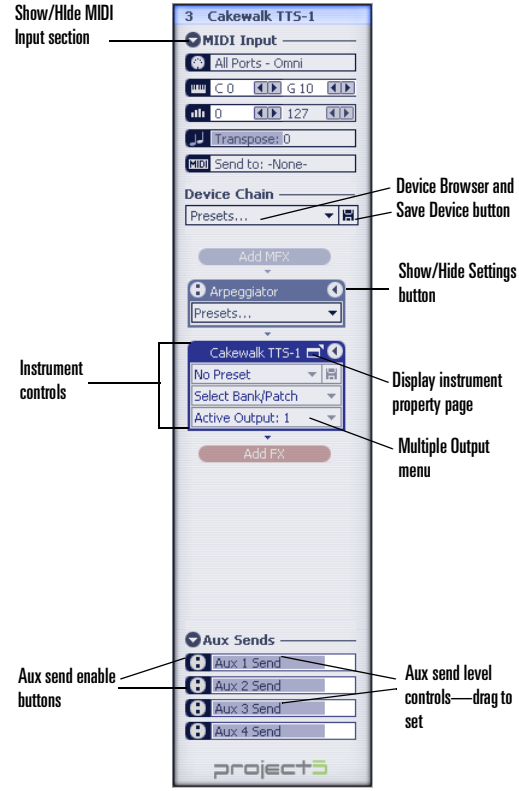
Track Inspector

## Track Inspector

The Track Inspector replaces the old SYN.OPS view. The Track Inspector displays the track information of the track that is currently selected in the Track view. You can show or hide the Track Inspector by clicking the Show/Hide

Track Inspector button that's just left of the Add Track buttons in the Main Control view.

Track Inspector



The Track Inspector is divided into three sections:

### MIDI Input Section

The Input section of the Track Inspector contains:

- The track name (at the very top of the Track Inspector)
- MIDI input port and channel—this menu filters out any live MIDI input that's not on the listed port and/or channel.
- Key range filter—excludes any live MIDI input that's not in the selected range of notes that is bounded by the low note and high note that you select in these two fields.
- Velocity range filter—excludes any live MIDI input that's not in the selected velocity range that is bounded by the lower velocity and higher velocity that you select in these two fields.
- Input transposition field—transposes live input **and patterns** up or down by the positive or negative number of half-steps you enter in this field.
- Send to MIDI channel menu—sets the MIDI channel for patterns in this track, and for incoming notes and data when you're playing live. This menu overrides the MIDI channel menu that's in the Editor, unless this menu is set to ***None***.

**Note**: If you create multiple lanes in a track, each lane has its own instance of the Track Inspector with its own Send to MIDI channel menu. Just highlight each lane in succession to see each lane's Track Inspector. If a lane's Send to MIDI Channel menu is set to None, then each pattern in that lane will play back on the MIDI channel that the pattern contains. Otherwise, patterns play back on the MIDI channel that's listed in that track's Send to MIDI Channel menu in the Track Inspector.

### Device Chain Section

The Device Chain section of the Track Inspector contains the device chain, which displays the instrument and effects that a track uses in the order of their signal flow. **To hide or show the parameter controls** on the instrument or effects, click the Show/HIde Settings button that's on the right end of the titlebar of each instrument or effect.

The Device Chain section has modules that contain the following devices:

- Device Chain menu—use this menu to open the Device Browser, which allows you to choose a device chain for the current track. A device chain is made up of an instrument, effects, parameter settings for the instrument and effects, and remote control assignments for the parameters. Once you've created or edited a device chain, you can click the disk icon to save the device chain for use in other projects.
- Add MFX (Add MIDI effects)—MIDI effects come first in the device chain's signal flow. When you click the Add MFX button to add a MIDI effect, a popup menu of MIDI effects appears, from which you can select one to insert. You can use as many as your computer's processing power can handle. You can change the order of effects by dragging one from a lower position to a higher one
- Arpeggiator—each track gets its own instance of Project5's powerful new arpeggiator. See Arpeggiator for more information.
- Instrument module (or Add Instrument button if no instrument is loaded)—the instrument comes next in the device chain. If no instrument is loaded in this track, you can click the Add Instrument button to open a list of instruments and ReWire applications. Click the name of a device on the list to load it. After an instrument is loaded, you can open the interface of an instrument or ReWire application by double-clicking the name of the instrument or effect in the device

chain, or by clicking the Show Property Page button that's just to the right of each instrument or ReWire name in the device chain.

- Add FX (Add Audio effects)—audio effects come last in the device chain's signal flow. When you click the Add FX button to add an audio effect, a popup menu of audio effects appears, from which you can select one to insert. You can use as many as your computer's processing power can handle. You can change the order of effects by dragging one from a lower position to a higher one. After an effect is loaded, you can open the interface of the effect by double-clicking the name of the effect in the device chain, or by clicking the Show Property Page button that's just to the right of each effect name in the device chain.

**Note**: the device chain supports mouse wheel scrolling.

### Aux Sends Section

The Aux Sends section of the Track Inspector contains:

- Aux send enable and aux send level controls for the selected track

See:

The Bus Inspector

## The Bus Inspector

When you click an aux or master strip in the Bus pane, the Track Inspector becomes the Bus Inspector. The Bus Inspector has two sections:

### Device Chain

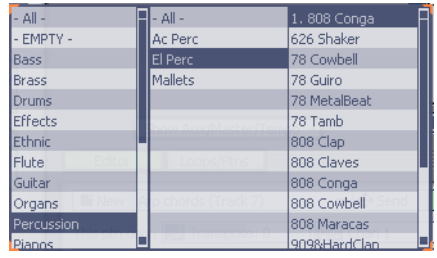
- Name of the selected bus (at very top of Bus Inspector)
- Add FX (Add Audio Effects)—The Devices section shows the effects that are currently inserted into the bus. Effects are displayed according to signal flow, with the earliest effect in the bus's chain displayed at the top. The Devices section also contains the Add FX button, which enables you to insert more effects into the bus. **To hide or show the controls of the effects**, click the Show Settings button, which is at the right end of the titlebar of each effect.

See:

Device Browser

## Device Browser

Project5 patches are now called device chains. A device chain is made up of an instrument, effects, parameter settings for the instrument and effects, and remote control assignments for the parameters. The Device Browser (see graphic below) appears when you open the device chain menu that's in the Device Chain section of the Track Inspector, or when you click the Add Instrument Track button in the Track view. Use the Device Browser to load, edit, and save patches. You can change or delete the instrument and effect(s) in a device chain if you want.




See:

Arpeggiator

## Arpeggiator

P5's arpeggiator lets you play intricate patterns of notes that would otherwise be extremely difficult or impossible to

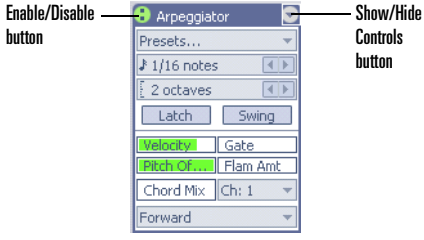
play manually and at speeds and octave ranges that exist beyond the physical limitations of the player or keyboard range.

Arpeggiated events are new events that are based on notes that you play on your controller keyboard. The new events are rhythmically and harmonically specified by the arpeggiator's preset, allowing you to "play" an endless variety sophisticated of musical passages with simple key pressing.

In addition to note events, the arpeggiator can send parameter automation such as pan, volume, and even effects automation for the current track.

Each P5 track owns an arpeggiator, visually located in the Track Inspector. Running multiple arpeggiators across tracks can help realize exciting melodic and rhythmic textures.

The arpeggiator can be played in real time so that it is reliable for live performance.




## Controls

The following table describes the controls in the Arpeggiator:

| Control... | Description... |
|---|---|
| Enable/ Disable | Enables/disables the arpeggiator on a given track. This control can be assigned to MIDI RC and modified in real-time during project playback. |
| Preset Control | You can create and edit arpeggiator presets; all user parameters are stored in the preset.<br>• Arpeggiator settings are included in track patches.<br>• Arpeggiator presets can be saved to a file and exchanged with other users.<br>• Arpeggiator files are stored in a shared directory |
| Rate | Adjusts the relative speed of the arp sequence by changing all the note durations by a factor of the current tempo. This control can be assigned to MIDI RC and modified in real-time during project playback. |

| | |
|---|---|
| Octave Range | Sets the number of octaves through which the arpeggio will play. A value of 1 means that a held chord will only arpeggiate the notes that are being held within the octave from which the notes are being transmitted. A value of 2 means a held chord will arpeggiate for two octaves. The held chord always represents the bass octave, meaning that the other octaves sound in a higher register.<br><br>If you specify a range higher than the standard MIDI specifications, the Arpeggiator will repeat the pattern in the highest available octave as necessary.<br><br>This control can be assigned to MIDI RC and modified in real-time during project playback. |
| Latch | Latch keeps the arpeggio playing after you let go of the keys.<br><br>Control: Button; this control can be assigned to MIDI RC and modified in real-time during project playback. |
| Swing | Swing is either on or off, as it is with the Editor's Step mode. |
| Velocity | An offset control that adds whatever velocity value you select to the velocities of the notes in the pattern. |
| Gate | Controls whether the notes in the pattern are held to their full value, or are held for shorter or longer durations. |
| Pitch Offset | A transposition control in half-steps, up or down a maximum of 2 octaves. |
| Flam Amount | If a pattern contains flams, this menu controls how big a difference there is between the attack time of the flam and the note it is attached to. |
| Hold Chord Mix | When 0, simultaneously held notes arpeggiate as single notes. At 50%, simultaneously held notes are heard as a chord in addition to the usual arpeggiated notes, both at equal levels. At 100%, only the held chord is audible.<br><br>Control: Knob (0 – 100%); this control can be assigned to MIDI RC and modified in real-time during project playback. |
| Ch | MIDI input and output menu—the Arpeggiator only affects input data that's on the MIDI channels listed on this menu, and then the Arpeggiator sends the arpeggiated data out on this channel also. These functions are independent of the Track Inspector's Send to MIDI Channel menu. |

| | |
|---|---|
| Shape | Choosing a shape which specifies the direction in which currently held notes are to be sequenced.<br><br>The Shape selectors behave as a button radio group, and include the following:<br><br>• Rhythm<br>• Forward<br>• Reverse<br>• Forward Circle 1<br>• Reverse Circle 1<br>• Forward Circle 2<br>• Reverse Circle 2<br>• Inward<br>• Outward<br>• Inward Circle<br>• Outward Circle<br>• As Played<br>• As Played Circle<br>• Random<br>• None ( = implicit rhythm mode) |

For a tutorial, see Arpeggiator.

Next, see:

Loops/Ptns (Patterns) Tab

## Loops/Ptns (Patterns) Tab

Replacing the old Patterns Bin is the Loops/Patterns tab. The Loops/Patterns tab is located in the same space as the Editor, just click the “tab” that’s labeled Loops/Ptns to display it. The Loops/Patterns tab allows you to navigate your computer to show patterns, preview them, and insert them into your project.

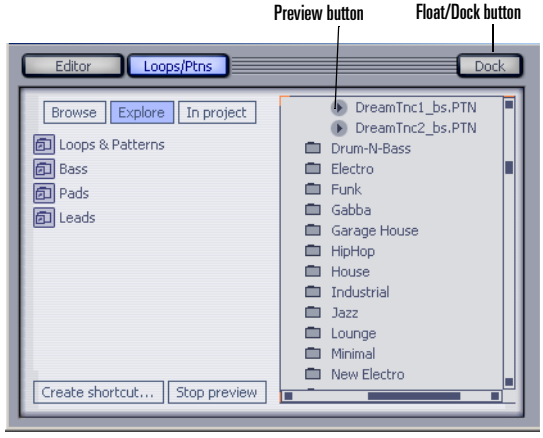
The Loops/Patterns tab has three modes:

- **Explorer mode**—this mode displays your patterns and audio loops in Windows Explorer style. Click the Explore button to enter Explorer mode.
- **Browse mode**—this mode displays your patterns and audio loops in several columns, divided by type. Click the Browse button to enter Browse mode.
- **In Project mode**—this mode displays the **In Use** folder, which shows all the patterns that are currently being used in the Arrange pane, and the **Not In Use** folder, which stores patterns that you have viewed in the Editor or have deleted from the Arrange pane, but are not currently being used in the Arrange pane.

The Loops/Patterns tab also has the following components:

- Create Shortcut button—the Loops/Ptns tab can remember where you browse. Click a folder to make it the current folder, and then click the Create Shortcut button to bookmark the folder.
- Stop Preview button—Stops the playback of a file being previewed.
- Float/Dock button—you can float or dock the Loops/Patterns tab along with the Editor.
- Delete button—the Delete button  deletes the currently selected pattern from the Not In Use or In Use folders.
- Delete Not In Use Patterns button—the Delete Not In Use Patterns button  clears the Not In Use folder of all unused patterns.

Loops/Patterns tab




Next, see:

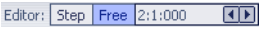
The Editor

## The Editor

The Editor is where you create new MIDI patterns (you can also create MIDI patterns by recording in the Track view), edit patterns (including pattern automation), and save patterns to your patterns folders. You can also edit Groove clips in the editor.

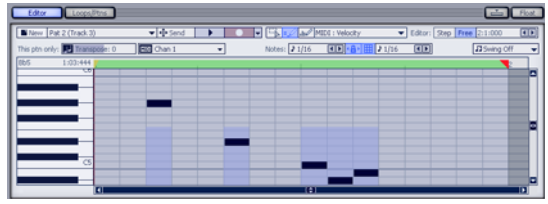
The Editor has three modes:

- Step mode—this mode models a hardware step sequencer, allowing you to create and edit MIDI patterns on a grid. In Step mode, you can draw notes (always of a fixed length) with the mouse and also do Step Recording, but not real-time recording
- Free mode—in this mode, the Editor displays a traditional piano-roll style editing surface, which allows any note length. In Free mode, you can draw notes with the mouse, and also do both Step Recording and real-time recording.
- Groove clip mode—when you double-click a Groove clip (ACIDized clip) in the Arrange pane, the Editor becomes a Groove clip editor.

Click the Step or Free fields in the Editor menu 

to change the Editor to Step mode, or back to Free mode.

Here's a picture of the Editor:



The Editor has the following controls:

### Float/Dock Button 


To Float or Dock the Editor:

- Click the Float/Dock button that's in the upper right corner.

  Or

- Double-click the left border

To Resize the Editor:

- Drag any border or corner.

**Note**: when the Editor is docked, dragging its upper border changes the size of the Arrange pane.

### Show/Hide Button 

Click this button to show or hide the Editor and the Loops/Ptns tab.

### New Pattern Button 


Clicking this button creates a new empty pattern, and automatically loads the pattern into the Arrange pane at the Now time on the selected track. The new pattern is one measure long by default, but you can change this by using the ***Options-Default Step Size for Step Sequencer*** command, together with the ***Options-Default Step Count for Step Sequencer*** command. For example, if you chose a default step size of 16th notes, and a default step count of 32 steps, that would create a pattern of two measures in 4/4 time.

### Pattern Menu 


The pattern menu, located the in upper left corner of the Editor, displays the name of the current pattern. You can rename the pattern by double-clicking the pattern name.

Clicking the dropdown button in the pattern menu displays these options:

- ***Open Pattern***—opens the Open Pattern dialog to the default directory for patterns. Navigate to the directory you want and select a file to open in the Editor.
- ***Save Pattern As***—opens the Export Pattern dialog, enabling you to name and save the pattern to the folder where you store patterns.
- ***Duplicate Pattern***—copies the current pattern under a new name, so that any editing you do to the new copy doesn't affect the original.
- ***Automatically send new patterns to track view***—if this option is enabled, every time you click the New Pattern button, Project5 automatically places the new pattern on the highlighted track at the Now Time.
- ***In Use***—opens a menu of patterns that are currently in use in the current project.
- ***Not In Use***—opens a menu of patterns that have been used in the current project, but were deleted from the Arrange pane.

### Send Pattern to Track Button 


Click this button to place the pattern that's currently displayed in the Editor on the highlighted track at the Now Time.

You can also drag this button to the track and time where you want your pattern to go.

### Pattern Preview Button 

Click this button to play the pattern that's currently displayed in the Editor. The pattern plays back through whatever instrument is currently selected in the Track view. You can set the time where playback begins in the Editor by double-clicking in the Editor's Time Ruler, which moves the Edit Marker to the location you double-clicked.

### Record Pattern Button 

Click this button to record a new pattern by either live or step recording in the Editor.

Click the dropdown arrow on the Record Pattern button to choose recording options. Choose any or all of these three options:

- **Constant Velocity**—when this option is checked, recorded notes are not affected by velocity changes from the MIDI controller. Note velocities are all set to 100.
- **Overwrite**—when this option is checked, current note data is overwritten by new note data.
- **Step Record**—when this option is checked, the recording mode is set to Step Recording. Step Recording means that instead of recording notes that you play at the time the notes were played, Project5 records notes of exactly the same length, one after another, each time you play your MIDI controller, no matter how much time has passed since the last note

was entered. The note lengths are determined by the Notes menu setting.

### Tools

The Editor has three tools to help you create and edit patterns.


- The **Select** tool is an all-purpose tool for selecting data, however you can use the Note tool when you just need to select an individual object without dragging it. Pressing T on your keyboard toggles which tool is active (including the Select tool).
- Use the **Note** tool to draw notes in a pattern. The note length menu determines the length of the notes you draw.
- Use the **Automation** tool to draw automation in a pattern. Select an automation parameter to draw or edit in the automation edit menu in the Editor.

### Automation Menu


The automation menu is just to the right of the Auto tool (Automation tool). Clicking the dropdown arrow on the automation edit menu displays a menu of automation editing options:

- Outputs—choosing this option displays a menu of parameters that are specific to a particular output of the currently-selected track. If the instrument in the selected track has multiple outputs, the menu will show parameters for each output.
- MIDI—choosing this option displays a menu of standard MIDI continuous controllers that affect all the outputs on the selected track.
- DXi—choosing this option displays a menu of parameters that are specific to the instrument that is loaded into the selected track.
- Effects—choosing this option displays a menu of parameters that are specific to the selected effect on the selected track.
- Arpeggiator—choosing this option displays a menu of parameters that control the Arpeggiator on the current track.

For more information, see the online help topic Automation.

### Editor Menu


Click the Step or Free fields in the menu to change the Editor to Step mode, or back to Free mode. Also, you can click the left or right arrows in the menu to set the length of the current pattern, or double-click the length field and type a length value. See the online help topics Creating Patterns in Step Mode and Drawing Notes In Free Mode for more information.

### This Ptn Only Menus


By default, all copies of a pattern in the Arrange pane are identical except for their MIDI channel and transposition. The Transpose and MIDI Ch menus allow you to change the transposition and MIDI channel of a particular instance of a pattern. Double-click the instance of the pattern where it appears in the Arrange pane to display the instance for editing.

- Transpose menu—this menu lets you transpose just the current instance of a pattern (the pattern in the Arrange pane that has the black border). The field lists the number of half-steps up (+) or down (-) that the current instance of the pattern is being transposed.

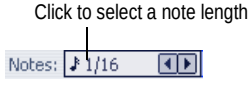
If you use copies of this pattern in other parts, the Transpose menu is independent for each copy.

Select a pitch offset for the current instance of the pattern. The range is from -127 to +127 for a MIDI pattern or -24 to +24 for a Groove clip. You can double-click the value, type a number, and press Enter if you don't want to click the up and down arrows. The transposition value is displayed in parenthesis next to the pattern name

- MIDI Ch menu—this menu allows you to choose which MIDI channel that the displayed pattern plays back through, and also sets the channel that the Editor's keyboard display uses when you click the keys. Choosing different MIDI channels for a pattern allows you to access different sounds on different channels of a multi-timbral instrument.

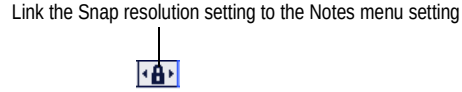
  **Note**: the Track Inspector has a menu for each track or track layer called the Send to MIDI Channel menu. This menu overrides the MIDI channel that you assign to a pattern in the Editor, forcing all patterns on a track or track layer to play on the MIDI channel that's listed in the Send to MIDI Channel menu. To disable the Send to MIDI Channel menu, set the menu to ***None***.

### Notes Menu



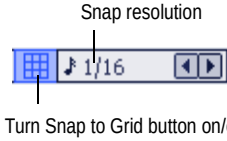

The Notes menu controls the length of the current step-recorded note, or of notes that you draw with the Notes tool. You can select a new length at any time

### Link




The Link button forces the Snap to Grid button resolution and the Notes menu value to be the same. For example, if you change the Notes menu setting then click the Link button, the Snap to Grid resolution will follow the Note Length setting.

### Snap to Grid




In Free mode, the Snap to Grid setting sets the precision at which notes can be entered and edited, and also sets the time interval that the Now Time moves when you double-click in the Editor's Time Ruler. The Snap to Grid control is **not visible in Step mode**, because the Snap to Grid is always on in that mode, and is set to whatever duration the Notes menu is set to. A snap resolution of 1/2 means that entered notes and notes you drag and drop in the Editor "snap" to the nearest 1/2 note boundary. The snap resolution in the Editor ranges from measures to 1/128th notes. The default is 1/16th. You can override the snap resolution setting by holding the Shift key while dragging notes. When the Snap to Grid button is disabled, or when you are overriding it, data moves by ticks. Project5 divides each beat into 960 ticks.

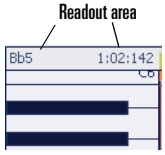
### Swing Control


When the Swing Control is on, patterns of consecutive 8th notes, 16th notes, or 32nd notes play back with a swing feel, instead of a straight feel. You control the strength of the swing effect for each project by dragging the Swing control that's in the Main Control view.

### Keyboard Display

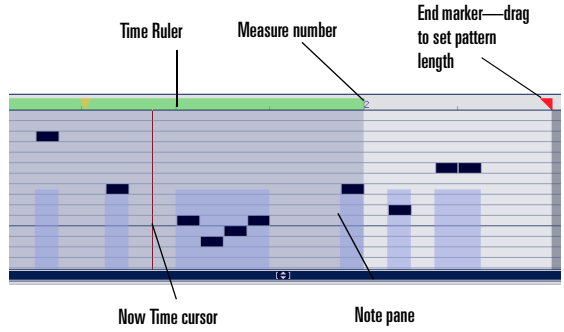
The keyboard display, which is on the left side of the Editor, lights up to show what pitches you're playing on a MIDI keyboard. It also gives you a visual reference for pitches while you're drawing notes with the Note tool.

### Cursor Display




At the very top of the Keyboard Display is the Cursor Display, which shows a readout of the vertical and horizontal coordinates of whatever tool you're using in the Note pane, both while the tool is moving and while it's not.

### Time Ruler




The Time Ruler in Free mode shows measure numbers and beat boundaries. The Now Time cursor (vertical white line) moves through the Note pane during playback to show you where the Now Time currently is in your pattern.

In Step mode, the Time Ruler has no measure numbers. See the online help topic The Time Ruler in Step Mode for more information.

### Note Pane

This is the pane where you display and edit patterns.

### Zooming and Scrolling

You can zoom and scroll in all modes of the Editor (see the online help topic Zooming and Scrolling in the Editor).

### The Now Time

The Editor has its own Now Time, which is independent of the Now Time in the Arrange pane. The Editor's Now Time marks the point in a pattern at which playback is taking place, or where playback is currently stopped. The vertical cursor in the Editor is a graphical display of the Editor's

Now Time position. You can set the Now Time in the Editor by double-clicking in the Editor's Time Ruler.

### Trans "n" % (in Groove Clip Mode Only)


When you double-click a Groove clip in the Arrange pane, the Editor changes to Groove clip mode, displaying the Groove clip with a series of transient markers. The Trans Detect control senses transients in your audio pattern and assigns a marker at the beginning and end of each transient that it finds. As the you increase the sensitivity (by using larger numbers) smaller transients are detected and the number of markers increases.

### Slice Division Menu (in Groove Clip Mode Only)


The Slices Division menu sets the resolution for the creation of markers, or the "slicing" of the looped clip. This menu uses transients or note lengths, so the settings are:

- Transient Only
- Whole
- Half
- Quarter
- Eighth
- Sixteenth
- Thirty-second

The automatic markers appear at the note resolutions according to the slider setting. At the eighth note setting, there are eight markers per measure.

This control works well for slicing audio that has more subtle changes in volume with few dramatic transients.

The markers in a Groove clip preserve the timing of the audio at that moment. Too few or too many markers can cause unwanted "artifacts" when a Groove clip is stretched.

### Restore Markers (in Groove Clip Mode Only)

The Restore Markers tool restores all automatically generated markers to the original position and enables all those that were disabled. Manually created markers remain as is.

### Beats in Clip (in Groove Clip Mode Only)


The number of beats in the clip.

### Transient Markers (in Groove Clip Mode Only)


Project5 uses the transient markers in a clip to stretch or shrink the clip to synchronize to different tempos. Transient markers mark the loudest and most characteristic-sounding parts of the clip, so Project5 tries to leave these parts of the clip alone as much as possible when adjusting tempo. If you want to move markers, you can drag them to new positions, with or without the Snap to Grid button enabled. You can add new markers by double-clicking in the Time Ruler.

Next, see:

Automation Editing in the Track View

## Automation Editing in the Track View

When you click the Automation tool in the Main Control view, the tracks automatically expand vertically to provide a space to edit track automation. Each track also has a Show/Hide Automation button for more control.

For more information, see:

Automation

Next, see:

Automation Selection

## Automation Selection

You can now use the Select tool to select automation in the Arrange pane. After you select it, you can press the Delete key to delete it, cut or copy it with Ctrl+X or Ctrl+C commands, paste it at the Now Time in the current track with the Ctrl+V command, or move it by the Snap to Grid value by pressing the left or right arrow keys. Pressing the up or down arrow moves the selected automation to adjacent tracks.

Next, see:

Editing Enhancements

## Editing Enhancements

Project5 continues to add editing enhancements, including:

- Transposing tracks
- Merging patterns
- Splitting patterns
- Shift-dragging patterns
- Ctrl-Alt-dragging patterns
- Sliding patterns or notes
- Scaling velocity
- Unlinking patterns
- Groove quantizing

See:

Transposing Tracks

Merging Patterns (Clips)

Splitting Patterns

Shift-dragging Patterns

Ctrl-Alt-dragging Patterns

Shifting Events in Time

Scaling Velocity

Unlinking Patterns

Groove Quantizing

### Transposing Tracks

Unlike the old SYN.OPS transpose menu, the Transpose menu in the Track Inspector affects both live input and patterns. You can transpose whole tracks at a time in this menu by entering the number of half-steps (positive or negative) by which you want to transpose your track.

### Merging Patterns (Clips)

You can now merge selected audio or MIDI patterns on the same track.

**Note**: track automation, and slip-edited (cropped) data are not included in the merge.

### To Merge Patterns

1. If you don't want empty space in the newly formed pattern, move the patterns you want to merge so that their borders line up back to front.
2. Select the patterns (Ctrl-click each one). Selected patterns appear darker than unselected patterns.
3. Right-click one of the selected patterns and choose ***Combine Selected Clips*** from the popup menu.

   **Note**: the terms "patterns" and "clips" are used interchangeably in Project5.

Project5 creates a new pattern out of the selected patterns.

## Splitting Patterns

You can now split audio or MIDI patterns in the Arrange pane. Splitting a pattern creates two slip-edited sections of the same pattern. Both patterns contain the same data and are still the same pattern, but only the data that appears on the pattern sounds.

**Note**: the terms "patterns" and "clips" are used interchangeably in Project5.

### To Split Patterns

1. Move the Now Time to the place where you want to split the patterns.
2. If you want to split multiple patterns on multiple tracks, move any patterns you want to split so that the Now Time cursor lies across the places where you want to split the patterns.
3. Select the patterns you want to split.
4. Right-click a selected pattern and choose ***Split Selected Clips*** from the popup menu.

## Shift-dragging Patterns

When you drag patterns from one track to another, holding the Shift key while you drag keeps the patterns at their original time location.

## Ctrl-Alt-dragging Patterns

Ctrl-Alt-dragging patterns creates independent copies of the dragged patterns in both the Arrange pane and the Groove Matrix, instead of creating new instances of the same patterns.

## Shifting Events in Time

The ***Process-Slide*** command opens the Slide dialog box, which allows you to move selected MIDI notes or automation (not track automation) forward or backward in time.

**Note1**: the ***Process-Slide*** command moves selected MIDI data, but does not move the pattern that the data occupies. After you slide your MIDI data, you may need to lengthen the boundaries of the pattern that the data is in to see and hear the data.

**Note 2**: this command is intended for MIDI pattern data only. However, some Groove clips created in earlier versions of Project5 may contain MIDI data that will respond to this command.

### To Shift Events in Time

1. Select the notes or patterns you want to shift.
2. Choose ***Process-Slide*** to display the Slide dialog box.
3. Enter the number of measures, ticks, seconds, or frames to slide. Enter a negative number to shift material earlier. Note that you cannot slide any event earlier than 1:01:000. For example, if the current selection starts at 2:01:000, you cannot slide events earlier by more than one measure.
4. Click OK when you are done.

Project5 shifts the selected events.

## Scaling Velocity

This feature creates a smooth velocity transition from the beginning of a selection to the end.

**Note**: this command is intended for MIDI pattern data only. However, some Groove clips created in earlier versions of Project5 may contain MIDI data that will respond to this command.

### To Scale Velocity

1. Make sure the patterns in the Arrange pane, or the notes in the Editor are selected.
2. Use the ***Process-Scale Velocity*** command.

   The Scale Velocity dialog opens.
3. Fill in beginning and ending values for the selected notes or patterns. If you decide to use percentages instead of actual values, click the Percentages checkbox first.
4. Click OK.

Project5 scales the velocity values of the selected patterns or notes. If you selected multiple patterns, the beginning of a pattern gets the beginning velocity value that you chose, and the end of the pattern gets the ending value.

## Unlinking Patterns

You can now unlink instances of a pattern, making independent copies.

**Note**: the terms “patterns” and “clips” are used interchangeably in Project5.

### To Unlink Patterns

1. Select the copies of a pattern that you want to unlink.
2. Use the ***Edit-Unlink Selected Clips*** command.

Project5 unlinks the selected patterns, and edits their names.

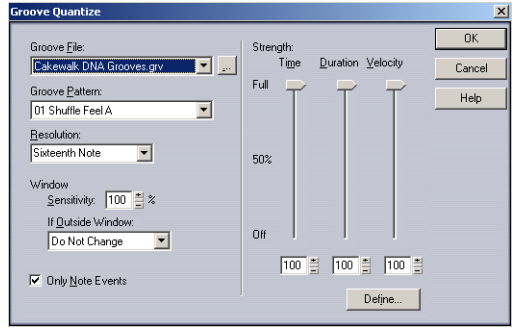
## Groove Quantizing

Groove quantizing changes the timing of selected notes to resemble the timing of another group of selected notes, which is referred to as a groove.

**Note**: commands from Project5’s Process menu are intended for MIDI pattern data only. However, some Groove clips created in earlier versions of Project5 may contain MIDI data that will respond to these commands.

### To Use the Groove Quantize Command

1. Select the pattern or group of notes you want to quantize.
2. Choose ***Process-Groove Quantize*** to display the Groove Quantize dialog box.




3. Choose a groove file from the Groove File field.
4. Choose a groove pattern from the Groove Pattern field.

5. Use the following fields to configure your pattern:

| Setting... | What to do... |
|---|---|
| Resolution | Choose a note size or enter the number of clock ticks |
| Window Sensitivity | Enter the window sensitivity value (percentage) |
| If Outside Window | Choose what should happen to events outside the window |
| Only Note Events | Check to prevent MIDI controller, aftertouch, and xRPN data from being adjusted |
| Strength | Use the sliders or enter values for Note strength, Duration strength, and Velocity strength |

6. Click OK when you are done.

Project5 quantizes the selected data. You can use ***Undo*** to restore the material to its original state.

### Show Waveform or MIDI Notes on Patterns

Project5 now displays MIDI patterns and audio patterns with distinctive markings:

- MIDI patterns show MIDI notes


- Audio patterns show audio waveforms


## Tap Tempo

You can set the tempo in Project5 by clicking the Tap button that's in the Main Control view. Just click the button at the playback speed that you want your project to use. You can also click the Tap button by Remote Control--right-click the Tap button and choose ***MIDI Remote Control*** from the context menu, and assign a MIDI note or controller to the Tap button.

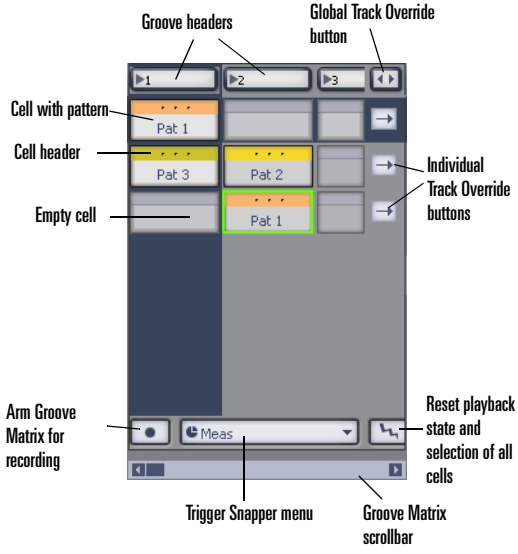

## Using the Groove Matrix

A groove in Project5 is a collection of one or more patterns stacked vertically in the Groove Matrix, one pattern per track. Each groove lasts as long as the longest pattern in that particular groove. The shorter patterns in a groove repeat until the longest pattern in that groove finishes (by default, but you can change this). Each column in the Groove Matrix is made up of cells, which are just pattern holders, one per track. You can drag one pattern into each cell, or leave the cell empty.

By default, you can play one groove at a time, starting each groove by clicking its header, or by triggering the groove with remote control.

You can record your grooves in the Arrange pane.

Groove Matrix




### To Show or Hide the Groove Matrix

- Click the Show/Hide Groove Matrix button .

### To Add a Pattern to a Cell

- Drag a pattern from the Loops/Patterns tab or from the Arrange pane to the desired cell.

### To Remove Patterns from Cells

- Select a cell by clicking its header, or select multiple cells by Ctrl-clicking their headers; then press the Delete key to remove the patterns from the selected cells.

  Or

- Drag a pattern to a different cell, or a group of selected patterns to different cells.

### To Select Patterns in Cells

- Select a pattern by clicking its cell header, or select multiple patterns by Ctrl-clicking their cell headers

Patterns display a green outline when they are selected.

### To Deselect a Pattern in a Cell

- Ctrl-click the cell header.

### To Deselect All Patterns in Cells

- Click inside of an empty cell, or click the Reset Cells button

### To Scroll the Groove Matrix

- Drag the horizontal scrollbar that's at the bottom of the Groove Matrix.

For more informaiton, see:

Groove Playback

Cell Playback

Editing Grooves

Recording Grooves

## Groove Playback

By default, grooves repeat themselves until another groove starts to play (you can change the default behavior). Grooves also play back simultaneously with patterns in the Arrange pane, unless you enable the global Track Override button (each track also has its own Track Override button). If you enable the global Track Override button, only the Groove Matrix sounds if there are patterns in the Arrange pane that would sound at the same time. Besides playing grooves, you can audition individual or multiple cells. You can trigger grooves and cells from a MIDI controller if you want.

### To Play a Groove

- Click the groove header.

All the patterns in the groove start playing, and all the cells in the groove turn green to show that they are selected for playback. Each cell that's playing back displays a progress bar to show what part of the cell's pattern is playing at any given time.

### To Set the Time Lag Before a Groove or Cell Starts Playing

- In the Trigger Snapper menu (it's at the bottom of the Groove Matrix, just right of the Arm button), choose one of the available options.

Now, when you trigger (play) a groove or cell, playback starts after the amount of time you chose in the Trigger Snapper menu.

### To Play Multiple Grooves Simultaneously

- Ctrl-click the groove header on each groove you want to play.

### To Pause or Resume Playback of all Currently-playing Grooves and Cells

- Press the Spacebar.

Starting or stopping playback with the Spacebar maintains the playback selection of all currently-playing grooves and cells.

### To Stop Playing a Groove

- Click the groove header.

Clicking a groove header stops the groove from playing back, and removes the groove from playback selection.

### To Trigger a Groove or Cell with Remote Control

1. If you want to trigger a groove, right-click the groove header and select ***MIDI Remote Control*** to open the MIDI Remote Control dialog.
2. If you want to trigger a cell, right-click the cell header and select ***MIDI Remote Control*** to open the MIDI Remote Control dialog.
3. Click the Learn button, and then move the MIDI key or control you want to use to trigger the groove or cell.
4. Click the Stop Learning button, and click OK to close the dialog.

Now when you press the MIDI key or control you selected, the groove or cell starts to play.

### To Retrigger Grooves from the Beginning

- Right-click an empty place in the Groove Matrix and choose ***Trigger = Play/Retrigger*** from the popup menu.

By default, retriggering a groove stops playback of the groove. However, if you choose the above option, when you retrigger a groove, the groove will start playing from the beginning of the groove, after the amount of time listed in the Trigger Snapper menu.

If you're playing multiple grooves, retriggering a groove stops other grooves from playing back. if you want other groove to keep playing, retrigger grooves by Ctrl-clicking instead of just clicking.

### To Mute or Unmute the Arrange Pane or Groove Matrix

- If you want groove patterns on a certain track to override the Arrange pane (mute the Arrange pane while that tracks's groove patterns play), click that track's Track Override button so that the button arrow points at the Groove Matrix.
- If you want patterns on a certain track in the Arrange pane to override the same track in the Groove Matrix, click that track's Track Override button so that the button arrow points at the Arrange pane.
- If you want a certain track's patterns in both the

Arrange pane and the Groove Matrix to sound, Alt-click that track's Track Override button so that the button arrow points both directions.

- If you want all patterns in the Groove Matrix to override the Arrange pane when any Groove Matrix patterns play, click the Groove Matrix's Global Track Override button so that the arrow points at the Groove Matrix.
- If you want all patterns in the Arrange pane to override the Groove Matrix, click the Groove Matrix's Global Track Override button so that the arrow points at the Arrange pane.
- If you want both the Arrange pane and the Groove Matrix to sound, Alt-click the Groove Matrix's Global Track Override button so that the arrow points in both directions.

See Cell Playback.

## Cell Playback

You can play individual or multiple cells whether grooves are playing or not.

### To Set the Time Lag Before a Groove or Cell Starts Playing

- In the Trigger Snapper menu, choose one of the available options.

When you trigger (play) a groove or cell, playback starts after the amount of time that's selected in the Trigger Snapper menu.

### To Play One or More Cells

- Click each cell in the lower part of the cell where the pattern name is. You can only play one cell per track at the same time unless you Ctrl-click (see next procedure).

While a cell plays, the cell turns green to show that the cell is selected for playback, and the cell displays a progress bar that shows what part of the cell is playing at any given time.

### To Play Multiple Cells on the Same Track

- Ctrl-click each cell in the lower part of the cell where the pattern name is.

### To Play a Cell in Sync with the Song

1. Right-click the cell header and choose ***Play In Time With Song*** from the popup menu.

   Project5 displays the clock icon on the cell.

2. Play the cell.

Using this option starts the cell playing after the Trigger Snapper interval passes, and in sync with the Now Time in your project. It's as if the cell's pattern was repeated throughout the song and you unmuted the pattern at a certain point.

### To Pause or Resume Playback of all Currently-playing Grooves and Cells

- Press the Spacebar.

Starting or stopping playback with the Spacebar maintains the playback selection of all currently-playing grooves and cells.

### To Stop Playing One or More Cells

- Click each cell in the lower part of the cell where the pattern name is.

Stopping playback with this method stops the cell from playing back, and removes the cell from playback selection.

### To Trigger a Groove or Cell with Remote Control

1. If you want to trigger a groove, right-click the groove header and choose ***MIDI Remote Control*** from the popup menu to open the MIDI Remote Control dialog.
2. If you want to trigger a cell, right-click the cell header to open the MIDI Remote Control dialog.

3. In the MIDI Remote Control dialog, click the Learn button, and then move the MIDI key or control you want to use to trigger the groove or cell.

4. Click the Stop Learning button, and click OK to close the dialog.

Now when you press the MIDI key or control you selected, the Groove or cell starts to play.

### To Cause a Cell to Play Just Once Without Repeating

- Right-click the cell and choose ***One-shot*** from the popup menu.

Project5 displays the One-shot icon on the cell that you right-clicked.

### To Retrigger Cells from the Beginning

- Right-click an empty place in the Groove Matrix and choose ***Trigger = Play/Retrigger*** from the popup menu.

By default, retriggering a cell stops playback of the cell. However, if you choose the above option, when you retrigger a cell, the cell will start playing from the beginning of the cell, after the amount of time listed in the Trigger Snapper menu.

**Note 1**: the cell's ***Play In Time With Song*** option overrides the retriggering option.

**Note 2**: if you're playing more than one cell on a track, retriggering a cell stops other cells on the same track from playing back.

### To Remove All Cells from Playback Selection

- Click the Reset All Cells button.

See Editing Grooves.

## Editing Grooves

You can drag patterns from the Loops/Patterns tab or the Arrange pane to cells, you can also drag patterns from one cell to another, and use standard cut/copy/paste commands.

### To Rename a Groove

- Right-click a groove header, choose ***Rename Groove*** from the popup menu, and press Enter.

### To Change the Width of Cells

- Right-click an empty cell, and select ***Cells Width-[small, normal,*** or ***large]*** from the popup menu.

Project5 changes the width of all the cells.

### To Remove All Patterns from a Groove

- Right-click the groove header, and select ***Clear Groove*** from the popup menu.

### To Remove a Groove

- Right-click the groove header, and select ***Remove Groove*** from the popup menu.

Project5 removes the groove, and moves any grooves that are to the right of the groove to the left.

### To Insert a Groove

- Right-click a groove header, and select ***Insert Groove*** from the popup menu.

Project5 inserts an empty groove to the left of the groove you right-clicked.

### To Select Cells

- Select a cell by clicking the cell header, or select multiple cells by Ctrl-clicking their cell headers.

Cells display a green outline when they are selected. You can also drag around a group of cells that you want to select.

### To Play Only Selected Cells

- Shift-click the lower part of one of the selected cells where the pattern name is.

### To Remove Specific Patterns from Cells

- Select a pattern by clicking its header, or select multiple patterns by Ctrl-clicking their headers; then press the Delete key.

  Or

- Drag a pattern to a different cell, or a group of selected patterns to different cells.

### To De-select a Pattern in a Cell

- Ctrl-click the cell header.

### To De-select All Patterns in Cells

- Click inside of an empty cell.

  Or

- Click the Reset All Cells button  .

### To Copy or Cut Patterns from Cells

- Select the patterns you want to copy or cut, and use the Ctrl+C or Ctrl+X command, respectively.

  Or

- Copy and paste a pattern or a group of selected patterns to a new cell or cells by Ctrl-dragging the pattern(s).

**Tip**: If you Alt-Ctrl-drag, you create independent copies of the dragged patterns.

### To Paste Patterns into Cells

1. Click inside of an empty cell.
2. Use the Ctrl+V command.

Project5 pastes the cell data from the clipboard into the Groove Matrix, starting at the cell you clicked, and maintaining the same pattern of filled cells that you copied.

### To Reorder Grooves

- Drag the groove header to move the groove to a new place in line.

See Recording Grooves.

## Recording Grooves

You can record the output of the Groove Matrix on the same tracks that each filled cell in the Groove Matrix uses. If there are already patterns in the tracks you're recording to, the pre-existing patterns are not overwritten.

Audio patterns in the Groove Matrix record as audio patterns in the Arrange pane, and MIDI patterns record as MIDI patterns.

### To Record Grooves

1. Set the triggering time lag in the Trigger Snapper.
2. If you want some or all tracks in the Groove Matrix to override the Arrange pane, click the appropriate Override buttons in the Groove Matrix.
3. Click the Groove Matrix's Arm button to enable it.
4. Move the Now Time to where you want to start recording.
5. Click a groove header to start playback.

   Project5 starts recording.
6. Trigger other grooves and/or cells when you want them to start playing.
7. Click the Stop button or press the Spacebar when you want to stop recording.

Project5 records the output of each cell into the same track the cell occupies. To erase your recording, press ***Ctrl+Z***.

## Track Layers

The new track layer feature lets you drag overlapping patterns into separate lanes in a track so you can easily see and edit the patterns. Lanes look like new tracks, and have a track number that increases by 0.1 every time you create a new lane. Each new lane that you add to a track is controlled by the same volume and pan controls as the original track, but each lane has its own mute, solo, and arm controls. You can display and edit different automation parameters in separate lanes, but the parameters apply to all the lanes (it's still only one track). On MIDI tracks, you can use different MFX (MIDI effects), and a different program/channel combination on each lane.

**Note 1**: an original track and all of its track lanes use the same output on a multi-output instrument.

**Note 2**: you can only patch Project5's Arpeggiator into an original track, but the Arpeggiator affects all lanes of the track.

### To Add Lanes to a Track

1. Right-click the track name, and choose ***Create Layer*** from the popup menu.

   Project5 creates a new track lane.

2. Drag overlapping patterns to the new lane. If you have more than two layers of patterns, repeat step 1 to create extra lanes, and drag the remaining overlapping patterns to the new lane.

You can rename any of the new lanes if you want. To add more lanes, right-click any of the lanes and choose ***Create Layer*** from the popup menu.

### To Remove a Lane from a Track

Right-click the lane, and choose ***Delete*** from the popup menu.

## ReWire Hosting

Project5 can now function as either a ReWire host or client.

For more information, see the ReWire topic in the online help.

## New Audio Features

New audio features include audio recording, audio playback from disk (no size limit on clips), input monitoring, freezing tracks, Groove clip (ACIDized clip) editing and export, and per-project audio folders to store each project's recorded audio. Project5 Version 2 lets you record and play back audio in several forms. You can use Groove clips which follow your project's tempo, or standard audio wave files which are streamed off your hard disk.

Let's look at the different types of audio files and where they are stored.

See:

Audio Types

### Audio Types

There are two types of audio files which you can use in Project5: wave files and Groove clips (ACIDized wave files). Wave files are standard Windows audio files while Groove clips are special files that "know" their pitch and tempo and can adjust to your project accordingly. Groove clips are stored in RAM. Wave files are streamed off your hard disk.

See:

Loading Audio Patterns

Recording Audio

Audio Folders

### Audio Folders

Each project has its own audio folder. When you save your project, it creates a folder with your project's name in the same directory as the project. The audio folder is the same as the project name plus the word Audio at the end. For example, a project called My Project would create an audio folder called My Project Audio. When you back up or move a project, make sure you include the project's audio folder.

See:

Loading Audio Patterns

Recording Audio

## Loading Audio Patterns

Use the following procedure to load an audio pattern into Project5.

**To Load a Groove Clip or Wave File**

1. Use the Loops/Patterns tab to navigate to the folder where your audio clips (patterns) are stored.
2. If you want, click the Play button that's on the left side of the audio clip name to preview the clip.
3. Drag the clip from the Loops/Patterns tab into the Arrange pane at the place and time where you want the clip to be.

**To Import a Groove Clip or Wave File**

1. Select the track that you want to load the clip into.
2. Move the Now Time to the place where you want to load the clip.
3. Use the ***File-Import*** command to open the Import dialog, and navigate to the folder where the desired audio pattern is stored.
4. Select the pattern. If the pattern is not ACIDized and you want it to be, click the Convert Audio to Groove Clip option in the dialog.
5. Click OK.

Project5 imports the clip to the time and track you chose, and displays the clip in the Editor.

See:

Recording Audio

Audio Folders

# Recording Audio

In addition to importing audio clips and Groove clips, you can record your own audio tracks in Project5.

See:

Choosing a Sound Card Input

## Choosing a Sound Card Input

You need to choose a sound card input for recording.

### To Choose a Sound Card Input

1. Open the Audio Options dialog by using the ***Options-Audio*** command.
2. In the Select Input Channel field, choose the sound card input you want to record into. Click OK.

### To Connect an Instrument

Plug your instrument or microphone into the audio input you selected (or plug your pre-amp or mixer into that input, if your instrument or mic is connected to a pre-amp or mixer).

See:

Input Monitoring

## Input Monitoring

Input monitoring lets you hear any effects you have associated with the track. It also lets you see an output meter for the track.

### To Check Levels

1. In an audio track, click the Arm button  so that it's enabled (red), and also click the track's Input Monitor button  so that it's enabled.
2. Play your instrument and observe the meter in the armed track. Use your sound card's software mixer (or hardware controls, if it has them) to adjust the input volume so that the meter almost peaks when you play the loudest volume that you plan to record.

See:

Starting to Record

## Starting to Record

Once you have set up your track and inputs for recording, you are ready go.

### To Record Audio

1. Select the track and the Now Time where you want the recording to appear in the Track pane.
2. If you want to hear the Metronome while you're recording, click the Metronome button  in the Main Control view to enable it (it turns blue when enabled).
3. If you want to hear a count-in before you record, use the ***Transport-Count-in On/Off*** command. When the command is enabled, a checkmark appears next to the command.
4. To set the number of beats in the count-in, use the ***Options-Metronome*** command to open the Metronome Properties dialog, choose a count-in duration in the Count in # of Beats field, and click OK.
5. Select an audio input from these options in the track strip's input menu: Stereo, Left, Right, or None. Select None if you want to record automation on the track without recording audio data at the same time.

6. Click the Record button  to start recording, and play your instrument.

   If audio data is successfully being recorded, Project5 displays a red bar graph in the area of the track where audio data is being recorded. Recording automation data only does not generate the bar graph.

7. Press the Spacebar to stop recording.

Project5 displays your recorded data in the audio track. Rewind and play back what you recorded. You can press ***Ctrl+Z*** to erase what you recorded if you're not satisfied.

When you save your project, Project5 stores the recorded audio in the project's own audio folder, which is called "(name of project) Audio," and is located in the same folder that the project file is stored in. When you back up your project on another disk, make sure that you copy both the project file and its associated audio folder.

**Note**: if you want to record automation on the track without recording audio data at the same time, select ***None*** in the track's audio input menu.

## Working With Groove Clips

In Project5, you can import two kinds of audio files: Groove clips (ACIDized clips), and Wave files. Groove clips change their tempo to the project tempo when you import them; Wave files do not. You can transpose Groove clips in the Editor pane (see second procedure, following).

Audio files play back on audio tracks. If you create an audio track and select it, importing an audio file brings the imported file to the selected audio track. If you haven't created any audio tracks, Project5 will automatically create one the first time you drag an audio file from the Loops/Patterns tab into the project. You can copy and move audio files, and edit pattern length and some kinds of automation in the Editor pane. You can drag audio patterns directly from the Loops/Patterns tab to the Arrange pane, and also preview one or more at the same time (see Loading Patterns).

### To Insert an Audio Track

- Right-click an empty area of the Track pane, and choose ***Insert-Audio Track*** from the popup menu.

The audio track appears in the Track pane.

### To Transpose a Groove Clip

1. In the Arrange pane, double-click the Groove clip to both display it in the Editor and make it the active instance of this pattern. The pattern has a black outline in the Arrange pane when the pattern is the active instance.

2. In the Editor pane's Transpose menu, use the up and down arrows to choose the number of half-steps to transpose the Groove clip by.

This transposes just this one instance of the Groove clip. All copies of an audio pattern are identical except for their Transpose value. Now, wherever this one instance of the Groove clip appears in the Arrange pane, it will display a plus or minus number on it to show its Transpose level.

You can also just select a pattern in the Arrange pane, and press the + or - keys on your keyboard's Num Pad to transpose the pattern.

### To Make an Audio Clip a Groove Clip

1. Right-click on the clip in the Arrange pane.

2. Select ***Groove-clip Looping*** from the menu that appears.

When you display a Groove clip in the Editor, the name of the Groove clip reads "(Grooved)" when the clip's looping feature is turned on.

### To Export a Groove Clip (ACIDized Wave File)

1. Double-click the clip in the Arrange pane to open the clip in the Editor.
2. In the pattern menu, click the dropdown arrow and select ***Export Loop to WAV File*** from the menu that appears (this option is greyed-out if the clip is not a Groove clip).
3. In the Save Pattern dialog, type a name for the Groove clip, choose a folder to store it in, and click Save to close the dialog.

Project5 exports your file as an ACID-compatible wave file.

### To Set the Number of Beats in a Groove Clip

Find the pattern length menu that's in the top right corner of the Editor, and click the left arrow to reduce the number of beats or the right arrow to increase the number of beats.

### To Send a Groove Clip to the Arrange Pane

1. Select the Track in which you want the clip to appear.
2. Select the time at which you want the clip to appear in the Track pane.
3. Click the Send button 

.

Instead of selecting a track and time location, you can just drag the Send button to the place where you want the pattern to be.

See also:

Groove Clip Editor Pane Controls

Patterns: Loading, Arranging, and Editing

## Groove Clip Editor Pane Controls

The following is a list of Groove clip controls in the Editor pane, followed by a description:

**Send** 


Creates an instance of the current Groove clip in the Track pane. The clip appears at the Now time on the selected track.

**Preview Loops** 

Plays the current loop repeatedly. Use the Stop Preview control to stop playback.

**Stop Preview** 

Stops loop preview playback.

**Record** 

Begins recording. What you record is determined by the setting in the dropdown menu to the right.

**Select** 

Use the Select tool to move markers in the Markers bar.

**Draw Automation** 

Use to draw automation data in a Groove clip.

**Automation Parameters** 


Select the automation you want to draw in your Groove clip.

**Clip Duration** 


Adjust the length of the clip. This is an alternative to dragging the clip end marker.

**Trans Detect (%)** 


The Trans Detect control senses transients in your audio clip and assigns a marker at the beginning and end of each one it finds. As the you increase the sensitivity (by using larger numbers) smaller transients are detected and the number of markers increases.

### Slice Division Menu


The Slice Division menu sets the resolution for the creation of markers, or the “slicing” of the looped clip. This menu uses note lengths, so the settings are:

- Whole notes
- Half notes
- Quarter notes
- Eighth notes
- Sixteenth notes
- Thirty-second notes

The automatic markers appear at the note resolutions according to the slider setting. At the eighth note setting, there are eight markers per measure.

This control works well for slicing audio that has more subtle changes in volume with few dramatic transients.

The markers in a loop clip preserve the timing of the audio at that moment. Too few or too many markers can cause unwanted “artifacts” when a loop clip is stretched.

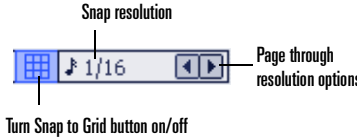
### Restore Markers 

The Restore Markers tool restores all automatically generated markers to the original position and enables all those that were disabled. Manually created markers remain as is.

### Beats in Clip 


The number of beats in the clip.

### Snap to Grid




The Snap to Grid button turns the Snap to Grid on or off. The Snap Resolution control sets the Snap to Grid resolution.

### Clip Transpose 


Raise or lower the pitch of the clip by half-steps.

## Freeze

The Freeze Track command preserves all of the instrument and effect settings for the track by rendering the track, essentially mixing the track down temporarily into an audio pattern, and disabling the track’s instrument and effects. This has several benefits. Frozen tracks use much less of your CPU, giving you the potential to add more instruments and effects to your project. The patterns in a frozen track can’t be edited, eliminating the possibility of accidentally altering them.

The following track parameters can be edited in a frozen track:

- Volume
- Pan
- Aux Send
- Phase Invert
- Output

When you freeze a track, any effects that the track uses frequently need some extra time at the end of the track to finish. You can set the amount of extra time that Project5 adds to a frozen track by using the ***Options-Freeze Tail***

***Duration*** command, and entering the amount of extra time you want.

### To Freeze a Track

1. Right-click on the track (directly on to of the track name or above the volume or pan controls).
2. From the menu that appears, select Freeze Track.

The track is mixed down, and appears greyed-out.


**Note**: if you freeze a ReWire track, Project5 only mixes down audio on the part(s) of the track where there are patterns.

### To Unfreeze a Track

1. Right-click on the track (directly on to of the track name or above the volume or pan controls).
2. From the menu that appears, select ***Unfreeze Track***.

# Device Chains, Instruments, and Effects

Project5 refers to software synthesizers as *instruments*. Instead of loading an instrument and then adding an effect to the instrument, in Project5 you can load a device chain instead (formerly known as a Project5 patch). A device chain is made up of an instrument, any effects that were loaded with the instrument when the device chain was saved, the parameter settings of the instrument and effects, and remote control settings for the instrument and effects. When you change anything about a device chain, you can save your changes to that device chain so that you can use the same device chain in other projects. If you save a project without saving any device chains, the changes you make to device chains in that project are only available in that project.

With Project5 you can play and layer as many instruments as your computer can handle. You can play them all at the same time, using different effects on each one if you like, trigger each one independently with recorded MIDI data, split your keyboards by range and velocity, and transpose MIDI data from either live playback or from patterns. Project5 uses instruments that conform to the **DXi** plug-in standard, but includes a special adapter that allows you to use **VST** instruments and plug-in effects also.

In Project5, each instrument gets its own track, with controls for volume, pan, width, mute, solo, arm, and output (for multi-output instruments). You can choose what MIDI channel and port an instrument responds to, opening up the possibility of using several controllers on different MIDI interfaces at the same time. You can add extra lanes to a track, and use different MIDI channels on each lane to trigger different sounds on multi-timbral instruments for live keyboard playback and/or patterns in the Arrange pane. Only your computer's processing power limits the number of instruments you can use.

The Device Browser appears when you click the Add New Instrument Track button that's in the Add Track section of the Main Control view. Use the Device Browser to load either a device chain or an instrument into a new track.

You can change or delete the instrument and effect(s) in a device chain if you want.

See:

Inserting Tracks, Instruments, and Device Chains

Loading, Editing, and Saving Device Chains

Layering Instruments for Real-time Playback

Using VST instruments and Effects

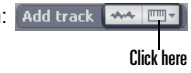
Using the Arpeggiator

## Inserting Tracks, Instruments, and Device Chains

There are two types of tracks in Project5: instrument tracks and audio tracks. Each instrument gets its own track: **one instrument = one track**; **one track = one instrument**. MIDI patterns play back through instrument tracks, and audio data plays back through audio tracks.

### To Insert an Instrument or Device Chain and a New Track

1. In the Main Control view, click the right button in the

   Add track section: 


   The Device Browser appears.

2. At the top of the browser, click either the Device Chains button if you want to load an instrument and effects, or click the DXi and VST Instruments button if you want to add only an instrument.

3. Choose an instrument or device chain from the menu, or from the Most Recently Used list that appears in the upper right corner of the Device Browser (a numbered list appears if you've inserted at least one instrument into this project).

Project5 inserts the instrument or device chain that you chose into the new track.

Play your MIDI controller and listen to the instrument. Notice that the volume meter on the instrument's track lights up when you play the instrument. You can adjust the instrument's track controls to change volume, pan, etc.

Another way to insert an instrument is to right-click in the Track pane, select ***Insert Instrument-(name of instrument)*** from the popup menu, or select ***Insert Instrument-Insert from Device Chain-(name of device chain)*** if you want to add an instrument and related effects.

### To Insert an Audio Track

- In the Main Control view, click the left button in the Add track section: 

Click here

  Or

- Right-click in an empty area of the Track pane, select ***Insert Audio Track*** from the popup menu.

Project5 adds an audio track below the last track.

See also:

Multiple Outputs

### To Clone an Instrument Track

- Right-click the controls of the instrument track you want to clone, and choose ***Clone Instrument*** from the popup menu.

  Or

- Click the controls of the instrument track you want to clone, and use the ***Edit-Clone Instrument*** command.

**Note**: cloning an instrument and track does not clone the patterns that the track contains.

### To Transpose an Instrument and Track

- In the Track Inspector, drag the the Transpose menu to the left or right by the number of half-steps (positive or negative) by which you want to transpose your track.

### To Replace an Instrument in an Existing Track

- Right-click the controls of an existing track, and choose ***Replace Instrument***-[***name of the instrument you want***].

### To Replace a Device Chain in an Existing Track

- Right-click the controls of an existing track, and choose ***Replace Instrument*** and then ***Replace from Device Chain*** on the popup menu, and select the name of the device chain you want to insert.

### To Rename a Track

- Double-click the name of the track, type a new name, and press Enter.

### To Delete a Track

- Right-click the track's name or number, and choose ***Delete*** from the popup menu.

### To Unmute, Unsolo, or Disarm All Instruments

- In the Main Control view, click the master mute button, the master solo button, or the master arm button so that the appropriate button is not lit.

Main Control view (left side) master arm, mute, and solo buttons


The master mute button lights up whenever any instrument's mute button is lit. The master solo button lights up whenever any instrument's solo button is lit, and the master arm button lights up whenever any instrument's arm

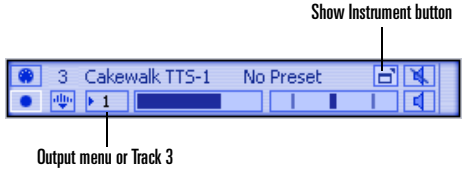
button is lit. Turning any of these master buttons off turns off all buttons of the same kind that are on individual instrument tracks.

### To Change the Order of Tracks

- Drag the track name of the track you want to move to the location where you want it.

## Multiple Outputs

If the instrument you inserted has multiple outputs (Cakewalk TTS-1 is a multi-output instrument), Project5 shows what output the track controls apply to in the output menu that's located just left of the volume slider in each track, and in the Track Inspector just below the Bank/Patch menu. Each track has as many sets of track controls as its instrument has outputs. For multi-output instruments, use each instrument's property page to route specific sounds or MIDI channels through specific outputs. You can use separate effects on each output. Remember though, that effects use a lot of your computer's processing power. If two or more outputs can use the same effect, consider inserting the effect into an aux bus, and sending each output's signal through that bus.




**Note**: to use extra outputs on an instrument, you must enable each extra output. Only the first output is enabled by default to conserve memory.

### To Enable All Extra Outputs for an Instrument

- Right-click the track name in the Track pane, and under ***Bypass***, select ***Enable All Outputs*** (the checkmarks show what outputs are NOT enabled).

### To Enable Individual Outputs for an Instrument

- In the output menu of an instrument track, drag the displayed number up or down to display the desired output number. When the desired number appears, double-click the number so that it is not grey.

  Or

- Right-click the track name in the Track pane, and under ***Bypass***, select the output you want to enable (the checkmarks show what outputs are NOT enabled).

  Or

- Click the Track Inspector's output menu, and under ***Bypass***, select the output you want to enable (the checkmarks show what outputs are NOT enabled).

### To Display the Track Controls for a Specific Output

- In the output menu of an instrument track, drag the displayed number up or down to display the desired output number.

  Or

- Right-click the track name in the Track pane, and under ***Active Output***, select the output whose controls you want to display (the checkmark shows what output is displayed).

### To Send Specific MIDI Channels or Sounds Through Specific Outputs

1. Open an instrument's property page by clicking its Show Instrument button that's just left of the track's mute button.
2. Use the instrument's property page to route specific MIDI channels to specific outputs. Each property page is unique to the instrument. You may have to read the instrument's documentation to find the controls for this function.

See:

Loading, Editing, and Saving Device Chains

## Loading, Editing, and Saving Device Chains

A device chain is made up of an instrument, any MIDI and audio effects that were loaded with the instrument when the device chain was saved, the parameter settings for the instrument and effects, and any remote control settings for the instrument and effects. Use the Device Browser to load device chains. The Device Browser appears when you click the Add Instrument Track button in the Add Track section, or when you click the device chain menu in the Track Inspector.

You can change device chains rapidly while playback continues. This lets you quickly try out sounds for a particular pattern.


Device chain menu in the Track Inspector

See:

Loading Device Chains

### Loading Device Chains

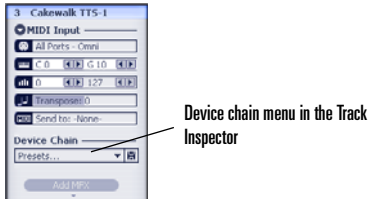
The Device Browser lets you see your stored device chains, and load them into new or pre-existing tracks. You can open the Device Browser from either the Add track section of the Main Control view, or from the Track Inspector. If you open the Device Browser from the Track Inspector, clicking the name of a device chain in the Device Browser loads that device chain into the currently-selected track. If you open the Device Browser from the Add track section, clicking the name of a device chain in the Device Browser loads that device chain into a new track.

Device Browser


**Note**: if you've been editing a device chain and you then load another device chain without saving the device chain you were working with, you can get back to the previous device chain by using the ***Edit-Undo*** command (or pressing ***Ctrl+Z***). You can use this command repeatedly (press ***Ctrl+Z*** multiple times) to go back to any edit you've done since you opened Project5, up to the default limit of 64 edits.

### To Load a Device Chain into a Pre-existing Track

1. Select the track whose instrument or device chain you want to replace.
2. In the Track Inspector, click the dropdown arrow in the device chain menu to open the Device Browser.

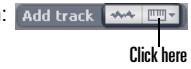



3. In the Device Browser, choose the instrument or device chain that you want to load.

Project5 loads the selected instrument or device chain into the selected track.

### To Insert a Device Chain and a New Track

1. In the Main Control view, click the right button in the

   Add track section: 


   The Device Browser appears.
2. At the top of the browser, click either the Device Chains button if you want to load an instrument and effects, or click the DXi and VST Instruments button if you want to add only an instrument.
3. Choose an instrument or device chain from the menu, or from the Most Recently Used list that appears in the upper right corner of the Device Browser.

Project5 inserts the instrument or device chain that you chose into the new track.

To add, replace, or delete instruments and effects, or change their parameters, see Changing Instruments and Effects, and Controlling Device Chain Parameters.

## Changing Instruments and Effects

In the Track Inspector, the effect modules and instrument module appear in vertical order illustrating the signal flow: MIDI effects are first in the chain and appear at the top of the Track Inspector. Next comes the instrument, and then come the audio effects. You can change the order of the MIDI and audio effects in their respective areas. The instrument module stays between the MIDI effects and the audio effects.

Use the following procedures to add and delete instruments and effects, and change their order.

### To Replace an Instrument in the Track Pane

- Right-click the controls of an existing track, and choose ***Replace Instrument-***[***name of the instrument you want***].

### To Replace an Instrument in the Track Inspector

- To replace an instrument, right-click the name of an existing instrument, and choose ***Replace Instrument-***[***name of the instrument you want***] from the popup menu.

### To Add a MIDI Effect

- In the Track Inspector, click the button that's labeled Add MFX.

### To Add an Audio Effect

- In the Track Inspector, click the button that's labeled Add FX.

### To Replace an Effect

- Right-click the name of an existing effect, and choose ***Replace Effect-***[***name of the effect you want***] from the popup menu.

### To Delete, Cut, or Copy an Effect

- In the Track Inspector, right-click the name of an effect, and choose ***Delete Effect***, ***Cut***, or ***Copy*** from the popup menu.

### To Paste an Effect

- In the Track Inspector, right-click an effect module and choose ***Paste*** from the popup menu. Project5 pastes the effect module just before the effect you right-clicked.

### To Reorder an Effect

- Drag the name of the effect you want to move to the place in the effect chain where you want the effect to go.

### To Bypass or Unbypass an Effect

- Click the green bypass button that's just left of the effect's name. When the vertical line on the button is unbroken, the effect is enabled.

See Controlling Device Chain Parameters.

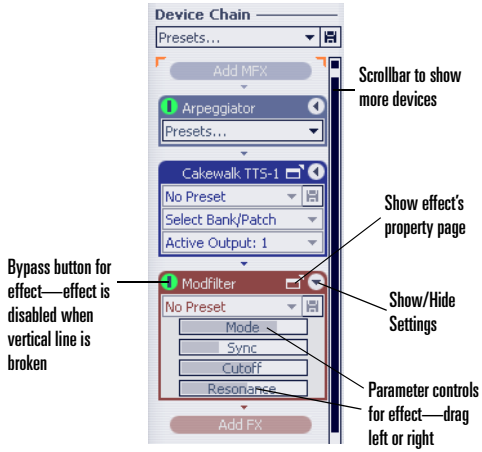
## Controlling Device Chain Parameters

In the Track Inspector, you have tremendous control over the sound of each device chain through the sliders in the instrument and effect modules, the instrument's property page, and through each effect's property page. You can also automate changes to device chain parameters (see the online help topic Automation for more information).

You can control most of your instrument and effect parameters from a MIDI controller if you want (see Remote Control for more information).

### To Display Controls for an Instrument or Effect

- In the Track Inspector, in an instrument or effect module, click the Show/Hide Settings button that's at the right end of the name of the instrument or effect.




Project5 displays slider controls for the first eight parameters of an instrument, or the first four parameters of an effect. You can right-click a slider and choose a different parameter for the slider to control.

### To Choose a Factory Bank/Patch Combination

- In the Track Inspector, in the instrument module just above the Active Output menu, click the Select Bank/Patch menu and select the Bank/Patch combination that you want.

### To Adjust an Instrument or Effect Parameter

- In the Track Inspector, find the slider in an instrument or effect module that's labeled with the parameter you want to adjust, and drag the slider.

### To Display an Instrument or Effect Property Page

- In the Track Inspector, double-click the name of the instrument or effect.

Or

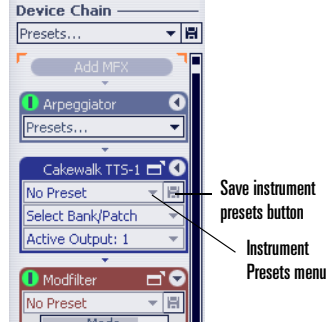
- Click the Show Property Page button in the Track Inspector that's at the right end of the instrument or effect module whose property page you want to display.

Or

- In the Track pane, click a track's Preset menu, and choose ***Show Instrument*** from the popup menu.

### To Save an Instrument or Effect Preset

1. Using either the module's property page or the control knobs on the module, move the controls to configure the instrument or effect the way you want it.
2. In the Presets field in either the module's property page or in the module itself, type a name for the new settings.
3. Click the disk icon that's in either the module's property page or the module itself to save your preset.




### To Load an Instrument or Effect Preset

1. In the Presets field in either the module's property page or in the module itself, select the name of the preset you want to load.

Project5 loads the selected preset.

### To Delete an Instrument or Effect Preset

1. In the Presets field in the module's property page, select the name of the preset you want to delete.
2. Click the X button that's next to the Presets field.

Project5 deletes the selected preset.

After you've edited your device chain, don't forget to save it, so you can use it in other projects. See Saving Device Chains.

## Saving Device Chains

After you've set an instrument's parameters and related effects just the way you want them, you can save this setup as a device chain, so that you can use the exact same sound in other songs.

**Note**: if you've been editing a device chain and you then load another device chain without saving the device chain you were working with, you can get back to the previous device chain by using the ***Edit-Undo*** command (or pressing ***Ctrl+Z***). You can use this command repeatedly (press ***Ctrl+Z*** multiple times) to go back to any edit you've done since you opened Project5, up to the default limit of 64 edits.

### To Save a Device Chain

1. In the Track Inspector, click the Save device chain button  to open the Save device chain dialog.
2. Navigate to the folder where you want to store the device chain, type a name for the device chain, and click Save.


Project5 saves the current instrument and its settings, together with the current effect(s) and its/their settings, and any remote control assignments for the instrument and effects.

## Automating Device Chain Controls

As you're moving the sliders in the instrument and effect modules to control the sound of a device chain, you can record the sliders' movements into the current pattern or track, if you want the sound of a pattern to change as it's playing. See Automation for more information.

# Using Aux Buses

You can conserve your computer's CPU power by using aux buses, instead of inserting effects into each individual track. If several tracks can use the same effects, you can send them to the same aux bus or buses, and avoid processing each track's sounds individually.

Another consideration for where to put your effects is whether you want them pre-fader or post-fader. Individual effects on tracks (inserts) are pre-fader. Aux send controls are post-fader. If you want a completely wet signal, the

inserts are the only way to achieve it, instead of using the effects on an aux bus.

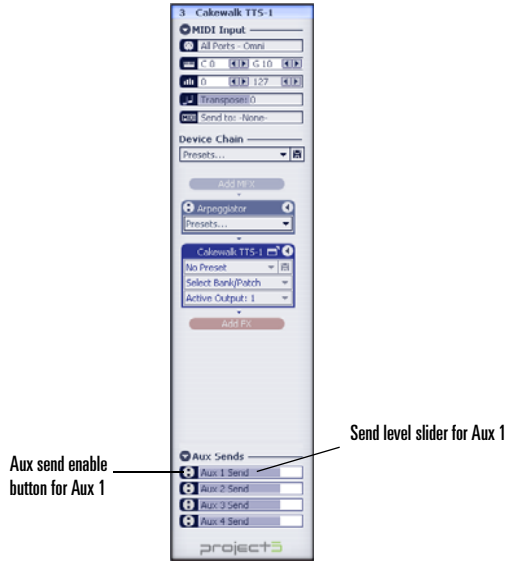
### To Add Effects to an Aux Bus

1. Make sure the Track/Bus Inspector and the Bus pane are visible. If the Bus pane is not visible, click the Show Aux/Master/Tempo button 

to display it.
2. Display the Aux bus in the Inspector that you want to add the effects to by clicking in the desired Aux bus controls in the Bus pane.
3. In the Inspector, click the Add FX button to add an effect. Repeat for additional effects.
4. Configure the effects by moving their control sliders, or by using the effects' property pages, or by choosing presets.

### To Send a Track Through an Aux Bus

1. Display the track in the Track Inspector that you want to add the effects to by clicking in the desired Track controls in the Track pane.
2. In the Aux Sends section of the Track Inspector, click the Aux Send Enable button of the Aux bus that you want to send the track through so that the button turns green.
3. In the same Aux bus, drag the send level slider to the desired strength to hear the track played through the aux bus effect(s). The return level slider for the Aux bus is in the Bus pane on this Aux bus's controls.




## Layering Instruments for Real-time Playback

When you play your MIDI controller, you can play and layer as many instruments as your computer can handle. You can play them all at the same time, using different effects on each one if you like, split your keyboards by range and velocity, transpose playback in real time, or mix and match them any way you want. You can choose what MIDI channel and port an instrument responds to, opening up the possibility of using several controllers on different MIDI interfaces at the same time.

To get fast enough response to your playing, your sound card's latency needs to be set to 20 mS or less. The

latency slider is in the Audio Options dialog (***Options-Audio*** menu command). If the sound starts to distort at this setting, you may need a new audio driver for your sound card. Latency does not affect recorded playback—only real-time input from a controller.

### To Play One Instrument at a Time

- Make sure no solo buttons are enabled, and click the MIDI Routing Override button of the instrument track you want to play. The button turns blue when it's enabled.


Or

- Make sure no MIDI Routing Override buttons or Solo buttons are enabled, and click the solo button of the instrument track you want to play. The button turns blue when it's enabled.

Or

- Configure each instrument to only respond to a certain MIDI channel, and/or note range, and/or velocity, and or/input port. See To Choose a MIDI Port and/or Channel for an Instrument to Respond to (Real-time Input Only).

Play your MIDI controller and listen to the instrument. Notice that the volume meter on the instrument's track lights up when you play the instrument. You can adjust the instrument's track controls to change volume, pan, etc.

**Tip**: When you're playing live, and you don't want to grab the mouse to choose which instrument you want to play, use Remote Control to operate the Solo buttons. Alternate method: configure each instrument to respond to a different MIDI channel, and switch channels at your controller.

### To Play Several Instruments at a Time

- Make sure that no MIDI Routing Override button is lit, and then click the solo buttons of the instrument tracks you want to play, or click the mute buttons of the instrument tracks you don't want to play.

### To Play All Instruments

- Make sure none of the MIDI Routing Override buttons, mute buttons, or solo buttons are lit. Also, make sure all instruments are configured to respond to the MIDI channel and port that your MIDI controller is using (see following procedure).

### To Choose a MIDI Port and/or Channel for an Instrument to Respond to (Real-time Input Only)

1. Right-click the track's number, or click the instrument's port menu in the Track Inspector's MIDI Input section.

   A popup menu appears.

2. Choose from the following options:

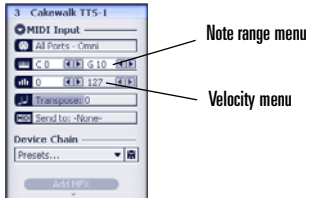
   - ***No Ports***—this option prevents the instrument from responding to input from your MIDI controller.
   - ***All Ports***-[choose ***MIDI Channel "n"*** or ***Omni***]—this option causes the instrument to respond to a specific MIDI channel that comes in through any MIDI port (interface). If you choose Omni, the instrument responds to any MIDI input on any MIDI port.
   - [***name of port***]-[choose ***MIDI Channel "n"*** or ***Omni***]—this option causes the instrument to respond to a specific MIDI channel that comes in on a specific MIDI port. If you choose Omni, the instrument

responds to any MIDI input on the specified MIDI port.

Choosing a MIDI port, channel, note range, or velocity range for real-time input filtering does not affect recorded playback. You control MIDI routing for recorded playback in the Editor pane and in each instrument's property page.

### To Limit the Note Range and/or Velocity that an Instrument Responds to (Real-time Input Only)

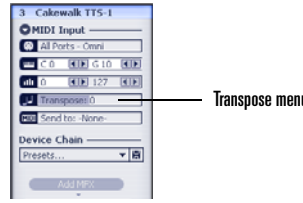
1. In the Track Inspector MIDI Input section, find the note range and velocity menus.




2. In the note range menu, drag the first field up or down to choose the lowest note that this instrument will respond to; drag the second field up or down to choose the highest note that this instrument will respond to (you can also double-click the menu, type a value, and press Enter; or click the left/right arrows).
3. In the velocity menu, drag the first field up or down to choose the lowest velocity that this instrument will respond to; drag the second field up or down to choose the highest velocity that this instrument will respond to (you can also double-click the menu, type a value, and press Enter; or click the left/right arrows).

### To Transpose an Instrument and Track

1. Display the instrument in the Track Inspector, and then find the Transpose menu that's in the Track Inspector MIDI Input section.




2. Drag the slider to the left or right to set the number of half steps you want to transpose the instrument's output by (you can also double-click the menu, type a value, and press Enter).

Transposition settings in the Track Inspector affect both real-time input from a MIDI controller and the playback of recorded patterns.

See also:

Using VST instruments and Effects

## Using the Arpeggiator

You can play any synth through Project5's arpeggiator to create rich tapestries of sound by a single note on your MIDI keyboard (or any MIDI instrument). Project5's arpeggiator is highly customizable. You can change the speed at which notes are played, set the octave range of the notes played and mix chords with arpeggiated notes.

For a tutorial, see Arpeggiator.

### Playing Through the Arpeggiator

Follow this procedure to use the Arpeggiator.

1. Select a track or tracks in the Track view. Make sure there is a synth assigned to the track.
2. Click the Enable button located in the upper left corner of the Arpeggiator.

3. Select a preset or adjust the arpeggiator settings. You may need to click the Show/Hide Controls button in the upper right corner to display the Arpeggiator settings. See Arpeggiator for more information.

4. Play your MIDI device. If you do not hear anything, make sure the MIDI input you are using is connected to your computer via a MIDI port and the MIDI input is assigned in the MIDI Devices dialog (select ***Options-MIDI Devices*** to open the MIDI Devices dialog).

5. Make changes to the Arpeggiator's settings as desired.

See Adjusting the Arpeggiator's Settings.

## Adjusting the Arpeggiator's Settings

Use the following procedures to change the Arpeggiator's settings.

### To Play Notes Faster or Slower

Adjusting the Rate control changes the tempo at which arpeggiated notes play. Use the following procedure to change the rate.

1. If you have not already done so, select a track, enable the Arpeggiator and show the Arpeggiator's controls.

2. Click on one of the Rate control's arrows. The left arrow decreases the rate while the right arrow increases the rate.

### To Set the Octave Range for the Arpeggiator

Adjusting the Octave range increases or decreases the number of octaves represented in the arpeggiated notes. Use the following procedure to change the Octave Range.

1. If you have not already done so, select a track, enable the Arpeggiator and show the Arpeggiator's controls.

2. Click on one of the Octave Range control's arrows. The left arrow decreases the range while the right arrow increases the range.

### To Mix Chords and Arpeggios

You can adjust the mix of the notes and chords you play and the arpeggiated notes that are played. The default setting plays both the held chord notes and the arpeggiated notes derived from them.

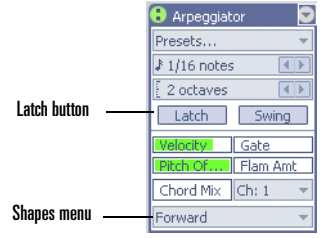
1. If you have not already done so, select a track, enable the Arpeggiator and show the Arpeggiator's controls.

2. Adjust the Hold Mix setting. At 0% you hear none of the held notes. At 100% you hear none of the arpeggiated notes.

### To Make Notes Play After Releasing the Key

1. If you have not already done so, select a track, enable the Arpeggiator and show the Arpeggiator's controls.

2. Click the Latch button.




### To Change the Order Notes Are Played

1. If you have not already done so, select a track, enable the Arpeggiator and show the Arpeggiator's controls.

2. Select a shape from the Shapes menu.

# Using VST instruments and Effects

You can use VST instruments and effects exactly the way you use DXi instruments and effects in Project5. All you need to do is run the included VST wrapper program to do a configuration each time you install new VST instruments and/or effects.

When you installed Project5, you had the option of registering your VST plug-ins at that time. Whenever you install new VST plug-ins, you need to register the new plug-ins by running the VST wrapper program again.

### To Register VST Plug-ins to Use as DXi Plug-ins

1. Use the Windows Start menu: ***Programs-Cakewalk-VST Adapter 4-VST Adapter 4***. This opens the VST Configuration Wizard.
2. Follow the instructions in the Wizard, and when the VST Plug-in Search Path dialog appears, click the Add button to browse for the folders where you installed your new VST plug-in(s).
3. After your folders are displayed in the VST Plug-in Search Path dialog, choose from these options to decide how configuration will proceed:
    - Re-scan failed plug-ins—choose this option if there was an error when you originally scanned a plug-in.
    - Re-scan existing plug-ins—choose this option if you're having trouble with an existing plug-in, or if you want to change how plug-ins are displayed in your plug-ins menu.
    - Subdivide menu—choose this option if you want to add breaks between plug-ins in your plug-in menu, to make it easier to read.
    - Don't add VST prefix—choose this option if you don't want the plug-ins you're about to scan to be labeled VST (name of plug-in) in your plug-ins menu.
4. Click Next to have the adapter scan the folders for VST plug-ins.

   The adapter finds your plug-ins and lists them in the VST Plug-in Configuration dialog.
5. Select a plug-in you want to configure, and click Properties. The VST Plug-In dialog appears, with the selected plug-in listed, and some Plug-in Options:
    - Presets folder—click the browse button at the end of this field to choose the folder where you want to store presets for this plug-in.
    - Enable as DXi plug-in—enable this option if you want to use the plug-in as an audio effect.
    - Configure as DXi instrument—enable this option if you want to use the plug-in as a soft instrument.
    - Do not intercept NRPNs—the adapter uses NRPNs to run automation of your VST plug-ins. However, some instruments have their own implementation of this process, so checking this box passes the NRPNs directly to the instrument, allowing it to manage its own automation.
    - Force stereo operation—some host applications assign a single, mono track to carry a VST plug-in's output. Checking this option forces the host to use two mono tracks or a single stereo track.
    - Editor size—the X field lets you choose the width of the plug-in's property page (in

pixels), and the Y field lets you choose the height of the page.

6. Choose the options you want for this plug-in, and click OK.

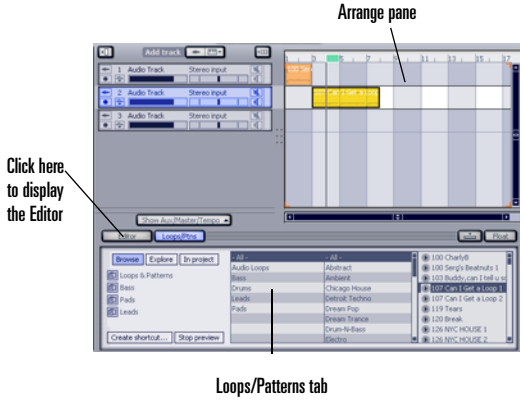
   The adapter configures the plug-in and returns to the VST Plug-In Configuration dialog.

7. If you want to finish, select no more plug-ins and click Next; otherwise, repeat steps 5 and 6 for additional plug-ins.

# Patterns: Loading, Arranging, and Editing

The Loops/Patterns tab lets you preview and load patterns. To load a pattern, simply drag it from the Loops/Patterns tab to where you want it to go in the Arrange pane. The Arrange pane is where you arrange patterns into a project or composition. The Editor is where you create and edit patterns.

After you edit a pattern, you can save it to a folder and view it in the Loops/Patterns tab, so that you can use the same pattern in other projects.




See:

Loading Patterns

Arranging Patterns

Editing Patterns

Previewing Patterns in the Loops/Patterns tab

## Loading Patterns

The Loops/Patterns tab allows you to navigate your computer to show patterns, preview them, and insert them into your project.

The Loops/Patterns tab has three modes:

- **Explorer mode**—this mode displays your patterns and audio loops in Windows Explorer style. Click the Explore button Explore to enter Explorer mode.
- **Browse mode**—this mode displays your patterns and audio loops in several columns, divided by type. Click the Browse button Browse to enter Browse mode.
- **In Project mode**—this mode displays the **In Use** folder, which shows all the patterns that are currently being used in the Arrange pane, and the **Not In Use** folder, which stores patterns that you have viewed in the Editor or have deleted from the Arrange pane, but are not currently being used in the Arrange pane. Click the In Project button In project to enter In Project mode.

The Loops/Patterns tab also has the following components:

- Create Shortcut button Create shortcut... —the Loops/Ptns tab can remember where you browse. Click a folder to make it the current folder, and then click the Create Shortcut button to create a shortcut button for the folder. You can create multiple shortcut buttons.
- Stop Preview button Stop preview —stops the playback of a pattern or patterns being previewed.
- Show/Hide button —you can hide (or show) the Loops/Patterns tab and the Editor by clicking this button.
- Float/Dock button Float —you can float or dock the Loops/Patterns tab along with the Editor.

- Delete Button  —the Delete button, which is only visible in In Project mode, deletes the currently selected pattern from the Not In Use or In Use folders.
- Delete Not In Use Patterns Button  —the Delete Not In Use Patterns button, which is only visible in In Project mode, clears the Not In Use folder of all unused patterns.

See:

Loading and Deleting Patterns in the Loops/Patterns Tab

Previewing Patterns in the Loops/Patterns tab

## Loading and Deleting Patterns in the Loops/Patterns Tab

The Loops/Patterns tab is the main place where you load and preview patterns (you can also load and preview patterns from the Editor).

You can drag patterns directly from any folder in the Loops/Patterns tab to any location in the Arrange pane. The Snap to Grid menu in the Main Control view determines what unit of time the pattern snaps to when you drag it.

The following table summarizes how to load and delete patterns in the Loops/Patterns tab:

| To Do This... | Do This... |
|---|---|
| Drag patterns from the Loops/Patterns tab | Set the Snap to Grid menu in the Main Control view to the desired setting, and drag a pattern from any folder in the Loops/Patterns tab to any location in the Arrange pane. If you drag an audio pattern to a part of the Arrange pane that doesn't have a track, Project5 creates a new audio track automatically. |
| Change the Loops/Patterns tab to Explorer mode | Click the Explore button. |
| Change the Loops/Patterns tab to Browse mode | Click the Browse button. In Browse mode, you can click a folder icon to open it. You can use the vertical scrollbar that's on the right edge of the Loops/Ptns tab to scroll up and down. When you see a pattern file (.PTN extension), you can preview it by clicking its Preview button (see Previewing Patterns in the Loops/Patterns tab), or drag a pattern to the Arrange pane or Groove Matrix. |
| Create shortcuts to folders | Highlight the desired folder, and click the Create Shortcut button. |

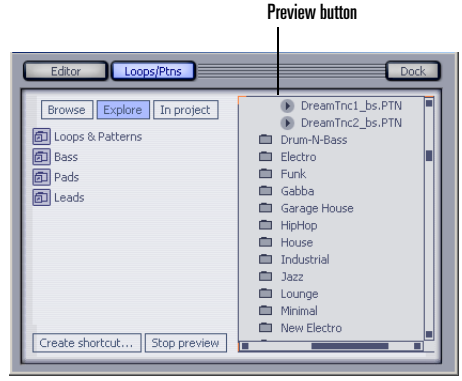
| | |
|---|---|
| Preview a pattern through the current track | Click the preview button that's on the left side of each pattern. |
| Display the In Use and Not In Use folders | Click the In Project button. |
| Delete a pattern from the In Use or Not In Use folders | Select the pattern you want to delete, and click the Delete Pattern button . |
| Clear the Not In Use folder | Click the Trash button . |
| Name or save a pattern | See Naming Patterns and Saving Patterns. |

See:

Previewing Patterns in the Loops/Patterns tab

### Previewing Patterns in the Loops/Patterns tab

You can preview patterns from any of the folders in the Loops/Patterns tab. MIDI patterns preview through the current track. If you preview more than one pattern at the same time, the patterns all play at the same time, and at the project tempo.




#### To Preview Patterns

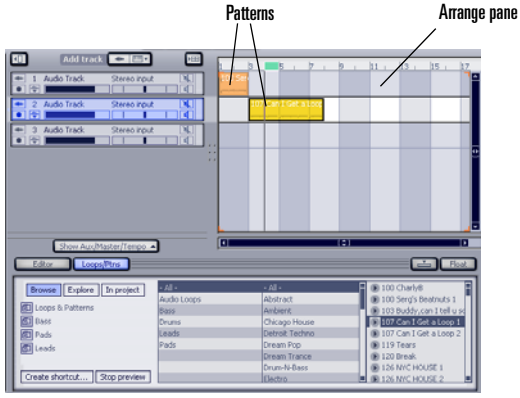
Click the preview button that is next to the pattern you want to preview. If you want to preview more than one pattern Ctrl-click the preview buttons of the additional patterns. To stop previewing, click each pattern's preview button again, or press the Spacebar.

You can also preview patterns in the Editor. You can preview patterns from the Loops/Patterns tab and the Editor all at the same time. MIDI Patterns in the Loops/Patterns tab play back through the currently selected track, and at the current project tempo. A MIDI pattern in the Editor plays back through the currently selected track unless the pattern is used in the Arrange pane. Then the pattern plays back through the track it's in. If it's in more than one track, the active instance (the pattern marked with a black outline) plays back through the track that it's in.

## Arranging Patterns

The **Arrange pane** allows you to make copies of patterns and arrange them to form your project. Once you create or import some patterns you want to use, you can slip-edit,

move, copy, delete, and transpose your patterns. Most of the same editing procedures work on both audio and MIDI patterns. Wave files (non-ACIDized audio files), however, can not change pitch or tempo.




The **Loops/Patterns tab** stores your patterns. You can drag patterns from the Loops/Patterns tab into the Arrange pane.

**Slip-editing** means to drag the beginning or end of a pattern inward to hide some of the data in the pattern. The hidden portions do not sound, but are not deleted. You can hear them again by dragging the boundaries outward back to their original location. Once you drag outward past the original clip boundary, Project5 starts creating another repetition of the pattern (**slip-copying** or **rolling-out)**. An alternative way to copy patterns, **drag-copying** (holding down the Ctrl key while you drag), copies patterns into a separate instance of the pattern—if you have slip-edited any portion of the pattern, using the drag-copying technique creates an exact copy of the pattern *and* any slip-edits you've done on the pattern (the slip-edited portions are still temporary). You edit MIDI and audio patterns with the same methods. Patterns that sit on top of other patterns are still heard, along with the patterns they're on top of. You can right-click an overlapping pattern and choose ***Bring to Front*** from the popup menu to uncover a pattern that's under another one. You can also create extra lanes in a track (right-click the track and choose ***Create Layer*** from the popup menu) and drag each overlapping pattern to its own track lane.

When you drag patterns or pattern boundaries, the precision of their movements is governed by the **Snap to Grid** menu. For example, if the Snap to Grid menu is set to Measure, and the Snap to Grid button is enabled, you can only drag patterns to measure boundaries; if the Snap to Grid menu is set to Quarter Note (displayed as 1/4), you can only drag patterns to beat boundaries, etc. If you want to drag objects by irregular distances, leave the Snap to Grid button in the disabled position, or hold down the Shift key while you drag. The Arrange pane has its own Snap to Grid button (in the Main Control view), which is independent of the Snap to Grid button in the Editor.

See:

Slip-editing and Slip-copying (Rolling-out) Patterns

Drag-copying Patterns with the Ctrl Key

Moving, Selecting, and Deleting Patterns

Undoing Edits, and Undo History

## Slip-editing and Slip-copying (Rolling-out) Patterns

Dragging the front and/or back borders of a pattern inward is called slip-editing—this hides portions of the pattern and mutes the sound from the hidden portions. You can drag the borders back out to expose the hidden portions and hear them again. If you drag the borders outward past the original boundaries of the pattern instead of inward,

Project5 starts creating new repetitions of the pattern (“rolling-out”). You can “roll out” as many repetitions of the pattern as you want. All the repetitions stay in one container, or “instance,” that you can move around as one unit, or do further slip-editing on. When you move the cursor over the front or back border of a pattern in the Arrange pane, the cursor changes to slip-editing or slip-copying mode (same thing), and looks like this:

### To Slip-edit a Pattern

1. If you want to move the pattern border to an exact location, set the Snap to Grid resolution (in the Main Control view) to a value that will allow this. For example, if you want to move the pattern border to a location that’s between beats, set the Snap to Grid resolution to an eighth note, or whatever small interval you require.
2. In the Arrange pane, drag the front and/or back borders of the pattern to the location you want.

### To Slip-copy a Pattern

1. If you want to make only whole repetitions of the pattern, set the Snap to Grid button in the Track view to a value that will allow this. For example, if your pattern is 3 beats long (in 4/4 time), set the Snap to Grid button to a quarter note so that all the repetitions, including the final one, can be three beats long (depending on where you release the mouse). If the Snap to Grid button is set to a measure instead, some repetitions of this particular pattern will end in the middle of the pattern.
2. Drag the front and/or back borders of the pattern to make as many repetitions as you want.

See:

Drag-copying Patterns with the Ctrl Key

Moving, Selecting, and Deleting Patterns

Undoing Edits, and Undo History

## Drag-copying Patterns with the Ctrl Key

If you hold down the Ctrl key while you drag the center of a pattern, Project5 pastes a separate copy of the pattern at the location where you release the mouse.

You can copy **multiple patterns** with this technique. Just select the patterns you want to copy first, then Ctrl-drag one of the selected patterns where you want it to go (see Moving, Selecting, and Deleting Patterns to learn how to select multiple patterns).

### To Drag-copy with the Ctrl Key

1. Set the Snap to Grid resolution to the beat boundary where you would like the copied pattern to go.
2. Hold down the Ctrl key while you drag the pattern from the center of the pattern to the location where you want the copy to go.

Project5 pastes a separate copy of the pattern to the location where you released the mouse. You can move and slip-edit this copy independently from the source copy, however, if you edit the MIDI notes or data in this copy or the original copy the same edits appear in all copies of the original.

To make truly independent copies, hold both the Ctrl and Alt keys down while you drag-copy the pattern. You can also display a pattern in the Editor, and use the ***Duplicate Pattern*** command from the Editor’s pattern menu.

See:

Moving, Selecting, and Deleting Patterns

Undoing Edits, and Undo History

Slip-editing and Slip-copying (Rolling-out) Patterns

## Copying and Pasting Patterns with Edit Menu Commands

After you select a pattern or patterns, you can copy the selected data by using the ***Edit-Copy*** command, or the Ctrl+C keyboard shortcut. If you copy **multiple patterns** with this technique, and then use the ***Edit-Paste*** command, Project5 pastes the patterns to their original tracks starting at the Now Time. If you want to move the selected data after that, just press the arrow keys on your computer keyboard to move the data vertically between to another track, or horizontally by increments of the Snap to Grid setting.

See Moving, Selecting, and Deleting Patterns to learn how to select multiple patterns.

### To Copy and Paste Patterns with the Edit Menu Commands

1. Select the patterns you want to copy.
2. Use the ***Edit-Copy*** command, or the Ctrl+C keyboard shortcut.
3. Set the Snap to Grid resolution to the beat boundary where you would like to paste the copied pattern(s).
4. If you're pasting a single pattern, you can now select the track you want to paste it into. Project5 pastes multiple patterns into their original tracks only.
5. Move the Now Time to the place in the selected track where you want to paste the copied pattern(s) (you can click in the Time Ruler that's just above the Arrange pane to move the Now Time to the nearest Snap to Grid boundary).
6. Use the ***Edit-Paste*** command.

Project5 pastes the selected data to the nearest Snap to Grid boundary. If you want to move the pasted data after that, just press the arrow keys on your computer keyboard to move the data vertically to another track, or horizontally by increments of the Snap to Grid setting.

See:

Moving, Selecting, and Deleting Patterns

Undoing Edits, and Undo History

Slip-editing and Slip-copying (Rolling-out) Patterns

## Moving, Selecting, and Deleting Patterns

You can drag patterns in the Arrange pane to any location in any existing track. The precision of the patterns' movements is controlled by the Snap to Grid resolution.

If you're going to move or copy several patterns at once, you first have to select them.

**Note**: Patterns in the Arrange pane can **overlap.** All the patterns will still sound. If one or more patterns is **hidden** underneath another pattern, the top pattern displays the boundaries of the lower patterns in a contrasting color. You can display a hidden pattern by right-clicking the top pattern, and choosing ***Bring to Front-(name of pattern)*** from the popup menu.

### To Select a Single Pattern

Click the pattern to select it—the pattern darkens in shade when it's selected.

### To Select Multiple Patterns

- Drag a rectangle around the patterns you want to select. The patterns darken in shade when they're selected.

  Or

- Hold down the Ctrl key while you click each pattern that you want to select.

### To Move Patterns

1. Select the patterns you want to move—if you're dragging a single pattern, you don't have to select it.
2. Set the Snap to Grid menu to an appropriate interval.
3. Do one of the following:
    - Drag from the center of one of the selected patterns to the location you want them to be in, and release the mouse.
    - Press the Left Arrow or Right Arrow key on your keyboard to move the selected pattern(s) in the direction of the arrow, by intervals of the Snap to Grid setting.
    - Press the Up/Down arrows to move the selected patterns to adjacent tracks.
    - If you drag clips from one track to another, holding the Shift key while you drag keeps the clips at their original time location.

### To Delete Patterns

1. Select the patterns you want to delete.
2. Press the Delete key, or use the ***Edit-Delete*** menu command.

### To Reuse Deleted Patterns

1. Right-click in the Arrange pane at the place where you want the pattern: Project5 displays a popup menu.
2. Choose a pattern from the Not In Use option on the popup menu.

   Or

1. Click the In Project button in the Loops/Patterns tab to display the Not In Use folder.
2. Click the folder if it's not open.
3. Drag the desired pattern(s) to the Arrange pane.

See:

Slip-editing and Slip-copying (Rolling-out) Patterns

Drag-copying Patterns with the Ctrl Key

Undoing Edits, and Undo History

### Transposing Multiple Patterns

You can transpose multiple patterns in the Arrange pane by selecting the patterns you want to transpose, and then pressing the + or - keys on the Num Pad. The patterns then display the number of positive or negative half-steps that you transposed them by.

## Editing Patterns

The Editor is where you edit individual patterns. You can display the Editor by double-clicking a pattern in the Arrange pane.

Any **editing** you do to a pattern in the Editor **affects all copies** or repetitions of that pattern (except for each pattern's MIDI channel and Transpose setting). If you want to create an **independent** copy of a pattern, display the pattern in the Editor, and click the dropdown arrow in the pattern menu, and choose ***Duplicate Pattern***. Project5 copies the pattern, and names it **Copy of (name of pattern you copied)**. You can also do this by holding down the Ctrl and Alt keys while you drag-copy the pattern in the Arrange pane.

The Editor has three display modes:

- Free mode—for MIDI patterns only, this mode is a piano roll style editor, which allows irregular note lengths.
- Step mode—also for MIDI patterns only, this mode emulates a hardware step sequencer. This mode displays notes on a grid of cells that are all the same size. If you open a pattern in this mode that contains

notes of irregular length, Project5 quantizes the notes to the nearest cell boundary (if you do this accidentally, you can press ***Ctrl+Z*** to undo).

- Groove clip mode—when you double-click a Groove clip in the Arrange pane or the Groove Matrix, the Editor shifts to Groove clip mode and displays the Groove clip.

In the Editor, some of the same editing procedures work on both audio and MIDI patterns. Groove clips (ACIDized clips) can be transposed like MIDI patterns in the Transpose menu in the upper right corner of the Editor. Wave files (non-ACIDized audio files), however, can not change pitch or tempo. See Working With Groove Clips for more information.

The Editor has its own Preview Pattern and Record Pattern buttons, so you can audition and/or record individual patterns without affecting your overall project. If you like a pattern you created in the Editor, you can use it in your project by dragging it to a location in the Arrange pane.

Pressing T on your keyboard toggles your tool selection between the Select, Note, and Automation tools.

In the Editor, you can add and edit notes and automation data, and also change pattern length:

- Notes can be added, deleted, moved, shortened, lengthened, transposed, quantized (with swing or without), groove quantized, copied, played backwards (retrograde), and modified with velocity and controller data.
- Patterns can be lengthened, shortened, duplicated, dragged to tracks, assigned to a MIDI channel, transposed, merged or layered with other patterns, and split.

You can undo your edits, starting with the most recent, by pressing ***Ctrl+Z*** repeatedly, or by using the ***Edit-Undo*** command (see Undoing Edits, and Undo History for more information). If you want to redo an edit after you just "undid" it, you can press ***Ctrl+Shift+Z*** (this is the ***Edit-Redo*** command). You can use this command repeatedly, also.

See:

Displaying Patterns in the Editor

Using the Snap to Grid Button in the Editor

Selecting and Deselecting Notes and Data in the Editor

Editing Notes in a Pattern

Changing the Length of Patterns

## Displaying Patterns in the Editor

To edit a pattern, you first need to display it in the Editor.

### To Display a Pattern in the Editor

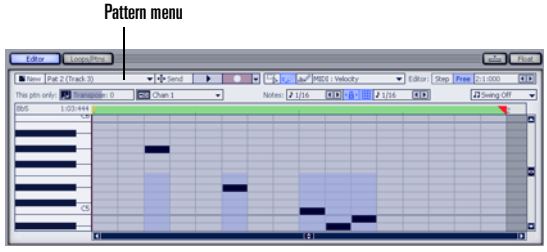
- Double-click the pattern in the Arrange pane.

  Or

- In the Editor, click the pattern menu, and under ***In Use*** or ***Not In Use***, click the name of the pattern you want to display.

  Or

- In the Editor, click the dropdown arrow on the pattern menu, and choose ***Open Pattern*** from the dropdown menu to open the Open Pattern dialog.




## Zooming and Scrolling in the Editor

All modes of the Editor allow zooming and scrolling.


### To Zoom In or Out Vertically

- Drag the Vertical Zoom/Scroll control left to zoom in or right to zoom out (see picture above).
- The keyboard shortcut is Ctrl+Down Arrow (in) and Ctrl+Up Arrow (out).

### To Zoom In or Out Horizontally

- Drag the Horizontal Zoom/Scroll control up to zoom in or down to zoom out (see picture above).
- The keyboard shortcut is Ctrl+Right Arrow (in) and Ctrl+Left Arrow (out).

### To Scroll Left or Right

- Drag the Horizontal Zoom/Scroll control to the left or right (see picture above).

### To Scroll Up or Down

- Drag the Vertical Zoom/Scroll control up or down (see picture above).

## Pattern Appearance

Patterns in the Arrange pane change their appearance, depending on whether you have selected them, and/or displayed them in the Editor.

The following table summarizes pattern appearance in the Arrange pane:

| Pattern appearance... | Meaning... |
|---|---|
| Black outline  | This “instance” of this pattern is currently displayed in the Editor; this pattern is the “active instance.” This instance is the one you’re editing, in case there are more copies of this pattern in the Arrange pane. |
| Shaded interior  | This pattern is selected. Being selected is totally independent of being the active instance of a pattern. |

See:

Naming Patterns and Saving Patterns

To Assign a MIDI Channel to an Instance of a Pattern

Using the Snap to Grid Button in the Editor

Selecting and Deselecting Notes and Data in the Editor

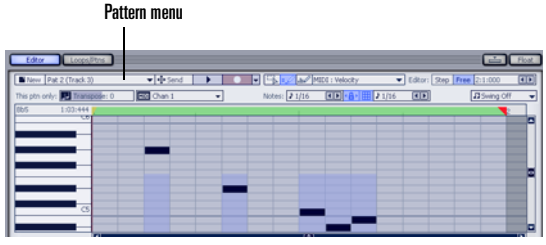
Editing Notes in a Pattern

Slip-editing and Slip-copying (Rolling-out) Patterns

Changing the Length of Patterns

## Naming Patterns and Saving Patterns

Project5 names each new pattern with a number (Pat 1, Pat 2, etc.), and adds the name of the track (if any) that this instance of the pattern is in. You can rename patterns in the Editor. Whenever you edit a pattern, you can save it so that your edits will be available in other projects.




### To Rename a Pattern

1. Display the pattern in the Editor.
2. Double-click the pattern name in the pattern menu.
3. Type a new name and press Enter.

You can also rename tracks: double-click the name (it will usually be the name of the instrument you patched to that track), type a new name, and press Enter.

### To Save a Pattern

1. Click the dropdown arrow in the pattern menu.
2. Choose ***Save Pattern As*** from the dropdown menu, choose a name and location for the pattern, and click Save.

See:

To Assign a MIDI Channel to an Instance of a Pattern

Using the Snap to Grid Button in the Editor

Selecting and Deselecting Notes and Data in the Editor

Editing Notes in a Pattern

Slip-editing and Slip-copying (Rolling-out) Patterns

Changing the Length of Patterns

## Assigning a MIDI Channel to a Pattern

You can assign each instance of a pattern to a different MIDI channel if you want, enabling you to access different sounds in a multi-timbral instrument. For example, if you have two copies of Pattern 1 in a track, you can double-click one copy and set its MIDI channel and/or transposition setting, and then either leave the other copy alone, or double-click the other copy and set a different MIDI channel and/or transposition setting.

**Note**: the Track Inspector has a menu for each track or track layer called the Send to MIDI Channel menu. This menu overrides the MIDI channel that you assign to a pattern in the Editor, forcing all patterns on a track or track layer to play on the MIDI channel that's listed in the Send to MIDI Channel menu. To disable the Send to MIDI Channel menu, set the menu to ***None***.

### To Assign a MIDI Channel to an Instance of a Pattern

1. Display the pattern you want to assign in the Editor.
2. The pattern must be the active pattern: make sure the pattern is in a track and has a black outline. Double-click it in the track if it does not have a black outline.
3. Click the MIDI Channel dropdown arrow that's in the This Ptn Only menu of the Editor, and choose a MIDI channel from the menu that appears.


Project5 assigns the pattern to the MIDI channel you chose.

See:

Using the Snap to Grid Button in the Editor

Selecting and Deselecting Notes and Data in the Editor

Editing Notes in a Pattern

Slip-editing and Slip-copying (Rolling-out) Patterns

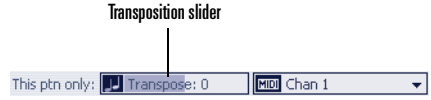
Changing the Length of Patterns

## Setting the Transposition Level of a Pattern

Each instance of a pattern can have its own MIDI channel and/or transposition setting. Groove clips can have a transposition setting. For example, if you have two copies of Pattern 1 in a track, you can double-click one copy and set its MIDI channel and/or transposition setting, and then either leave the other copy alone, or double-click the other copy and set a different MIDI channel and/or transposition setting.

### To Set a Pattern's Transposition Level

1. In the Editor, display the instance of the pattern you want to transpose.
2. The pattern must be the active pattern: make sure the pattern is in a track and has a black outline. Double-click it in the track if it does not have a black outline.
3. In the This Ptn Only menu of the Editor, drag the transposition slider left or right to set the number of half-steps you want to transpose the pattern by. You can also double-click the slider, type a positive or negative number, and press Enter.




Now this instance of the pattern will play back at a new pitch level. When you use this pattern in the Arrange pane, notice that it has a plus or minus number on it to show its transposition level.

Once a pattern or patterns are in the Arrange pane and are selected, you can transpose them by pressing the + or - keys on the Num Pad of your computer keyboard.

See:

Selecting and Deselecting Notes and Data in the Editor

Editing Notes in a Pattern

Slip-editing and Slip-copying (Rolling-out) Patterns

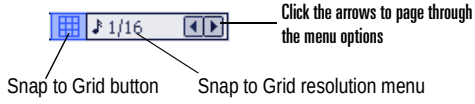
Changing the Length of Patterns

Displaying Patterns in the Editor

To Assign a MIDI Channel to an Instance of a Pattern

## Using the Snap to Grid Button in the Editor

The Free mode of the Editor has its own **Snap to Grid button**, which is independent of the Snap to Grid button that's in the Main Control view.




Step mode does not have a Snap to Grid button, because in this mode, the Snap to Grid is always enabled, and is set to whatever value the Notes menu is set to.

When you drag or add notes in Free mode, the precision of their placement is governed by the Snap to Grid resolution. For example, if the Snap to Grid button is set to Measure, and the button is enabled (blue), you can only drag notes to or insert notes at measure boundaries; if the Snap to Grid button is set to Quarter Note (displayed as 1/4), you can only drag notes to or insert notes at beat boundaries, etc. If you want to drag notes to or insert notes at irregular locations, leave the Snap to Grid button in the disabled position. You can override the Snap to Grid button while dragging notes if you hold down the Shift key while you drag.

The Snap to Grid button works by forcing any dragged notes or data to move **to** a certain size boundary within a measure. The Snap to Grid button does not work by forcing dragged objects to move **by** a certain size interval. For example, if a note is at an irregular location in a measure in a pattern, and you want it to move to the exact same location in the next measure in the same pattern, if you just drag the note to the approximate visual location in the next measure (the Snap to Grid button has to be off to do this), you will only get an approximate result. A way that you could do this precisely would be to set the Snap menu to Measure, add an extra note at the beginning of the measure, select the extra note and the note you want to move, drag them to the next measure as a group, and then delete the extra note.

The following table describes how to use the Snap to Grid button in the Editor:

| To Do This... | Do This... |
|---|---|
| Choose a snap menu value | Click the dropdown menu that's next to the Snap to Grid button and choose a value. This automatically enables the Snap to Grid button. |
| Turn off the Snap to Grid button | Click the Snap to Grid button so that it's not blue. |
| Temporarily override the Snap to Grid button | Hold down the Shift key while you drag a note. |

See:

Selecting and Deselecting Notes and Data in the Editor

Editing Notes in a Pattern

Slip-editing and Slip-copying (Rolling-out) Patterns

Changing the Length of Patterns

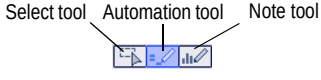
Displaying Patterns in the Editor

To Assign a MIDI Channel to an Instance of a Pattern

## Selecting and Deselecting Notes and Data in the Editor

Many editing procedures require that you select the notes and/or automation data you're editing, especially if you're editing more than one object. **Selected data** appears **highlighted in red**.

The **Select** tool is an all-purpose tool for selecting data, however you can use the Note tool when you just need to select an individual object without dragging it. Pressing T on your keyboard toggles which tool is active (including the Select tool).




The following table describes how to select and deselect objects in the Editor:

| To Do This... | Do This... |
|---|---|
| Select a single note | Click the note. |
| Deselect all selected data | Press the Escape key, or click outside of the selected area. |
| Select multiple notes | Use the Select tool to drag through the notes, or Ctrl-click each note (hold down the Ctrl key while you click). |
| Add or remove notes from a selection | Ctrl-click each one (hold down the Ctrl key while you click), or use the Select tool to drag through the notes (called Lasso selection). |
| Select all data in the Editor (including automation) | With the focus on the Editor (not the Arrange pane), press ***Ctrl+A*** or use the ***Edit-Select All*** command. Pressing the Escape key deselects all data. |

| | |
|---|---|
| Select automation data | Display the data, and drag through the data horizontally (if you drag through any notes, they become selected also). You can move the selected data by dragging or using the Left Arrow or Right Arrow key. If you want to select all the automation data (and notes) in the pattern, use the ***Edit-Select All*** command. |

See:

Changing the Length of Patterns

Editing Notes in a Pattern

Slip-editing and Slip-copying (Rolling-out) Patterns

Displaying Patterns in the Editor

Using the Snap to Grid Button in the Editor

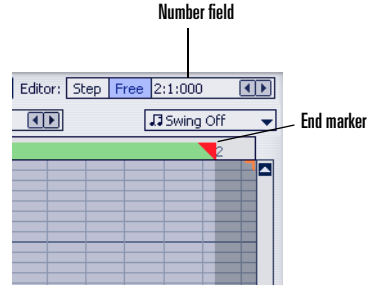
To Assign a MIDI Channel to an Instance of a Pattern

## Changing the Length of Patterns

You can change the length of a pattern in the Editor by dragging the End marker (if you want to change where the pattern starts, rather than ends, see Splitting MIDI Patterns in the Editor). If the new length of the pattern leaves some notes or data outside of the end of the pattern, the notes or data do not sound, but are not deleted. You can make them sound again by lengthening the pattern to include them.

### To Change the Length of a Pattern

1. In the Editor, set the Snap to Grid button to an appropriate interval. For example, if you want to change the pattern length by exactly one measure, set the Snap to Grid menu to Measure.
2. Do one of the following:
   - Drag the end marker of the pattern to the time where you want the pattern to end.
   - Drag the number field that's at the right end of the Editor: Step/Free menu to the left or right.




Project5 changes the length or the pattern, and of all copies of the pattern also.

You can change the default length of patterns. See Changing the Default Pattern Length and Step Count.

See:

Editing Notes in a Pattern

Displaying Patterns in the Editor

Using the Snap to Grid Button in the Editor

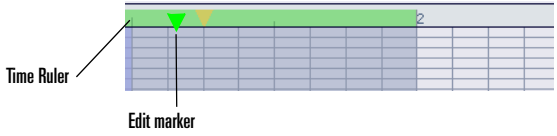
Selecting and Deselecting Notes and Data in the Editor

Slip-editing and Slip-copying (Rolling-out) Patterns

## Editing Notes in a Pattern

Project5 gives you extensive note-editing tools. An easy way to transpose or move notes is to select them with the Select tool, and then press the Arrow keys on your computer keyboard to move them in any direction.

Project5 also has an Edit Marker, that marks the place where pasting takes place if you use the ***Ctrl+C*** and ***Ctrl+V*** commands to copy and paste selected data. The Edit Marker is at the beginning of the Editor's Note pane by default, but you can drag it where you want it, or double-click the Editor's Time Ruler to set its location. The Snap to Grid resolution determines by what increments the Edit Marker moves when you move its location.




The following table summarizes the note editing and copy/paste procedures in the Editor. To edit automation, see Automation.

| Note-editing Action... | How To Do It... |
|---|---|
| Add notes | Set the Snap to Grid resolution (not necessary in Step mode), click the Note tool, click a note size value from the note size menu, and click the pitch and time location where you want the note to go. If you enable the Link button, any changes to the Snap to Grid resolution also change the note size menu, and vice versa. |
| Delete notes | Using the Note tool, right-click the note, or, using the Select tool, select the notes you want to delete, and then press the Delete key. |

| | |
|---|---|
| Move notes | Set the Snap to Grid resolution (or the note size menu in Step mode), and, using the Note tool or Select tool, drag the center of the note to a new location and/or pitch. **Or**, select the notes, and press the Arrow keys to move the notes vertically or horizontally<br><br>**Note**: in Step mode, moving a note through or on top of another note erases the original note. |
| Lengthen or shorten notes | Set the Snap to Grid resolution (or note size menu in Step mode), and, using the Note tool or Select tool, move the cursor over the beginning or end of a note until the cursor changes into the slip-editing tool, then drag the border of the note to lengthen or shorten it.<br><br>You can also use the ***Process-Length*** command. In the Length dialog, choose to edit Start Times and/or Durations of selected notes, and then enter a percentage less than 100 to shorten notes and/or start them sooner, or a percentage greater than 100 to do the opposite.<br><br>**Note**: this command is intended for MIDI pattern data only. However, some Groove clips created in earlier versions of Project5 may contain MIDI data that will respond to this command. |

| | |
|---|---|
| Copy and paste notes | Set the Snap to Grid resolution (or note size menu in Step mode), select the notes you want to copy, and Ctrl-drag (hold down the Ctrl key while you drag) the notes to the time and pitch you want them to occupy. **Or** select the notes to paste, copy them (***Ctrl+C*** command), drag the Edit Marker to the place where you want to paste the notes, and use the ***Ctrl+V*** command to paste a copy of the selected notes at the Edit Marker. Press the Arrow keys to move the selected notes vertically or horizontally. The Snap to Grid resolution (or note size menu in Step mode) determines by what horizontal increment the notes move.<br><br>**Note**: Pasting notes on top of other notes does not overwrite the old notes—both new and old notes play back. |
| Transpose notes | Use the Select tool or Note tool to drag the center of the note up or down; you can move several notes at once if they're all selected. You also can press the Arrow keys to move selected notes.<br><br>You can also use the ***Process-Transpose*** command. In the Transpose dialog, enter a positive number to transpose up by a number of half-steps, or a negative number to transpose down.<br><br>**Note**: in Step mode, moving a note through or on top of another note erases the original note. |

| | |
|---|---|
| Quantize notes | Select the notes you want to quantize, right-click in the editing pane of the Editor and choose ***Quantize*** from the popup menu. Choose options and click OK (this command is greyed-out in Step mode, since all notes are quantized by default in Step mode).<br><br>**Note**: this command is intended for MIDI pattern data only. However, some Groove clips created in earlier versions of Project5 may contain MIDI data that will respond to this command. |
| Groove quantize notes | See Groove Quantizing. |
| Slide notes | See Shifting Events in Time. |
| Retrograde notes (play them backwards) | Select the notes you want to play backwards, right-click in the editing pane of the Editor and choose ***Retrograde*** from the popup menu. Choose options and click OK.<br><br>**Note**: this command is intended for MIDI pattern data only. However, some Groove clips created in earlier versions of Project5 may contain MIDI data that will respond to this command. |

| | |
|---|---|
| Change note velocity | Select Velocity from the MIDI menu in the Editor, and use the Automation tool to edit each note's velocity. **Or**, move the Note tool just above the center of the note until the cursor changes shape, and drag upward or downward<br><br>You can also use the ***Process-Scale Velocity*** command. In the Scale Velocity dialog, enter a beginning and ending velocity, or percentage, if you check the Percentages checkbox. After you click OK, Project5 creates a smooth increase or decrease in the velocities of the selected notes.<br><br>**Note**: the ***Process-Scale Velocity*** command is intended for MIDI pattern data only. However, some Groove clips created in earlier versions of Project5 may contain MIDI data that will respond to this command. |

See:

Merging Patterns (Clips)

Setting Swing

Arranging Patterns

Displaying Patterns in the Editor

Using the Snap to Grid Button in the Editor

Selecting and Deselecting Notes and Data in the Editor

Editing Notes in a Pattern

Slip-editing and Slip-copying (Rolling-out) Patterns

Changing the Length of Patterns

To Assign a MIDI Channel to an Instance of a Pattern

To Set a Pattern's Transposition Level

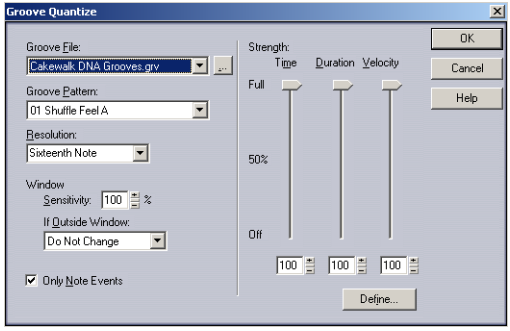
## Groove Quantizing

Groove quantizing changes the timing of selected notes to resemble the timing of another group of selected notes, which is referred to as a groove.

**Note**: commands from Project5's Process menu are intended for MIDI pattern data only. However, some Groove clips created in earlier versions of Project5 may contain MIDI data that will respond to these commands.

### To Use the Groove Quantize Command

1. Select the pattern or group of notes you want to quantize.
2. Choose ***Process-Groove Quantize*** to display the Groove Quantize dialog box.




3. Choose a groove file from the Groove File field.
4. Choose a groove pattern from the Groove Pattern field.
5. Use the following fields to configure your pattern:

| Setting... | What to do... |
|---|---|
| Resolution | Choose a note size or enter the number of clock ticks |
| Window Sensitivity | Enter the window sensitivity value (percentage) |
| If Outside Window | Choose what should happen to events outside the window |
| Only Note Events | Check to prevent MIDI controller, aftertouch, and xRPN data from being adjusted |
| Strength | Use the sliders or enter values for Note strength, Duration strength, and Velocity strength |

6. Click OK when you are done.

Project5 quantizes the selected data. You can use ***Undo*** to restore the material to its original state.

## Shifting Events in Time

The ***Process-Slide*** command opens the Slide dialog box, which allows you to move selected MIDI notes or automation (not track automation) forward or backward in time.

**Note1**: the ***Process-Slide*** command moves selected MIDI data, but does not move the pattern that the data occupies. After you slide your MIDI data, you may need to lengthen the boundaries of the pattern that the data is in to see and hear the data.

**Note 2**: this command is intended for MIDI pattern data only. However, some Groove clips created in earlier versions of Project5 may contain MIDI data that will respond to this command.

### To Shift Events in Time

1. Select the notes or patterns you want to shift.
2. Choose ***Process-Slide*** to display the Slide dialog box.
3. Enter the number of measures, ticks, seconds, or frames to slide. Enter a negative number to shift material earlier. Note that you cannot slide any event earlier than 1:01:000. For example, if the current selection starts at 2:01:000, you cannot slide events earlier by more than one measure.
4. Click OK when you are done.

Project5 shifts the selected events.

## Merging Patterns (Clips)

You can now merge selected audio or MIDI patterns on the same track.

**Note**: track automation, and slip-edited (cropped) data are not included in the merge.

### To Merge Patterns

1. If you don't want empty space in the newly formed pattern, move the patterns you want to merge so that their borders line up back to front.
2. Select the patterns (Ctrl-click each one). Selected patterns appear darker than unselected patterns.
3. Right-click one of the selected patterns and choose ***Combine Selected Clips*** from the popup menu.

   **Note**: the terms "patterns" and "clips" are used interchangeably in Project5.

Project5 creates a new pattern out of the selected patterns.

## Splitting Patterns

You can now split audio or MIDI patterns in the Arrange pane. Splitting a pattern creates two slip-edited sections of the same pattern. Both patterns contain the same data and are still the same pattern, but only the data that appears on the pattern sounds.

**Note**: the terms "patterns" and "clips" are used interchangeably in Project5.

### To Split Patterns

1. Move the Now Time to the place where you want to split the patterns.
2. If you want to split multiple patterns on multiple tracks, move any patterns you want to split so that the Now Time cursor lies across the places where you want to split the patterns.
3. Select the patterns you want to split.
4. Right-click a selected pattern and choose ***Split Selected Clips*** from the popup menu.

See:

Splitting MIDI Patterns in the Editor

Setting Swing

Arranging Patterns

Displaying Patterns in the Editor

Using the Snap to Grid Button in the Editor

## Splitting MIDI Patterns in the Editor

You can split a MIDI pattern (not an audio pattern) in the Editor, which creates a new independent pattern from the portion of the original pattern that's either before or after the Edit Marker. The original pattern remains the way it was, and Project5 names the new pattern "Split of (original pattern name) (number of beats in new pattern)."

### To Split a MIDI Pattern in the Editor

1. Display a MIDI pattern in the Editor that you want to split a piece from.
2. Set the Snap to Grid resolution to a value that allows you to split the pattern at the time location where you want to split.
3. Drag the **Edit Marker** to the split location, or double-click in the Editor's Time Ruler where you want the split to be.
4. Using the Select tool, right-click in the Editor's Note pane either before or after the Edit Marker, depending on what portion of the pattern should make up the new pattern.
5. Choose ***Split Until Marker***, or ***Split From Marker*** from the popup menu, depending on where you right-clicked.

Project5 creates a new pattern called Split of (name of original pattern).

See:

Setting Swing

Arranging Patterns

Displaying Patterns in the Editor

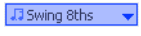
Using the Snap to Grid Button in the Editor

## Setting Swing

You can make a pattern of 8th, 16th, or 32nd notes play back as swing notes instead of straight notes. The appearance of the notes in the Editor does not change, only the way they play back. You can vary the strength of swing playback by dragging the swing strength menu, which is in the upper left corner of the Main Control view, just right of the Tap button.

### To Set Swing Strength

1. Display the pattern you want to edit in the Editor.
2. Set the swing note-size menu (located on the right side of the Editor), to the length of note that's in the pattern. For example, if the pattern is made up of 8th notes, set the swing note-size menu to Swing 8ths.




3. Adjust the swing strength menu in the Main Control view to vary the strength of the swing effect: 0% = no swing, 100% = maximum swing.


## Undoing Edits, and Undo History

Project5 keeps every edit you do during a session in the History file, up to a maximum number of 64 edits by default. You can change this number in the Undo History dialog if you want (***Edit-Undo History*** command). 128 is the maximum number. Keeping all of these edits takes up a lot of memory, so you may find that 64 is an adequate maximum number.

You can undo the edits you make in Project5 by pressing ***Ctrl+Z*** for each edit you want to undo, starting with the most recent edit. You can also open the Undo History dialog and look at the list of edits, and select the one that you'd like to jump back to.

### To Undo Edits

- To undo the most recent edits, press ***Ctrl+Z*** (or use the ***Edit-Undo*** command) once for each edit you want to undo, starting with the most recent.
- To use the History list, use the ***Edit-Undo History*** command to display the list of edits, select the one you'd like to jump back to, and click OK. Project5 "undoes" all the edits that happened after the one you selected.

If you want to clear the History list, open the Undo History dialog (***Edit-Undo History*** command) and click the Clear button. Project5 automatically clears the list when you close Project5 or open a new project.

# Creating MIDI Patterns

MIDI Patterns are basic building blocks in Project5. There are several ways to create MIDI patterns. You can draw notes, record notes one step at a time, and you can record a live performance to capture a “human feel.” This section covers how to create MIDI patterns. If you want to create audio patterns, see Recording Audio.

See:

Importing Patterns

Creating Patterns in Step Mode

Drawing Notes In Free Mode

Recording a MIDI Pattern in the Editor

Recording a MIDI Pattern in a Track

## Importing Patterns

You can import MIDI patterns into Project5 in several different ways:

- You can import any Standard MIDI File (extension .MID) into Project5.
- You can browse your computer by using the Explorer mode of the Loops/Patterns tab (see Loading and Deleting Patterns in the Loops/Patterns Tab for more information). Pattern files created with other Cakewalk programs that have the .PTN extension are compatible with Project5.
- You can import patterns by using the Open Pattern command in the Editor’s pattern menu

**Note**: Standard MIDI Files frequently contain program or patch changes. If you want a particular instrument to respond to the program changes, set the Bank/Patch menu in the Track Inspector of the track that you want to respond to program changes to ***None*** (which is the default). If you want the instrument to ignore the program changes, manually choose a sound from the Bank/Patch menu, and the track will ignore the program change messages that are in the Standard MIDI File.

### To Import a MIDI File

1. Select ***File-Import***.

   The Open dialog appears.

2. Navigate to the location of your MIDI files.
3. Select the MIDI file and click Open.
4. If the MIDI file contains more than one channel, a message box appears asking if you want to split the MIDI data to one track per channel. Click Yes to create multiple tracks or No to create one track.

The file appears as a new track or tracks in Project5.

### To Import a Project5 Pattern in the Editor

1. Click the dropdown arrow in the Editor’s pattern menu 

, and select ***Open Pattern*** from the dropdown menu.

   The Open Pattern dialog appears.

2. Navigate to the location of the desired Project5 pattern (.PTN file extension).
3. Select the pattern and click Open.

The pattern appears in the Editor. You can save the pattern to another location by using the ***Save Pattern As*** command that’s in the pattern menu’s dropdown menu.

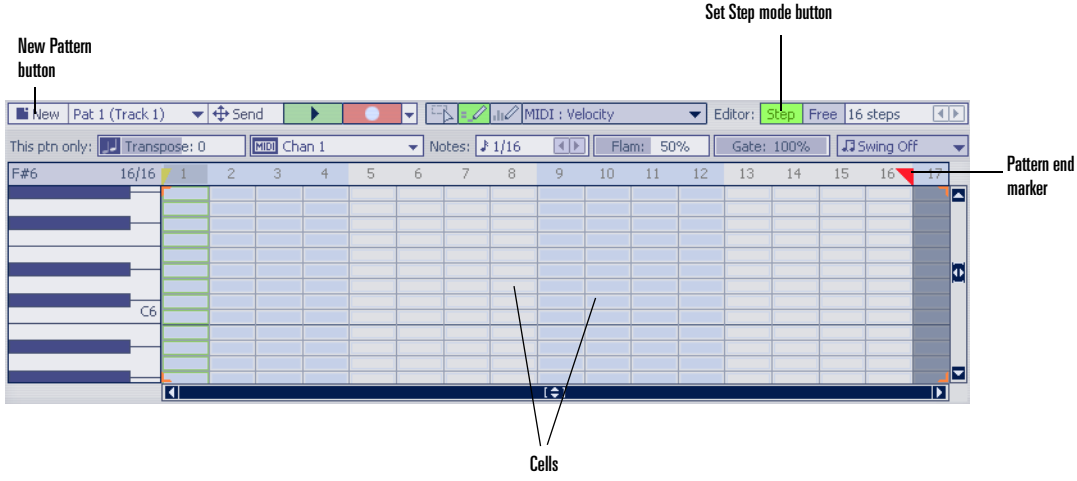
## Creating Patterns in Step Mode

When the Editor is in Step mode, you can create patterns by turning notes on or off by clicking the cells in the pattern grid (you can also use Step Recording, but not real-time recording). In Step mode, all the notes you draw are the same duration (step size), and start and end on grid lines.

You can edit the individual note durations if you want, after you draw the notes.

**Note**: the numbers in the Time Ruler in Step mode are step numbers, not measure numbers. The Notes menu sets the duration of each step. See The Time Ruler in Step Mode, for more information.

The Editor in Step Mode



Step mode has some tools and a procedure that Free mode (the Editor's other mode) doesn't have:

- Gate control—use this tool to control how long a pattern's notes actually sound after they are triggered, compared to their note size. For example, if you have a pattern of four quarter notes that has a gate value of 100%, and another pattern of four quarter notes that has a gate value of 50%, each note in the pattern that has the 50% value will only sound half as long as each note in the pattern that has the 100% gate value, even though the notes in the two patterns appear the same size in the grid, and the notes in both patterns start at the same time.
- Legato—not an actual tool, but a procedure to control the amount of time between the end of one note and the start of the next cell. You can cause the previous note to keep sounding even through the beginning of the next cell, for a very smooth-sounding effect.
- Flam tool—use this tool to add an extra short note to the beginning of another note, which is the way drummers frequently play.

### To Create a Pattern in Step Mode

1. In the Editor, click the New Pattern button 

, and then click the Set Step mode button in the Editor menu. This creates a new pattern of 16 steps (see Changing the Default Pattern Length and Step Count if you want to change this).
2. Each new pattern appears with the Notes menu set to 1/16, meaning that each cell represents a 16th note. If you want the steps to be a different length, choose a different value from the Notes menu.


3. Set the length of the whole pattern by dragging the pattern end marker to the right or left until you get the number of steps (cells) that you want.
4. Click the Note tool 
, and click the cells of the notes you want to enter. You can enter multiple notes on the same step, if you want harmony or chords. To enter a stream of notes, drag across the cells where you want notes.
5. You can erase a note by right-clicking it, or multiple notes by holding down the right mouse button and dragging.

After you enter the notes into your pattern, you can add flam, gate (duration), and legato. See Using Flam, Using Gate, and Using Legato.

You can edit velocity and automation in Step mode the same way you do in Free mode. See Automation.

If you want to give your pattern a swing feel, see Setting Swing.

### To Save a Pattern

1. Click the dropdown arrow in the Editor's pattern menu (it's in the upper left corner of the Editor).


2. Choose ***Save Pattern As*** from the dropdown menu, choose a name and location for the pattern, and click Save.

## Using Flam

A flam is a short note added to the beginning of another note, which is the way drummers frequently play.

### To Add a Flam to a Note

1. If you want to add a flam to a note (or remove a flam), use the Select tool 
or the Note tool 
to double-click the note.

   Project5 adds a dividing marker halfway through each flammed note to give a visual reminder that the note is flammed.

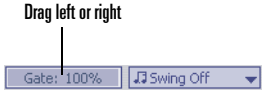
2. Set the flam amount for all the flammed notes in the pattern by dragging left or right in the Flam menu. A flam value of 10% means that the short note starts after 10% of the original note has played.


## Using Gate

The Gate menu in Step mode controls the length of time in a note's step size that the note actually sounds after the note is triggered. For example, if you have a pattern of four quarter notes that has a gate value of 100%, and another pattern of four quarter notes that has a gate value of 50%, each note in the pattern that has the 50% value will only sound half as long as each note in the pattern that has the 100% gate value, even though the notes in the two patterns appear the same size in the grid, and each pattern lasts for the same amount of time. This way you can make the notes in a pattern sound choppy and separated, or smooth and connected.

### To Use Gate

- Drag left or right in the Gate menu to select the gate value for your pattern.




## Using Legato

In Step mode, to make the notes in a pattern sound "smoother," if that's what you want, Project5 can delay the end of a note until slightly after the next cell starts. This effect is called *legato*, and you use it on individual notes in a pattern.

You create legato by dragging the end of a note less than half way into the next cell. **If you drag it more than half way**, the note simply changes its duration, filling up the next cell and erasing any note that might already be in that cell.

### To Use Legato

1. In Step mode, hold the Note tool or the Select tool over the end of a note until the cursor turns into the Crop tool  .
2. Drag the right end of a note into the next cell until a red hollow rectangle appears around the cell, and release the mouse. If you drag more than halfway through the next cell, the note fills up the next cell completely, erasing any note that might be in the cell. **Note**: if a note of the same pitch is in the next cell, the rectangle appears around the note.
3. Press the Escape key to deselect the note.

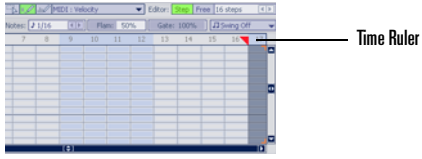
Notice that the hollow rectangle remains in the cell that follows the legato note. If a note of the same pitch is in the following cell, you'll only see the rectangle when the first note is selected.

## Changing the Default Pattern Length and Step Count

By default, patterns in the Editor contain 16 steps of 16th notes, which equals one measure in 4/4 time. You can change the length and number of steps for both Step mode and Free mode by using the ***Options-Default Step Size for Step Sequencer*** command and the ***Options-Edit-Default Step Count for Step Sequencer*** command. For example, if you chose a default step size of 16th notes, and a default step count of 32 steps, that would create a pattern of two measures in 4/4 time (32 16th notes). These changes take effect the next time you create a new pattern.

### The Time Ruler in Step Mode

There are no measure numbers above the Time Ruler in Step mode because each cell can represent a measure, a couple of beats, a beat, or a part of a beat. Instead, the numbers are step numbers. The value in the Notes menu sets the value of a cell or step in Step mode. For example, if the Notes menu displays “Meas,” each step is a measure long. However, for most patterns that you use Step mode for, you’ll probably set the menu to 1/16, so that each cell represents a sixteenth note: four notes to the beat.




Try turning the metronome click on, and try different values in the Notes menu while you play a pattern. You’ll notice that the Now Time cursor moves through the Editor at different speeds depending on the value in the Notes menu. For example, when the Notes value is 1/4, the Now Time cursor moves through one cell for each beat. When the Notes value is 1/16, the Now Time cursor moves through 4 cells for each beat.

## Drawing Notes In Free Mode

The Editor’s Free mode is a piano roll-style interface that allows notes to be irregular sizes, unlike Step mode.

See Drawing Notes.

### Drawing Notes

Use the following procedure to draw notes in Free mode.

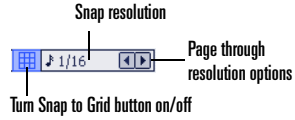
#### To Draw Notes in Free Mode

1. Put the Editor into Free mode by clicking the Free field in the Editor menu.

2. If necessary, create a new pattern by clicking the New Pattern button 
   
   in the Editor pane.

3. Click the Note tool  . If you want, click the Snap to Grid button in the Editor to enable it.

4. The Snap to Grid button forces a note to “snap” to a certain resolution when you draw a note in the Editor pane. If the Snap to Grid button is not enabled, notes you draw in the Editor pane begin at the spot you click.

5. Select a note length value in the Notes menu:

   
   
   This value determines the length of the notes you create. You can choose to link the Snap to Grid button with the Notes menu by enabling the Link button  that’s between them, making both menus locked to the same value. For example, changing the Snap resolution to a quarter note would automatically set the Notes menu to a quarter note, and vice versa.

6. Click in the Editor pane where you want notes to appear.

You can edit notes in new or existing patterns. For more information on how to do this, see Editing Patterns.

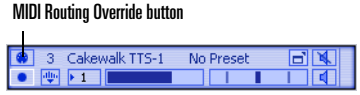
# Recording a MIDI Pattern in the Editor

If you play keyboard or any other kind of MIDI instrument, you may want to record a performance to create a pattern.

You can record live MIDI performances in the Editor's Free mode—Step mode is for step recording only.

### To Record a MIDI Pattern in the Editor

1. If you want to hear yourself playing through a particular track, click the MIDI Routing Override button of that track. At least, make sure that a MIDI track is highlighted.

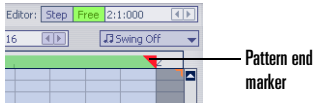



2. Click the New Pattern button 

in the Editor.

   An empty pattern appears in the Editor.

3. If necessary, click and drag the pattern end marker to make the pattern the length you want.




4. Click the dropdown arrow on the Record Pattern button  , and select one, none, or both of these recording options:

   - Overwrite—enabling this option means that any notes you record erase any pre-existing notes that occur at the same time.
   - Constant Velocity—enabling this option sets the velocity of any notes you record to 100.

5. Click the Record Pattern button in the Editor to start recording.

6. Play your MIDI instrument as long as you want; the pattern repeats itself until you click the Record Pattern button again, or press the Spacebar.

7. Stop recording by clicking the Record Pattern button in the Editor pane or by pressing the Spacebar.

You can erase your recording by pressing ***Ctrl+Z***. If you want to use this pattern in other projects, click the drop-down arrow in the Pattern menu 

and choose ***Save Pattern*** from the dropdown menu. After you save the pattern, you can load it from the Loops/Patterns tab.

See also:

Recording a MIDI Pattern in a Track

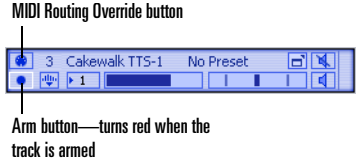
Step Recording

# Recording a MIDI Pattern in a Track

If you want to record a longer MIDI pattern without setting an end point for the pattern, you can record the performance directly onto a track. Track recordings are patterns, and can be edited in the Editor.

### To Record a MIDI Pattern in a Track

1. Arm the instrument track you want to record to.




2. Set the Now Time to the time when you want to begin recording.
3. If you want to hear a count-in before you record, use the ***Transport-Count-in On/Off*** command. When the command is enabled, a checkmark appears next to the command.
4. To set the number of beats in the count-in, use the ***Options-Metronome*** command to open the Metronome Properties dialog, choose a count-in duration in the Count in # of Beats field, and click OK.
5. If you want to enable constant velocity recording, choose this option in the Editor's Record button dropdown menu.
6. Click the Record button  in Project5's Main Control view.
7. Play your MIDI instrument.
8. To stop recording, click the Record button again or press the Spacebar.

Project5 creates a new pattern at the time and track that you recorded into. If your new pattern extends through a pre-existing pattern on the track, Project5 does not overwrite the pattern. You can place the older pattern on top of the newer pattern by right-clicking the place where the buried pattern is, and choosing ***Bring To Front*** from the popup menu.

## Step Recording

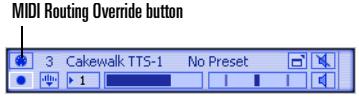
Step recording allows you to enter notes one at a time using a MIDI controller. You can do this in either mode of the Editor. The following table lists the step recording controls and what they do.

| Control... | Description... |
|---|---|
| Record Pattern button dropdown menu | Allows you to enable step recording, and choose constant velocity recording and/or overwrite mode.<br>Note: step |
| Notes menu | Controls the length of the current step-recorded note. You can select a new length at any time. |
| Record Pattern button | Click to begin step recording. Click again when you are finished step recording. |
| Tab key (on keyboard) | Advances to the next step without adding a note. |

| | |
|---|---|
| Edit marker | Shows where recording will begin in the pattern. It's located at the beginning of the pattern by default. You can relocate it by dragging it. The Snap to Grid menu determines the increments that the Edit marker moves when you drag it. |
| Link button | Links the Step Value field with the Snap button menu—changing one automatically changes the other. |

### To Step Record a Pattern

1. Select the track you want to play through by enabling its MIDI Routing Override button.




2. Enable step recording by clicking the dropdown arrow on the Record Pattern button  and making sure that there's a checkmark next to ***Step Record***.
3. Also in the Record Pattern button dropdown menu, select from these recording options:
    - Overwrite—enabling this option means that any notes you record erase any pre-existing notes that occur at the same time.
    - Constant Velocity—enabling this option sets the velocity of any notes you record at 100.
4. In the Notes menu 

, click the menu to choose the note length you want to use for the first note.
5. Make sure a MIDI track is highlighted, and then click the Record Pattern button in the Editor to start recording.
6. Play a note on your MIDI controller—Project5 displays the note you played in the Editor.
7. You can change the note length for subsequent steps by choosing a new note length from the Notes menu (or by using the keyboard shortcuts listed in the menu) as you record.
8. Continue playing notes, or entering rests (using the Tab key), changing note lengths as desired until you have finished step recording your pattern.
9. Click the Record Pattern button or press the Spacebar to end step recording.

Project5 displays the recorded notes in the Editor.

# Automation

Automation means to record the movement of a fader, knob, or other “control” so that the next time you play your project, that control moves automatically. You can use Remote Control to move the control while you’re recording. You can also draw and edit automation with the Automation tool in either the Arrange pane or the Editor. You can put automation into **patterns** and reuse the patterns in any place in your project where you want an automation command to go (see To Create Latch Automation of Track Controls).

Project5 allows you to automate track controls, pattern parameters, aux buses, the main bus, effects parameters, and instrument parameters. When you export your finished project, Project5 uses all your automation data to create your final mix.

See:

Quick Overview

Automating Track Controls

Automating Instrument and Effect Parameters

Automating Aux and Master Buses

To Create Latch Automation of Track Controls

To Create Latch Automation of Instrument or Effect Parameters

To Create Latch Automation of a Bus

Editing Velocity, Pitch Wheel, and MIDI Controllers

## Quick Overview

You can record track control automation and effects parameter automation into either tracks or patterns. When track automation and pattern automation coincide, **both sets of automation data take effect**. This can cause an automated control to jump erratically, so make sure you’re not sending conflicting streams of automation data to the same control.

There are four ways to create automation in Project5:

- You can record the movement of a “control” (knob, fader, or other control). You can use the mouse or Remote Control to move the control during recording.
- You can draw a graph of the automation in the Editor or the Arrange pane, using the Automation tool that’s in the Main Control view, or the Automation tool that’s in the Editor.
- You can create Latch Automation, which is like taking a snapshot of the position that a control is in, and adding that snapshot to your project at the time where you want the control to snap to the value it had when you took the snapshot.
- You can reassign automation from one control to another.

In all cases, the automation shows up on a graph that you can view and edit in either the Arrange pane or the Editor.

**Tip**: When you edit automation, holding the Shift key down while you use the mouse enables you to draw straight lines. Also, pressing T on your keyboard toggles your tool selection between the Editor’s Select, Automation, and Note tools.

**Note**: The Quantize and Retrograde commands function on automation data that is selected in the Editor. To use these commands, right-click in the Editor after you have selected some data, and choose a command from the popup menu.

See:

Automating Track Controls

Automating Instrument and Effect Parameters

Automating Aux and Master Buses

# Automating Track Controls

You can automate the volume, pan, width, phase, and mute controls in tracks. You can record the automation in either a track or a pattern.

**Note**: to automate phase, you must draw the automation instead of recording it.

### To Record Track Control Automation

1. Arm the track by depressing the track's arm button.
2. Put the focus on the armed track by clicking the track's name or number.
3. If you're recording into a pattern, display the pattern that you want to record the automation into in the Editor.
4. If you're recording into a track, click the Record button in the Main Control view  ; if you're recording into a pattern, click the Record button in the Editor  .

   Project5 starts recording.
5. Move the track control(s) you want to automate.
6. Stop recording.

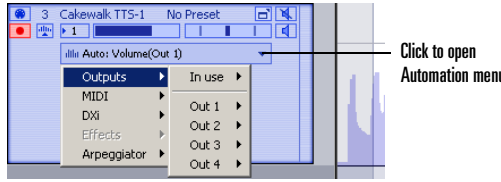
Project5 stores the recorded automation in the track or pattern you chose. You can also draw and edit automation graphically in the Editor or Arrange pane (see following procedure).

**Note 1**: Project5 only overwrites old automation data when you're actually moving a control or holding down the mouse. Just holding a control in one position does not overwrite old data. If you use Remote Control to overwrite old automation data, it's usually a good idea to erase any old data first, or use the mouse to re-record the data, since this produces a much smoother curve. To erase old data, hold down the right mouse button and drag the Automation tool through the data. If you just recorded the data, you can use the ***Ctrl+Z*** command to undo it.

**Note 2**: If you want to record automation on an audio track without recording audio data at the same time, set the recording input on the track to ***None***.

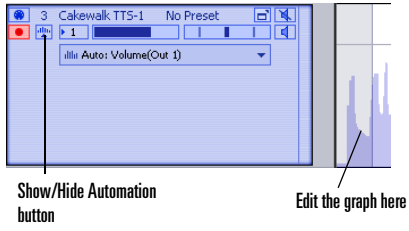
### To Draw or Edit Track Control Automation that's in a Track

1. In the Main Control view, click the Automation tool  . This activates the tool and expands the tracks so that you can edit automation.
2. Press the Up or Down arrows on your computer keyboard to display the correct track that you recorded into.
3. In the track that you want to edit, scroll through the Automation menu and select the parameter you want to edit. If you want to edit automation that applies to a specific output on a multi-output instrument, you'll find it in the ***Outputs-Out "n"*** menu. If a parameter already has some automation data, click the ***In Use*** submenu that you'll find in the Outputs, MIDI, DXi, or Effects menus, and then select the name of the track control that you automated.




4. Scroll the Now Time to the measure where the automation begins.

5. Click the Automation tool, and use the mouse to draw or edit the graph in the Arrange pane. If you want to draw a completely smooth curve, make sure that the Snap button is off.




6. To erase automation, hold down the right mouse button and drag the Automation tool through the graph.

**Note**: You can expand or collapse the track by clicking the track's Show/Hide Automation button.

### To Draw or Edit Track Control Automation that's in a Pattern

1. Display the pattern in the Editor.

2. In the Editor, click the automation menu


and select from these menu options:

- To draw new track control automation, select ***Outputs*-(name of parameter you want to edit)**.
- To draw new track control automation for a multi-output instrument, select ***Output*-(output number)-(name of parameter you want to edit)**.
- If you're editing a parameter that already has automation data, select ***Output-In Use*-(name of parameter you want to edit)**.

3. Click the Editor's Automation tool  , and use the mouse to draw or edit the graph. You can also use the Select tool  to select parts of the graph, and then use the Left/Right arrow keys and the +/- (plus and minus) keys to edit the selected data.

4. To erase automation, hold down the right mouse button and drag the Automation tool through the graph (the cursor changes to an eraser when you hold down the right mouse button).

### To Create Latch Automation of Track Controls

1. Move a track control to a position that you want the control to snap to at a certain time in your project.

2. If you want to add the latch automation data to a pattern, double-click the pattern in the Arrange pane to make it the active instance. Project5 will add the automation to the beginning of the pattern, and you can move the pattern to the place where you want the automation to be used, or you can copy the pattern and use it in multiple locations. If you don't make any

pattern into the active instance, Project5 stores the automation at the beginning of the track.

3. Right-click the track control and choose ***Latch Automation in (name of pattern*** or ***Automation-track (number))*** from the popup menu.

Project5 adds the automation data to the beginning of the pattern or the track you chose. If you play the track back, the control you right-clicked snaps to the position it was in when you right-clicked it, when the Now Time reaches the beginning of the track or pattern you put the automation into. You can edit the automation the same way you edit automation that's in patterns or tracks.

See:

Automating Instrument and Effect Parameters

Automating Aux and Master Buses

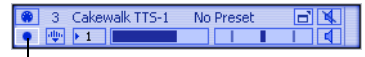
Editing Velocity, Pitch Wheel, and MIDI Controllers

## Automating Instrument and Effect Parameters

Most instruments and effects have automatable parameters.

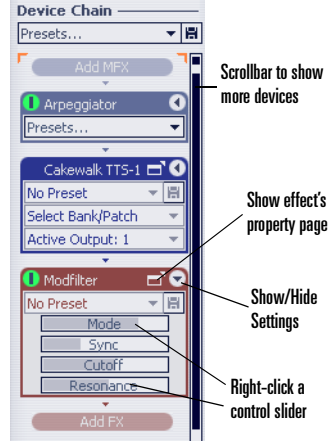
### To Record Instrument or Effect Automation

1. Select the track (click the track name or number) that contains the instrument or effect you want to automate.
2. Arm the track that contains the instrument or effect you want to automate (click the track's Arm button so that the button is red).




Arm button—turns red when the track is armed

3. If you want to record the automation into a pattern, display the pattern in the Editor.
4. In the Track Inspector, right-click one of the control sliders on the instrument or effect module, and choose a parameter from the popup menu (you may have to click the Show/Hide Settings button that's at the end of the instrument name). The parameter that the control is currently assigned to is listed in the ***Assigned*** section of the menu.




**Note:** You can automate some instruments and effects directly from their own interfaces.

5. If you're recording into a track, click the Record button in the Main Control view  ; if you're recording into a pattern, click the Record button in the Editor  .

   Project5 starts recording.

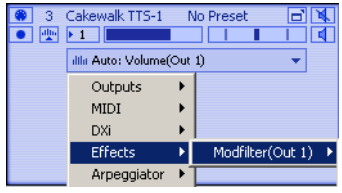
6. Move the control knob the way you want it to move.

7. Stop recording.

Play the track or pattern, and edit if desired (see following procedure).

### To Draw or Edit Instrument or Effect Automation in a Track

1. In the Main Control view, click the Automation tool  . This activates the tool and expands the tracks so that you can edit automation. You can also click the Show/Hide Automation button on a track to expand the track strip.
2. Press the Up or Down arrows on your computer keyboard to display the correct track.
3. In the Automation menu of the track you're editing, click the dropdown arrow to display the menu, click ***DXi*** to edit instrument automation, or click ***Effects*** to edit effects automation, then do one of the following:
    - If you're editing pre-existing automation, click ***In Use***, and then click the name of the parameter that you want to edit.
    - If you're drawing new automation, select the name of the parameter that you want to edit.




4. Scroll the Now Time to the measure where the automation begins, if necessary
5. Use the Automation tool to draw or edit the graph in the Arrange pane. If you want to draw a completely smooth curve, make sure that the Snap button is off.
6. To erase automation, hold down the right mouse button and drag the Automation tool through the graph.

### To Draw or Edit Instrument or Effect Automation that's in a Pattern

1. Double-click the pattern to display the pattern in the Editor.
2. In the Editor click the dropdown arrow on the Automation menu 

, then click ***DXi*** to edit instrument automation or click ***Effects*** to edit effects automation, and do one of the following:
    - If you're editing pre-existing automation, click ***In Use***, and then click the name of the parameter that you want to edit.
    - If you're drawing new automation, click the name of the parameter that you want to edit.
3. Use the Editor's Automation tool  to draw or edit the graph. You can also use the Select tool  to select parts of the graph, and then use the Left/Right arrow keys and the +/- (plus and minus) keys to edit the selected data.
4. To erase automation, hold down the right mouse button and drag the Automation tool through the graph.

### To Create Latch Automation of Instrument or Effect Parameters

1. In the Track Inspector, move an instrument or effect control slider to a position that you want the slider to snap to at a certain time in your project.
2. If you want to add the automation data to a pattern, double-click the pattern in the Arrange pane to make it the active instance (the pattern must be in the track you're automating). Project5 will add the automation to the beginning of the pattern, which you can move

to the place where you want the automation to be used.

3. Right-click the instrument or effect control slider and choose ***Latch (name of parameter) in*** "***Automation-track (number)***" or ***"Pat (number)"*** from the popup menu. If you have an active instance of a pattern in the track, only the Latch In Pattern option appears on the popup menu. To display the Latch In Track option, double-click a pattern in another track, or move the active pattern to another track.

Project5 adds the automation data to beginning of the pattern or the track you chose. If you play the track back, the instrument or effect control slider you right-clicked snaps to the position it was in when you right-clicked it, when the Now Time reaches the beginning of the track or pattern you put the automation into. You can edit the automation the same way you edit automation that's in patterns or tracks.

See:

Automating Aux and Master Buses

Editing Velocity, Pitch Wheel, and MIDI Controllers

Automating Track Controls

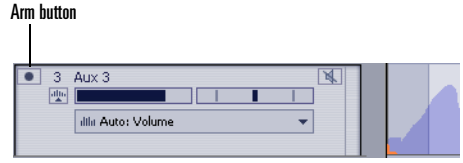
# Automating Aux and Master Buses

You can automate volume, balance, width, and mute in Project5's Bus pane. To display the master bus and aux bus controls, click the Show Aux/Master/Tempo button 

that's in the Track view.

### To Record Bus Automation

1. Arm the aux or master bus that you want to automate by depressing its arm button.




2. If you want to use Remote Control to move the desired control, make sure your remote control assignment is set up.

3. Click the Record button  in the Main Control view to start recording.

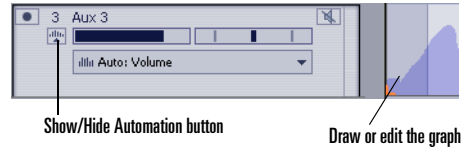
4. Move the control you want to automate.

5. Stop recording.

Play back your project, and re-record the automation if desired. You can edit the automation in the Arrange pane (see following procedure).

### To Draw or Edit Bus Automation

1. In the Main Control view, click the Automation tool. This activates the tool and expands the bus strips so that you can edit automation. You can also click the Show/Hide Automation button on a bus to expand the bus strip.




2. Press the Up or Down arrows on your computer keyboard to display the correct bus.

3. In the Automation menu of the bus you're editing, click the dropdown arrow to display the menu, and do one of the following:
    - If you're editing pre-existing automation, click ***In Use*** (find it in either the Outputs or Effects submenus), and then click the name of the parameter that you want to edit.
    - If you're drawing new automation, select the name of the parameter that you want to edit.
4. Scroll the Now Time to the measure where the automation begins, if necessary
5. Use the Automation tool to draw or edit the graph in the Arrange pane. If you want to draw a completely smooth curve, make sure that the Snap button is off.
6. To erase automation, hold down the right mouse button and drag the Automation tool through the graph.

### To Create Latch Automation of a Bus

1. Move a master bus or aux bus control to a position that you want the control to snap to at the beginning of your project.
2. Right-click the main bus control or aux return and choose ***Latch [name of parameter] in [name of bus]*** from the popup menu.

Project5 adds the automation data to beginning of the project. If you play the track back, the control you right-clicked snaps to the position it was in when you right-clicked it, when project starts playing. You can edit the automation the same way you edit automation that's in tracks.

## Automation Selection

You can use the Select tool to select automation in the Arrange pane or the Editor. After you select it, you can press the Delete key to delete it, cut or copy it with ***Ctrl+X*** or ***Ctrl+C*** command.

In the Arrange pane, you can paste copied or cut automation data at the Now Time in the current track with the ***Ctrl+V*** command. You can move selected automation data by the Snap value by pressing the left or right arrow keys. Pressing the up or down arrow moves the selected automation to adjacent tracks.

In the Editor, you can paste copied or cut data at the Edit marker with the ***Ctrl+V*** command, or move selected automation data by the Snap value by pressing the left or right arrow keys. You can place the Edit marker by double-clicking in the Time Ruler of the Editor.

See also:

Reassigning Automation

## Reassigning Automation

If you have some automation data in a track or pattern that you want to reassign, for example from track volume to track pan, you can do it in the Arrange pane or in the Editor.

### To Reassign Automation

1. In the Arrange pane or Editor, display the automation you want to reassign.
2. Use the Select tool to drag through the automation data that you want to reassign. The data turns red when it is selected.
3. Right-click the selected automation, and choose Reassign ***(name of original parameter) To (name of new parameter)***.

See:

Editing Velocity, Pitch Wheel, and MIDI Controllers

Automating Track Controls

Automating Instrument and Effect Parameters

# Editing Velocity, Pitch Wheel, and MIDI Controllers

You can edit any of these parameters on a per-pattern basis in the Editor. You can also edit these parameters (except for velocity) on a per-track basis in the Arrange pane.

**Note**: The ***Quantize*** and ***Retrograde*** commands function on note and automation data that is selected in the Editor. To use these commands, right-click in the Editor while data is selected, and choose a command from the popup menu.

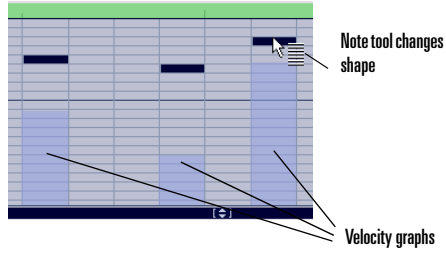
**Tip**: When you edit automation, holding the Shift key down while you use the mouse enables you to draw straight lines.

### To Edit Pitch Wheel or MIDI Controller Data in a Track

1. In the Main Control view click the Automation tool  . This activates the tool and expands the tracks so that you can edit automation.
2. Press the Up or Down arrows on your computer keyboard to display the correct track.
3. In the automation menu of the track you're editing, click the dropdown arrow to display the menu, click ***MIDI***, then select the name of the parameter that you want to edit.
4. Scroll the Now Time to the measure where the automation begins, if necessary
5. Use the Automation tool to draw or edit the graph in the Arrange pane. If you want to draw a completely smooth curve, make sure that the Snap button is off.
6. To erase automation, hold down the right mouse button and drag the Automation tool through the graph.

### To Edit Velocity

1. Display the pattern you want to edit in the Editor.
2. In the automation menu, click Velocity in the MIDI menu.
3. Click the Automation tool button (pressing T on your keyboard toggles your tool selection between the Select, Automation, and Note tools).
4. Use the **Automation tool** to adjust the height of the blue velocity graph that's under or over each note in the pattern.




Or

1. Display the pattern you want to edit in the Editor.
2. In the automation menu, click Velocity in the MIDI menu.

3. Move the **Note tool** just over the center of the note you want to edit until the cursor changes shape.
4. Drag the blue velocity graph up or down and release the mouse. When you're through editing a note's velocity, you can press the Escape key to deselect the note.

**Note**: You can also use the Select tool to select parts of the graph, and then use the Left/Right arrow keys and the +/- (plus and minus) Num Pad keys to edit the selected data.

### To Edit Pitch Wheel or MIDI Controller Data in a Pattern

1. Display the pattern you want to edit in the Editor.
2. Click the automation menu


, and choose Wheel or a controller from the MIDI menu.
3. Click the Editor's Automation tool (pressing T on your keyboard toggles your tool selection between the Select, Automation, and Note tools).
4. Use the **Automation tool** to draw the graph of the automation (turning off the Snap button will allow you to draw a smooth curve).

See:

Automating Track Controls

Automating Instrument and Effect Parameters

Automating Aux and Master Buses

## Automating Arpeggiator Parameters

Project5's Arpeggiator has automatable parameters.

### To Record Arpeggiator Automation

1. Select the track (click the track name or number) that contains the Arpeggiator that you want to automate.
2. Arm the track that contains the arpeggiator that you want to automate.
3. If you want to record the automation into a pattern, display the pattern in the Editor.
4. If you're recording into a track, click the Record button in the Main Control view  ; if you're recording into a pattern, click the Record button in the Editor  .

   Project5 starts recording.
5. In the Track Inspector, move the desired Arpeggiator slider or button the way you want it to move.
6. Stop recording.

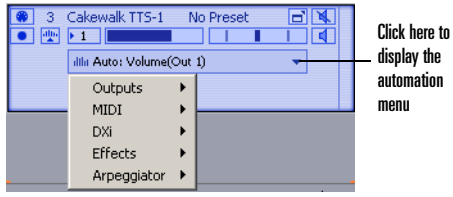
Play the track or pattern, and edit if desired (see following procedure).

### To Draw or Edit Arpeggiator Automation that's in a Track

1. In the Main Control view, click the Automation tool  . This activates the tool and expands the tracks so that you can edit automation.
2. Press the Up or Down arrows on your computer keyboard to display the correct track.
3. In the Automation menu of the track you're editing, click the dropdown arrow to display the menu, click

***Arpeggiator*** to edit Arpeggiator automation, then do one of the following:

- If you're editing pre-existing automation, click ***In Use***, and then click the name of the parameter that you want to edit.
- If you're drawing new automation, select the name of the parameter that you want to edit.




4. Scroll the Now Time to the measure where the automation begins, if necessary
5. Use the Automation tool to draw or edit the graph in the Arrange pane. If you want to draw a completely smooth curve, make sure that the Snap button is off.

# Remote Control

Remote control means to control various sliders and controls in Project5 by using sliders and controls on your MIDI controller. Remote control creates enormous possibilities for controlling your tracks, instruments, and effects. For example, if you have several instruments layered on the same patterns, you can assign each track's volume control to a different slider on your MIDI controller. That way, you can crossfade and mix the level of each instrument in real time. You can also control the parameters of most instruments and effects with remote control, creating almost limitless ways to continuously change the mix and content of your project's sounds.

Project5 allows you to use any MIDI device or controller to change instrument and effect parameters as well as many of Project5's controls. Many of Project5's controls can be assigned to a specific MIDI port, channel, and control source (slider or knob on your MIDI controller). Any MIDI control message can be used as a source. For example, you can assign a mod wheel to control an instrument's volume or reverb decay time.

See:

Using Remote Control

## Using Remote Control

You can assign a Project5 control to respond to a controller message on a specific MIDI channel, or you can assign the control to respond to a controller message on any MIDI channel. If you run out of sliders on your MIDI controller, and your controller can send out more than one MIDI channel, you can use the same slider to control several different Project5 controls by choosing a different MIDI channel for each control to respond to. Or you can assign several controls to respond to the same MIDI message if you want to.

### To Assign a Project5 Control to a MIDI Device

1. Right-click the control you want to assign to a MIDI device. You can select from most of the controls for tracks, aux buses, and the Master track. The Tap Tempo and Transport buttons also respond to MIDI remote control.
2. Select ***MIDI Remote Control*** from the menu that appears.

   The MIDI Remote Control dialog opens, with the control you clicked highlighted in the Mapped Parameters list.
3. Select an input port from the MIDI Input Source menu.
4. Select a channel—if you want the control to respond to any channel, choose Omni.
5. In the Control Source section, select the MIDI controller message that you want to use to control the control.
6. If you're not sure what controller message a slider or button on your MIDI Controller sends out, click the Learn button, move the slider or button in question, and then click Stop Learning. You can choose a different MIDI channel, or Omni, after you click Stop Learning.
7. Click OK.

Project5 assigns the control source you selected to the parameter (control) that's highlighted in the Mapped Parameters list.

### To Assign an Instrument or Effect Parameter to a MIDI Device

1. Right-click an instrument or effect parameter slider in the Track Inspector. If the slider already controls the parameter you want to control, skip to step 4.
2. Select the parameter you want to control from the popup menu.

   The popup menu closes and the name of the slider you clicked changes to the name of the parameter you chose from the popup menu.
3. Right-click on the same slider to redisplay the popup menu.
4. Select ***MIDI Remote Control*** from the popup menu that appears.

   The MIDI Remote Control dialog opens; the name of the parameter (slider) you clicked is highlighted in the Mapped Parameters field.
5. Select an input port from the MIDI Input Source menu.
6. Select a channel—if you want the knob to respond to any channel, choose Omni.
7. In the Control Source section, select the MIDI controller message that you want to use to control the slider.
8. If you're not sure what controller message a slider sends out, click the Learn button, move the slider in question, and then click Stop Learning. You can

choose a different MIDI channel, or Omni, after you click Stop Learning.

9. Click OK.

Project5 assigns the control source you selected to the parameter that's highlighted in the Mapped Parameters list.

See also:

The MIDI Remote Control Dialog

## The MIDI Remote Control Dialog

Right-clicking a control and choosing ***MIDI Remote Control*** from the popup menu opens the MIDI Remote Control dialog.

The MIDI Remote Control dialog has the following fields:

- **Mapped Parameters**—this field lists all the parameters and controls in this project that are currently assigned to a control source. When you highlight any parameter in the list, the other fields in this dialog update automatically to show you what control source is assigned to the highlighted parameter.
- **MIDI Input Source**—use this menu to choose which MIDI input you want to send the controller messages in through.
- **MIDI Channel**—use this menu to choose which MIDI channel that the Project5 control responds to. If you want the control to respond to any MIDI channel, choose Omni.
- **Control Source**—choose the type of MIDI message that you want the Project5 control to respond to.
- **Learn button**—if you're not sure what MIDI message a certain slider or knob on your controller sends out, click this button, move the slider or knob, and then click Stop Learning. Project5 reads the message that the slider sends out, and assigns that message to the control in question.
- **Delete button**—if you want to detach a control from a control source, highlight the name of the control in the Mapped Parameters field, and then click the Delete button.

See also:

Remote Control

Using Remote Control

# ReWire and MIDI Sync

Project5's ReWire and synchronization functions make it compatible with a variety of hardware and software devices.

See:

ReWire

MIDI Synchronization

## ReWire

ReWire is a software format that allows two audio applications to synchronize their transports and share audio data. Project5 is a ReWire **host and client**, and works with any application that supports ReWire. Always open your ReWire host application before you open your client. Then open your client application from your host application (it should have a command to open ReWire clients). Also, it's a good idea to not open two projects at the same time in your host application. In Cakewalk's SONAR, Project5 appears as a ReWire device that you can patch from the Synth Rack view.

Here's a list of Project5's ReWire functionality:

- The transports on both applications (host and client) are synchronized—moving a transport control (play, rewind, stop, etc.) in either application also moves the same control in the other one's transport. However, the record function is independent in each application.
- The tempo is controlled by the host application. Project5 ignores any tempo data in its own project when Project5 is the client.
- The sound card latency for real-time input from your controller is controlled by the host application.
- Setting up loop points in either the host or client application sets loop points in the other. If you set loop points in the host application, you won't see the new loop points in the client until the host application starts playing.
- In a ReWire host such as SONAR, you can choose any Project5 bus or track as an input for an audio track, giving you another layer of control over volume, pan, and effects.

**Note**: When you use Project5 with SONAR, if your SONAR project has no data in it, SONAR will rewind the Now time to the beginning whenever you click the Play button in either program. For best results, always include at least one clip of data in SONAR, which should be located at a later time than the end of your Project5 project.

### To Use Project5 as a ReWire Host

1. Open Project5 before you open your ReWire client application.
2. Insert a ReWire device by doing one of the following:
   - In the Track Inspector, click the Add Instrument button, and choose ***ReWire Devices-[name of your ReWire client application]*** from the popup menu, or right-click a pre-existing instrument module, and choose ***Replace Instrument-ReWire Devices-[name of your ReWire client application]*** from the popup menu
   - In the Track pane, right-click an empty space, and choose ***Insert Instrument-ReWire Devices-[name of your ReWire client application]*** from the popup menu, or right-click a pre-existing track, and choose ***Replace Instrument-ReWire Devices-[name of your ReWire client application]*** from the popup menu.
3. After you insert a ReWire device into a new or pre-existing track, open the ReWire application by clicking the Show Property Page button in the ReWire device's track or Track Inspector in Project5.

**Note**: the property page (interface) of some ReWire clients can not be opened from Project5. Try the Show Property Page button first; if that does not work, open the ReWire client application from the Start menu.

You can also insert ReWire devices from the Add New Instrument Track button that's in the Add Track section.

**Note**: if you freeze a ReWire track in Project5, Project5 only mixes down audio on the part(s) of the track where there are patterns.

See also:

ReWiring to SONAR

MIDI Synchronization

## MIDI Synchronization

Project5 can function as a MIDI Sync master—it can send MIDI Sync and Song Position Pointer signals to other devices. Project5 can not function as a MIDI Sync slave—it can't receive MIDI Sync, SMPTE, or any other synchronization signal. If you need Project5 to slave to another device, open a ReWire host such as SONAR, and Project5 will slave to the ReWire host.

### To Send MIDI Sync from Project5

1. Use the ***Options-MIDI Devices*** command to open the MIDI Devices dialog.
2. In the Output Device field, select the MIDI port or interface that you want to send the sync signal out through.
3. If your slave device is a drum machine, you may want the drum machine to always start playing at the beginning of its loop or pattern, even if you're restarting Project5 from the middle of a project. If that's the case, enable the Send Start, Never Continue checkbox.
4. If the slave device you want to control requires a Song Position Pointer signal (if it has a project length or pattern that always needs to play back at the same time location as your Project5 project), make sure that the Send SPP checkbox is enabled.
5. Click OK.
6. Make sure that the ***Options-Send MIDI Sync*** command is enabled.

Start Project5 playing and check the response of your slave device.

See also:

ReWire

# Guide to Instruments and Effects

See: What Instrument Should I Use?

## What Instrument Should I Use?

Read the descriptions of each below to see where you should begin:

### DS864

The **DS864** is a multitimbral, multi-output sampler, capable of receiving MIDI on up to 16 channels. Each MIDI channel can in turn be assigned to 1 of 8 stereo outputs.

This instrument is good for:

- Realistic instrument and drum sounds

### nPulse

The nPULSE Drum Synth provides easy control of vintage-style electronic drum voices, reminiscent of Roland's TR808, but with extended flexibility. The drum synth is a single channel, 12-voice multitimbral synthesizer that provides a master stereo output as well as 4 alternate stereo outputs, to which any voice may be assigned.

This instrument is good for:

- Vintage drum sounds
- Percussion
- Special FX

### PSYN II

PSYN II models a full-featured subtractive synthesizer, providing four oscillators that primarily model subtractive synthesis. Oscillator tone can be modified based on cross-modulating the OSCs to create Ring Modulation (AM) and Frequency Modulation (FM) models of synthesis, combined with full automation.

This instrument is good for:

- Analog Leads
- Lush Pads
- Deep Synth Bass lines
- Ambient and Special FX

### Velocity

VELOCITY is a single channel, multi-timbral sampler which provides 18 polyphonic voices. Four stereo outputs and a master output are also provided, to which the voices may be arbitrarily assigned. Each voice is capable of storing multiple samples which can be assigned to different VELOCITY layers.

This instrument is good for:

- Realistic velocity-layered drum kits
- Percussion

### Dimension

Dimension is a sample-playback synthesizer, it uses samples to generate sound. It includes a comprehensive library of sounds covering every aspect of contemporary music, and more sounds can be added to the instrument via expansion packs, or user multi-samples based on standard PCM wave files.

This instrument is good for:

- A variety of instrument sounds

### Cyclone

Cyclone DXi is a powerful 16-part, ACID™-compatible, groove sampler, composition tool, and loop editor wrapped up in a single DXi synth.

This instrument is good for:

- Loop tweaking, resequencing, and triggering
- Extreme drum sounds

### Roland GrooveSynth

Roland GrooveSynth is a GM2 (General MIDI 2) compatible software synthesizer featuring a newly developed software synthesis engine, with 256 sounds and 9 drum sets built in.

This instrument is good for:

- Getting a variety of good sounds quickly

## What Effects Should I Use?

Read the descriptions of each below to see where you should begin:

### Chorus/Flanger

The Chorus/Flanger uses a very slight delay to modulate the sound. This can create the sound of multiple instruments and an enhanced stereo field in Chorus mode, or add motion and a metallic edge when used as a Flanger.

This effect is good for:

- Solo instruments (especially strings, voice or keys)

### Classic Phaser

This is a classic phaser effect that uses a modulating notch filter with a feedback loop. It includes the following automatable parameters:

This effect is good for:

- Subtle or extreme modulation of strings and pads
- Creating spacey leads

### Compresser/Gate

A compressor takes the loudest parts of an input signal and reduces their volume. When you use a compressor, the master gain adjustment can result in increased low-level system noise. As a result, it is common to use a gate in combination with a compressor.

The compressor is good for:

- Adding punch to drums and instruments
- Increasing overall volume without clipping

The gate is good for:

- Eliminating unwanted noise
- Interesting rhythmic effects

### Tempo Delay

The Delay effect produces an echo on whichever channel it is patched to.

This effect is good for:

- solo instruments or voice
- adding rhythmic variation to drums or percussion.

### HF Exciter

HF (High Frequency) exciters are used to enhance the higher end of the frequency spectrum. This produces the psycho-acoustic affect that the signal is brighter and clearer. This is done by adding harmonic content not present in the original signal.

This effect is good for:

- Adds movement and air to dull sounds
- Increases perceived stereo image

### ModFilter

This is a resonant low-pass filter which allows you to remove higher frequencies. This can be done in response to incoming audio, rhythmically using the built-in LFO (low-frequency oscillator), or manually via automation.

This effect is good for:

- creating breakdowns and build tensions—commonly used by DJs
- making instruments sound more ‘lo-fi’ or less present.

### Para Q

The Para-Q effect is a lightweight process that can be used on many tracks simultaneously. It is used to boost or attenuate generally high or low bands of the signal.

This effect is good for:

- Removal of unwanted frequency bands from loops samples

- Emphasis of particular timbres in samples or synths

### Studioverb2

The Studioverb2 provides very dense and warm reverberation with 32-bit floating point implementation. This eliminates the digital grunge and harshness that occurs even in the best studio reverberation systems, which are implemented using less advanced fixed point processing. The Studioverb2 provides extremely high efficiency, typically using half of the CPU load of other premium reverb plug-ins.

This effect is good for:

- Creates a realistic environment for dry or synthesized sounds
- By applying more reverb to an instrument you can push it into the background. A dryer track (less effects) will stand out more.

### Spectral Transformer

Spectral Transformer is a multi-functional plug-in designed as a real-time sound modifying instrument. It has several functions which can be chained, so that the effect of processing is cumulative.

This effect is good for:

- Special effects

### Alias Factor

Alias Factor is a sound mangling plug-in which emulates sampling rates.

This effect is good for:

- Vintage sampler modeling
- Adding a gritty or retro character

### Arpeggiator

You can play any synth through Project5's arpeggiator to create rich tapestries of sound by a single note on your MIDI keyboard (or any MIDI instrument). Project5's arpeggiator is highly customizable. You can change the speed at which notes are played, set the octave range of the notes played and mix chords with arpeggiated notes.

This effect is good for:

- adding complexity to simple parts
- triggering realistically articulated patterns, especially useful for guitars, strings, and keyboards.

# DS864 Sampler

The **DS864** is a multitimbral, multi-output sampler, capable of receiving MIDI on up to 16 channels. Each MIDI channel can in turn be assigned to 1 of 8 stereo outputs.

The sampler imports popular sample formats, which you can subsequently edit. You can also create your own programs from a collection of WAV files. Programs are stored in banks; any number of programs, regardless of which bank they originate from, can be assigned to a specific MIDI input. You can save banks and programs in DS8 file format.

Samples can be key mapped and set to different velocity zones to create dynamic programs. Samples also respond to loop points and it is possible to edit volume offsets, tuning, and panning of the samples. Sample-level effects include waveform reversal, phase inversion and bit decimation.

In addition to two resonant filters, the sampler provides standard modulation controls such as envelopes and LFOs. The envelopes and LFOs can modulate the volume, panning, filter cutoff and resonance levels, pitch and so on. Envelopes and LFOs can also respond to various modulation sources, including MIDI CCs, aftertouch, etc.

Generally, the user interface displays the value of the control you're adjusting, in a popup hint—to adjust a value, simply click with the left mouse button on a knob, and hold the mouse button while you drag the mouse up or down, to increase or decrease the value. It is also useful to notice, that most of the controls can be fine-adjusted, by holding down the left shift button on the PC keyboard while dragging the mouse up or down.

The folder and disk icons in the second row are used to open a multisample (AKP/KRZ/SF2) or program (DP8), and to save a program (DP8)—the **DS864** is capable of loading several sampler formats:

- ***.WAV** and ***.AIF—**These are the standard one-sample files used on Windows and Mac OS operating systems. 16-bit and 24-bit formats, in mono or stereo, are supported. You can build your own multi-sample programs from such one-sample files, and these can be saved in the **DS864**'s native (*.DP8) format.
- ***.AKP**—Multisamples from AKAI S5000 / S6000 hardware samplers can be imported.
- ***.KRZ**—These are multisample programs for the Kurzweil K2000 hardware sampler.
- ***.SF2—**This format is widely used in software samplers, as well as on many soundcards.
- ***.DP8—**This is the native format of the **DS864**—you can save your own multisample programs in this format.

To name a program before saving it, doubleclick on the program name, and input the new name in the dialog that appears.

When importing third-party multisamples, such SoundFont 2, AKAI and Kurzweil files, it is important to understand that only the multisamples are loaded—such formats contain other information used to program the filters, envelopes, and other components of the native hardware/software platforms from which these formats originate. The **DS864** ignores this additional programming, which may be contained in some formats, but provides it's own, usually much more flexible and diverse, set of filters, LFOs and envelopes that you can use the shape the sound of the imported multisamples.

## Using DS864

Use the following procedures to start using DS864.

### To Load a Program

1. To load a program from the factory bank that comes with the **DS864**, move your mouse to the large display in the left panel—the top row in the display contains the program and bank controls.
2. To pick a program from the currently loaded bank (by default the factory bank), simply click the current program title (where it says "001: Default Program" at startup)
3. Choose the program you want, from the popup menu that appears.

   Or

1. Use the little green left/right arrows next to the program title, to cycle through the programs in the currently loaded bank.

### To Load and Save

Loading and saving is done by clicking on the folder and disc icons in the large display on the left panel. The first two of the four rows are the ones used to load and save programs and layers.

The first row deals with DS864 programs. In **DS864**, a MIDI bank is a collection of up to 128 DS864 programs, and a program is a complete "sound" for the sampler, including the multisample and all settings. The label on the left displays the program currently selected from the loaded bank, and provides forward/backward buttons (left/right green arrows) for quick access to all the programs in a bank. You can also click on the green arrow to the left of the program name, to open popup menu from which you can directly select the program you want to open.

The left half of the second row displays the multisample/program filename chosen for the currently selected part—you can have up to 8 parts, each of which have their own program; all other controls in the plug-in display and modify the settings for the currently selected part. You can switch to a different part by clicking on the filename, which will display a popup with the 8 available parts and their associated filenames.

## DS864 Program Controls

The right half of the second row in the large display on the left panel, contains the MIDI input and audio output settings for the currently selected part

The following is a description of how to use the different controls in the DS864:

### MIDI and Audio settings

The MIDI setting (the left of the two controls), determines which of the 16 MIDI channels the currently selected part "listens" to—this can be set to **OMNI** as well, which means that the part will respond to MIDI messages on any of the 16 channels. By choosing the same MIDI channel for two (or more) parts, you can effectively "stack" several programs; that is, play them at the same time—for example, by loading cello, violin and viola programs into three different parts, and setting them all to MIDI channel 1, you could conduct a small string ensemble at one time.

The audio output setting (the right of the two controls), decides which audio channel the part is sent to—on hosts that support multiple audio outputs from the same instrument, the **DS864** has a total of 8 channels, and each part can be assigned to any one of these. You can use this feature to process several parts differently in your host application—for example, if your host has insert effects for channels (most hosts do), you could send your drum part to output 1, and your strings to output 2, which would enable you to insert different effects on them, as if they were two different instruments.

### Part controls

The **VOL**, **PAN**, **TUNE** and **BITS** knobs in the upper-right corner of the left panel, are the master controls for the cur-

rently selected part. **VOL** controls the volume of the part, and **PAN** controls the stereo panning. With **TUNE**, you can adjust the tuning of each individual part, from -1 to +1 octave, specified in halfnotes, with one decimal. The **BITS** setting can be used to decimate/degrade the sound to a lower quality, simulating a lo-fi sound.

## DS864 Performance Controls

These are the controls that determine how the **DS864** reacts to keystrokes and pitchbender messages from a MIDI keyboard.

### Portamento

Portamento, when enabled, causes new notes to initially trigger with the pitch of the previous note, and then to glide towards the pitch of the new note.

When using portamento, it is most common to play only a single key at a time—there is no technical reason why you couldn't play chords if you wanted to, but most of the time this won't give very interesting results. The portamento section (in the red area on the right panel) contains two controls, which adjust the rate and type of portamento effect.

The **RATE** control controls the time it takes to slide from the previous note to the new one—when this is set to zero (default), portamento is disabled. The higher the setting of this value, the longer the duration of slides between notes.

**LIN**, **EXP** and **LOG** are the three possible choices for the portamento transition curve. When set to **LIN**, the glide between notes is linear—the pitch changes with a constant rate from the previous to the new note. If set to **EXP**, the transition is exponential, which means that the glide is quicker at first, and then slows down as it approaches the pitch of the new note. When set to **LOG**, the transition is logarithmic—the glide is slower at first, and then speeds up as it approaches the pitch of the new note.

### Pitch Bend

These controls determine how the **DS864** reacts to movement of the pitch bender on a MIDI keyboard. The pitch bend section contains three controls (in the red area of the right panel), for adjusting the pitch bend range and behavior.

The amount of possible upwards pitch bend (to a higher note pitch) is controlled with the knob labelled **UPPER**, while the amount of possible downwards pitch bend (to a lower note pitch) is controlled with the **LOWER** knob—possible settings, for both knobs, range from 0 (no pitch bending possible) to 12 halftones (a full octave of pitch bend possible).

## Master Controls

The master volume, panning and tune controls affect all parts—these controls affect the output globally, on all channels.

These controls are located in the upper-right corner of the right panel, in the red area.

The **VOLUME** knob controls the overall output volume of the instrument, for all parts, on all output channels.

**PAN** controls the stereo panning offset of the instrument. You can pan the individual parts as well, using the small controls at the top of the left panel (the Program Contols), but these are relative to the global panning of the instrument. So for example, if you set the global panning all the way to the left, and the panning of a part all the way to the right, this results in zero panning (+100% -100% = 0%) for that part.

Global tuning of the entire instrument is done with the **TUNE** control—again, this tuning is an offset, and results in relative tuning of all parts. Possible values range from -1 to +1 octave, with a precision of 1/10th of a halfnote.

### Filters (FLT1 and FLT2)

The sampler includes two multi-mode filters that can be independently enabled, each with its own unique character. Advanced filtering techniques can be realized by sending the output of the first filter to that of the second.

This section of the manual deals with the **DS864**'s filter controls specifically—if you're new to the concept of filters in general, you should begin by reading the Terminology: Filter section, before studying the remainder of this page.

### FLT 1

The first filter is a multimode filter with a 12 dB/octave falloff. The four different modes, of which one can be selected, are:

- LP (Low Pass)—Passes low harmonic frequencies (including the fundamental frequency). High harmonic frequencies are filtered out.
- HP (High Pass)—Passes only high harmonic frequencies, filtering out the lower frequencies, including the fundamental frequency.
- BP (Band Pass)—A movable region of the frequency spectrum that passes frequencies within its specified range, while frequencies above and below the band are filtered out.
- NT (Notch)—A movable region of the frequency spectrum that rejects frequencies within its specified range.

### FLT 2

The second filter is a 4-pole low pass filter, with a 24 dB/octave falloff, similar to the 60's analogue Moog filter. Unlike the first filter, this is a low-pass filter only—it passes low harmonic frequencies (including the fundamental frequency). High harmonic frequencies are filtered out.

### CUTOFF (Filter Cutoff Frequency)

Both filters have a cutoff frequency to control the point in the spectrum where frequencies are passed and rejected in a given mode.

### RESO (Resonance)

Both filters have a resonance control, which adjusts the amount of amplification around the filter's current cutoff frequency. Turning this up, will produce the traditional howling or whistling filter effect.

### BYP (Bypass)

Turning on the bypass switch, disables a filter—both filters have this option. If you only want one filter enabled, or if you want no filtering at all, you can bypass one or both of the filters.

### Filter Modes

The filter mode switch is located on the right side of the **FLT 2** panel. This switch can be used to toggle between **SR** (serial) or **PL** (parallel) combination of the two filters.

With both filters enabled, and when set to serial, filter 1 is applied first, and filter 2 is then applied to the filtered output from filter 1. In parallel mode, the two filters are processed in parallel—that is, the unfiltered signal is fed to both filters, and the two filtered signals are then mixed.

If either filter is disabled (bypassed), and when set to serial, only one of the active filter is applied to the dry signal—the other filter has no effect. In parallel mode, the output of the active filter will blend with the unfiltered signal.

### LINK

If enabled, the cutoff parameters on both filters will be affected by the CUTOFF knob on filter 1's panel, while the difference between the cutoff values of the two filters, is preserved. This is especially useful when using the cutoff parameter on filter 1 during performance, so that when the filters are in parallel mode, you don't have to adjust both cutoff parameters to create a filter slide.

### MOD AMOUNT

Both filters have three knobs to control the amount of modulation of the filter cutoff frequencies, by from envelopes (**EG**), by LFOs currently assigned to cutoff destinations (the **LFO** knob), and by keyboard (the **KEY** knob).

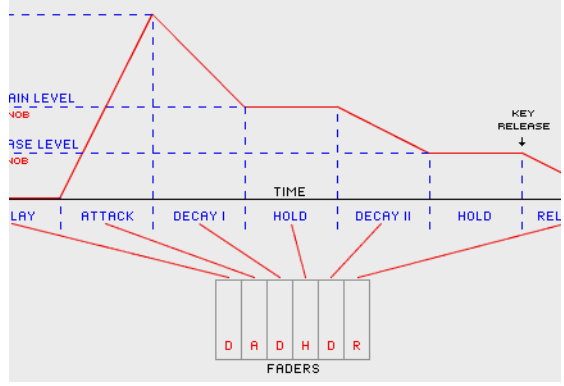
The latter (**KEY**) can be set to either positive or negative values—when set to a positive value, keys on the right end of the keyboard will have an increased cutoff frequency, while keys on the left end of the keyboard will have a decreased cutoff frequency. When set to a negative value, it's the other way around.

## Envelopes

The **DS864** uses 7-stage envelopes, which means that an envelope goes through 7 distinct stages during the duration of a note—this will be explained in further detail on this page. There are four different envelopes, which have similar controls, but different modulation targets:

- **F1 EG** (Filter 1 Envelope Generator)—This envelope modulates the cutoff frequency of the first filter. The amount of modulation is determined by the **EG** knob in the **FLT 1** control section. If filter 1 is set to bypass, or if the **EG** knob is turned all the way down, this envelope has no effect.
- **F2 EG** (Filter 2 Envelope Generator)—Modulates the cutoff frequency of the second filter. Again, the amount of modulation is controlled by the **EG** knob in the **FLT 2** control section. And again, if filter 2 is set to bypass, or if the **EG** knob is turned all the way down, this envelope will have no audible effect.
- **PITCH EG** (Pitch Envelope Generator)—This envelope modulates the pitch of the note—depending on the setting of the **AMT** (Amount) knob, which is present only on the pitch envelope, the envelope can modulate the note pitch either positively (higher pitch) or negatively (lower pitch).
- **AMP EG** (Amplitude Envelope Generator)—Controls the amplitude (loudness) of the note, and affects the duration of notes after a key is released.

The following illustration shows how the envelope is shaped over time:




An envelope begins when the key is pressed down, at the left end of the graph—and it ends after the release stage, at the right end of the graph. The envelope goes through 7 distinct stages, and is shaped by the six time faders (**DADHDR**) and the two red knobs (**SUS** and **REL**) as follows:

1. Delay—When a key is pressed down, the delay stage begins. During this stage, the envelope remains at zero for a given period of time. The delay time is adjusted by the leftmost **D** fader, and can last from 0 to 10 seconds—if set to 0, the envelope will enter directly into the attack stage when the key is pressed down.
2. Attack—During the attack stage, the envelope gradually rises from zero to it's full amplitude. The

duration of the attack stage is adjusted by the **A** fader, and can last from 1 millisecond to 10 seconds.

3. Decay I—After the attack stage, the envelope gradually falls from full amplitude to the level specified by the **SUS** knob. The duration of the Decay I stage, is determined by the second **D** fader (the third fader from the left) and can last from 1 millisecond to 10 seconds.

4. Hold—During the sustain stage, the envelope remains at the level specified by the **Sus** knob, for a given period of time. The duration of this stage is determined by the **H**fader, and can last from 0 to 10 seconds—if set to 0, the envelope will skip the sustain stage entirely, and enter directly from Decay I into Decay II.

5. Decay II—In this stage, the envelope gradually falls from the sustain level, as determined by the **SUS** knob, to the level specified by the **REL** knob—this level is relative to the sustain level, so that for example, a setting of 0.5 would mean "half the sustain level", and not "half the envelope's maximum amplitude". The duration of this stage of the envelope is adjusted with the rightmost of the **D** faders (the fifth fader from the left), and can last from 1 millisecond to 10 seconds.

6. Hold—By the time the envelope has completed the Decay II stage, if the key is still being held down, the envelope will enter the hold stage. It will remain at the release level (as specified by the **REL** knob) for as long as the key is still held.

7. Release—The final stage of the envelope begins when the key is released. During the release stage, the envelope gradually falls from it's current amplitude to zero, over the period of time specified by the **R** fader.

Additionally, the envelope's behavior and response to key release, is governed by the envelope mode switch—that is, the right-most switch with the three settings:

- **NORMAL—**In this mode, the envelope will proceed through the first stages into the sustain stage, only if the key is still being held—if the key is released before the envelope reaches the sustain stage, it will proceed directly into the release stage, falling from it's current amplitude to zero.

- **REPEAT—**If set to **REPEAT**, the envelope repeats indefinitely, acting like an LFO with a programmed shape. So every time the envelope reaches the end of the Decay II stage, it will begin the Attack stage again, and will repeat the sequence for as long as the key is held. Upon key release, the envelope proceeds directly into the release stage, falling from it's current amplitude to zero.

- **FREE—**In this mode, the envelope will always complete the Delay, Attack and Decay I stages, regardless of wether the key is still released. Apart from this, it behaves normally.

The **TIME** knob adjusts the relative time for the six time faders. By default, it's at 50%, in the middle, which means that the parameter range for the faders is up to 5 seconds—at 100%, the parameter range is up to 10 seconds, etc.

The velocity modulation amount is specified by the **VEL** knob, from minus 100% to plus 100%. This affects how a note's velocity (how hard you press the key on a pressure-sensitive MIDI keyboard) will affect the amplitude of the envelope. If set to a positive value, a harder keypress will have a larger amplitude than a softer keypress—or if set to a negative value, a harder keypress will have a smaller amplitude than a softer keypress.

Aftertouch response affects the envelope's amplitude after the initial attack. Provided that your MIDI keyboard sup-

ports aftertouch, it has a system to measure the physical pressure on the key—so when you've played a soft note, you can make the note louder by increasing the pressure, thus the name aftertouch. The **AFT** control determines the amount of amplitude increase, that can be caused by aftertouch, from a 0% (none) to a 100% increase (twice the amplitude).

## LFOs

If you're already familiar with LFOs in general, this section will explain how to use the LFOs in the **DS864**—if you need some background knowledge about LFOs in general, please see the Terminology: LFO section before proceeding with the controls.

Three LFOs are available, which can be assigned to modulate different variables. For example, tremolo effects are created by using an LFO to modulate the amplitude, and vibrato effects are created by modulating the pitch. The filter cutoff is also a common destination for LFO modulation, to create evolving or pulsating effects.

### Settings

To disable an LFO, switch on the **BYP** (bypass) switch—when disabled, an LFO has no effect, and uses no CPU time.

The **RATE** control determines the frequency of an LFO, while **DEPTH** controls the amount of modulation it performs on it's destination—possible values are between 0.001 Hz (extremely slow) to 20.000 Hz (extremely fast).

The **DELAY** time can be turned up, which results in a delay before the LFO reaches full depth—for example, if you set this to 1 second, it will take one second from you press down the key, until modulation reaches full depth. Possible values range from 0 (instant full modulation) to 10 seconds.

The **SHAPE** setting determines the shape of the LFO. Five different LFO shapes are available, they are (in order): sinus, square, triangle, sawtooth and noise.

### Destinations

The available modulation destinations (under **DEST**) vary between the three LFOs—the following choices are available:

- **PITCH—**Modulation destination is the note pitch, resulting in a vibrato effect.
- **AMP** (amplitude)—The amplitude is modulated, resulting in a tremolo effect.
- **PAN** (panning)—By modulating the panning, you can make the sound pan back and forth between the left and right speakers.
- **F1 CUT** or **F2 CUT** (filter cutoff frequency)—Modulation destinations for the cutoff frequency on filter 1 and filter 2—with a fast LFO, this results in "wobbling" sounds, while a slow LFO results in a continuously changing character of sound (useful for pads and synth atmospheres).
- **F1 RESO** or **F2 RESO** (filter resonance amount)—This modulates the resonance amounts of filter 1 or filter 2, changing the character and presence of the sound.

### Trigger Modes

Each LFO has a trigger mode setting, which determines wether the LFO restarts on keypress or not. Four different modes are available:

- **MONO—**In this mode, an LFO is monophonic, so that all voices of polyphony in the same part will be modulated synchronously. An LFO will not reset itself in this mode, but runs continuously despite the triggering of new notes. The **PHASE** control has no effect in this mode.
- **KEY MONO—**Same as **MONO** triggering, an LFO is monophonic, but whenever a key is pressed, the LFO will reset—that is, it will restart itself from the location specified by the **PHASE** control.

- **POLY—**In this mode, an LFO is polyphonic, which means that all voices of polyphony have their own individual LFOs—so voices are modulated asynchronously. These LFOs run continuously, despite any triggering of new notes. The **PHASE** control has no effect in this mode.
- **KEY POLY—**Same as **POLY** triggering, an LFO is polyphonic, but whenever a key is pressed, the individual LFO of each voice will reset itself to the location specified by the **PHASE** control.

To summarize: **MONO** means that an LFO is monophonic, sharing a single LFO between all voices of polyphony, whereas **POLY** means that each voice has it's own LFO—and **KEY** means that LFOs reset according to the **PHASE** setting, when a note is triggered.

### Performance Settings

The modulation wheel depth (**MOD**) knob, controls the amount of influence by the modulation wheel on the depth of the LFO—possible settings range from 0%, where the modulation wheel has no influence on the LFO, to 100%, where the modulation wheel has the most possible influence on the depth of the LFO.

The aftertouch level (**AFT**) knob, determines the amount of influence by the aftertouch information from a MIDI keyboard, on the LFO's depth. Some MIDI keyboards can measure a change in the amount of pressure you apply to the keys while you're holding them down. Possible settings range from 0%, where aftertouch has no effect on the LFO, to 100%, where increasing the pressure on the keys of your keyboard will have the most possible effect on the depth of the LFO.

## Key Map Controls

This section of the guide will teach you how to use the key map editor and sample editor to modify the key map of a program—that is, how the samples in the program are mapped to the keyboard. You can use these techniques to build your own key maps from WAV or AIF files too.

All of the controls dealt with in this section are located on the left panel. The key map editor is the big display with the keyboard display at the bottom—this is where you control how and when each sample gets played. The sample editor is labelled **SAMPLE EDIT**, and is located beneath the key map editor—this is where you decide how the sample associated with the currently selected split is played, how loud, and so on.

To familiarize yourself with the key map editor while reading through these instructions, it is a good idea to begin by loading one of the factory programs, and trying out the editing techniques it's key map as you read along. Hint: before switching from the help window to the **DS864** window, first double-click a of the words in this text to highlight it, so you can pick up reading when you switch back to the help window.

### The Key Map Editor

The key map editor display consists of rectangles in a two-dimensional system. Each rectangle represents a split (and thus a sample) in the key map you're editing—the currently selected split is highlighted in red, while other splits are displayed in green. To select a split for editing, simply left-click on it.

The third and fourth rows of information at the top of the key map editor display, contain various information about the currently selected split. In the third row, the sample name, root note, and duration of the sample are displayed—the sample name is derived from the filename of the WAV or AIF file from which the sample was originally imported. In the fourth column, the low and high velocity, and the low and high notes of the currently selected split, are displayed—these will be discussed in further detail below.

**The horizontal axis**

The horizontal axis of the display corresponds to the notes on a MIDI keyboard, as indicated by the keyboard display below it. The view can be scrolled left and right, simply by holding the mouse over the left or right end of the keyboard display. The left and right sides of a rectangle in the key map editor determine the first and last note onto which the sample is mapped—for the currently selected split (i.e. the red rectangle), the range of keys that it covers is highlighted in red on the keyboard display.

The root note of the sample (the note where the sample is played at it's original note pitch), is highlighted on the keyboard display as a single green key—to change the root note of the currently selected split, simply left-click on the keyboard display. The root note is also displayed as text, in the middle of the third row of information at the top of the display.

To modify the range of notes covered by the currently selected split, move the mouse over the left side (first note), or the right side (last note) of the selected (red) rectangle on the key map display—the mouse changes shape to indicate that the side of the rectangle can be grabbed. Then click and hold the left mouse button, and drag the rectangle side to it's new position. The notes on the keyboard display will change accordingly, to help you see which notes will be covered by the split.

Additionally, the low and high notes are displayed as text, in the right side of the fourth row of information at the top of the display.

**The vertical axis**

The vertical axis of the display corresponds to different note velocities, as indicated by the numbers on it's left—from softer keypresses at the bottom of the scale, to harder keypresses at the top of the scale. By mapping two or more splits to different velocity ranges (by stacking rectangles on top of each other), you can cause a different sample to play depending on the velocity of a keypress.

To alter the velocity range of the currently selected split, move the mouse over the upper edge (high velocity), or the lower edge (low velocity) of the selected (red) rectangle on the key map display—the mouse changes shape to indicate that the value can be changed. Then click and hold the left mouse button, and drag the rectangle edge to it's new position.

The low and high velocity values are also displayed as text, in the left side of the fourth row of information at the top of the display. For precise editing, always keep an eye on the numeric displays while dragging the edges of the rectangle.

**Adding/removing splits**

In the lower-left corner of the key map display, there are two small buttons labelled **ADD** and **DEL**.

To add a new split to your key map, click the **ADD** button—a file open dialog will appear, from which you must select the sample you want to import for the new split—navigate to your samples folder, and select the WAV or AIF file you want to add, then click the **Open** button. A new split will be created for the sample you've just loaded, and this new split will be selected—while it is still selected, it is a good idea to edit the boundaries of the new rectangle, as described above.

To delete a split from your key map, first select the split by left-clicking it's rectangle in the editor—the click the **DEL** button. This of course deletes the sample from memory only, it does not affect the original sample file on your harddisk.

## Sample Properties

For the currently selected split, the sample playback properties can be edited with the controls in the **SAMPLE EDIT** area.

The **GAIN** and **PAN** controls can be used to adjust the volume and stereo panning of the sample.

**TUNE** can be used to adjust the pitch of the sample—to finetune the pitch, hold down the SHIFT button on your computer keyboard while dragging with the mouse. The value is displayed (while the mouse button is held down) in cents—one cent is 1/100th of a semitone. Possible values range from -1200 (-1 octave) to +1200 cents (+1 octave).

**KTRK** adjusts the amount of keyboard tracking for note pitch—possible values range from 0 to 100 cents/key. At 0 cents/key, no keyboard tracking is done, so the note pitch is the same regardless of which key is pressed—this is useful for drum samples. At 100 cents/key, keyboard tracking is "normal"—that is, one whole semitone of pitch increase between every key.

The **PHASE** switch can be used to invert the phase of the sample, and the **REVERSE** switch can be used to play the sample backwards.

Loop points are imported when loading a WAV or AIF sample. The loop points are not editable within the **DS864** and should be created in a sample editor when preparing the samples for a custom key map. The **LOOP SAMPLE** setting has three possible settings—**OFF** means the sample will only play once, **FWD** means the sample will repeat forwards between the loop points, and **FWD/BKW** means that the sample will loop forwards and backwards ("ping pong") between the loop points. If there were no loop points in the original sample, the loop points will be set at the beginning and end of the sample.

# DS864 Reference

Terminology Reference

Terminology: Filter

Terminology: LFO

## Terminology Reference

**Sample**

An individual wave file, represents the smallest primitive of a sampler's sound. Wave files include information such as their sample rate and bit depth. They can also specify original pitch information. The **DS864** is capable of displaying this information, which is useful for assigning the samples to appropriate MIDI notes.

**Split**

Refers to a range of notes over which a given sample is pitched, that is transposed, to adjacent MIDI notes. A split may be assigned to a specific velocity range.

**Program**

Programs are structures that organize collections of samples, splits and zones, and all related settings (fine-tuning, attenuation, etc). A total of 128 programs can be stored in a bank.

**Part**

The **DS864** is multitimbral, which means it can play up to 8 different parts at one time—each part can receive from a specified MIDI channel (or "omni", all MIDI channels) and output to a specified audio channel.

**Bank**

Banks store programs. The **DS864** supports up to 128 Programs per Bank. The **DS864** can respond to standard MIDI Bank/Program changes.

**Key Map**

A key map is made up of splits, mapping samples to different keys (notes) to be played from a MIDI controller or MIDI data sequence.

**Root Pitch**

When key mapping a single sample across a split, the root specifies the original pitch of the sample. Root pitches are usually assigned to the middle of a note range, as they can

usually transpose up or down a few semitones before loosing their character.

**Filter**

A filter removes and/or amplifies certain frequencies in a sound. For background information about filters in general, see Terminology: Filter—for details about the filter controls of the **DS864**, see Filters (FLT1 and FLT2).

**Envelope**

An envelope is a signal that is used to modify, for example, the amplitude of sound—often an envelope is also used to modulate one or more variables in a synthesizer, for example the cutoff frequency variable of a filter. An envelope can have practically any sort of shape, but typically, envelopes enter or leave certain stages keys are pressed or released.

**LFO**

An LFO is a Low Frequency Oscillator, usually used to modulate a variable, such as filter cutoff. For general information about LFOs, see Terminology: LFO—for information about the LFO controls of **DS864** specifically, see LFOs.

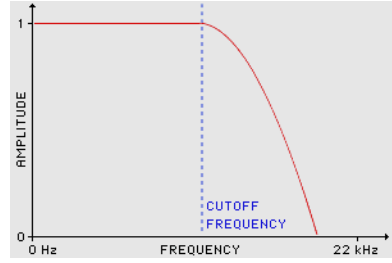
## Terminology: Filter

A filter changes the frequency content of sound by amplifying or damping certain frequencies. A number of terms are used when we talk about filters—below is a description of each of these terms, with illustrations to make it easier to understand.

The first important thing to understand about a filter, is that it does not create sound—it cannot make anything appear, that doesn't already exist in the sound it is processing. It can only remove certain frequency content from the sound, or amplify existing frequency content. However, amplifying or damping the frequencies of a sound, can radically modify it, often as much as to make the sound seem completely different—thus, filters are a crucial and powerful component in nearly all types of synthesizers.

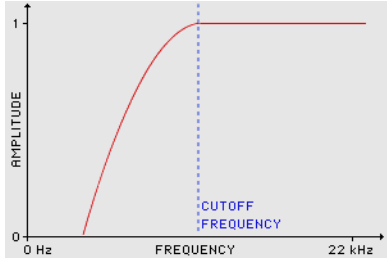
### Filter types

When we talk about filter types, we're describing the kind of filtering that the filter performs. Let's start by looking at what's probably the most commonly used type of filter, a lowpass filter:



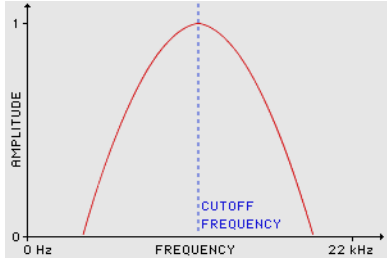

A low-pass filter, as the name suggests, allows low frequencies to pass, while blocking out higher frequencies. When we talk about the cutoff frequency of a filter, we're talking about the frequency where the filter starts to work—as you can tell by looking at the above graph, a lowpass filter starts to gradually dampen frequencies above it's cutoff frequency, thus making the sound less bright.

Now let's look at the counterpart of the lowpass filter type, namely the highpass filter:

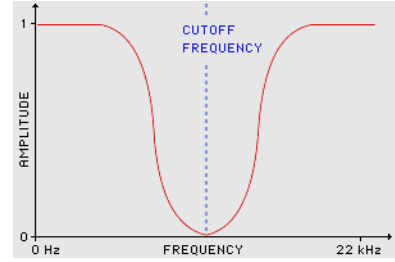



As you can see, this works the other way around—frequencies below the cutoff frequency are gradually dampened, resulting in a thinner, sometimes brighter sound. As explained, a filter cannot create frequencies that don't already exist in the sound that it's processing, thus this filter type is most valuable when used on sounds with a rich variety of frequency content.

Let's look at some other common types of filters, which you may encounter while using Orion—the bandpass filter looks like this:



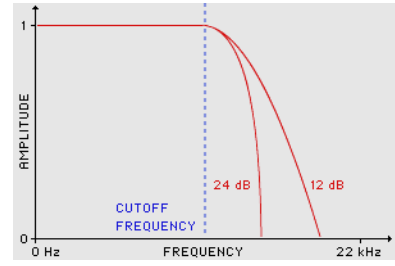

The bandpass filter dampens frequencies both above and below the cutoff frequency, allowing only a band of frequencies around the cutoff frequency to pass through. It's counterpart is the notch filter:




The notch (or "band-notch") filter type, removes frequencies around the cutoff frequency, allowing only frequencies that are either higher or lower to pass through.

### Filter Slope

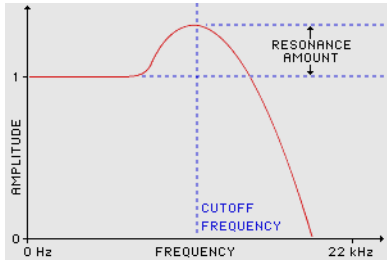
The slope (or "steepness") of a filter, describes the curve of the cutoff graph. This is normally specified as the amount of damping per octave, and is best explained by looking at the following illustration:




As you can see, the filter with 24 dB slope starts to dampen frequencies twice as soon as a filter with 12 dB slope. The higher the slope value, the steeper the drop of the curve. Filters with a sharper slope are commonly more CPU intensive, and result in a sound that is less rich in frequency content, which is often desirable.

### Resonance

Some filters have a resonance setting—in particular, it's common for the low-pass filter type to have this property. The filter resonance as the amount of amplification performed on frequencies around the cutoff frequency—for example, a resonant low-pass filter would look like this:

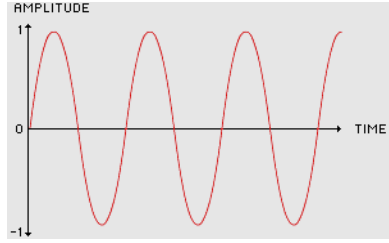



As you can see, the low-pass filter now does not only dampen frequencies above it's cutoff frequency, but also amplifies the frequencies just around this point. The higher the resonance amount, the taller the "bump" on the curve. Very high resonance amounts can cause ringing (or "self-oscillation"), which means that the filter starts to generate a tone with a frequency that is equal to the cutoff frequency—for example, with a cutoff of 800 Hz, an 800 Hz tone will start to appear on top of the filtered signal. This may seem contrary to what we said before: a filter does not create sound—this is, however, still true—if the filter is processing silence, it will not output an 800 Hz tone, it will only do this as long as the sound passing through contains frequencies around 800 Hz.

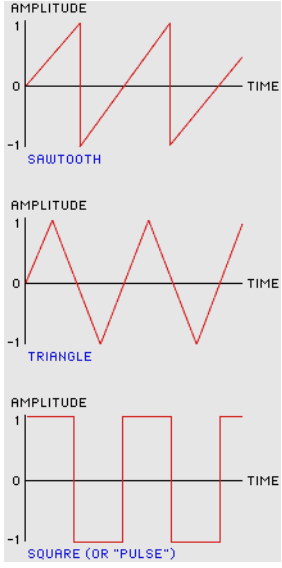
This covers the basics of filtering in general—if you wish to read about the filter controls of the **DS864** specifically, proceed to Filters (FLT1 and FLT2).

### Terminology: LFO

LFO is short for Low Frequency Oscillator. An oscillator is a repeating waveform with a fixed shape—for example, here is a sinus oscillator:

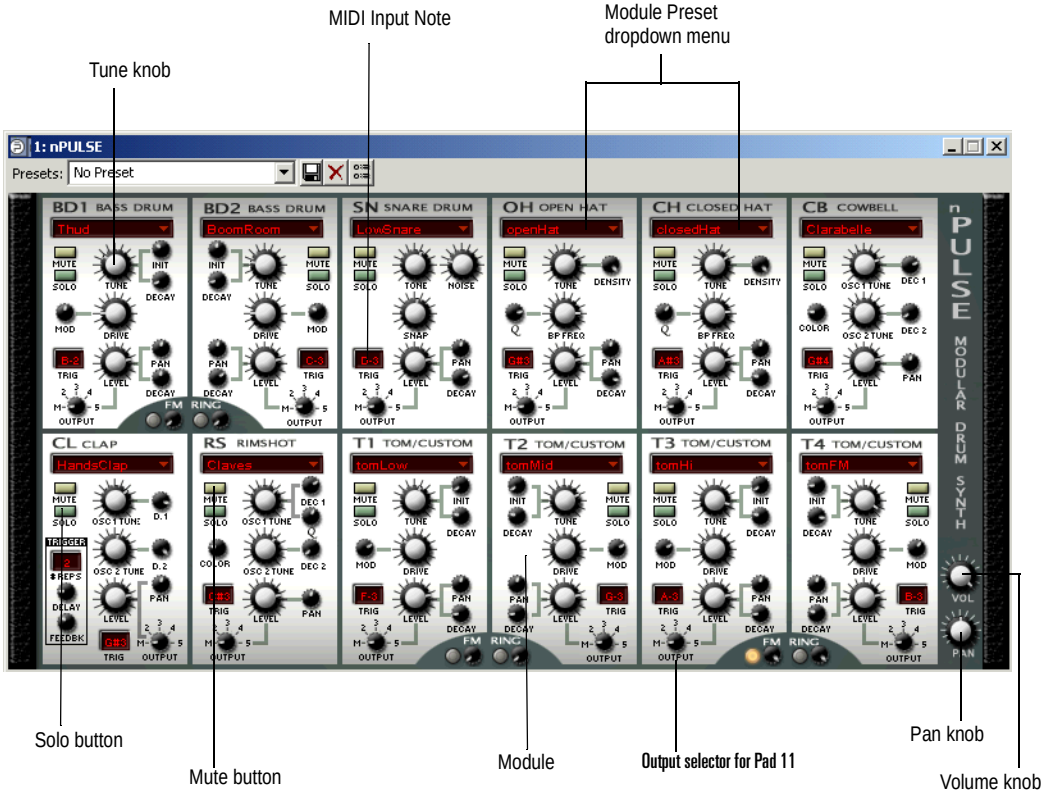



LFOs can be used to drive various parameters of an instrument, such the pitch, the amplitude, the cutoff frequency of a filter, or even a second LFO. Where there's an LFO, there is always, at least, a frequency setting for the LFO—in many cases, there is also a selection of waveforms to choose from, in addition to the sinus, for example:




The three LFOs in **DS864** have many different possible targets and other options—for detailed information about the LFO controls, please see LFOs.

# nPULSE Modular Drum Synth



## Feature Summary

- 12 monophonic subtractive synth modules
- Key map voices to any note
- MUTE / SOLO for each voice
- 5 assignable outputs for each voice—M (for Main), and 2 through 5
- characteristic oscillators and filters
- Ring and Frequency modulation between some modules
- Master gain and pan

The 12 modules include:

- 2 Kicks
- 1 Snare
- Open Hat
- Closed Hat
- Cowbell / Rim shot
- Clap
- Rim Shot
- 4 Toms

## Using nPULSE

Use the following procedures to begin using nPULSE. You can open the nPULSE Help file from the nPULSE inteface by clicking anywhere in nPULSE and pressing the F1 key.

### To Audition a Pad

- Right-click the pad you want to audition.

### To Change the Module Preset

1. In the module you want to change the sound for, click the Module Preset dropdown menu.
2. Select a preset from the menu that appears.

### To Mute or Solo a Module

- Click the Mute or Solo button in the module you want to mute or solo.

### To Change the MIDI Input Note

1. In the module you want to change the MIDI trigger note for, double-click the MIDI Input Note field.
2. Enter a new value. Valid values are the note name (C, E, F#, for example) and a number from 1 through 10 representing the octave of the note. C1, E5, and G#3 are all valid entries.

### To Change the Volume of a Module

- Click on the Volume knob in the module and move your mouse up to increase the volume of the module or down to decrease the volume.

### To Change the Volume of nPULSE

- Click the nPULSE Volume knob and move your mouse up to increase the volume of nPULSE or down to decrease the volume.

### To Change the Pan of a Module

- Click the Pan knob in a module and move the mouse down to pan left or up to pan right.

### To Change the Pan of nPULSE

- Click the nPULSE Pan knob and move your mouse up to pan left or down to pan right.

## Master controls

The master controls VOL and PAN allow you to adjust the master volume and pan position, respectively, of the Drum Synth.

Feature Summary

Using nPULSE

Common controls

## Common controls

The nPULSE Drum Synth features several controls common to all its different synth generators:

- Preset—allows you to select various ready-to-use settings for the current sound.
- Mute/Solo—the mute button mutes the current module; if the module has its solo button activated, only it and any other soloed modules will be audible; all others will be muted.
- Level—sets the overall volume of the pad.
- Pan—sets the panoramic position of the pad.
- MIDI input note—chooses which MIDI note from the sequencer or your keyboard will be used to trigger this module.

Audio output destination—chooses which of the Drum Synth's audio outputs this module will be routed to.

Feature Summary

Using nPULSE

Master controls

### Bass Drums

The Bass Drum modules have the following controls:

- Osc Tune controls the basic pitch of the oscillator
- Tune Init controls the degree to which the initial pitch of the oscillator is raised above the basic pitch
- Tune Decay controls the rate at which the initial pitch decays towards the basic pitch
- Drive controls the amount of overdrive in the circuit, which gives a brighter, more aggressive sound
- Drive Mod controls the way in which this overdrive changes through the duration of the sound
- Level Decay controls the rate at which the drum's volume falls off towards zero
- SYNC modes control the interaction between the two bass drum generators in one of the following ways:- NONE - no interaction; FM - frequency modulation; RING - ring modulation.

### Snare Drum

The Snare Drum module has the following controls:

- Tone controls the basic pitch of the oscillator
- Noise controls the amount of noise added to the oscillator signal
- Snap controls the tone of the snare
- Level Decay controls the rate at which the drum's volume falls off towards zero

### Hi Hats

The Hi Hat modules (open and closed) have the following controls:

- Tune controls the pitch of the oscillators
- Density controls the number and density of oscillators
- Frequency controls the filter frequency of the hi-hat circuits
- Width controls the width of the filter
- Level Decay controls the rate at which the drum's volume falls off towards zero

### Cowbell

The Cowbell module has the following controls:

- Osc 1 Tune controls the pitch of the primary oscillator
- Osc 2 Tune controls the pitch of the secondary oscillator relative to the primary
- Env 1 Decay controls the decay time of the primary volume envelope

- Env 2 Decay controls the decay time of the secondary volume envelope
- Color Adjusts the overall color and sharpness of the sound

### Hand Clap

The Hand Clap module has the following controls:

- Osc 1 Tune controls the pitch of the tone oscillator
- Osc 2 Tune controls the pitch of the noise oscillator
- Env 1 Decay controls the decay time of the tone osc
- Env 2 Decay controls the decay time of the noise osc
- Trig Reps adjusts the number of times the sound is repeatedly triggered
- Trig Delay adjusts the delay between retriggers
- Trig Fbk adjusts the relative volume of successive triggers
- Level Decay controls the rate at which the drum's volume falls off towards zero

### Rim Shot

The Rim Shot module has the following controls:

- Osc 1 Tune controls the pitch of the noise oscillator
- Osc 2 Tune controls the pitch of the tone oscillator
- Env 1 Decay controls the decay time of the noise osc
- Env 2 Decay controls the decay time of the tone osc
- Osc 1 Q controls the width of the noise osc
- Level Decay controls the rate at which the drum's volume falls off towards zero
- Color Adjusts the overall color and sharpness of the sound

### Toms

The Tom modules have the following controls:

- Osc Tune controls the basic pitch of the oscillator
- Tune Init controls the degree to which the initial pitch of the oscillator is raised above the basic pitch
- Tune Decay controls the rate at which the initial pitch decays towards the basic pitch
- Drive controls the amount of overdrive in the circuit, which gives a brighter, more aggressive sound
- Drive Mod controls the way in which this overdrive changes through the duration of the sound
- Level Decay controls the rate at which the drum's volume falls off towards zero
- SYNC modes control the interaction between the paired Tom generators in one of the following ways:- NONE - no interaction; FM - frequency modulation; RING - ring modulation.

# PSYN II Virtual Analog Synthesizer

PSYN II models a full-featured subtractive synthesizer, providing four oscillators that primarily model subtractive synthesis. Oscillator tone can be modified based on cross-modulating the OSCs to create Ring Modulation (AM) and Frequency Modulation (FM) models of synthesis, combined with full automation.

PSYN II includes two filters that can be independently enabled, each with its own unique character. Advanced filtering techniques can be realized by sending the output of the first filter to that of the second.

The synth's internal modulation matrix allows for syncing to the host's tempo. Modulation destinations (PSYN II parameters) may be assigned directly to common control sources such as mod wheel or pitch wheel.

A variety of modulation destinations (destination parameters) is available. For each OSC, you can modulate pitch, portamento time, pulse width, the level of the FM input from the other oscillator, the amount of envelope that is applied to pitch, or the amount of LFO that is applied to pitch.

The synthesizer includes five 6-stage EGs, four of which are completely assignable, one of which is hard-wired to control the dynamics of PSYN II's amplifier. Each envelope also provides performance controls, which specify how the envelope functions during playback.

PSYN II also includes 3 LFOs, which can be assigned to modulate many aspects of the synthesizer. Common modulations include amplifier (tremolo), pitch (vibrato) and filter (cutoff frequency).

## Using PSYN II

There are a several options available when saving patches in PSYN II. All of the patches that appear in PSYN II are part of the default set of patches which are loaded from disk in PSYN II's \Presets subfolder. This file is called the "default". The default consists of many patches which are categorized by banks.

You can navigate through PSYN II's patches by clicking on the bank buttons (labeled A through H) in the bottom left of PSYN II's interface. Each bank contains up to 128 patches. You can increment and decrement through the patches within a given bank by left and right-clicking on the patch name display, adjacent to the bank buttons. You may also use your mouse wheel to scroll through the patches. Another alternative is to select a patch from a list menu, which is displayed when you right-click on any of PSYN II's bank buttons.

Patches may be copied and pasted from location to location across any of PSYN II's banks. Individual patches may be saved to disk and shared across machines. You may also permanently overwrite the default set of patches with everything currently in PSYN II's memory.

**Important notes:**

- When you tweak a patch in a project, then move on to another patch, those changes will remain a part of the patch in that instance of PSYN II, and will remain part of the project if you save it. This ensures that every change you make to the sound of a patch for purposes of a song project will remain in that file and sound the same everywhere.
- Every time you insert a new instance of PSYN II, the original presets are read from the default file, regardless of what you've done to the patches in other instances in the current project.

### To Change the Name of a Patch

1. Hold down [SHIFT] and click once in PSYN II's patch name field.

   This will open up an editable text field.

2. Type in the new name.
3. Click again in the text field.

The new name is now set.

### To Copy a Patch from One Location to Another

1. Select the patch you wish to copy.
2. Click on the SAVE button near PSYN II's banks
3. Select COPY from the menu (the patch data is now held temporarily in memory).
4. Select a new bank/patch location in PSYN II.
5. Click on the SAVE button and select PASTE from the menu.

The patch is now copied to the new location.

### To Save an individual patch to disk

1. Select the patch you want to save.
2. Click on the Save button.
3. Select "Save Program"; a save dialog appears.
4. Type in the name of the patch.
5. Press the Enter key.

The patch is now saved to disk in PSYN II's \Presets folder.

### To Load an individual patch from disk

1. Select the location into which you want to load the patch
2. Click on the Save button.
3. Select "Load Program" from the menu; an open file dialog appears.
4. Select the preset file you wish to load.
5. Press the Enter key.

The patch is now loaded from disk into PSYN II's current patch location.

### To save the current configuration into the default bank file

1. Click the Save button.
2. Select "Save Default Bank" from the menu.

Your changes will be written permanently to the default bank file. PSYN II will load with the new default set of patches every time you insert it into a project.

## PSYN II Graphical User Interface

PSYN II has a Graphical User Interface (GUI), which shows the current status of all parameters using specific controls, and allows changing them in real-time while playing a sequence or playing live.

The GUI components are the following:

### Pages

To allocate the over three hundred parameters of PSYN II in a comfortable screen space, some of the components are placed in Pages. A page is a 'virtual' container, which shows the currently edited component parameters while keeping the rest off-screen, minimizing this way the screen usage and making the programming environment more clear and specific.

PSYN II uses pages for:

| | |
|---|---|
| Oscillators | One page holds 2 oscillators, while the other two are hidden. |
| Envelope Generators (EGs) | There is one page per EG (1-5). |
| Low Frequency Oscillators (LFOs) | There is one page per LFO (1-3). |

To select the desired page, click (and drag) on the corresponding Page Selector Button.

### Knobs

PSYN II uses knobs to adjust most of the continuous variable parameters. There are two kind of knobs:

| | |
|---|---|
| Unipolar | the knob range goes from zero to maximum (0% to 100%). |
| Bipolar | the knob range goes from -100% to +100%, with zero at center. |

Both knobs display a continuous value indicator, clearly displaying the parameter value. The knobs can be moved in a number of ways, as follows:

| | |
|---|---|
| Click and drag vertically | Increase/decrease knob value. |
| Click and use mousewheel | Change the knob value with fine increments. |
| Click the knob and use the Up-Down arrows | Change knob value. |
| Double-Click | Reverts the parameter to its Default value ('natural' value of the knob, ie center for Bipolar knobs). |

### Sliders

Like with knobs, sliders are used in PSYN II to adjust continuous variable parameters. The sliders can be moved in a number of ways, as follows:

| | |
|---|---|
| Click and drag vertically | Increases/decreases slider value. |
| Click and use mousewheel | Changes the slider value with fine increments. |
| Click and use the Up-Down arrows | Increases/decreases slider value. |
| Double-Click | Sets the parameter to its Default value ('natural' value of the slider, ie center for EG Amount). |

### Buttons

Buttons are used in PSYN II to toggle all ON-OFF values. To turn any button ON or OFF, just click repeatedly on it.

NOTE: Oscillator Waveforms Saw Up and Saw Down can't be selected at same time, due they would cancel each other.

### Displays and Encoders

The Displays and Encoders are used to show and change all parameters in PSYN II that require discrete values. (i.e. Transpose, Octave, etc). Every display parameter has a related encoder that can be used to change the parameter value. The display itself can also be used, as follows:

Using the Encoder:

| | |
|---|---|
| Click and drag vertically | Changes parameter value (display is updated). |
| Click and mousewheel | Changes parameter value in one-step increments. |
| Click and use Up/Down arrows | Changes parameter value in one-step increments. |
| Double Click | Resets the parameter to its Default value. |

Using the Display:

| | |
|---|---|
| Left Click | Next discrete value. |
| Right Click | Previous discrete value. |
| CTRL + Left Click | Resets the parameter to its Default value. |
| Left and Right click together | Resets the parameter to its Default value. |

## PSYN II Architecture

PSYN II has a very classic architecture, with a Oscillators group followed by a Filters group, and several Envelope Generators and Low Frequency Oscillators to perform several modulations.

### Oscillators

The oscillators are the real 'sound engine' on PSYN II. There are four oscillators grouped in two pages of two oscillators each. Every oscillator can play up to five waveforms simultaneously including Sine, Triangle, Square, Saw Up or Down and Noise, with specified width. Additionally, all oscillators feature a individual Sub-Oscillator which plays the same waveform one octave lower, allowing for very thick and fat sounds.

The waveforms are stored in a external file, allowing for the future expansion of PSYN II by replacing the waveforms set. Oscillator parameters are grouped as follows:

### Oscillators Waveforms

PSYN II features five waveforms per oscillator: SINE, TRIANGLE, SQUARE, SAW UP, SAW DOWN. All of them can

be played simultaneously, excepting SAW UP and SAW DOWN, which are mutually exclusive (they would cancel each other).

All waveforms width is controlled by using the WIDTH control, in a continuous way. When the waveform WIDTH is selected as modulation destination in any of the EGs or LFOs, the WIDTH control regulates the modulation offset of the oscillator.

The initial phase of the waveform when a MIDI Note On event arrives is set with the PHASE knob, from 0 to 360 degrees. It is possible to create complex sound textures by combining waveforms in two oscillators with different starting phases.

Additionally, any oscillator has a full-bandwidth NOISE generator, which can be added to the waveform mix.

### Oscillators Tune

The tuning of every individual oscillator in PSYN II is adjusted with the TUNE section controls:

| | |
|---|---|
| Keyb | When ON, the oscillator follows the MIDI notes played on the keyboard. When OFF, the pitch of the oscillator is always the same, as set with OCT, TRANSPOSE and FINE controls. |
| Oct | Sets the Octave for the oscillator pitch, ±5 octaves. |
| Transpose | Sets the Transpose amount (note) for the oscillator, ±12 semitones. |
| Fine | Sets the Fine tuning of the oscillator, ±100 cents. |

By changing the tuning settings in different oscillators, different effects are achieved: chord or intervals, detune, octaved, etc. When L-FM or E-FM modes are set, changing the modulator pitch results in great tonal variations.

### Sub Oscillator

All oscillators in PSYN II feature a individual Sub Oscillator, which generates a waveform identical to selected mix, but at a one-octave lower pitch. This is mostly used for bass and pad sounds, but can be used to 'fatten' any patch.

| | |
|---|---|
| ON-OFF | Turns the Sub Oscillator On/Off. No CPU is used when the Sub Oscillator is off. |
| Level | Regulates the sub pitched tone level. |

### Oscillators Modulation Sensitivity

The Modulation Sensitivity controls allow for different EG or LFO amounts of modulation to be applied to different oscillators. In this way, you could choose to modulate Oscillator 1 pitch only, with the other oscillators not being affected.

| | |
|---|---|
| EG | Sensitivity to EG modulation to oscillator pitch. |
| LFO | Sensitivity to LFO modulation to oscillator pitch. |

### Oscillators Level and Mode

The four oscillators in PSYN II are grouped in two pages of two oscillators each. Both oscillators in any page can be combined in several ways, allowing for very complex sound textures:

| | |
|---|---|
| NORMAL | Both oscillators outputs are added, resulting in two individual oscillators stacked. |
| RING | Both oscillators are sent to a ring-modulator, creating the classic add-and-difference signals on the resulting sound. NOTE: The LEVEL on any oscillator can make the output of the ring modulator disappear when set to zero. |
| SYNC | Oscillator 2 (4) becomes a SLAVE of oscillator 1 (3), restarting its phase every time the MASTER oscillator phase crosses zero. |
| L-FM | Linear FM. Oscillator 1 (3) becomes a MODULATOR of oscillator 2 (4) which becomes a CARRIER, performing a linear-phase frequency modulation. |
| E-FM | Same as L-FM, but the frequency modulation is performed on a exponential basis. |

The oscillators output is adjusted with the LEVEL knob. Using the four LEVEL knobs it is possible to adjust the oscillators mix. While it is possible to create very powerful sounds by using only one oscillator, most complex patches are obtained combining the power of the oscillator modes in the four oscillators.

## Filters

PSYN II features two filters: one multimode Low Pass, High Pass, Band Pass and Band Reject two-pole (12dB/Octave) filter, and a Low Pass-Only four-pole (24dB/oct) filter. The two filters can be combined in serial or parallel mode, allowing for a broad spectrum of filter combinations.

### Filter 1

Filter 1 is a multimode 12dB/Oct filter, featuring Low Pass, High Pass, Band Pass and Band Rejection modes. The filter can be completely disabled by turning it off, so the signal passing it is unaffected. Filter 1 parameters are:

| | |
|---|---|
| Cutoff | Sets the static cutoff frequency of the filter. The cutoff can be set anywhere in the audio spectrum. |
| Resonance | Sets the resonance amount, which produces a volume increase for frequencies in the neighborhood of the cutoff frequency. |

| | |
|---|---|
| Keyboard tracking | Determinates how much the cutoff 'tracks' the keyboard. Positive values mean 'higher notes, brighter sound', and negative values mean 'higher notes, duller sound'. |
| Velocity Sensitivity | Regulates how much the static cutoff is affected by the note velocity. Positive values mean 'faster velocities, brighter sound', while negative values mean 'faster velocities, duller sound'. |

### Filter 2

Filter 2 is a 24dB/Octave Low Pass. As the filters can be connected in serial or parallel configuration (see Filters Configuration), the use of the two filters allows for several sound routings. Filter 2 parameters are:

| | |
|---|---|
| Cutoff | Sets the static cutoff frequency of the filter. The cutoff can be set anywhere in the audio spectrum. |
| Resonance | Sets the resonance amount, which produces a volume increase for frequencies in the neighborhood of the cutoff frequency. |
| Keyboard tracking | Determinates how much the cutoff 'tracks' the keyboard. Positive values mean 'higher notes, brighter sound', and negative values mean 'higher notes, duller sound'. |
| Velocity Sensitivity | Regulates how much the static cutoff is affected by the note velocity. Positive values mean 'faster velocities, brighter sound', while negative values mean 'faster velocities, duller sound'. |

### Filters Configuration

The filters in PSYN II can be connected in SERIAL or PARALEL configuration, as follows:

| | |
|---|---|
| Parallel | The output of all oscillators is routed to both filters, and the output of the filters is added and sent to PSYN II outputs. |
| Serial | The output of all oscillators is routed to Filter 1, and Filter 1 output is sent to Filter 2. The output of PSYN II is Filter 2 output. |

When the LINK control is active, moving any of the parameters on one filter sets the same parameter on the other filter to same value. This is very useful when setting both filters to same value.

When in Serial mode, The FEEDBACK control sends part of filters output to the inputs again, resulting in a typical feedback effect, comb-filter like. The FEEDBACK control is not active in Parallel mode.

## Envelope Generators (EGs)

PSYN II features five individual 5-stage polyphonic Envelope Generators, each with its own page of parameters. Every EG can be routed up to two different destinations, with individual depth for each, allowing for a huge amount of routing possibilities and creating the framework for extremely complex modulations.

The fifth Envelope Generator is hardwired to the Amplifier Envelope, which controls the evolution of the voice Volume over time. However, it can also be routed to its two individual modulation targets.

There are five polyphonic Envelope Generators (EGs) in PSYN II. The last EG is hardwired to Amplifier, so it sets the evolution of instrument volume over time for every note played.

### EGs Settings

The settings for any EG are:

| | |
|---|---|
| Mode | EG mode:<br>NORM = Eg will perform one-shot per voice.<br>REP = Eg will repeat the Attack-Decay-Sustain phase for every note. |
| Start Level | The envelope start level, particularly useful when modulating pitch sources. |
| Delay | The time elapsed since Note On message till the EG starts working, 0 to 10 seconds. |
| Attack | Time from Start Level to Max Level (typically 0% to 100% of EG output), 0 to 10 seconds. |
| Attack Shape | The shape for the Attack stage variation, LINEAR, FAST, SLOW. |
| Decay | Time to go from 100% to Sustain Level, 0 to 10 seconds. |
| Decay Shape | The shape for the Decay (and Slope) stage evolution, LINEAR, FAST, SLOW. |
| Sustain | The level where the note will stay after Attack-Decay phase, and until note expiration (in case SLOPE is set to maximum). |
| Slope | Once the Sustain stage is reached, the Slope setting adjusts the time for the note to go from Sustain Level to 0%, generating a 'second Decay' stage. If Slope is set to maximum, this stage is ignored, and the note stays at Sustain level until Note Off message is processed. |
| Release | The time to go from Sustain level (or from last EG output level, if not in Sustain stage) to 0% after a Note Off message is processed. |
| Release Shape | The shape for the Release stage evolution, LINEAR, FAST, SLOW. |

| | |
|---|---|
| Amount | The EG amount. This sets the maximum modulation level for all destinations, and also the polarity. -100% to +100%. |
| Velocity | Regulates how much the EG output is affected by Note Velocity. Higher settings mean more variation of EG output with higher velocities. |

### EGs Modulation

Each EG on PSYN II can be routed up to two different modulation destinations, each with its own depth setting. The 15 available modulation destinations are:

| | |
|---|---|
| OFF | No destination, no modulation is produced. |
| LEV-ALL | Output Level of all Oscillators. |
| LEV-O1 | Output Level of Oscillator 1. |
| LEV-O2 | Output Level of Oscillator 2. |
| LEV-O3 | Output Level of Oscillator 3. |
| LEV-O4 | Output Level of Oscillator 3. |
| PWM-ALL | Pulse Width Modulation of all Oscillators. |
| PWM-O1 | Pulse Width Modulation of Oscillator 1. |
| PWM-O2 | Pulse Width Modulation of Oscillator 2. |
| PWM-O3 | Pulse Width Modulation of Oscillator 3.0 |
| PWM-O4 | Pulse Width Modulation of Oscillator 4. |
| PITCH | Pitch of all Oscillators. Individual Oscillator sensitivity can be performed with the Oscillator Eg Sens control. |
| CUTOFF1 | Cutoff frequency of Filter 1. |
| CUTOFF2 | Cutoff frequency of Filter 2. |
| RESO1 | Resonance of Filter 1. |
| RESO2 | Resonance of Filter 2. |

The DEPTH knob sets the modulation depth for the two individual destinations, from 0% to 100%.

## Low Frequency Oscillators (LFOs)

PSYN II has three individual polyphonic Low Frequency Oscillators (LFOs), all of them in their individual parameters page, and which can be applied up to three modulation destinations each.

### LFOs Settings

The settings for any of the three LFOs are:

| | | |
|---|---|---|
| Mode | The working mode for the LFO, as follow | |
| | FMONO | Free running, Mono operation. The LFO does not restart on Note On, but all voices LFOs are in-sync (mono). |
| | SMONO | Key-Sync, Mono operation. The LFO phase restarts on Note On, all voices LFOs are in-sync (mono). |
| | FPOLY | Free running, Poly operation. The LFO phase doesn't restart on Note On, but every voice keeps its own phase. |
| | SPOLY | Key-Sync, Poly operation. The LFO phase restarts on Note On, and every voice keeps its own phase. |
| Waveform | Sets the LFO Waveform (Sine, Triangle, Square, Saw Up, Saw Down, Random). | |
| Offset | The waveform DC offset, from -100% to +100%. | |
| Sync | Sets the LFO Sync-to-Host Tempo division, in beats (16, 8, 4, 2, 1, 1/2, 1/4, 1/8 plus all triplett and dotted values). | |
| Keyb | Adjusts the LFO speed variation according to the key played (Speed Keyboard Tracking), from -100% to +100%. | |
| Speed | The LFO Speed, from 0 to 20Hz. | |
| Polarity | Sets the LFO polarity, Positive or Negative. | |
| Phase | Initial phase for the LFO when in SMONO or SPOLY mode, 0 to 180 degrees. | |

| | |
|---|---|
| Delay | Time before the LFO operation starts after Note On message, 0 to 10 seconds. |
| Depth | Amount of LFO output level applied to all destinations. |

### LFOs Modulation

Each LFO on PSYN II can be routed up to three different modulation destinations, each with its own depth setting.
The 15 available modulation destinations are:

| | |
|---|---|
| OFF | No destination, no modulation is produced. |
| LEV-ALL | Output Level of all Oscillators. |
| LEV-O1 | Output Level of Oscillator 1. |
| LEV-O2 | Output Level of Oscillator 2. |
| LEV-O3 | Output Level of Oscillator 3. |
| LEV-O4 | Output Level of Oscillator 3. |
| PWM-ALL | Pulse Width Modulation of all Oscillators. |
| PWM-O1 | Pulse Width Modulation of Oscillator 1. |
| PWM-O2 | Pulse Width Modulation of Oscillator 2. |
| PWM-O3 | Pulse Width Modulation of Oscillator 3. |
| PWM-O4 | Pulse Width Modulation of Oscillator 4. |
| PITCH | Pitch of all Oscillators. Individual Oscillator sensitivity can be performed with the Oscillator Eg Sens control. |
| CUTOFF 1 | Cutoff frequency of Filter 1. |
| CUTOFF 2 | Cutoff frequency of Filter 2. |

| | |
|---|---|
| RESO1 | Resonance of Filter 1. |
| RESO2 | Resonance of Filter 2. |

The DEPTH knob sets the modulation depth for the three individual destinations, from 0% to 100%.

### LFOs Controls

The Controls section allows to set how much any LFO on PSYN II will affect the selected destinations according to incoming MIDI controllers:

| | |
|---|---|
| WHEEL | Sets the amount of LFO modulation applied when Modulation Wheel MIDI control messages (CC#1) are received. |
| AFTER | The amount of LFO modulation applied when Modulation AfterTouch MIDI messages are received. |
| BREATH | The Amount of LFO modulation applied when Breath MIDI control messages (CC#2) are received. |

Combining the Controls settings with the LFO Depth setting it is possible to set any fixed and variable modulation amounts by the LFOs.

## Effects Section

The Effects section has Drive, Delay and Modulation effects.

### Drive

The Drive effect has three controls. Filter 1 must be enabled to use the Drive effect.

- **Distortion level**—Choose Off, Tube, Soft, Mid or Hard.
- **Drive**—Increase the amount of drive for more distortion.
- **Gain**—Set the amount of gain you want.

### Delay

Delay has the following controls:

- **Delay Mode**—There are five delay modes:
  - Stereo—A separate delay line for left and right channels
  - Cross—Sames as stereo but with cross feedback
  - Ping—Delay taps bounce in the stereo field
  - LRC—Delay tap moves from left to right and then to the center
  - RLC—Delay tap moves from right to left and then to the center
- **Time Left**—Delay time for the left channel
- **Time Right**—Delay time for the right channel
- **Feedback**—
- **Tone**—Tone adjustment
- **Level**—Set the level for the delay

### Modulation Effects

The following is a list of the Modulation Effect's controls:

- **Modulation Effect Modes**:
  - **Chorus**—A single stereo chorus effect
  - **Symphonic**—6-voice stereo chorus effect
  - **Phaser**—An 8-stage phaser effect

- **Delay**—Length of the delay
- **Frequency**—Frequency of the modulation
- **Depth**—The depth of the modulation
- **Feedback**—
- **Level**—Set the level of the modulation effect

## Master

Master section in PSYN II groups several general-purpose parameters, as follows:

### Programs and Banks

PSYN II has a internal capacity of 1024 programs, arranged in eight banks of 128 programs each. MIDI Program Change and Bank Change messages can be used to select any program inside PSYN II, alternatively to the GUI Program and Bank Selectors.

Alternatively, PSYN II will react to 'Static' presets when recalled from Project5.

PSYN II can save the whole internal program contents to a User Default file, which will be loaded in all subsequent PSYN II instances, and in all future sessions. To save this file, click on the Save button near Bank selector.

### Polyphony

PSYN II has a maximum polyphony of 64 simultaneous notes. However, there are some circumstances where you don't want to allow it to play at full polyphony.

As the CPU load of PSYN II depends on how many voices at once are played, a very common technique to avoid overloading the CPU while running a song is to limit the maximum polyphony. This is achieved by using the Polyphony control.

When the voice amount being played exceeds the polyphony setting, some voices are 'stealed', which means, they are turned off softly and the new voice takes their place. In this way, it is possible to play very comfortably even a very low polyphony settings.

When Polyphony is set to MONO, only one voice is active, and PSYN II uses legato playback mode, in which EGs and LFOs are not restarted on notes played legato (new key was pressed before last one was released).

### Unison

The UNISON mode is used to recreate the vintage synthesizers Unison mode, where all the available voices could be played at once, resulting in a very fat and wide sound.

When UNISON mode is activated, PSYN II will play three notes for every MIDI note received (until the maximum Polyphony setting is reached), with adjustable detuning by using the DETUNE knob. In this way, fat sounds can be achieved while keeping the ability to play polyphonically.

NOTE: Setting the Polyphony too low might result in early voice stealing, so it is important to keep the Polyphony setting high when using the UNISON mode.
Due UNISON mode plays true new voices, the CPU usage can be very high. Keep an eye on the CPU indicator.

### Portamento

Portamento is a effect featured in many analog synthesizers, and which consist of the continuous pitch variation between played notes instead of instantaneous shift. PSYN II features four Portamento modes, with adjustable time for the effect:

| | |
|---|---|
| OFF | No effect. |
| NFIX | Normal, Fixed Time. The Portamento effect will always be active, and a fixed time will be assigned to every note. In this mode, long jumps take more time than small jumps. |

| | |
|---|---|
| FFIX | Fingered, Fixed Time. Same as above, but the effect will only be active when notes are played legato (one note starts before last ends). |
| NVAR | Normal, Variable Time. Portamento effect will always be active, and all jumps will take the specified time no matter how big the jump is. |
| FVAR | Fixed, Variable Time. Same as above, but the effect will only be active when notes are played legato. |

### Pitch Bend

Pitch Bend in PSYN II is a powerful resource for live or sequenced expressive performance, as it features several modes and allows for different settings for down and up bend directions.

Bend Up and Bend Down controls set the amount that the pitch will be bent when activating the bend wheel Up or Down, in semitones. The bend effect will be performed according to the Bend Mode settings, as follows:

| | |
|---|---|
| Normal | All sounding notes will be bent. |
| Up | Bend will only be applied to highest pitched note. |
| Down | Bend will only be applied to lowest pitched note. |
| Hold | Only keys that are still down will be bent. Notes in release status, or held by sustain switch won't be affected. |

### Master Pan and Volume

The Master Pan and Volume on PSYN II sets the Panoramic position (L to R) and output Volume for the selected program.

As this settings are remembered inside the program, it is possible to precisely adjust volume differences between programs using this controls.

## Performance Controls

These settings affect PSYN II's performance during playback or real time performance.

### Voices

PSYN II has only one voice, meaning that it cannot receive or transmit through multiple channels. Mixing, layering and other multi-channel techniques is facilitated through Project5's work environment, as different instances of PSYN II can be set to different channels with port/channel, note range and velocity filtering.

### Polyphony And Mono

Each instance of PSYN II is capable of 64 note polyphony. A polyphony limiter control let's you specify how many notes can play back at a time. Oldest notes are cut first, should the limit be reached. (Vendor is free to implement intelligent polyphony scheme as befits the synth).

If the Polyphony control is set to one PSYN II is in mono mode. When in mono, PSYN II performs in full legato mode, which means that if a subsequent note is played before a previous note is released, that note's attack phase is skipped (it commences at the last point of the envelope of previous note.

### Unison Mode

Unison mode is typically used in mono mode, in which one note triggers all oscillators. However unison may be enabled in polyphonic modes as well.

An associated detune control adjusts the unison detune level, where greater values increase the tuning offset between oscillators. This helps create a bigger sound, often used for melody lines or solos. Detune is an "amount" control (0…100%) that uses a detune algorithm which determines the detuning amount of each OSC.

### Portamento
Portamento parameters govern how a pitch glides to subsequent notes from the pitch of a preceding note.

### Pitch Bend
This determines the pitch range that the Pitch Wheel is capable of affecting. Additionally, you can set different bend modes, which specify how the notes are bent.

### Oscillators
PSYN II provides four (4) oscillators, modeled after traditional OSCs used in analog synthesis.

While PSYN II primarily models subtractive synthesis, oscillator tone can be modified based on cross-modulating the OSCs in certain ways. While subtractive synthesis is the default mode, other modes may be enabled when running at least two OSCs. Specifically, a preceding OSC can modulate a downstream OSC according to several parameters to create Ring Modulation (AM) and Frequency Modulation (FM) models of synthesis.

By definition, AM and FM synthesis require the use of at least two oscillators, as one must modulate the other. OSC 1 and 2 work together in this way, as do OSC 3 and 4.

For increased richness, each OSC provides a sub-oscillation control, which produces a sine wave an octave below the current pitch. Additionally, PSYN II include controls for PWM, which works on all waveforms.

Each OSC provides a set of controls for managing its raw tonal character.

### OSC Output
The section specifies waveform selection and other parameters that affect the character of each OSC's raw audio output.

- Waveforms—This control group lets you select up to one of each waveform for each OSC.
- Sub-Oscillator Function—Each OSC also provides a sub-oscillating frequency. It is a sine wave whose frequency is 1/2 that of the OSC's current tuning (i.e. one octave below). This helps provide a fuller, richer sound.
- Pulse Width—The tone of a square wave can be modified by changing the width of the pulse. The pulse width control warps other waveforms in a similar manner when something other than square is selected. Note that pulse width modulation is carried out through the EG's and LFO's.

## FM and Ring Modulation
Using more than one oscillator makes it is possible to model two other analog synthesis techniques: Ring Modulation and FM.

### Ring Modulation
In Ring Modulation mode, the first oscillator (modulator) controls the output of the second oscillator (the carrier). The aural result is a tone whose character is distorted or metallic. This is accomplished by creating a new waveform that is comprised of two frequencies. The new frequencies result from multiplying the original waveforms together, which gives us the sum and the difference of the original waveforms.

Example: Using sine waves, OSC 1 produces a 250 Hz wave, and OSC 2 produces a 900 Hz wave. The Ring Modulation results in the carrier waveform being comprised of two new frequencies: 1150 Hz and 650 Hz.

PSYN II provides two sets of two OSCs, wherein OSC 1 modulates OSC 2, and OSC 3 modulates OSC 4. Note: The level of the modulating OSC controls the amount of Ring Modulation.

### Frequency Modulation
In FM mode, the resulting effect creates a set of new harmonics that produces a sharp, metallic tones. Increasing the amplitude of the modulating oscillator increases the

spectrum width and the “FM effect” of the carrier (signal) oscillator.

There are in fact two FM modes: Linear and Exponential. Linear FM allows the strength of modulation to be increased without the perceived center frequency rising. Exponential FM is a more unusual sounding form of FM than Linear (most often found in analog modular systems). In this case the carrier frequency modulates up and down an equal musical interval (instead of a fixed amount above and below the center freq as in linear). The result is that you have more Hz going up than down. The perceived center frequency drifts upwards as modulation depth is increased.

## Filters

PSYN II includes two filters that can be independently enabled, each with its own unique character. Advanced filtering techniques can be realized by sending the output of the first filter to that of the second.

The first filter is a multi-mode 2-pole filter with a 12 dB/octave rolloff. It has four fully adjustable modes: low pass, high pass, band pass and notch.

The second filter is a 4-pole low pass filter, with a faster slope of 24 dB/octave rolloff, which emulates the traditional Moog filter of the 1960s.

### Filter Attributes

This section specifies the different filtering modes that determine how harmonics will pass through them.

- Filter 1: 2-pole, 12 dB/octave
    - Low Pass—Passes low harmonic frequencies (including the fundamental frequency). High harmonic frequencies are filtered out.
    - High Pass—Passes only high harmonic frequencies, filtering out the lower frequencies, including the fundamental frequency.
    - Band Pass—A movable region of the frequency spectrum that passes frequencies within its specified range, while frequencies above and below the band are filtered out.
    - Notch—A movable region of the frequency spectrum that rejects frequencies within its specified range.
- Filter 2: 4-pole, 24 dB/octave—Filter 2 is a lowpass filter only. Passes low harmonic frequencies (including the fundamental frequency). High harmonic frequencies are filtered out.
- Cutoff Frequency—Both filters have a cutoff frequency to control the point in the spectrum where frequencies are passed and rejected in a given mode.
- Resonance—Both filters have a resonance control which is used to amplify the actual harmonic nearest the specifies cutoff frequency. This produces the traditional whistling sound.

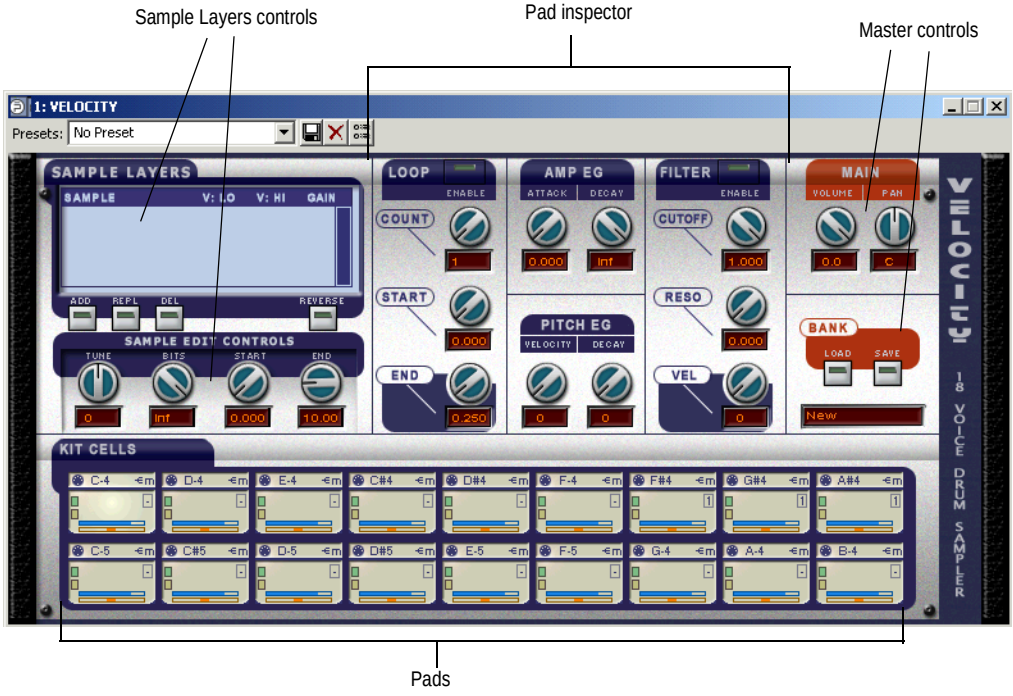
### Filter Modes

Filters live downstream from the OSC. Filter 1 may be used by itself or in series with Filter 2, meaning that its output is routed to Filter 2. Additionally, Filter 2 may be used in parallel with Filter 1, meaning that it processes OSC input independently from Filter 1.

Filter 2 can work in parallel with Filter 1, so that it acts a separate filter on the same sound source, or it can work in series, such that Filter 1’s output is directed into Filter 2.

- Parallel Mode—The OSC levels are forced into two different channels, going to Filter 2 in parallel to Filter 1. This allows you to modify the same OSC outputs separately through each filter.
- Series Mode—Filter 1’s output is sent to Filter 2 for additional filtering of the remaining frequency content.

# VELOCITY Drum Sampler




VELOCITY is a single channel, multi-timbral sampler which provides 18 polyphonic voices. Four stereo outputs and a master output are also provided, to which the voices may be arbitrarily assigned. Each voice is capable of storing multiple samples which can be assigned to different VELOCITY layers.

VELOCITY imports the following sample formats: LM4, WAV, AIF, as well as its own proprietary format, and can

import ready-made drum kits in LM-4 format. Samples can be key mapped and set to different VELOCITY zones to create dynamic programs. It is also possible to edit the samples' start and end times, volume offsets, tuning and panning.

VELOCITY controls are fully automatable.

The sampler is laid out with 18 sample-loading cells in the upper section of the UI, and pad inspector controls below. Workflow centers around the cells; the pad inspector controls update to reflect the settings of the one pad that has focus at any given time.

The interface is split in to four main areas:

- Master Controls, which control the overall behavior of the machine and let you load and save your settings.
- Pads, which let you adjust the volume and panning of individual sounds, and select which sound you want to edit.
- Pad Inspector, which lets you adjust the properties of an individual pad in detail
- Sample Layers Inspector, which lets you fine-tune the individual layers (samples) that make up each pad.

**Note**: Holding down the Shift key while you move VELOCITY's controls allows you to make much finer adjustments.

## Master Controls

The Master Controls for the VELOCITY drum sampler are as follows:

**Volume**—lets you adjust the overall loudness of the VELOCITY drum sampler.

**Pan**—lets you adjust the overall panoramic position of the VELOCITY drum sampler.

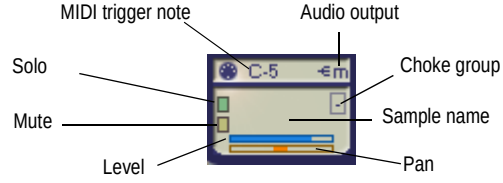
**Load Bank**—allows you to load a new set of samples in to the VELOCITY drum sampler. The sample set can be in either *.p5d format, or *.txt format if it's an LM-4 bank.

**Save Bank**—allows you to save the current state of the VELOCITY drum sampler as a *.p5d (Project5 Drum Bank) file.

**Bank selector**—allows you to quickly select other VELOCITY banks for use.

## Pads

The eighteen Pads represent the eighteen independent sounds available at any one time in the drum sampler. Clicking on a Pad will select it, allowing you to further edit in the Pad Inspector. If the pad contains samples already, you will hear the pad, otherwise you will be prompted to load a sound file. In addition, you have the following controls:




**Sample name**—lists the first sample that is assigned to this pad.

**Mute**—when the yellow Mute button is switched on, this pad will be muted and inaudible.

**Solo**—when one or more Pads has the green Solo button switched on, only those Pads are audible.

**Gain**—adjusts the volume of that pad

**Pan**—adjusts the panoramic position of the pad

**MIDI input note**—sets which MIDI note causes this pad to be triggered.

**Audio output**—the number or letter after the fork icon. Chooses which of the drum sampler's audio outputs this

pad is routed to so you can have a separate set of track controls for this pad. This allows you to add separate effects to this pad, in addition to having extra control over volume, pan, and width.

**Choke group**—select a choke group number for the pad. When any pad that's a member of this group is played, the other members of the group stop playing.

## Pad Inspector

The Pad Inspector lets you adjust all the settings for the currently selected pad. The current selection is highlighted in blue. It features the following controls:

### Sample Layers Inspector

The Sample Layers Inspector is where you manage the individual samples that make up a Pad. The Sample Layers Inspector, as with the Pad Inspector, shows details for the currently selected Pad.

The Sample Layers Inspector has the following controls:

- Add—click this button to add a new sample (WAV or AIFF file) to the pad.
- Repl—click this button to replace the currently-selected sample in the pad with a new WAV or AIFF file.
- Del—click this button to delete the current sample from the pad.
- Vel Lo—this control sets the minimum MIDI velocity (0..127) for which the selected sample will play.
- Vel Hi—this control sets the maximum MIDI velocity (0..127) for which the selected sample will play.
- Gain—allows you to set the gain for the individual sample, in dB. A value of 0 means no gain change, +6dB is twice as loud, -6dB is half as loud.

### Sample Edit Controls

The Sample Edit Controls include the following:

- **Tune**—controls the pitch of the sample(s).
- **Reverse waveform**—when activated, causes the sample(s) to be played backwards.
- **Start offset**—allows you to adjust the playback start position of the sample(s).
- **End offset**—allows you to adjust the playback end position of the sample(s).
- **Looping (on/off; start/end; reps)**—controls the way the sample is repeated (looped).
    - **Note**: Re-triggering a sample that uses long loop and/or decay times before the first note finishes sounding can cause high or excessive CPU readings.
- **Bit decimation**—reduces the bit resolution of the sample giving a sound reminiscent of early-80s sampled drum machines.

### Amp EG

- **Attack**—controls the attack time for the volume envelope. A higher value means a longer attack time, which will make your sample start in a softer way.
- **Amplitude Decay**—controls the rate at which your sample fades away towards silence. If you set the knob to the fully clockwise position, the decay portion of the envelope is deactivated.

  **Note**: Re-triggering a sample that uses long loop and/or decay times before the first note finishes sounding can cause high or excessive CPU readings.

### Pitch EG

- **VELOCITY to Pitch—**controls the extent to which playing the note louder or softer will increase or decrease the pitch of the sample.
- **Pitch Decay**—controls the rate at which the pitch of the sample decays (falls).

### Filter

- **Filter Cutoff—**adjusts the filter. A low value makes for a muted, muffled sound; a high value will have a brighter sound.
- **Filter Resonance—**controls the resonance (peaking) of the filter. A high value will make the filter "ring" or "whistle".
- **Velocity to Filter Cutoff**—allows you to control the way in which note-velocity affects the filter, so that loud notes can be brighter than quiet ones.

# Dimension Sampling Synthesizer

Dimension is a sample-playback synthesizer, it uses samples to generate sound. It includes a comprehensive library of sounds covering every aspect of contemporary music, and more sounds can be added to the instrument via expansion packs, or user multisamples based on standard PCM wave files.

Besides sample-playback, Dimension is capable of Wavetable synthesis, and Physical Modeling (Waveguide) synthesis. These two synthesis methods allow a broad sound palette, ranging from synthesized analog sounds, to plucked instruments, to precise reproductions of acoustic instruments.

## The Structure

Dimension is composed of four individual sound generation components, called Elements.

Each Element has a complete engine composed by a Player, a per-voice DSP (digital signal processing) stage (lo-fi, filter and drive), a global DSP stage (three band parametric equalizer, multi effect) and a set of Modulators (envelopes, low frequency oscillators and keyboard tracking, applied to the main sound generation parameters). The sound generated by the four Elements is mixed and routed to the stereo output.

Additionally, each Element processes two stereo effect bus mixes, which are routed to the two Global Effects (Modulation and Reverb). The output of the two Global Effects is then added to the main output.

## The Interface

Dimension interface consists of three areas:

- Program area (top)

  In this area we can find the program selector/loader, and the buttons for the Program Handling, MIDI Matrix and Vector Mixer.

  The MIDI Matrix and Vector Mixer are deployable windows. In the MIDI Matrix window, all MIDI assignments for current presets are defined. The Vector Mixer allows graphical mixing of the four elements.

- Elements area

  This area has an horizontal selector button to choose the Element for editing (1-4), plus all the Element components.

- Modulators

  Any of the four elements in Dimension offers five main parameters, which can be modulated: Pitch, Filter Cutoff, Filter Resonance, Pan and Amplitude (volume).

  Unlike other synthesizer designs where a few Envelope Generators (EG), Low Frequency

Oscillators (LFO), Keyboard Tracking generators, etc. are shared and routed to the destination parameter via a Modulation Matrix, Dimension has one set of dedicated components for each destination. In this way, a total of twenty Envelope Generators, twenty Low Frequency Oscillators, and twenty Keyboard Tracking generators are available for a program, and they can be all active at once with their own settings.

- Mixer/Global Effects area

  This is a two-page area. The first page displays the mixer controls for the four elements, the second page displays the settings for the two Global Effects.

## The Interface Controls

All the functions in Dimension are performed by the following controls:

### Horizontal Selectors (Buttons)

The horizontal selectors are always in the header of a section, and are used to choose a 'page' for editing in a multiple-page context.

They're used to select the Element (1-4), the Modulators for each element (Pitch, Cutoff, Resonance, Pan and Amplitude) and the Mixer/Global Effects pages.

### To Use Horizontal Selectors

- Direct Clicking or Clicking and Dragging can be used to select each page in the Horizontal Selectors.
- When a horizontal selector is clicked it becomes 'active'. When a text selector is active, it can receive keystrokes.
- If a horizontal selector is 'active', it will receive keystrokes. Number keys can be used to select each page when active.

### Knobs

Parameters that are continuously variable and suited for automation are controlled by knobs. The knobs in Dimension can be operated by mouse movements, mouse wheel or keyboard.

When a parameter is not active, the knob will become semi-transparent. If a knob is operated when in this state, the parameter can be adjusted, however there won't be any change in the resulting sound.

### To Use Knobs

- Hovering the mouse over the knob for a moment (without clicking on it) will make a tooltip appear, displaying the parameter name and the current parameter value.
- Clicking on the knob, then moving the mouse vertically will adjust the parameter value. A tooltip will show the parameter value for current adjustment.
- Double-Clicking on a knob will set the parameter to its default value.
- The mouse wheel will change the parameter value in ± 5% steps for the active knob. If the **Shift** key is held down while moving the wheel, the knob will move in ± 1% steps, allowing for more precise adjustment. Knobs won't generate interpolated values on mouse wheel.
- If a knob is 'active', it will receive keystrokes. The following keys can be used to change the parameter value:

| Key... | Change... |
|---|---|
| Left, Right arrow | ± 0.1% |
| Up, Down arrow | ± 1% |
| Home | Minimum |

| | |
|---|---|
| End | Maximum |

## Up/Down Selectors

Parameters with numerical values, not suitable for automation, are controlled via Up/Down selectors. An example of this kind of parameter is the Low and High Keyboard note setting for any Element, in the main display.

- The Up/Down selectors are controlled in the same way as the knobs: clicking on a selector and moving the mouse up or down. However, adjusting an Up/Down selector won't result in interpolated values. A tooltip will show the parameter value for current adjustment.
- Like the knobs, after an Up/Down selector is clicked, it becomes active. The font color will change to orange when in that status.
- Because many parameters represented by Up/Down selectors have wide ranges, and at the same time they require precise adjustments, the following modifiers can be used to achieve different speed/resolution changes while using the mouse:

| Modifier... | Change... |
|---|---|
| Shift | Small steps (small parameter movements, increased resolution): 1, 2, 3, etc. |
| Control | Big steps (big parameter changes, reduced resolution): 10 steps at a time |

- The range and step size for each parameter is shown in the 'Parameter Ranges' table.
- If an Up/Down selector is active, it will receive keystrokes. The following keys can be used to change the parameter value:

| Key... | Parameter Value... |
|---|---|
| Up/Down Arrows | Next/Previous parameter value. Standard Steps: 1, 2, 3, etc. |
| Page Up/Down | Step forward/backward 10 steps |

## Text Selectors

The text selectors are used to choose a value for parameters that have multiple options, non-numerical. An example of this kind of parameter is the Filter Type.

A text selector will advance to next/previous value when left/right clicked.

When a Text Selector is clicked, it becomes active. The font color will change to orange when in that status. When a text selector is active, it can receive mouse wheel messages and keystrokes.

The following keys can be used to change the parameter value:

| Key... | Change... |
|---|---|
| Up/Down Arrows | Next/Previous parameter value: 1, 2, 3, etc. |
| Page Up/Down | Step forward/backward 10 steps |

## The Sound Elements

As previously defined, a Dimension program is composed of four sound generation components called Elements. The elements can be selected using the top horizontal selector, and each element consists of the following components:

### The Player

Each element has a Player, the core of the sound manufacturing process. Each player is capable of high-quality, high-performance sample playback, oscillator/wavetable synthesis or waveguide synthesis.

The mode each player adopts depends on a file that is loaded into it, called a Multisample.

To load a Multisample for any element, click on the Multisample field in the main display (when no multisample is selected, the display will show 'Empty Multisample'). This will open a standard open Dialog Box (Load Multisample), pointing to the factory Multisamples folder. In this dialog it is possible to pick any supported multisample format file (.sfz, .wav, .ogg).

The Player will be set according to the multisample definition in one of the following modes:

### Sample-Playback Generator

In this mode, the player can load a single sample, or multiple samples arranged as defined in a Multisample Definition File (multisample for short) using the standard, open, text based **sfz** format.

In this way, even when Dimension ships with a comprehensive library covering most used sounds in contemporary music, it is not limited to that content. The user can 'reload' Dimension anytime using standard wave files, or via expansion packs.

As the architecture of the multisample definition files is open, the shipped content, user content and external contents can be combined to create new sets, or adjust the existing sets to particular uses in any way the project requires.

The sfz multisample definition file allows very complex sample arrangements that extend traditional sample mapping parameters. Besides the standard keyboard and velocity splits, a definition file allows multiple layers, dimensions, release triggers, crossfades, legato playback, random and alternate (round robin) and samples triggered on MIDI controllers.

Each sample in a multisample can be a standard PCM Windows wave file (.wav), or a compressed file in the standard, high-quality, open and royalty-free ogg-vorbis format (.ogg). Those files can also be loaded directly into a player.

Samples can be of any bit depth (8 to 32-bit), any samplerate, and either mono or stereo. Dimension will detect any defined loop inside the sample and will play it accordingly.

Alternatively, it is possible to open multisample definition files (.sfz) or individual samples by drag and dropping them into Dimension window. The sample will be loaded into the selected element.

Once the single sample or multisample is loaded, it's needed to turn on the corresponding element from the mixer area so Dimension can play it. The main display will show the multisample name, and the corresponding sample size.

If a multisample or individual sample (even samples inside a multisample) is loaded several times (for instance in two elements, or in two different instances of Dimension, the sample will exist on memory only once. The size indicated for the second and subsequent instances will be zero.

### Wavetable Oscillator

Any element in Dimension can work as a wavetable oscillator, with the wavetable definition being a single-cycle audio file. Dimension will turn the element into an oscillator when a file containing less than 4000 samples is loaded.

During the loading procedure, Dimension will create all the images for the oscillator required to play the single cycle across the whole keyboard range without any aliasing distortion.

Dimension ships with over a hundred wavetable definition files, and more can be easily created. For more information on how to create single-cycle wavetable definition files, check Appendix C.

### Waveguide Generator

A special sfz opcode is reserved to tell the Player in each element to treat the loaded sample as an impulse that will be directed to a waveguide.

Consequently, this turns the Player into a waveguide generator, generally used to emulate the sound of plucked strings.

Dimension ships with over fifty impulse files, and more can be easily created. For more information on how to create impulse files, check Appendix D.

### Multisample Parameters

Once the multisample is loaded in the Element, the following parameters adjust when and how the element will play it. They are located in the Main Display, and apply to all multisample modes.

| Key... | Does This... | | |
|---|---|---|---|
| Lo/Hi Key | Limits the Keyboard Range for the player. | Intersects | Note Number |
| Lo/Hi Vel | Limits the Keyboard Range for the player. | Intersects | Note Number |
| Bend Up/Down | Pitch Bend Up/Down | Overwrites | Semitones |
| Sust/Sost | Enables/Disables Sustain (cc64) and Sostenuto (cc66) pedals for the element. | Overwrites | On/Off |
| Transpose | Multisample transpose | - | Semitones |
| Tune | Multisample tune | Adds | Cents |
| Keytrack | Pitch Keyboard Tracking | Overwrites | Cents/Key |

| | | | |
|---|---|---|---|
| Shift | Multisample transposition value, preserving the mapping.<br><br>This value is used to transpose samples inside a multisample, but keeping the original mapping. This can be combined with the Transpose value to create timbre variations of the multisamples. | Adds | Semitones |
| Mode | Loading Mode.<br>The loading mode defines how the samples will load into memory. 32-bit mode has a lower CPU tag, but twice the memory.<br>Quality is not affected by Loading Mode. | - | 32-bit. 16-bit |
| Polyphony | Element Polyphony setting. | - | Notes |

Third column defines how the parameter interacts with the sfz file definitions.

Also in the Main Display is the Layers Counter, which display the current amount of layers in playback for all elements.

Dimension defines a Layer as the playback for one sample, either mono or stereo.

Playback of a stereo sample will use more CPU than a mono sample, but less CPU than two mono samples.

### Decimation

The decimation stage will adjust continuously the sampler-

### Voice level DSP

Dimension features a low-fidelity stage (bit reduction and decimation), a multi-mode filter and a drive stage at a voice level.

Applying DSP to stereo samples will result in higher CPU usage than mono samples, as a result of each module being duplicated to process each channel separately.

### Bit Reduction

Used to emulate the sound of old, low bit-resolution sample playback devices.

ate, as in ‘cheap’ sample playback machines.

**Filter**

Dimension includes a comprehensive selection of filters, as follows:

| Filter... | Description... |
|---|---|
| LP1P | Low Pass, One-Pole filter (6dB/octave roll-off). Allows passing all frequencies below the specified by the Cutoff knob. Above that frequency, there's a 6dB/octave roll-off, very gentle.<br>This filter doesn't feature resonance. |
| HP1P | High Pass, One-Pole filter (6dB/octave roll-off). Allows passing all frequencies above the specified by the Cutoff knob. Below that frequency, there's a 6dB/octave roll-off, very gentle.<br>This filter doesn't feature resonance. |
| BP1P | Band Pass composed of two One-Pole LP and HP filters in series (6dB/octave roll-off). Allows passing all frequencies in the neigborhood of the specified by the Cutoff knob. Above and below that frequency, there's a 6dB/octave roll-off, very gentle. |
| BR1P | Band Rejection composed of two One-Pole HP and LP filters in series (6dB/octave roll-off). Allows passing all frequencies except the ones in the neigborhood of the specified by the Cutoff knob. Surrounding that frequency, there's a 6dB/octave roll-off, very gentle.<br>This filter doesn't feature resonance. |
| AP1P | All Pass, One-Pole filter.<br>This filter is used to introduce sub-sample delay times.<br>This is useful when phase aligning samples between different elements.<br>This is a very subtle effect. |
| LP2P | Low Pass, Two-Pole filter (12dB/octave roll-off).<br>This filter allows passing all frequencies below the specified by the Cutoff knob. Above that frequency, there's a 12dB/octave roll-off in amplitude.<br>This filter features resonance, which is a boost of the frequencies surrounding the cutoff frequency.<br>Resonance can dramatically increase the loudness. Please make sure you have the main Limiter turned on when editing programs with high resonance. |

| | |
|---|---|
| HP2P | High Pass, Two-Pole filter (12dB/ octave roll-off).<br>This filter allows passing all frequencies above the specified by the Cutoff knob. Below that frequency, there's a 12dB/octave roll-off in amplitude.<br><br>This filter features resonance, which is a boost of the frequencies surrounding the cutoff frequency.<br><br>Resonance can dramatically increase the loudness. Please make sure you have the main Limiter turned on when editing programs with high resonance. |
| BP2P | Band Pass, Two-Pole filter (12dB/ octave roll-off).<br><br>This filter allows passing all frequencies around the specified by the Cutoff knob. Below and above that frequency, there's a 12dB/octave roll-off in amplitude.<br><br>This filter features resonance, which is a boost of the frequencies surrounding the cutoff frequency.<br><br>High resonance settings on a band pass filter result in a narrow output bandwidth. For most sounds, this is percieved as a reduced loudness. However, if the incoming sound frequency matches the filter cutoff, a dramatically high loudness is expected. Please make sure you have the main Limiter turned on when editing programs with high resonance. |
| BR2P | Band Rejection, Two-Pole filter (12dB/octave roll-off).<br><br>This filter allows passing all frequencies except the ones around the specified by the Cutoff knob. Surrounding that frequency, there's a 12dB/octave roll-off in amplitude. |
| PK2P | Peak Filter. This filter will reinforce the Cutoff frequency by 6dB, and the surrounding frequencies with a slope of 12dB/octave.<br><br>The width of the peak is adjusted with the Resonance knob. |

| | |
|---|---|
| LP4P | Low Pass, Four-Pole filter (24dB/ octave roll-off).<br><br>This filter allows passing all frequencies below the specified by the Cutoff knob. Above that frequency, there's a 24dB/octave roll-off in amplitude.<br><br>This filter features resonance, which is a boost of the frequencies surrounding the cutoff frequency.<br><br>Resonance can dramatically increase the loudness. Please make sure you have the main Limiter turned on when editing programs with high resonance. |
| HP4P | High Pass, Four–Pole filter (24dB/ octave roll-off).<br><br>This filter allows passing all frequencies above the specified by the Cutoff knob. Below that frequency, there's a 24dB/octave roll-off in amplitude.<br><br>This filter features resonance, which is a boost of the frequencies surrounding the cutoff frequency.<br><br>Resonance can dramatically increase the loudness. Please make sure you have the main Limiter turned on when editing programs with high resonance. |
| LP6P | Low Pass, Six-Pole filter (36dB/ octave roll-off).<br><br>This filter allows passing all frequencies below the specified by the Cutoff knob. Above that frequency, there's a 36dB/octave roll-off in amplitude.<br><br>This filter features resonance, which is a boost of the frequencies surrounding the cutoff frequency.<br><br>Resonance can dramatically increase the loudness. Please make sure you have the main Limiter turned on when editing programs with high resonance. |
| HP6P | High Pass, Six–Pole filter (36dB/ octave roll-off).<br><br>This filter allows passing all frequencies above the specified by the Cutoff knob. Below that frequency, there's a 36dB /octave roll-off in amplitude.<br><br>This filter features resonance, which is a boost of the frequencies surrounding the cutoff frequency.<br><br>Resonance can dramatically increase the loudness. Please make sure you have the main Limiter turned on when editing programs with high resonance. |

| | |
|---|---|
| PINK | Multiple Knee filter, composed of multiple Low Pass, One-Pole filters. This is a static filter, generally used to create pink noise. When applied to sample material it has the effect of creating a slight darkening on the tone, without affecting the sound character at all. |
| COMB | Comb filter.<br><br>A comb filter creates several frequency 'notches', which color the sound in a particular way. |

### Drive

The drive section in Dimension is connected after filter output, allowing to 'tame' high resonance filter settings or creating a broken, distorted sound, or just adding some 'character' to a sound, depending which drive mode is selected:

| Mode... | Description... |
|---|---|
| Off | Effect bypassed. |
| Valve | Very soft effect.<br>A shaping process like the one found in valve amplifiers is applied. |
| Soft | Slight overdrive. |
| Mid | Mid overdrive. |
| Hard | Aggressive overdrive effect, ideal to be applied on solo lead instruments |
| Asymmetric | Bright distortion effect. |

The drive stage has a tone control after the shaping process, to soften the resulting overdriven tone.

### Vector Mixer

The Vector Mixer in Dimension allows a graphical mixing of the four elements, before the signal reaches the Element level DSP. Each element is represented in each corner of the graph.

The desacceleration control sets the speed and desacceleration of the mixing pointer.

### Element level DSP

Each element in Dimension features a three band, stereo parametric equalizer, plus a combined delay/filter/lfo effect capable of multiple effect types.

### Stereo Parametric Equalizer

The parametric equalizer consists of three bands, which can be either a low shelf (modifies all frequencies below the specified), a peaking (modifies all frequencies surrounding the specified) or a high shelf (modifies all frequencies above the specified) filter. Additionally, the following parameters can be adjusted for each band:

| Parameter... | Description... |
|---|---|
| On/Off | Turns the band On/Off. When the band is off, all CPU usage is recovered. |

| | |
|---|---|
| Gain | ± 24dB |
| Frequency | 8 Hz to 22350 Hz |
| Q | 0.1 to 8 |

### Stereo Delay/Filter Effects

This section combines a delay line, a modulation line, a panner and a filter to achieve multiple effects. The effect type can be selected using the TYPE text selector, as follows:

| Effect... | Description... |
|---|---|
| Off | No Effect. All CPU usage is recovered. |
| Stereo Delay | A stereo delay effect, with independent delay lines for both stereo channels.<br>The delay output is routed through the filter. |
| Cross Feedback Delay | Two independent delay lines, with the feedback of each channel routed to the input of the other.<br>The delay output is routed through the filter. |
| Ping Delay | A delay effect where the echoes bounce in the stereo field.<br>The delay output is routed through the filter. |
| L/R/C Delay | The first echo appears in left channel, the second in the right channel and subsequent images appear centered.<br>The delay output is routed through the filter. |
| R/L/C Delay | The first echo appears in right channel, the second in the left channel and subsequent images appear centered.<br>The delay output is routed through the filter. |
| Triple Delay | Similar to Stereo Delay, but a mono echo image with independent delay time appears centered in the stereo field.<br>The delay output is routed through the filter. |
| Detuner | A static delayed image appears, tuned differently than the original according to the Modulation Frequency and Depth settings. |
| Chorus | A standard stereo modulated delay, with feedback. This setting allows for several Chorus and Flanger effects. |
| Symphonic | A multiple voice chorus effect. |
| LFO Filter Delay | Similar to Stereo Delay, but a low frequency oscillator is used to change the filter cutoff. Filter is applied to the wet signal only. |

| | |
|---|---|
| Panning Delay | A delay effect where the echo image is panned in the stereo by a low frequency oscillator. |
| Auto Pan | The low frequency oscillator is used to move the sound in the stereo field cyclically. |
| LFO Filter | Signal is processed by the filter, and the filter cutoff is modulated by the Low Frequency Oscillator. |

### Modulators

Any of the four elements in Dimension offers five main parameters, which can be modulated: Pitch, Filter Cutoff, Filter Resonance, Pan and Amplitude (volume).

Those parameters can be modulated by several components.

Unlike other synthesizer designs where a few Envelope Generators (EG), Low Frequency Oscillators (LFO), Keyboard Tracking generators, etc. are shared and routed to the destination parameter via a Modulation Matrix, Dimension has one set of dedicated components for each destination.

In this way, a total of twenty Envelope Generators, twenty Low Frequency Oscillators, and twenty Keyboard Tracking generators are available for a program, and they can be all active at once with their own settings.

### Modulator Structure

The modulators for the Pitch, Cutoff, Resonance, Pan and Amplitude can be selected for each Element by using the horizontal selector on top of the Modulators section.

Each modulator includes an multi-point, drawable Envelope Generator, a multi-waveform Low Frequency Oscillator capable of synchronizing to host tempo, and a Keyboard Tracking generator (except for the Pitch modulator, which doesn't feature a Keyboard Tracking generator).

### Envelope Generators

The Envelope Generators (EG) on Dimension are possibly the most advanced ever created. Each EG features an arbitrary amount of envelope segments, with adjustable shape, keyboard tracking and velocity tracking for each segment. The EG also allow looping, so they can be turned in a complex wave low frequency oscillator.

An envelope segment is defined as the transition between two nodes. Each EG has an extensive set of commands to handle segments, nodes and adjustments for each segment, as follows:

| Command... | Description... |
|---|---|
| Add/Insert a node | Right-click in the desired position.<br>A new node is created, and node Number, Time, Delta (time from previous node) and Level indicators are displayed on node creation.<br>Created node is selected (highlighted). |
| Delete/Remove a node | Right-Click in the node. |

| | |
|---|---|
| Select a node<br>Display node time/ delta/level | Hover on the node. Node will be highlighted.<br>The readout will be updated, displaying the node Number, Time, Delta (time difference from previous node) and Level. |
| Move a node | Left-click in the node, drag it to the new position.<br>Select the node (using the mouse), then move it using the arrow keys. Hold the **Shift** key for more precise movements. |
| Move interior node | Left-click on an interior node and drag.<br>All nodes at the right of selected node will be moved together with the selected node.<br>Node Number, Time, Delta and Level indicators will be updated during move operation. |
| Move interior node without shifting the rest | Hold the **Control** key, left-click in the interior node and drag it to the new desired position.<br>Only selected node will move.<br>Node Number, Time, Delta (time from previous node) and Level indicators will be updated during move operation. |
| Adjust segment shape/ tension | Left-click and drag vertically between the two nodes surrounding desired segment. |
| Reset segment shape to linear | Double-click between the two nodes surrounding desired segment, or<br>Hold the **Shift** key and click between the two nodes surrounding the desired segment (few click operations when resetting multiple segments). |
| Set/Clear/Reposition SUSTAIN point (loop end) | Select desired node and press the key **S**. |
| Set/Clear/Reposition<br>LOOP START point | Select desired node and press the key **L**. |
| Adjust transition segment shape | Hold the **Control** key, Left-click between the two nodes surrounding transition segment and drag vertically. |
| Pan | Left-click on bottom area and drag horizontally. |
| Zoom + | Mouse-Wheel Up.<br>NumPad '*' key (multiply).<br>Zoom will be centered on mouse pointer position. |
| Zoom - | Mouse-Wheel Down.<br>NumPad '/' key (divide).<br>Zoom will be centered on mouse pointer position. |

| | |
|---|---|
| Small Zoom + | Hold **Control** key, Mouse-Wheel Up.<br><br>Zoom will be centered on mouse pointer position. |
| Small Zoom - | Hold **Control** key, Mouse-Wheel Down.<br><br>Zoom will be centered on mouse pointer position. |
| Fit envelope | Double-click on bottom area. Zoom will be adjusted so the whole envelope fits on the display area.<br><br>Zoom and Pan values are stored in the programs. On program reload, last zoom and offset values will be applied for each EG. |

| | |
|---|---|
| Adjust Time Velocity Tracking for a segment | Make the EG window active (click anywhere on it), then press the key **V**.<br><br>Orange bars will display the time velocity tracking settings for each segment.<br><br>Positive bars mean ‘higher velocity = longer time’.<br><br>Negative bars mean ‘higher velocity = shorter time’.<br><br>Click between the two nodes surrounding the desired segment, drag vertically to adjust. The tracking value is expressed as a multiplier of the segment time, from 0.1x to 10x. |
| Adjust Time Keyboard Tracking for a segment | Make the EG window active (click anywhere on it), then press the key **K**.<br><br>Blue bars will display the velocity tracking settings for each segment.<br><br>Positive bars mean ‘higher notes = longer time’.<br><br>Negative bars mean ‘higher notes = shorter time’.<br><br>Click between the two nodes surrounding the desired segment, drag vertically to adjust. The tracking value is expressed as a multiplier of the segment time, from 0.1x to 10x. |

| | |
|---|---|
| Reset all envelope settings | Make the EG window active (click anywhere on it), then press the key **R**.<br><br>Upon confirmation, all envelope nodes will be deleted, all envelope settings will be cleared. |

The EG will start working on note-on, and will follow all defined segments until the last node, if there's no loop nor sustain point defined. Once the final node is reached, the level will remain unchanged for the whole note duration.

When the Amplitude Envelope Generator reaches the last node and if no loop is defined, it will deactivate the layer (layer expired).

If a sustain point is defined, the EG will start on note on and will follow all defined segments until the sustain node is reached. Then the level will remain unchanged until the Note-Off event for the layer. Then the segments defined after sustain point will be operational, stopping once the final node is reached.

If a loop is defined, the EG will move to the defined loop start node once it reaches the sustain node, over and over again.

### Envelope Generators Parameters

Each EG features the following global parameters, which control their overall functionality.

| Parameters... | Description... |
|---|---|
| On/Off | Turns the EG on or off. |
| Depth | Determinates the amount in which the EG modulates the destination.<br>Each destination Depth is expressed in the destination units. For instance, the Pitch EG is expressed in cents, the Resonance EG depth in dB, etc. |
| Vel->int | The intensity in which the Note-On Velocity affects the EG modulation depth.<br>Each destination Depth is expressed in the destination units. For instance, the Pitch EG is expressed in cents, the Resonance EG depth in dB, etc. |
| Vel->tim | The amount in which the Note-On Velocity affects the EG times, as a multiplier of the time (0.01x to 100x). |

### Velocity Tracking

The Note-On Velocity value can be set to affect each destination, according to this parameter. In each case, the effect is expressed in the destination units.

Velocity Tracking will work even when the EG is off.

### Low Frequency Oscillators

The Low Frequency Oscillators (LFO) in Dimension are a great component to add animation and movement to the sound. Originally intended to emulate the vibrato and tremolo found in natural acoustic instruments, synthesizers have redefined their use, making them a fundamental component in the construction of evolving pads and textures.

As the EG, one LFO is available for each destination in each element, for a total of twenty LFO which can be operative simultaneously.

The LFO main parameter is the LFO waveform. Dimension has a graphical waveform selector, which allows selecting the wave shape and phase for the selected waveform.

| Selections... | Description... |
|---|---|
| Waveform | Left/Right-click on the waveform to select next/previous waveform. |
| Phase | Hold the **Shift** key, then click on the waveform and drag horizontally to select the LFO start-up phase. |

Additionally, each LFO features the following parameters:

| Parameters... | Description... |
|---|---|
| On/Off | Turns the LFO on or off. |
| Freq | Frequency, in Hertz.<br>The waveform indicator will display the selected frequency, with a horizontal scale of two seconds. This is, two cycles will be shown when the frequency is set to 1Hz. |
| Sync | Synchronize to Host Tempo, in Beats.<br>When Sync is in the Off position, the LFO will move at the frequency defined by the previous value (Freq).<br>The LFO will follow the host tempo and position, generating one cycle each time the host moves through the specified beat value.<br><br>For instance, if Sync is set to 1, the LFO will generate one cycle in each host beat. |

| | |
|---|---|
| Delay | Time from Note-On message to LFO startup, in Seconds.<br><br>After Note-On, the LFO will wait a time to start working, as specified by this parameter. A value of zero means instant startup. |
| Fade | Time for LFO fade-in, in seconds.<br><br>Once the LFO starts working (after LFO Delay time), the LFO modulation level will rise gradually to a maximum, which will be reached after the time specified by the Fade parameter. |
| Depth | LFO modulation depth.<br>This determinates how much the LFO will affect the selected destination, expressed in the destination units. For instance, for the Pitch LFO, the depth is expressed in cents. |

### Keyboard Tracking

Each destination can be set to change following the keyboard in several ways. To determinate the variation direction, curve and amount, Dimension has a graphical Keyboard Tracking component. Using it, the following parameters can be adjusted:

| Parameter... | Description... |
|---|---|
| Variation Depth | Adjust the left/right nodes to set the keyboard tracking depth and direction. |
| Variation Curve | Left-click between the two nodes and drag vertically to set the keyboard variation curve.<br><br>Blue means higher levels, orange means lower levels. |
| Reset Keyboard Tracking | Make the Keyboard Tracking window active (click anywhere on it), then press the key **R**.<br><br>Upon confirmation, the keyboard tracking settings will be reset. |

### Modulator Copy/Paste

Sometimes is desirable to have identical settings for the EG, LFO or Keytrack in two different parameters or elements. Dimension offers the ability to Copy/Paste any EG, LFO, Keytrack or the whole Modulator to a new destination, or to the same destination in another element.

To Copy/Paste any component, right-click on the desired Modulator page button and select ‘Copy EG’, ‘Copy LFO’,

‘Copy Keytrack’ or ‘Copy Modulator’. Then right-click on the destination page and select ‘Paste EG’, ‘Paste LFO’, ‘Paste Keytrack’ or ‘Paste Modulator’.

It is possible to Copy/Paste between two Dimension instances.

### MIDI Matrix

Dimension features a very clear distinction between ‘sound modulations’ and ‘performance modulations’. The first group is represented by the Modulators, while the second is achieved thru the MIDI Matrix.

In the MIDI Matrix it is possible to ‘wire’ any MIDI control or message to any sound parameter in Dimension in any program. This way each program can be perfectly adapted to the control environment from a single, unified place. The MIDI Matrix features 16 rows which can connect any of the over 130 possible sources, to over 150 destinations. All those ‘connections’ can have a specified depth and a smooth value, and are stored in the program file.

To deploy/collapse the MIDI Matrix window, click on the middle button in the top area, marked with a MIDI connector. The MIDI Matrix features the following parameters:

| Parameter... | Description... |
|---|---|
| Source | The Source is the MIDI control which Dimension will use to change the parameter selected as destination.<br>Sources can be any MIDI Control Message (CC1-CC127), Pitch Bend, Channel and Polyphonic Aftertouch, Keyboard, Keyboard Gate, Attack and Release Velocity, Unipolar and Bipolar Random and Alternate. |
| Destination | Element Pitch, Cutoff, Resonance, Pan, Amplitude and their LFO Depth and Speed, plus most EQ/FX parameters can be used as destinations. |
| Depth | The depth for the modulation, in parameter units. |
| Smooth | Make the Keyboard Tracking window active (click anywhere on it), then press the key **R**.<br>Upon confirmation, the keyboard tracking settings will be reset. |

### Element Unload, Reset, Copy/Paste

Dimension has an Element menu with options to Unload (current multisample), Reset (revert all settings to default) and Copy/Paste all element parameters between destinations in the same or another instance. The Element Menu appears by right-clicking on the Elements horizontal selector.

To Copy an element, right-click on the desired element page button and select ‘Copy Element’. To Paste it into a new destination, right-click on the desired destination page button and select ‘Paste Element’.

### Element Effects Chaining

Sometimes a program requires two different multisamples being processed with their own lo-fi, filter and drive settings, but the same EQ and effects is applied to both.

The result of that operation, is the same as mixing the two elements and then applying the EQ and effects on the mix. However, the CPU usage in the later is much lower, due only one set of effects is operational.

Dimension allows to ‘chain’ the output of one element into the effects of the next, for the first three elements. The ‘Chain to Next Element’ is the last option in the Element menu. A chained element will disable the Fx1 and Fx2 mixer knobs.

Using element chaining it is possible to reduce the CPU usage of many programs. Element chaining allows also applying two, three or even four element effects to a single multisample. To do this, chain all desired elements and load the ’Element Chain.sfz’ sample, available in the ’98 – Special’ folder.

## The Mixer

The Mixer section in Dimension is defined so the volume, pan and effect sends for the four elements are simultaneously accessible.

There are five controls for each element in the mixer:

| Control... | Description... |
|---|---|
| On/Off | Turns the element on or off. When an element is off, it won’t take any CPU. |
| Fx1 | Effect 1 send amount.<br>This control sets the amount of each element signal which is routed to the Global Modulation Effect. |
| Fx2 | Effect 2 send amount (reverb).<br>This control sets the amount of each element signal which is routed to the Global Reverb effect. |
| Pan | Element stereo panoramic position. |
| Volume | Main element volume. |

## The Global Effects

In the second page of the Mixer section, there are the two Global Effects controls: the Modulation Effect, and the Reverb.

### Modulation Effect

The modulation effect consists of several LFO-driven effects such as chorus/flanger, symphonic and phaser, as follows:

| Effect... | Description... |
|---|---|
| Off | No effect. |
| Chorus | Chorus/Flanger effect.<br>A modulated delay is added to the original signal, resulting in a rich, evolving effect. |
| Symphonic | Similar as the Chorus effect, but with multiple voices at different phase intervals. |
| Phaser | A classic Phaser effect. |
| Chorus/Phaser | A Chorus and a Phaser effects combined in series. |

For each effect mode, the following parameters can be adjusted:

| Parameter... | Description... | Range | Scale |
|---|---|---|---|
| Frequency | The frequency of the LFO. | 0 ~ 5 | Hertz |
| Delay | The delay line time. | 0 ~ 50 | ms |
| Depth | Effect Depth | 0 ~ 100 | % |
| Feedback | Effect feedback | 0 ~ 100 | % |
| Dry/Wet | Mix of the Dry and Wet signals | 100 : 0 to 0 : 100 | % |

**Reverb effect**

Dimension features a built-in reverb processor, capable of several acoustic environment reproductions. The following parameters can be controlled:

| Parameter... | Description... | Range | Scale |
|---|---|---|---|
| Predelay | Time for the delay line before the wet signal reaches the reverb processor. | 0 ~ 200 | ms |
| Size | Room size, or decay time. | 0 ~ 100 | % |
| Damp | High frequency damping | 0 ~ 100 | % |
| Tone | Reverb tone | 0 ~ 100 | % |

| | | | |
|---|---|---|---|
| Level | Wet signal level | 0 ~ 100 | % |

## The Piano Body/Damper simulator

Dimension features an unique Body/Damper simulator, which is engaged automatically when the following multisamples are loaded:

- St Grand Piano - 2L - sim.sfz
- St Grand Piano - 2Ls - sim.sfz
- St Grand Piano - 3L - sim.sfz

The Body/Damper simulator is a physical model of the internal strings and body of a piano, and they generate inter-resonances between notes when the Sustain switch is pressed, allowing for very realistic Piano emulations.

The amount of the effect can be adjusted with the Modulation Wheel (CC1).

As in a real piano, the effect allows for half-pedaling (capturing the note resonance once the key has been released) and silent resonances (pressing notes silently and hear their resonances while playing neighbor notes).

## Program and Element File Handling

As described above, a program consists of the settings for the four elements, including a reference to each used multisample.

As Dimension programs rely on samples residing in the hard disk, loading a program will lead to disk operations, which might be lengthy when big multisamples are used. Consequently, Dimension will not react to MIDI Program Change/Bank Change messages in any way.

To save a program, just click on the disk button in the top area and select ‘Save Program’, then enter the program name. Dimension will automatically add the ‘.prog’ extension to the program, and the program name display will be updated to reflect the program name.

To load a program, click on the disk button and select ‘Load Program’, and select the desired program, or just drag and drop the .prog file into Dimension window. Dimension will load the program and all controls will be updated to reflect the new program settings.

It is possible to set the program Dimension loads on startup. To do so, load the program using the standard ‘Load Program’ option (or create the program using Dimension controls), click on the disk button on the top area and select ‘Save Default Program’. Upon confirmation, the default program will be set.
All subsequent Dimension instances will load that program on instantiation.

It is also possible to save individual Element files to disk (.elem). To do so, click on the disk button in the top area and select ‘Save Element’, then enter the program name. Dimension will automatically add the ‘.elem’ extension to the file. Loading and combining elements from different programs allows for quick program construction.

## Program, Element, Multisample and Sample folder and files organization

After installation, the following files and folders will be created inside the Dimension folder:

| File/Folder... | Description... |
|---|---|
| Elements\ | Elements folder<br>Dimension will point to this folder on Save…Element |
| Multisamples\ | Multisamples folder<br>All the factory multisample definitions and sample collections will be inside this folder. |
| Programs\ | Programs folder<br>All the factory presets/programs will be inside this folder. |
| Sample Pool\ | Sample Pool folder<br>Project/Demo song specific samples will be inside this folder. |
| Dimension.dll | Plug-in file. |
| DefaultEffects.sfz | Default effects definition. |
| DefaultRegion.sfz | Default region definition. |

### Program Files

Program files (.prog) can be anywhere in the disk or network. The 'Programs\' folder was created only with organization purposes, but the user can save the program anywhere.

Program files are not required for the Song Persistence to work. A copy of the program file is saved as persistence, and it's reloaded on song reload.

This means, each song will include a 'snapshot' of the used programs in the moment the song was last saved. This allows preserving old songs immutable on the event of factory programs update.

### Elements

Dimension can save and load individual Elements to file. The idea here is making an 'Element Set', capable of serving as 'quick construction kit' for new programs. An element file would contain all settings for an element, including the multisample definition and parameters, with all modulators and DSP settings applied.

### Multisamples

Unlike Program files, the multisamples (.sfz, .wav, .ogg) are not included in the Song Persistence. The set of multisamples used in a song can easily go over a few hundred megabytes, so definitely it's not a good idea to have them inside every song file.

Therefore, songs will be dependant on multisample changes.

Dimension doesn't feature a way of editing multisamples, so it a small amount of multisample changes is expected. However, the multisample definition files are text files, which the user can edit.

Additionally, the samples are external, standard wave files which can be edited using a standard wave editor. Consequently, this warning is here: if a multisample definition file is edited, and/or a sample file is edited, the old song might sound different after reloading it if it happens to use the edited files.

When a Program file is loaded, it will try to open the specified Multisamples from the complete path they had when the program was saved. This is, if we create a program using

C:\Program Files\Project5 Version 2\Dimension\Multisamples\00 – Pianos\Grand Piano 2L (small).sfz

Dimension will try to open it in that exact location. Keeping the full address offers more flexibility, so the user can create 'test' multisamples anywhere in his disk.

However, if the users decides to exchange that program with another user, chances are that the installation drive/folder are different, so Dimension won't find it there, and the attempt of loading it will fail.

Then Dimension will try to find that multisample in every path variation, inside –his- 'Multisamples\' folder. This is, Dimension will try to find:

<his Dimension 'Multisamples\' installation path>\Grand Piano 2L (small).sfz

If it fails, it will try

<his Dimension 'Multisamples\' installation path>\00 - Pianos\Grand Piano 2L (small).sfz

And so on, exhausting the possibilities to locate the original multisample inside the installation path.

[The default \Multisamples folder can be over-ridden by generating the registry key (string) HKLM\Software\Cakewalk Music Software\Dimension\Multisamples Folder

The string value is the new default multisamples folder. Folder must end in backslash (i.e. "d:\Dimension\". The whole 'Multisamples' folder must be moved to that location (in the previous example, "d:\Dimension\Multisamples\<all contents here>").

**Samples**

If a sample defined inside a .sfz definition file is missing, Dimension will try to load it from the original location on Program/Song reload.

If that wave file isn't in the original location, Dimension will try to find it in the Sample Pool folder. This simplifies exchanging sample files between users.

Dimension will report every sample it can't find after above attempts fail.

## Parameter Ranges

| Number | Name | Min | Max | Def | Sml | Std | Big | Unit |
|---|---|---|---|---|---|---|---|---|
| 1 | LoKey | 0 | 127 | 1 | 1 | 1 | 12 | Note |
| 2 | HiKey | 0 | 127 | 1 | 1 | 1 | 12 | Note |
| 3 | LoVel | 0 | 127 | 1 | 1 | 1 | 10 | - |
| 4 | HiVel | 0 | 127 | 1 | 1 | 1 | 10 | - |
| 5 | Transpose | -48 | 48 | 0 | 1 | 1 | 12 | St |
| 6 | Tune | -100 | 100 | 0 | 1 | 1 | 10 | Ct |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 7 | KeyTrack | -200 | 200 | 100 | 1 | 1 | 10 | Ct/Key |
| 8 | Shift | -48 | 48 | 0 | 1 | 1 | 12 | St |
| 9 | Bend Up | 0 | 24 | 2 | 1 | 1 | 1 | St |
| 10 | Bend Down | 0 | 24 | 2 | 1 | 1 | 1 | St |
| 11 | Polyphony | 0 | 8191 | 16 | 1 | 1 | 10 | Layer |
| 12 | BitRed On/Off | - | - | Off | - | - | - | - |
| 13 | BitRed Amount | 0 | 100 | 0 | 0.1 | 1 | 5 | % |
| 14 | Decim On/Off | - | - | Off | - | - | - | - |
| 15 | Decim Amount | 0 | 100 | 0 | 0.1 | 1 | 5 | % |
| 16 | Filter Type | Off, LP1P, HP1P, BP1P, BR1P, LP2P, HP2P, BP2P, BR2P, LP4P, HP4P, LP6P, HP6P, COMB, PINK | | | | | | |
| 17 | Filter Cutoff | 8.2 | 22350 | 8.2 | Log | Log | Log | Hz |
| 18 | Filter Reso | 0 | 40 | 0 | 0.04 | 0.4 | 4 | dB |
| 19 | Drive Type | Off, Tube, Soft, Mid, Hard, Asymmetric | | | | | | |
| 20 | Drive Shape | 0 | 100 | 0 | 0.1 | 1 | 5 | % |
| 21 | Drive Tone | 0 | 100 | 0 | 0.1 | 1 | 5 | % |
| 22 | Eq On/Off | - | - | Off | - | - | - | - |
| 23 | Eq Type | Lo Shelf, Peaking, Hi Shelf | | | | | | |
| 24 | Eq Gain | -24 | 24 | 0 | 0.024 | 0.24 | 2.4 | dB |
| 25 | Eq Freq | 8.2 | 22350 | 8.2 | Log | Log | Log | Hz |
| 26 | Eq Q | 0.1 | 8 | 1 | Log | Log | Log | - |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 27 | Fx Type | Off, Stereo Delay, Cross Feedback Delay, Ping Delay, L/R/C Delay, R/L/C Delay, Triple Delay, Detuner, Chorus, Symphonic, LFO Filter Delay, Panning Delay, Autopan, LFO Filter, Phased Delay, Filter/Phaser | | | | | | |
| 28 | Fx Filter Type | Off, LP1P, HP1P, BP1P, BR1P, LP2P, HP2P, BP2P, BR2P, LP4P, HP4P, LP6P, HP6P, COMB, PINK | | | | | | |
| 29 | Fx Delay Left | 1/8t, 1/8, 1/8d, 1/4t, 1/4, 1/4d, 1/2t, 1/2, 1/2d, 1t, 1, 1d, 2t, 2, 2d, 4t, 4, 4d, 8t, 8, 8d, 16t, 16, 16d<br>(0 to 50ms for Chorus and Symphonic) | | | | | | |
| 30 | Fx Delay Center | | | | | | | |
| 31 | Fx Delay Right | | | | | | | |
| 32 | Fx Delay Feedback | 0 | 100 | 0 | 0.1 | 1 | 5 | % |
| 33 | Fx Filter Cutoff | 8.2 | 22350 | 8.2 | Log | Log | Log | Hz |
| 34 | Fx Filter Resonance | 0 | 40 | 0 | 0.04 | 0.4 | 4 | dB |
| 35 | Fx Lfo Freq | 0 | 10 | 0 | 0.01 | 0.1 | 0.5 | Hz |
| 36 | Fx Lfo Depth | 0 | 100 | 0 | 0.1 | 1 | 5 | % |
| 37 | Fx Input | 0 | 100 | 0 | 0.1 | 1 | 5 | % |
| 38 | Fx Dry/Wet | 100:0 | 0:100 | 50:50 | 0.1 | 1 | 5 | % |
| 39 | EG Status | - | - | Off | - | - | - | - |
| 40 | EG Depth | | | | | | | |
| 41 | Pitch | -2400 | 2400 | 0 | 1 | 10 | 50 | Ct |
| 42 | Cutoff | -13700 | 13700 | 0 | 1 | 10 | 100 | Ct |
| 43 | Resonance | -40 | 40 | 0 | 0.01 | 0.1 | 1 | dB |
| 44 | Pan | -100 | 100 | 0 | 0.01 | 0.1 | 1 | % |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 45 | Amplitude | -100 | 100 | 0 | 0.01 | 0.1 | 1 | % |
| 46 | EG Vel->Int | | | | | | | |
| 47 | Pitch | -2400 | 2400 | 0 | 1 | 10 | 50 | Ct |
| 48 | Cutoff | -13700 | 13700 | 0 | 1 | 10 | 100 | Ct |
| 49 | Resonance | -40 | 40 | 0 | 0.01 | 0.1 | 1 | dB |
| 50 | Pan | -100 | 100 | 0 | 0.01 | 0.1 | 1 | % |
| 51 | Amplitude | -100 | 100 | 0 | 0.01 | 0.1 | 1 | % |
| 52 | EG Vel->Tim | 0.01 | 100 | 0 | 0.01 | 0.1 | 1 | x (mul) |
| 53 | VelTrack | 0 | 100 | 100 | 0.01 | 0.1 | 1 | % |
| 54 | LFO Status | - | - | Off | - | - | - | - |
| 55 | LFO Waveform | 20 Waveforms | | | | | | |
| 56 | LFO Frequency | 0 | 40 | 1 | 0.001 | 0.01 | 0.5 | Hz |
| 57 | LFO Sync | 1/8t, 1/8, 1/8d, 1/4t, 1/4, 1/4d, 1/2t, 1/2, 1/2d, 1t, 1, 1d, 2t, 2, 2d, 4t, 4, 4d, 8t, 8, 8d, 16t, 16, 16d<br>(0 to 50ms for Chorus and Symphonic) | | | | | | |
| 58 | LFO Delay | 0 | 10 | 0.001 | 0.01 | 0.05 | 2 | S |
| 59 | LFO Fade | 0 | 10 | 0.001 | 0.01 | 0.05 | 2 | S |
| 60 | LFO Depth | | | | | | | |
| 61 | Pitch | 0 | 1200 | 0 | 1 | 1 | 50 | Ct |
| 62 | Cutoff | 0 | 6000 | 0 | 1 | 1 | 100 | Ct |
| 63 | Resonance | 0 | 20 | 0 | 0.01 | 0.1 | 0.5 | dB |
| 64 | Pan | 0 | 100 | 0 | 0.1 | 1 | 5 | % |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 65 | Volume | 0 | 6 | 0 | 0.1 | 1 | 2 | dB |
| 66 | Mixer Element Status | - | - | Off | - | - | - | - |
| 67 | Mixer Fx1, Fx2 Send Level | 0 | 100 | 0 | 0.1 | 1 | 5 | % |
| 68 | Mixer Pan | -100 | 100 | 0 | 0.2 | 2 | 10 | % |
| 69 | Mixer Volume | 0 | 100 | 0 | 0.1 | 1 | 5 | % |
| 70 | Mod Fx Type | Off, Chorus, Symphonic, Phaser, Chorus/Phaser | | | | | | |
| 71 | Mod Fx Freq | 0 | 5 | 0 | 0.01 | 0.05 | 0.25 | Hz |
| 72 | Mod Fx Delay | 0 | 50 | 0 | Quad | Quad | Quad | ms |
| 73 | Mod Fx Depth | 0 | 100 | 0 | 0.1 | 1 | 5 | % |
| 74 | Mod Fx Feedback | 0 | 100 | 0 | 0.1 | 1 | 5 | % |
| 75 | Mod Fx Dry/Wet | 100:0 | 0:100 | 50:50 | 0.1 | 1 | 5 | % |
| 76 | Reverb Fx Type | Off, Hall, Room | | | | | | |
| 77 | Reverb Fx Predelay | 0 | 200 | 0 | Quad | Quad | Quad | ms |
| 78 | Reverb Fx Size | 0 | 100 | 0 | 0.1 | 1 | 5 | % |
| 79 | Reverb Fx Damp | 0 | 100 | 0 | 0.1 | 1 | 5 | % |
| 80 | Reverb Fx Tone | 0 | 100 | 0 | 0.1 | 1 | 5 | % |
| 81 | Reverb Fx Dry/ Wet | 100:0 | 0:100 | 50:50 | 0.1 | 1 | 5 | % |

## MIDI Matrix Sources

| | |
|---|---|
| CC 1 to CC 127 | MIDI Continuous Controllers 1 to 127, mapped to 0~1.<br>Any MIDI Controller can be used as source. |
| Pitch Bend | MIDI Pitch Bend messages, mapped to –1~1. |
| Channel Aftertoch | MIDI Channel Aftertouch, mapped to 0~1. |
| Polyphonic Aftertouch | MIDI Polyphonic Aftertouch messages, mapped to 0~1. |
| Velocity | Incoming Note-On MIDI Velocity, mapped to 0~1. |
| Release Velocity | Incoming Note-Off MIDI Velocity, mapped to 0~1. |
| Keyboard | Incoming Note-On MIDI Note, mapped to 0~1 (Note 0 = 0, Note 127 = 1). |
| Key Gate | Digital value based on MIDI Note-On messages: 0 when no keys are depressed, 1 when there's any note depressed. |
| Random Unipolar | Random value generated on MIDI Note-On messages, 0~1. |
| Random Bipolar | Random value generated on MIDI Note-Off messages, -1~1. |
| Alternate | Alternate value generated on MIDI Note-On messages, 0 or 1 in each new note-on. |

## MIDI Matrix Destinations

| | | | |
|---|---|---|---|
| Pitch 1-4, All | Pitch for elements 1 to 4 and for all elements simultaneously. | ±2400 | cents |

| | | | |
|---|---|---|---|
| Cutoff 1-4, All | Filter Cutoff for elements 1 to 4 and for all elements simultaneously. | ±13700 | cents |
| Resonance 1-4, All | Filter Resonance for elements 1 to 4 and for all elements simultaneously. | ±40 | dB |
| Pan 1-4, All | Pan position for elements 1 to 4 and for all elements simultaneously.<br>[!e] A bipolar curve is applied to the pan source, so it's possible to pan to both sides using any source. | ±100 | % |
| Volume 1-4, All | Volume for elements 1 to and for all elements simultaneously.<br>When changing the volume destination depth, a very high loudness change might result. Please make sure you have the main limiter turned on when performing the adjustment. | ±96 | dB |
| Pitch LFO Depth 1-4, All | Depth for the Pitch LFO added to the static depth value for elements 1 to 4 and for all elements simultaneously. | ±2400 | cents |
| Cutoff LFO Depth 1-4, All | Depth for the Cutoff LFO added to the static depth value for elements 1 to 4 and for all elements simultaneously. | ±13700 | cents |
| Reso LFO Depth 1-4, All | Depth for the Resonance LFO added to the static depth value for elements 1 to 4 and for all elements simultaneously. | ±40 | dB |
| Pan LFO Depth 1-4, All | Depth for the Pan LFO added to the static depth value for elements 1 to 4 and for all elements simultaneously. | ±100 | % |
| Volume LFO Depth 1-4, All | Depth for the Volume LFO added to the static depth value for elements 1 to 4 and for all elements simultaneously. | ±6 | dB |

| | | | |
|---|---|---|---|
| Pitch LFO Speed 1-4, All | Frequency of the Pitch LFO added to the static frequency setting for elements 1-4 and for all elements simultaneously | ±40 | Hertz |
| Cutoff LFO Speed 1-4, All | Frequency of the Cutoff LFO added to the static frequency setting for elements 1-4 and for all elements simultaneously | ±40 | Hertz |
| Reso LFO Speed 1-4, All | Frequency of the Resonance LFO added to the static frequency setting for elements 1-4 and for all elements simultaneously | ±40 | Hertz |
| Pan LFO Speed 1-4, All | Frequency of the Pan LFO added to the static frequency setting for elements 1-4 and for all elements simultaneously | ±40 | Hertz |
| Volume LFO Speed 1-4, All | Frequency of the Volume LFO added to the static frequency setting for elements 1-4 and for all elements simultaneously | ±40 | Hertz |
| Eq1 Gain 1-4, All | Gain of the first Eq band. | ±24 | dB |
| Eq1 Frequency 1-4, All | Frequency of the first Eq band. | ±12000 | cents |
| Eq1 Q 1-4, All | Q of the first Eq band. | ±1 | |
| Eq2 Gain 1-4, All | Gain of the second Eq band. | ±24 | dB |
| Eq2 Frequency 1-4, All | Frequency of the second Eq band. | ±12000 | cents |
| Eq2 Q 1-4, All | Q of the second Eq band. | ±1 | |
| Eq3 Gain 1-4, All | Gain of the third Eq band. | ±24 | dB |
| Eq3 Frequency 1-4, All | Frequency of the third Eq band. | ±12000 | cents |
| Eq3 Q 1-4, All | Q of the third Eq band. | ±1 | |

| | | | |
|---|---|---|---|
| Fx Feedback 1-4, All | Fx Delay Feedback | ±100 | % |
| Fx Cutoff 1-4, All | Fx Filter Cutoff | ±13700 | cents |
| Fx Resonance 1-4, All | Fx Filter Resonance | ±40 | dB |
| Fx LFO Frequency 1-4, All | Fx LFO Frequency | ±10 | Hertz |
| Fx LFO Depth 1-4, All | Fx LFO Depth | ±100 | % |
| Fx Input Level 1-4, All | Fx Input Level | ±100 | % |
| Fx Dry/Wet 1-4, All | Fx Dry/Wet | ±100 | % |

## Dimension Resources Usage

Your Dimension synthesizer uses state-of-the-art technology to economize resources, while preserving a superb sound quality. However, as any virtual synthesizer Dimension relies on the main CPU of your computer to generate and process the sound realtime.

Every component in Dimension can be enabled/disabled individually. When a component is disabled, it doesn't use any CPU. Consequently, is very important to turn off all unused components while the process of program creation or tweaking.

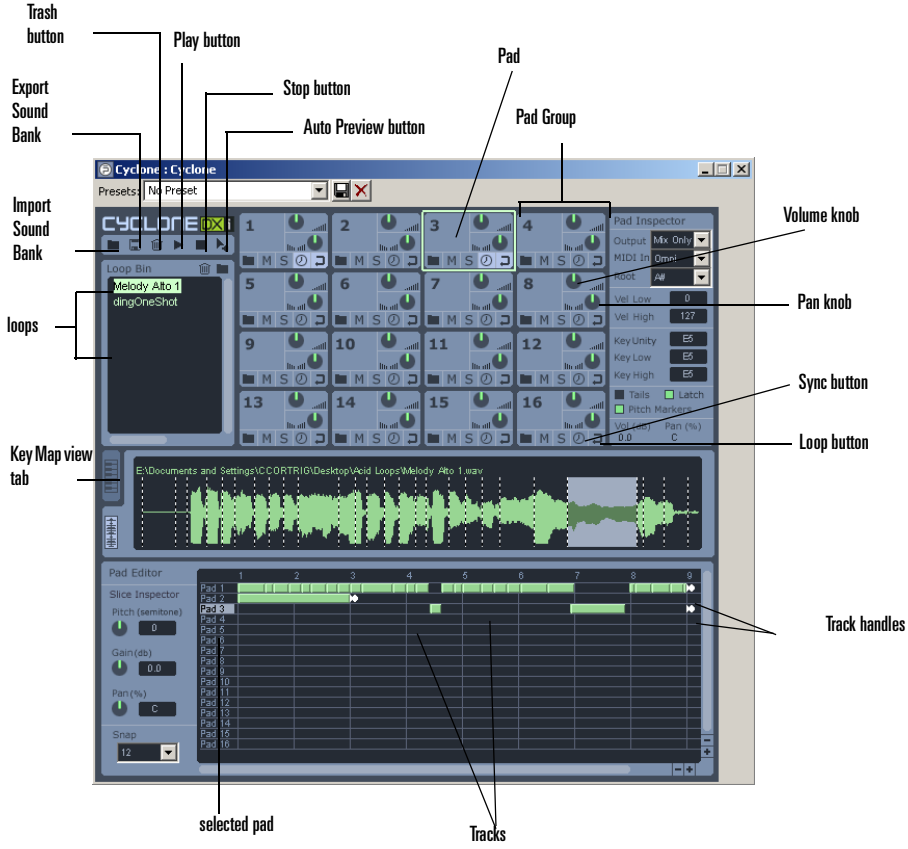
As described, the more components you use for a given patch, the more CPU Dimension will use. Here's a table that shows how the raw performance of Dimension depends on each individual component, as a guide for patch creation.

| | |
|---|---|
| Do Nothing, all elements off | 0.22 |
| Do Nothing | 0.61 |
| 100 Stereo layers playback | 28.01 |
| No DSP, 100 Mono layers playback | 20.13 |
| DSP BitRed, 100 Mono layers | 24.05 |

| | |
|---|---|
| DSP Decimator, 100 Mono layers | 22.50 |
| DSP LP1P/HP1P Filter, 100 Mono layers | 26.01 |
| DSP BP1P/BR1P Filter, 100 Mono layers | 27.31 |
| DSP Any 2P Filter, 100 Mono layers | 33.35 |
| DSP Any 4P Filter, 100 Mono layers | 36.65 |
| DSP Any 6P Filter, 100 Mono layers | 39.24 |
| DSP Drive, any mode, 100 Mono layers | 33.25 |
| DSP Any 2P Filter plus Drive, 100 Mono layers | 45.46 |
| DSP All (Bitred, Decim, LP6P, Drive), 100 Mono layers | 61.84 |
| DSP All (Bitred, Decim, LP6P, Drive), 100 Stereo layers | 88.21 |

# Cyclone DXi

Cyclone DXi is a powerful 16-part, ACID™-compatible, groove sampler, composition tool, and loop editor wrapped up in a single DXi synth.



Click on the links below to learn more about Cyclone.

Cyclone DXi Toolbar

Pad Groups

Pad Inspector

Loop View and Key Map View

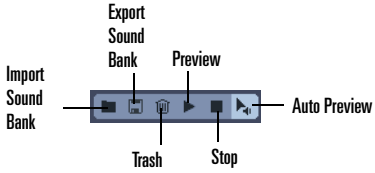
Pad Editor

Slice Inspector

Cyclone Tutorial

## Cyclone DXi Toolbar

The following graphic shows each of Cyclone DXi's toolbar buttons:

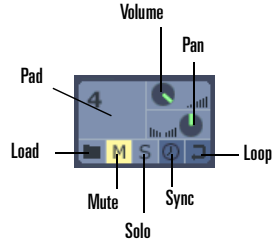



The following table describes each of Cyclone DXi's buttons:

| Button... | Description... |
|---|---|
| Import Sound Bank | Opens the Open dialog so you can load an existing Sound Bank. |
| Export Sound Bank | Opens the Save As dialog to save the current settings as a Sound Bank (.CYC). |
| Trash | Clears the contents of the project. |
| Preview | Plays the selected pads or slices. |
| Stop | Stops playback. |
| Auto Preview | When Auto Preview is on, you can preview the sound of a slice by clicking a slice in the Loop view or an event by clicking an event in the Pad Editor. Also, you can click and drag a slice over events in the Pad Editor, releasing the mouse button when you hear the event you want to replace. |

## Pad Groups

The following graphic shows a close-up of a Cyclone DXi pad group:

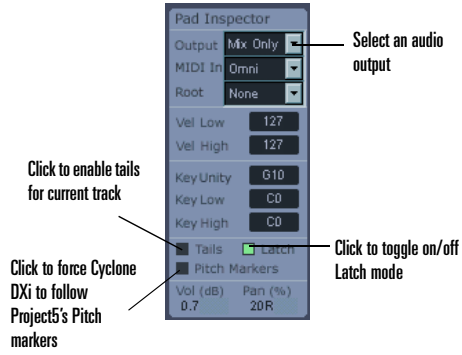


A Pad Group in Cyclone DXi has the following controls:

| Control... | Description... |
|---|---|
| Pad | The trigger for playing a loop. |
| Volume knob | Adjusts the volume of the Pad Group. The volume value is displayed in the Pad Inspector. |
| Pan knob | Adjusts the pan of the Pad Group. The pan value is displayed in the Pad Inspector. |
| File Load button | Opens the Open dialog where you can navigate to the directory or directories where you store your files. |
| Mute button | Mutes the playback of the Pad Group. |
| Solo button | When selected, only that Pad Group plays. |
| Sync button | Synchronizes the playback of the Pad Group to Project5. When selected, the Pad Group follows Project5's tempo and pitch. |
| Loop button | When selected, the playback of the Pad Group repeats continuously. |

## Pad Inspector

The Pad Inspector has additional pad group controls:



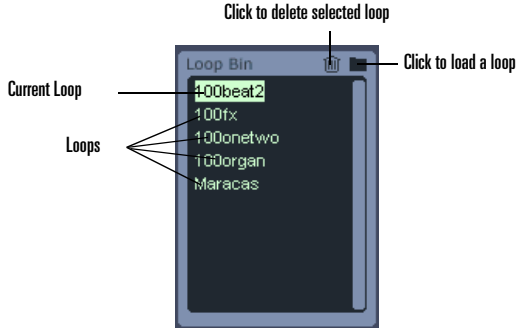

In the Pad Inspector there are the following controls:

| Control... | Description... |
|---|---|
| Output | You can select from one of 16 audio outputs or use the Mix Only setting to use the Master out. |
| MIDI In | You can set which MIDI channel the pad group responds to. Each pad group could have a unique MIDI Input channel. |

| | |
|---|---|
| Pad Root | This setting is read from the file when it is imported. The first loop sets the Pad Root value for each additional loop. |
| Velocity—Low | The minimum velocity value that triggers the pad group. |
| Velocity—High | The maximum velocity value that triggers the pad group. |
| Key Map—Unity | The MIDI note value at which the loop plays at the Pad Root pitch. This value is assigned to a loop when it is imported. You can change the Unity value in the Pad Inspector or in the Key Map view. |
| Key Map—Low | The lowest MIDI note value that triggers the pad group. Both the Low and High not values transpose the pitch of the loop if they are different from the Unity note value. The transposition is relative to the Unity note. The played pitch of the loop is not same as the MIDI note that triggers it unless the Unity note and the Pad Root note are the same. |
| Key Map—High | The highest MIDI note value that triggers the pad group. |
| Tails | The tails feature extends the “tail” or decay of a slice which may otherwise have ended prematurely, drowned out by the next slice. This is particularly useful when you substitute a longer slice with a shorter one leaving room for a tail to sound. |
| Latch | The Latch option gives you a second mode for trigger pads with the mouse or MIDI keyboard. In Latch mode, a pad only plays as long as the key or mouse button is held and stops when you release. If you want to set all pads to the same Latch state, hold down the Shift key while setting the Latch for any one pad. |
| Pitch Markers | This option forces Cyclone DXi to follow Project5’s Pitch markers. When a Pitch marker is encountered, the loop is transposed by the same number of semi-tones as the pitch change in Project5. |

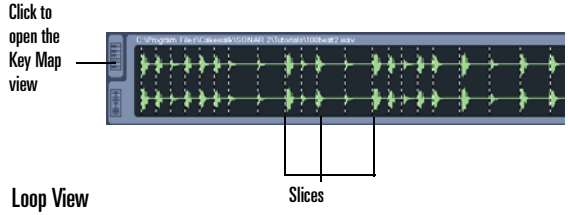
## Loop Bin

The Loop bin, located right below the Cyclone DXi toolbar, is where you can place loops you want to use in Cyclone DXi. From the Loop bin you can drag and drop loops onto a Pad or into the Pad Editor.



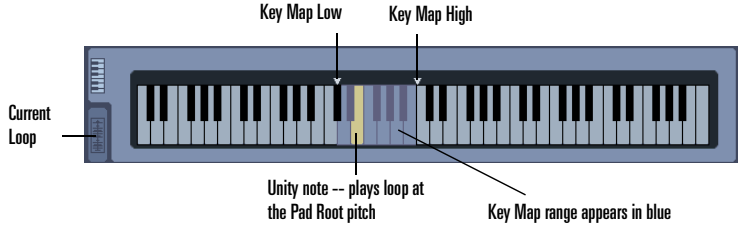

## Loop View and Key Map View

The Loop view displays the content of the loop you have selected in the Loop bin. If the loop is an ACIDized loop, the loops transient markers separate the file's slices. From the Loop view, you can drag a slice onto an event in the Pad Editor.




Loop View

The Key Map view shares the same space in Cyclone DXi as the Loop view. You toggle between the two views by clicking on one of the tabs to the left of whichever view is displayed. The keyboard in the Key Map view shows the Unity note (in orange) and the range of notes that trigger the pad group (in blue). Drag the Unity note to change its value. Drag the white triangles to extend the range of MIDI note values that trigger the pad group.




Key Map View

## Pad Editor

The Pad Editor displays up to 16 “tracks,” one for each pad in Cyclone DXi. Each track has the same number as the pad it represents. Each track is made up of events. An event represents a slice of a ACIDized loop, or in the case of standard wave files, it represents the entire file. Each track in the Pad Editor can be made up of slices from any number of different files. Each track in the Pad Editor terminates with a Track Handle. A Track Handle marks the point at which the track loops back to the beginning. You can move Track Handles using the mouse to any point in the Pad Editor, shortening or lengthening the length of the track.

## Slice Inspector

The Slice Inspector has pitch, gain and pan offset controls. You can change the pitch of the slices in a loop to change the melody of the loop. If you want to edit multiple slices at the same time, select multiple slices by Shift-selecting them and adjust the controls you want.

## Using Cyclone DXi

Cyclone DXi is a multi-output DXi, and you launch it the same way you launch other DXi’s: by inserting it into a Project5 project.

### To Load Loops into Cyclone DXi

- Click the folder icon that’s on the Loop bin to display the Open dialog. Select a loop and click Open. Cyclone DXi loads the loop into the Loop bin.

  Or

- Click a folder icon that’s on a particular Pad that you want to load a loop into. When the Open dialog appears, select a loop and click Open. Cyclone DXi loads the loop into both the Pad where you clicked the folder icon and the Loop bin.

  **Note:** ACIDized and Riff Wave files imported into Cyclone DXi can not be more than 64 beats long. Regular wave files are limited to 30 seconds. Cyclone DXi does not support 8-bit files.

### To Audition Loops

- Select a loop in the Loop bin, and then click Cyclone DXi’s Play button.

### To Play Loops

1. Assign a loop to a pad or pads.
2. Select the pad or pads you want to play by clicking on them.
3. Click the Preview button to play the selected pads.

   If the Loop button for that pad is depressed the loop plays indefinitely; you can stop it by clicking the Pad again.

   If the Loop button is not depressed, the loop stops when it reaches the end of its original length. You can stop it before then by clicking the Pad.

You can also trigger the Pads with a MIDI controller, or with recorded MIDI data.

# Roland GrooveSynth

Roland GrooveSynth is a GM2 (General MIDI 2) compatible software synthesizer featuring a newly developed software synthesis engine, with 256 sounds and 9 drum sets built in.

The Roland GrooveSynth features:

- A newly developed software synthesis engine that uses 32-bit internal processing, and supports a 96 kHz sampling rate
- High-quality reverb and chorus built-in
- 256 GM2-compatible sounds and 9 drum sets for serious music production in jazz, rock, classical, or any other style. In addition, you can create 512 user sounds and 128 drum sets. Maximum polyphony is a generous 128 notes, depending on the performance of your computer and audio device.
- Intel Corporation's SSE instructions, AMD Corporation's Enhanced 3D Now! technology, and Motorola Corporation's AltiVec are all supported, so you'll be able to take full advantage of the high-speed calculation potential of your CPU.

## The Edit View


The Edit view is where you control the sound of an instrument. Changes in the various parameters can be made by dragging a knob up or down. You can also click the spin button below a knob to adjust the value of a parameter in terms of its smallest increments. The settings you make in each part's Edit View are saved with your project.

Some notes about the parameters:

- Some parameters below are labeled GM2 (General MIDI 2). GM2 parameters will change in response to GM2-compatible MIDI messages. The other parameters are unique to Roland GrooveSynth.
- Since VST instruments cannot use exclusive messages, some of the functions defined by General MIDI 2 are assigned to NRPNs to be used with the Roland GrooveSynth.
- Parameters whose range is -63 to +63 apply relative change to the preset values of the sound. If the preset value is already set to the maximum or minimum value, only negative or positive adjustment will be available.

### Edit View Controls and Buttons

Here is a description of the Edit view's buttons and controls:

**Envelope:**

- Attack (GM2) [CC#73]--Adjusts the attack time of the envelope.
- Decay (GM2) [CC#75]--Adjusts the decay time of the envelope.
- Release (GM2) [CC#72]--Adjusts the release time of the envelope.

**Vibrato:**

- Rate (GM2) [CC#76]--Adjusts the modulation speed of the vibrato.
- Depth (GM2) [CC#77]--Adjusts the depth of the vibrato.

- Delay (GM2) [CC#78]--Adjusts the time that is to pass after a note begins sounding (or after a key's been pressed) before vibrato starts being applied.

**Mono**--selects Mono mode.

**Sound Name**--The current GrooveSynth patch. Click on the sound name to choose a different sound.

**Filter** (this has no effect on sounds that do not use the filter):

- Cutoff (GM2) [CC#74]--Adjusts the brightness of the sound. Lower values will produce a darker sound, and higher values will produce a brighter sound.
- Resonance (GM2) [CC#71]--Modifies the tone color by boosting or cutting the harmonics. The sound will become less idiosyncratic as this value is lowered, and sharper and more unique as the value is raised.

**Character** [NRPN 58H 01H]--modifies the character of the harmonics. By operating this knob you can make the sound more reedy or muffled. Note: with certain sounds, or in certain pitch ranges, this may have no effect.

- **Tone:**
  - Bass [NRPN 58H 22H]--adjusts the response of the lower range of frequencies, below 400 Hz
  - Mid [NRPN 58H 27H]--adjusts the response of the midrange, in the 1 kHz region
  - Treble [NRPN 58H 24H]--adjusts the response of the upper range of frequencies, above 4 kHz
  - On/off [NRPN 58H 20H]--the tone settings will be valid when this is on.

**Portamento**--portamento is a function that creates a smooth change in pitch from one note to the next-played note:

**Mod Depth** (GM2) [RPN 00H 05H]--adjusts the depth of modulation that will occur when modulation messages are received.

**Bend Range** (GM2) [RPN 00H 00H]--specifies the amount (in semitone units) of pitch change that is possible when the pitch bend lever is operated. This determines the amount of change that can take place when the lever is moved.

**Tuning:**

- Coarse (GM2) [RPN 00H 02H]--Specifies the amount of pitch shift in semitone units.
- Fine (GM2) [RPN 00H 01H]--Specifies the amount of pitch shift in one-cent units (one cent is 1/100th of a semitone).

**Pan** (GM2) [CC#10]--sets the stereo position of the output sound. L63 is far left, 0 is center, and R63 is far right.

**Level** (GM2) [CC#7]--adjusts the output volume of the part.

### To Switch Sounds

1. Click the sound name.
2. From the menu that appears, select the sound that you want to hear.

### To Edit the Sound Name

1. Double-click the sound name.
2. Type the desired sound name into the dialog box that appears.

## Using The Rhythm Edit View


When you select a patch from the Rythm Set menu, the Rhythm Edit view appears. In the Rhythm Edit view you can adjust the volume and pan, and edit sounds. The parameters can also be edited by dragging with the mouse. Changes in the various parameters can be made by dragging a knob up or down. You can also click the spin button below a knob to adjust the value of a parameter in terms of its smallest increments.

Some notes about the parameters:

Some parameters below are labeled GM2 (General MIDI 2). GM2 parameters will change in response to GM2-compatible MIDI messages. The other parameters are unique to Roland GrooveSynth.

Since VST instruments cannot use exclusive messages, some of the functions defined by General MIDI 2 are assigned to NRPNs to be used with the Roland GrooveSynth.

Parameters whose range is -63 to +63 apply relative change to the preset values of the sound. If the preset value is already set to the maximum or minimum value, only negative or positive adjustment will be available.

Here is a description of the Rhythm Edit views's buttons and controls:

**Tone:**

- Bass [NRPN 58H 22H]--adjusts the response of the lower range of frequencies, below 400 Hz
- Mid [NRPN 58H 27H]--adjusts the response of the midrange, in the 1 kHz region
- Treble [NRPN 58H 24H]--adjusts the response of the upper range of frequencies, above 4 kHz
- On/off [NRPN 58H 20H]--the tone settings will be valid when this is on.

**Voice:**

- LEVEL (GM2) [NRPN 1AH rrH]--adjusts the output volume of the instrument.
- PAN (GM2) [NRPN 1CH rrH]--sets the stereo position of the instrument. L63 is far left, 0 is center, and R63 is far right. If the overall panning of all sounds has been adjusted, that setting will also be taken into account.

**Tune:**

- COARSE TUNE [NRPN 18H rrH]--specifies the amount of pitch shift for the instrument in semitone units.
- FINE TUNE [NRPN 19H rrH]--specifies the amount of pitch shift for the instrument in one-cent steps. (1 cent = 1/100th semitone)

**Filter** (this will have no effect on sounds that do not use the filter):

- CUT OFF (GM2) [CC#74]--adjusts the brightness of the sound. Lower values will produce a darker sound, and higher values will produce a brighter sound.
- RESONANCE (GM2) [CC#71]--modifies the tone color by boosting or cutting the harmonics. The sound will become less idiosyncratic as this value is lowered, and sharper and more unique as the value is raised.

**Level** (GM2) [CC#7]--adjusts the output volume of the part.

**Pan** (GM2) [CC#10]--sets the stereo position of the output sound. L63 is far left, 0 is center, and R63 is far right.

### To Switch Sounds

1. Click the drum set name at the top of the view.
2. From the menu that appears, select the sound that you want to hear.

### To Edit the Sound Name

1. Double-click the sound name.
2. Type the desired sound name into the dialog box that appears.

## Controlling the Roland GrooveSynth from a MIDI Controller

You can control knobs in the Edit view and Rhythm Edit view.

### To Control a Roland GrooveSynth Knob or Slider from a MIDI Controller

1. Right-click the Roland GrooveSynth knob or slider that you want to control.
2. The Control Change Assign dialog appears.
3. Either fill in the controller and the MIDI channel of the control on your MIDI controller that you want to use to control the Roland GrooveSynth with, or check the Learn checkbox and then move the control on your controller that you want to use. If you change your mind click the Clear button.
4. If you want the Roland GrooveSynth knob or slider to respond to the control on your controller regardless of what MIDI channel the controller transmits, check the Apply to All Parts Checkbox.
5. Click OK.

## Parameter Control Via MIDI

Most of the parameters that can be set from the panel of this software can be edited using MIDI control changes and RPN (Registered Parameter Number) or NRPN (Non-Registered Parameter Number) messages.

- Parameters GM2 are parameters defined by GM2 (General MIDI 2). These parameters will change in response to GM2-compatible MIDI messages.
- Since the VST instruments cannot use exclusive messages, some of the functions defined by General MIDI 2 are assigned to NRPNs to be used with the Roland GrooveSynth.
- References to [CC#(number)] indicate control change numbers.
- References to [RPN (number)] indicate the MSB/LSB of the RPN that can be used to control the corresponding parameter.
- References to [NRPN (number)] indicate the MSB/LSB of the NRPN that can be used to control the corresponding parameter.

For details, refer to the MIDI implementation.

## Troubleshooting

Here's a list of common problems and solutions for the Roland GrooveSynth:

### Sound is too loud/too soft/cannot be heard

Check the following points.

- Make sure that Roland GrooveSynth is selected as the output destination for the MIDI tracks that are playing.
- Check the MIDI channel, volume, and mute settings for the MIDI tracks that are playing.
- Check the audio volume of the host application. Also make sure that the audio device you are using has

been correctly selected.

- Check the volume and other necessary settings for your audio device.
- Check the connections and volume of your audio system (amp, speakers, etc.)
- If a heavy processing load is placed on your computer, your host application may stop processing audio, causing the sound to stop. Refer to the troubleshooting items for "[2] Sound is interrupted/ playback tempo is irregular/playback stops midway through."

### Sound is interrupted/playback tempo is irregular/playback stops midway through

Check the following items.

- If your host application allows you to adjust the size of the audio buffer, try increasing the buffer size. Note : Increasing the buffer size will increase the delay (latency) of the sound.
- It is possible that playback cannot be performed correctly because other software is placing a processing load on the computer. Please exit any software you are not using.
- Refer to the troubleshooting section in the documentation for your host application or audio device. Suggestions on how to solve problems with audio playback may be effective for this situation as well.

Note, however, that if the MIDI data you are attempting to play is of such complexity that it requires sound processing capabilities that are well beyond those of your computer, these measures may not help.

### Notes are delayed

Check the following points.

- If your host application allows you to adjust the size of the audio buffer, try decreasing the buffer size. Note : decreasing the buffer size too much may cause notes to be interrupted or fail to sound. Make this setting as appropriate for the performance of your computer and audio device.
- If the documentation for your host application or audio device contains suggestions on how to fix problems with delayed notes, follow those suggestions.

Depending on the performance of your computer, and on the specifications of your host application and audio device, it may not be possible to resolve this problem.

Insufficient polyphony/Notes are omitted

### Sound is distorted

Check the following points.

- Try lowering the master volume in the Mixer window.

### Failure to plug-in

Check the following points.

- Roland GrooveSynth can be used only with the following audio formats. Check the audio format of your host application.

| | |
|---|---|
| Sampling frequency [kHz] | 44.1, 48, 96 |
| Number of channels | 2 |

It is possible that your computer does not have enough memory. Try exiting any other applications that you are not using. If failure to plug-in occurs frequently due to insufficient memory, we recommend that you install additional memory in your computer.

### To Play a Loop in Latch Mode

1. Assign a loop to a Pad.
2. In the Pad Editor, select the track you want to loop in Latch mode.
3. In the Pad Inspector, click the Latch control to enable it. The Latch control indicator appears green when enabled.
4. Click the mouse on the pad to start the loop playing.
5. Click the mouse on the pad again to stop playing.

The loop stops playing as soon as you release the mouse button.

### To Assign a Loop to a Pad

- Drag a loop from the Loop bin to a Pad.

  Or

- Click a folder icon that's on a particular Pad that you want to load a loop into. When the Open dialog appears, select a loop and click Open. Cyclone DXi loads the loop into both the Pad where you clicked the folder icon and the Loop bin.

You can assign one loop per Pad.

### To Assign MIDI Keys to a Pad

1. Click the Pad that you want to trigger.
2. Click the Keyboard button in the Loop view to display the Key Map view.

   The blue keys between the Pitch Range markers show what MIDI keys trigger the Pad. The yellow key is the Root Note, which triggers the loop at its original pitch.
3. Drag the edge of the Pitch Range (the blue keys within the white triangle markers) to change the range of notes that trigger the loop. If the loop's pitch changing function is turned on, each MIDI key in the trigger range transposes the loop by the trigger note's distance from the Root Note.
4. Drag the yellow key to change the Root Note. The Root note does not have to be in the trigger range.
5. In the MIDI Chn field, choose the MIDI channel that the MIDI notes will use to trigger this pad with.

You can assign the same key ranges to all the Pads if you want. You can assign different velocity ranges to each pad, also.

### To Assign a Velocity Range to a Pad

1. Click the Pad that you want to assign a velocity range to.
2. Click the Keyboard button in the Loop view to display the Key Map view.
3. In the Velocity Low field, fill in the lowest velocity that you want to trigger the Pad with.
4. In the Velocity High field, fill in the highest velocity that you want to trigger the Pad with.

Now the Pad only plays its loop when the Pad receives a MIDI note within its velocity range.

## Controlling Individual Pads—Volume, Pan, Mute, Solo, Sync, Looping, and Content

Each Pad has the following controls:

- Volume knob—turn to adjust.
- Pan knob—turn to adjust.
- Folder icon—click this to import a loop to an individual Pad.
- Mute button—click this to mute or unmute the loop that's assigned to an individual Pad.
- Solo button—click this to solo or un-solo the loop that's assigned to an individual Pad.
- Sync button—click this to synchronize (or unsynchronize) the Pad's loop to Project5's pitch and tempo.
- Loop button—click this to cause or prevent the Pad's loop from repeating indefinitely between its track length markers that are in the Pad Editor.

### To Export a Sound Bank

1. Click the Export Sound Bank button in the Cyclone toolbar.

   The Save As dialog appears.
2. Navigate to the directory where you want to save the Sound Bank.
3. Enter a name for the Sound Bank.
4. Click OK.

Cyclone DXi saves your Sound Bank. All wave files assigned to pads are saved. You can choose that Sound Bank in any Cyclone project.

### To Import a Sound Bank

1. Click the Import Sound Bank button on the Cyclone toolbar.

   The Open dialog appears.
2. Navigate to the directory where you saved your Sound Bank, select it and click OK.

Cyclone DXi loads the loops and associated settings that make up the Sound Bank you loaded.

### To Clear the Contents of a Project

- Click the Trash icon in the Cyclone DXi toolbar.

  Cyclone DXi deletes all loops from your project.

## Loop Editing

Clicking a loop in the Loop bin displays that loop in the Loop view. The Loop view displays the selected loop as a series of slices that separate the transients in the loop. When the Auto-preview button is depressed, you can click each of the slices to hear it. If the loop is assigned to a Pad, the slices also appear in the Pad Editor as a series of **events**, which you can also click to hear. Clicking an event in the Pad Editor also highlights the corresponding slice in the Loop view.

You can drag slices from the Loop view to any position in any track in the Pad Editor in order to add data to a Pad, or replace an already-existing event If you can drag a slice

along a series of events in the Pad Editor, if the Auto-preview button is depressed, each event sounds as you drag across it, enabling you to hear events before you decide to replace them.

### To Add or Replace Parts of a Loop

1. In the Loop bin, click the loop that you want to use as source material.
2. Make sure that the Auto-preview button is on.
3. Drag the slice that you want to use from the Loop view to the slice or empty space in the Pad Editor that you want to place the slice.
4. If you dragged to an area that's to the right of the Track Length marker, drag the marker to the right until it's to the right of the new slice.

### To Change the Length of a Track

- Drag the Track Length marker to the right or left to lengthen or shorten the track, respectively. You can include empty space in your track. If you depress the Loop button for that Pad (track), the track loops continuously between the beginning of the track and the Track Length marker.

### To Set the Number of Divisions for a Slice

You can set the number of divisions in each slice. This controls how exact the placement of your slices is within the Pad Editor. Each division represents a place where a slice can "snap to" or begin.

1. In the Pad Editor, click the down arrow next to the Snap field.
2. From the dropdown menu that appears, select one of the following:
    - None
    - 1/beat
    - 2/beat
    - 3/beat
    - 4/beat
    - 8/beat
    - 12/beat
    - 16/beat

    The number of divisions per beat in Cyclone DXi is set.

## Keyboard Shortcuts in Cyclone DXi

The following table lists the keyboard shortcuts in Cyclone DXi and explains what they do:

| Keyboard Shortcut... | Description... |
|---|---|
| Shift selecting | Hold the Shift key to select multiple slices in the Pad Editor. |
| Shift drag | Hold the Shift key while dragging to maintain a slice's time. |
| Ctrl drag | Hold the Ctrl key while dragging to copy a slice. |
| Shift Ctrl drag | Hold the Shift and Ctrl keys simultaneously while dragging to copy the slice and maintain the slice's time. |
| Left and Right arrows | Turn on Auto Preview, select a slice in the Loop view or Pad Editor, and use the left and right arrow keys to listen to individual beats. |

## Undo and Redo

You can undo any edit you make in Cyclone DXi. If you decide, after you have used Undo, that you want the edit after all, you can Redo the edit. The number of edits you can Undo and Redo in Cyclone DXi is unlimited.

### To Undo an Edit

Press the Ctrl+Z keys.

### To Redo an Edit

Press the Shift+Ctrl+Z keys.

## Cyclone Tutorial

The Cyclone DXi is a 16-part phrase sampler with beat-matching and extensive loop editing capabilities. With Cyclone you can trigger different loops of different tempos and Cyclone will automatically play them back at the same tempo, in sync with little or no signal degradation.
Cyclone is similar to a software-based sampler in that you can trigger the pads from the mouse, a MIDI keyboard, or from MIDI data in a track; the difference is that is works with entire loops or phrases, similar to Dr. Rex, the AKAI MPC 4000 or many other Groove-station-like hardware products. Cyclone takes Phrase sampler a step further because it lets you edit individual loop slices or make other changes on the slice level.

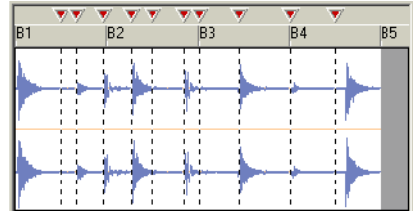
To use Cyclone, you just drag and drop any compatible loop onto one or more of the 16 pads. You can control how the loop plays back on a pad using the Pad Inspector or Key map. You can actually edit the contents of each pad using the pad editor.

## A Few Basics

Before we get started, we need to review a few basics:

### Loops

When we talk about loops, we are referring to Acidized .WAV files or Groove clips. These files are different than standard wave files in that each file contains information describing the tempo, number of pitch and the pitch of the wave file and a list of markers that align to each beat or subdivision of the beat.




These markers are called slices. Products like SONAR or Acid use this information to intelligently pitch shift or time-stretch the file.

### DXi

DXi are multi-out, software-based Synthesizers that run inside of Cakewalk's products, including SONAR. They work just like traditional MIDI Synths or Samplers in that you can use them to play back your MIDI tracks but what is really cool is that because they are in software, you can route them through your favorite software effects, automate their parameters without taking up lots of floor space in your studio. All of the major Soft-Synth manufacturers like Native Instruments, Edirol, FXPansion and many others offer their Software-Synths in the DXi format. Using DXi in SONAR is a breeze. From the view toolbar, choose DXi Synth Rack. Now click new Synth and choose Cyclone from the list. Click OK and you are ready to go. SONAR has automatically created the MIDI track, patched it through the Synth and routed the audio output from the Synth back to one or more audio tracks.

## Hit Replacement—Map Your Favorite Samples to Any Groove

As we mentioned earlier, acidized wave files and Groove clips are sliced up into their individual samples. When you drag a loop onto a pad, each slice of that loop appear in the Pad editor. These slices (or events) look similar to MIDI note events that you see in SONAR's Piano Roll Editor. In figure X, you can see that the loop in the waveform view is divided into several sections by the vertical dotted lines. These are slices. These slices are represented in the Pad Editor as green squares. You can delete a slice, copy a slice, or move slices within a pad or from pad to pad.

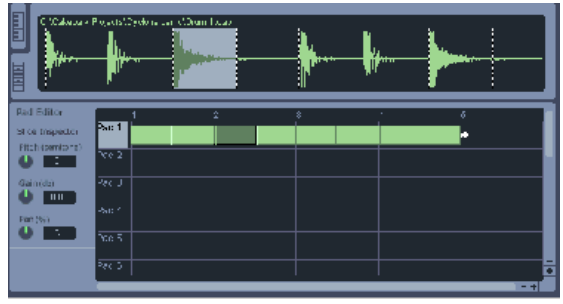
Using Cyclone's Pad Editor, you can replace or swap samples (slices) from one loop to another. Why would you want to do that? Good question. Let's say you've got this killer loop in your project, i.e., it captures the exact feel that you wanted. The only problem is that one or more of the drum samples don't match the rest of the track. To keep it simple, let's start with a blank project and insert the Cyclone DXi. All pads are routed through the mix output, which is patched to a single audio track.

Drag loop A onto Pad 1. Loop A has the right groove but the wrong sound. With Auto preview enabled, click the first event in the pad editor and use the cursor keys to hear each slice. Identify which slices (events) you would like to replace.

## Apply Effects to Slices within the Loop

Let's say you want to use an effect on a loop, but you don't want it to process the entire loop pattern. Perhaps you want to run the snare through a gated reverb or the kick through a filter but you didn't want the effect to process the other slices in the loop. Using Cyclone's editor and multi-out capabilities, you can do just that and more. In this example, I have inserted Cyclone into an empty project and have routed two Cyclone outputs to two SONAR inputs on track one and two. In Cyclone, I have set Pad one's output to Output 1 and Pad 2's output to Pad 2. Turn on the auto preview button in Cyclone's main tool bar if it isn't already (1st from the right).

The first step is to drag your loop onto pad 1. Let's use a simple kick-kick-snare-hihat-kick-kick-snare-hihat pattern with 8 slices. Now go down to the Pad editor and click on the first slice of your loop. You should hear either a kick or a combination of a kick and cymbal. Now click on each of the other slices until you find a snare sound.



Once you have located the first snare sound, click it once, hold down the shift key and drag the snare slice to the next row. The shift key locks the start time of the slice to ensure that you haven't changed the original beat. You can use the left and right arrow keys to navigate from slices to slice.

Repeat this procedure until you have divided the entire loop onto two pads.

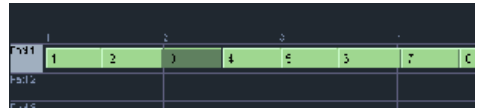
If you play pad one, you should hear the loop without the snare hits playing through track 1 in SONAR. If you play pad 2, you will hear just the snares through track 2 in SONAR. Of course they are all playing in sync at the same tempo.

## Mix It Up: Creating Loop Variations

One of the nice things about using a live drummer is that they alternate their part within a section. The energy of a song can lag if you use the same pattern over an over again. One way to keep the energy up is to use different loops in different sections of the track. Some better loop collections actually include pattern variations to help out. If you don't have a variation that fits your track or if you are looking for something a little subtler, you can use Cyclone to create variations of your existing loops. When you are done, you can actually print these to a track and export them out as new loops for later use.

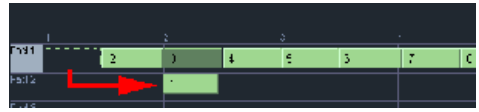
In SONAR you might have a number of loops in your project, rolled out along different tracks. Insert Cyclone from the Synth rack and open it up. Now, locate the loop in your project that you want to create a variation for. Drag and drop Drum 1 Loop from SONAR's track view onto Pad 1 in Cyclone. In the Pad Editor, you will see all the slices for Drum1.

For this example there are 8 slices. The slices are not numbered in Cyclone, but I have numbered them 1 to 8 to avoid confusion.

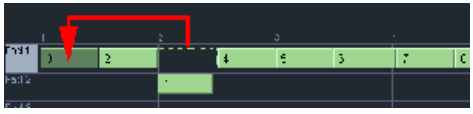


To create our variation, let's simply swap slice 3 and slice 1.

1. Click slice 1 on Pad 1 and drag it to Pad 2, just below slice 3 on Pad 1. Zoom in horizontally in the Pad Editor to line them up so they start playback at the same time.



2. Now, drag slice 3 to slice 1's original location.



3. Finally, shift-click slice 1 and drag it up to Pad 1.

After you have created this new part, you can trigger it from a MIDI track in your project or render the resulting file as an audio loop.

In this example we have focused on changing the rhythm of our loop. But there are many other ways to create variations by adjusting the pitch, pan or gain of one or more slices using the Slice inspector controls.

### Tip of the Cyclone

These are just a few very simple examples to demonstrate what you can do with Cyclone to personalize loops in your loop collection. Whether you rewrite the melody of a bass loop, de-tune a snare, re-map samples to your favorite patterns or apply effects to individual slices, its pretty amazing how easy it is to tweak your loops with Cyclone.

## Chorus/Flanger

The Chorus/Flanger effect is used to add depth and thickness to the signal.

**Note**: Double-clicking a knob will reset it to its default value. Also, if you want to save any particular settings you come up with, type a name for them in the Presets window, and click the Disk icon to save them. You can load them by clicking their name in the Presets menu, and delete them by clicking the X button.

The Chorus/Flanger provides the following automatable parameters:

- Power (On/Off)—This control is a simply a bypass switch. When it's lit up (blue), the plug-in is working. When it's off, the plug-in has no effect on the audio channel, nor taxes the CPU.
- Chorus Mode—This control allows you to specify what type of modulation will affect the signal. The modes include:
  - OFF
  - MONO CHORUS
  - STEREO CHORUS
  - 6-VOICE CHORUS
  - ENSEMBLE
  - MONO FLANGER
  - STEREO FLANGER
- Waveform—The modulation cycle follows a prescribed shape, which is defined as a waveform. Different waveforms include:
  - SINE
  - TRIANGLE
  - SQUARE
- Delay—Delay specifies the duration that the signal will feedback into itself. High delay times coupled with high feedback settings produce dramatic results.
- Speed—Speed specifies the rate of the waveform that the modulation follows.
- Depth—This control varies the strength of the modulation from 0 to 100%.
- EQ Modes—The 2-band EQ removes frequencies from the delay path (it passes them through, unprocessed), but *adds* resonance: either a little or a lot depending on the setting. The Low and High knobs determine how much signal from each band is removed: when both knobs are set to zero, no frequencies are cut. The EQ mode allows specific frequency and Q for each band (LO and HI respectively). Besides OFF, EQ modes and settings include:

| EQ Mode | Band Frequencies | Resonance | Q |
|---|---|---|---|
| STD | Low: 250<br>High: 500 | Low | Narrow |
| WIDE | Low: 250<br>High: 1000 | Low | Narrow |
| HIGH | Low: 500<br>High: 1500 | Low | Narrow |
| RES STD | Low: 500<br>High: 2500 | High | Wide |

| | | | |
|---|---|---|---|
| RES WIDE | Low: 1000<br>High: 4000 | High | Wide |
| RES HIGH | Low: 500<br>High: 8000 | High | Wide |

- Low knob—controls how much cutting the low band of the EQ does.
- High knob—controls how much cutting the high band of the EQ does.
- Feedback—determines what percentage of the processed output gain is routed again to the input of the effect. Higher feedback settings produce more echoes and longer decay times.
- Mix—controls ration of processed to unprocessed signal.
- Level—controls the level of the processed signal.

# Classic Phaser

This is a classic phaser effect that uses a modulating notch filter with a feedback loop. It includes the following automatable parameters:

### Power

Power (On/Off)—This control is a simply a bypass switch. When it's lit up (blue), the plug-in is working. When it's off, the plug-in has no effect on the audio channel, nor taxes the CPU.

### Mode

Mode allows you to select which phaser algorithm affects the signal. Mode options include:

- OFF
- MONO
- STEREO
- QUAD

### LFO Waveform

The modulation cycle follows a prescribed shape, which is defined as a waveform. Different waveforms include:

- Sine
- Triangle
- Square
- S&H (or Sample and Hold which means that the LFO shape is random)

### LFO Depth

This controls the amount by which the LFO affects the filter. Higher values mean broader filter sweeps.

### LFO Speed

LFOs can be used to modulate the filter as well. LFO speed determines the rate of the LFO (speed at which one cycle is completed), which ranges from 20Hz to 20kHz.

### LFO SYNC

LFO SYNC allows you to specify beat factors that consequently sync LFO cycles to the host tempo. When a sync mode is engaged, the LFO rate is based on a designated beat factor at the host project's current tempo. LFO sync modes include:

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 16 D | 7 | 4 D | 13 | 1 D | 19 | ¼ D | 25 | 1/16 |
| 2 | 16 | 8 | 4 | 14 | 1 | 20 | ¼ | 26 | 1/32 |
| 3 | 16 T | 9 | 4 T | 15 | 1 T | 21 | ¼ T | 27 | OFF |
| 4 | 8 D | 10 | 2 D | 16 | ½ D | 22 | 1/8 D | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 5 | 8 | 11 | 2 | 17 | ½ | 23 | 1/8 |
| 6 | 8 T | 12 | 2 T | 18 | ½ T | 24 | 1/8 T |

**Note**: D and T represent dotted and triplet equivalents respectively.

### Feedback

Feedback specifies the percentage of the processed signal that is fed back to the plug-ins input.

### Center Frequency

Center Frequency specifies the filter's band.

### Output Level

This controls the level of the processed output signal.

### Phaser Parameter Summary

| PHASER | | Stereo Phaser | |
|---|---|---|---|
| # | Parameter Name | Description | Range |
| 1 | Mode | Phaser Mode | OFF, MONO, STEREO, QUADRATURE |
| 2 | Waveform | LFO Waveform | SINE, SINE^3, TRIANGLE |
| 3 | Depth | LFO Depth | 0~100% |
| 4 | Sync | LFO Sync | OFF, 16d, 16, 16t, 8d, 8, 8t, 4d, 4, 4t, 2d, 2, 2t, 1d, 1, 1t, 1/2d, 1/2, 1/2t, 1/4d, 1/4, 1/4t, 1/8d, 1/8, 1/8t, 1/16, 1/32 |
| 5 | Speed | LFO Speed | 0.1-10Hz |
| 6 | Range | Frequency Range | 750-2000Hz |
| 7 | Feedback | Phaser Feedback | 0-100% |

| | | | |
|---|---|---|---|
| 8 | Level | Output Level | 0-100% |
| 9 | On-Off | Effect On-Off | On/Off |

## Compressor/Gate

A compressor takes the loudest parts of an input signal and reduces their volume. When you use a compressor, the master gain adjustment can result in increased low-level system noise. As a result, it is common to use a gate in combination with a compressor.

A compressor/gate combines a compressor and a gate into a single effect, so you can increase the overall dynamic level of an audio signal, without distorting the loud parts, and without excessively boosting low-level noise. The gate threshold is normally set low enough to remove low-level system noise, but not high enough to remove important program material. Note that the gate threshold is set automatically in this effect.

**Note**: Double-clicking a knob will reset it to its default value. Also, if you want to save any particular settings you come up with, type a name for them in the Presets window, and click the Disk icon to save them. You can load them by clicking their name in the Presets menu, and delete them by clicking the X button.

The FX Compressor/Gate provides the following automatable parameters:

- Power (On/Off)—This control is a simply a bypass switch. When it's lit up (blue), the plug-in is working. When it's off, the plug-in has no effect on the audio channel, nor taxes the CPU.
- Attack Time—the length of time it takes the compressor/gate to respond to increases in signal level. In general, attack times are set to be relatively short. This setting is shared by both compressor and gate mechanisms.
- Release Time—The release time is the length of time it takes the dynamics processor to respond to decreases in signal level. Release times are generally set to be much longer than attack times. This setting is shared by both compressor and gate mechanisms.
- Compressor Threshold—The compressor's job is to lower the loudest parts of the signal, therefore a signal threshold specifies a limit for the strength of the signal. This is set in dB.
- Compressor Ratio—Those parts of the signal that exceed the threshold are reduced toward the threshold by a factor known as the Ratio. The Ratio can be specified as 1:1 through 40:1.
- Input Gain—Allows you to boost the signal before it reaches the compressor/gate.
- Gate Mode—The gate function has two special controls: Mode and Trigger. Trigger is a control that allows you to activate the gate manually (see below). Gate Mode specifies whether or not the trigger is enabled. Modes include:
    - OFF—Gate function is disabled
    - NORMAL—Gate functions normally, according to attack/release times and threshold.
    - MANUAL—Normal gate mode is bypassed; gate opens and closes only when the trigger parameter is engaged.
- Threshold—This specifies the gate's signal threshold, the limit for the strength of the signal. When the signal strength falls below the gate threshold, it is cut. This is set in dB.
- Manual Trigger—This is a two-state control that allows you to manually toggle the gate. An anticipated use would be to assign a MIDI Note ON/OFF (via remote control) to the gate trigger to manually affect a "stutter" result in the mix. When the trigger is on, the gate is fully closed, meaning no signal passes through at all, despite threshold settings.

- Level—This controls the level of the processed output signal.

## Tempo Delay

The Delay effect produces an echo on whichever channel it is patched to.

**Note**: Double-clicking a knob will reset it to its default value. Also, if you want to save any particular settings you come up with, type a name for them in the Presets window, and click the Disk icon to save them. You can load them by clicking their name in the Presets menu, and delete them by clicking the X button.

The Tempo Delay provides the following automatable parameters:

- Power (On/Off)—This control is a simply a bypass switch. When it's lit up (blue), the plug-in is working. When it's off, the plug-in has no effect on the audio channel, nor taxes the CPU.
- Delay Mode—This control allows you to select the delay mode for the plug-in, which affects how the delayed signal feeds back. Delay modes include:
    - STEREO—Left and right channels have independent control of delay times
    - PING—Short for "ping-pong" means that the feedback signal bounces back-and-forth across the stereo field
    - CROSS—Cross provides cross-channel feedback, which allows for a more animated delay effect than standard center-panned delays
    - LRC—Affects a 3-channel delay, feeds back through left, right and center channels.
- Tempo Sync—This control allows you to specify beat factors that sync the echoes to the host tempo. When a sync mode is engaged, the delay values are based on factors of the beat at the host project's current tempo. Besides OFF, Sync modes include: 16, 8, 4, 2, 1, 1/2, 1/4/, 1/8 (all include triplet "T" and dotted "D" values), and 1/16 and 1/32 (no T or D).

  **Note**: When you set a SYNC mode to a value other than OFF, the delay follows the project tempo. Sync mode is automatically overridden when you adjust an actual time parameter (Time L/R below). Adjusting the sync control again resumes sync mode.
- Time L / Time R—Time Left and Time Right control the delay time for each channel, from 0.00 to 2.00 seconds. Note that these controls have no impact on Sync modes. Note that Sync mode is automatically overridden when you adjust an actual time parameter (Time L/R below). Adjusting the Sync control again resumes Sync mode.
- Feedback—The feedback level determines what percentage of the processed output gain is routed again to the input of the effect. Higher feedback settings produce more echoes and longer decay times.
- EQ Modes—The 3-band EQ removes frequencies from the delay path (it passes them through, unprocessed), but *adds* resonance: either a little or a lot depending on the setting. The Low, Mid, and High knobs determine how much signal from each band is removed: when all three knobs are set to zero, no frequencies are cut. The EQ mode allows specific frequency and Q for each band (LO and HI respectively). Besides OFF, EQ modes and settings include:

| EQ Mode | Band Frequencies | Resonance | Q |
|---|---|---|---|
| STD | Low: 250<br>High: 500 | Low | Narrow |

| | | | |
|---|---|---|---|
| WIDE | Low: 250<br>High: 1000 | Low | Narrow |
| HIGH | Low: 500<br>High: 1500 | Low | Narrow |
| RES STD | Low: 500<br>High: 2500 | High | Wide |
| RES WIDE | Low: 1000<br>High: 4000 | High | Wide |
| RES HIGH | Low: 500<br>High: 8000 | High | Wide |

- Low knob—controls how much cutting the low band of the EQ does.
- Middle knob—controls how much cutting the middle band of the EQ does.
- High knob—controls how much cutting the high band of the EQ does.
- Feedback—determines what percentage of the processed output gain is routed again to the input of the effect. Higher feedback settings produce more echoes and longer decay times.
- Mix—controls ration of processed to unprocessed signal.
- Level—controls the level of the processed signal.

# HF Exciter

HF (High Frequency) exciters are used to enhance the higher end of the frequency spectrum. This produces the psycho-acoustic affect that the signal is brighter and clearer. This is done by adding harmonic content not present in the original signal.

The HF Exciter provides the following automatable controls:

### Power

Power (On/Off)—This control is a simply a bypass switch. When it's lit up (blue), the plug-in is working. When it's off, the plug-in has no effect on the audio channel, nor taxes the CPU.

### Drive

Drive is a simple filter distortion unit which introduces an "edge" or presence to the affected signal. Drive is specified as an amount, 0 to 100%.

### Frequency

This specifies the frequency band that is processed by the Exciter.

### Stereo Spread

This control is used to enhance the stereo image by providing control over the perceptual distance of the left and right channels. 0% means no spread, while 100% means maximum spread.

### HF Exciter Parameter Summary

| Parameter Name | Description | Range |
|---|---|---|
| Bypass | Effect Bypass | On/Off |
| Drive | Drive amount | 0-100% |
| Frequency | Exciting frequency | 5kHz - 20kHz |
| Stereo spread | Stereo spread | 0-100% |
| Mix | Stereo wet/dry mix | 0-100% |

## Modfilter

This effect provides a dynamic filtering effect, in that the actual filter can respond to incoming signal or follow the cycle of an LFO. The filter itself is a lowpass filter type, meaning that it is used to filter out higher frequencies.

**Note**: Double-clicking a knob will reset it to its default value. Also, if you want to save any particular settings you come up with, type a name for them in the Presets window, and click the Disk icon to save them. You can load them by clicking their name in the Presets menu, and delete them by clicking the X button.

The Modfilter provides the following automatable parameters:

- Power (On/Off)—This control is a simply a bypass switch. When it's lit up (blue), the plug-in is working. When it's off, the plug-in has no effect on the audio channel, nor taxes the CPU.
- Filter Mode—You can put the Modfilter into one of four different modes:
    - LFO—In this mode, the filter uses a Low Frequency Oscillator in the form of a Sine wave, Square wave, Triangle wave, or Sample and Hold (random) wave to modulate the frequency. The Tempo Sync knob determines how the project tempo relates to the LFO.
    - EG—In this mode, the filter is controlled by an Envelope Generator. You can use the Attack and Release knobs to control the time the Envelope Generator takes to reach its cutoff frequency, and how long the filter stays open once it reaches the cutoff frequency.
    - Manual—In this mode, the filter is not controlled by an LFO or an Envelope Generator, but still uses the settings of all knobs except the Tempo Sync, Mod Depth, Waveform, LFO Rate, Attack, and Release knobs.
    - Off—This setting works just like the Power button.
- Tempo Sync—This knob (when not set to OFF), synchronizes the LFO rate to various divisors of the project tempo. The available tempo divisors are 16, 8, 4, 2, 1, 1/2, 1/4, 1/8 (all include triplet "T" and dotted "D" values), 1/16, and 1/32 (no T or D).
- Cutoff—This knob sets the cutoff frequency.
- Reso—This sets the amount of resonance. Resonance is used to amplify the actual harmonic nearest the specified cutoff frequency. This produces the traditional whistling sound common in resonant filters.
- Mod Depth—This controls the amount by which the LFO affects the filter. Higher values mean broader filter sweeps.
- Waveform—This control sets the kind of wave that the LFO uses. Choices include Sine wave, Square wave, Triangle wave, or Sample and Hold (random) wave.
- LFO Rate Hz—This knob sets the LFO rate when the Tempo Sync knob is set to off.
- Attack—This knob sets the time the Envelope Generator takes to get to its cutoff frequency.
- Release—In EG mode, this knob sets how long the filter stays open once it reaches the cutoff frequency.
- Overdrive—Overdrive is a simple filter distortion unit which introduces an "edge" or presence to the affected signal. Overdrive is specified as an amount, 0 to 100%.
- Output Level—This controls the level of the processed output signal.

# Para-Q

The Para-Q effect is a lightweight process that can be used on many tracks simultaneously. It is used to boost or attenuate generally high or low bands of the signal.

**Note**: Double-clicking a knob will reset it to its default value. Also, if you want to save any particular settings you come up with, type a name for them in the Presets window, and click the Disk icon to save them. You can load them by clicking their name in the Presets menu, and delete them by clicking the X button.

The Para-Q provides the following automatable parameters:

- Power (On/Off)—This control is a simply a bypass switch. When it's lit up (blue), the plug-in is working. When it's off, the plug-in has no effect on the audio channel, nor taxes the CPU.
- f—The frequency range of Band 1 and Band 2 is independent, and can be set to a value as follows:
    - Band 1: Frequencies from 40Hz to 20 kHz
    - Band 2: Frequencies from 40Hz to 20 kHz
- Gain (Band 1 & Band 2)—You can cut or boost each band can by 12 dB.
- BW—The bandwidth for each band is independent, and can be set to a value as follows:
    - Band 1: 0 – 5 octaves
    - Band 2: 0 – 5 octaves
- Level—This controls the level of the processed output signal.

## Studioverb2

The Studioverb2 provides very dense and warm reverberation with 32-bit floating point implementation. This eliminates the digital grunge and harshness that occurs even in the best studio reverberation systems, which are implemented using less advanced fixed point processing. The Studioverb2 provides extremely high efficiency, typically using half of the CPU load of other premium reverb plug-ins.

**Note**: Double-clicking a knob will reset it to its default value. Also, if you want to save any particular settings you come up with, type a name for them in the Presets window, and click the Disk icon to save them. You can load them by clicking their name in the Presets menu, and delete them by clicking the X button.

The Studioverb2 provides the following automatable parameters:

- Power (On/Off)—This control is a simply a bypass switch. When it's lit up (blue), the plug-in is working. When it's off, the plug-in has no effect on the audio channel, nor taxes the CPU.
- Room Size—Changes the size of the "room" modeled by the reverb plug-in.

  **Note**: Changing the Room Size slider in real time or automating changes to it can be noisy. Always change this parameter when the affected track is silent.
- Decay Time—Controls how reflective the walls of the room are, which determines how long in seconds it will take for a sound at the input to decay down approximately 60dB in level at the output
- High f Rolloff—Controls the high frequency cutoff point for the overall reverberant sound
- High f Decay—Controls how quickly highs are lost from the sound as it reflects off walls and passes through the air of the room
- Density—Determines how smoothly the reverb tails blend together. This is called "diffusion" on many reverb units.
- PreDelay—Adds additional delay from 0 to 100 ms. to the wet reverberant signal
- Motion Rate—Controls the overall rate of the spatial motion. Should be used at slower settings for highly pitched tracks.
- Motion Depth—Adds a spatial motion to the reverberant field, which adds extra dimension to the sound. Can be aggressively used on percussive tracks, needs to be less aggressively set for highly pitched tracks.
- Mix—Determines the mix of the wet and dry sounds in the overall output from the effect
- Level—Controls the strength of the reverb processor's output signal

This version of FXChorus was developed by Power Technology and is for use with SONAR only.

# Spectral Transformer

Spectral Transformer is a multi-functional plugin designed as a real-time sound modifying instrument. It has several 'tools' or functions which can be chained, so that the effect of processing is cumulative. The original functions have been developed by the internationally known composer/programmer, Trevor Wishart, and formed part of the Composers' Desktop Project (PV) sound transformation software package. They have been further developed with additional functionality and made into this plugin by Richard Dobson.

Spectral Transformer is based on the Phase Vocoder, which converts incoming audio to an overlapping series of analysis frames. Each analysis frame represents the spectrum of the sound at that moment in time. These frames are then passed through a series of transformations (effects in Spectral Transformer) before being converted back into audio. The advantage of this design, unique to Spectral Transformer, is that the expensive analysis and resynthesis is done only once: i.e., at the beginning and end of the effects chain.

**Note**: When you load and then unload some of the preset effects in the Spectral Transformer, it's possible for the effects to still function (to a lesser degree) even when no preset is currently loaded. Also, the Bypass buttons at the bottom of the Load Effect bins do not function completely for some presets. To completely unload these effects from the bin, you need to make any kind of change to the Analysis settings (the Power button must be off to change Analysis settings).

There are 7 effects available within the Spectral Transformer plugin. They may be selected in any order.

- **ACCUMULATOR** – sustain data across analysis windows
- **BANDSHIFT** – additive shift frequency bands
- **EXAGGERATOR** – emphasise contours of spectral envelope
- **LoHi FILTER** – filter out frequency regions
- **TRACE** – retain loudest channels, discarding the rest
- **TRANSPOSE** – pitch shifting
- **VOC-TRANSP** – transpose with formants preserved

# Alias Factor

Alias Factor is a sound mangling plug-in which emulates sampling rates.

How Alias Factor Works

Using Alias Factor

Alias Factor Controls

## How Alias Factor Works

Alias factor can emulate a range of sample rates, regardless of the current sampling rate using advanced oversampling interpolation magic. Unlike other decimators, Alias Factor uses interpolation to give you a smooth sound when sweeping the Sampling Frequency up or down. Because aliasing is an enharmonic type of distortion, there is a very clear audible pattern to "clean" aliasing versus distorted aliasing, so these interpolation magic is actually a good thing when it comes to sound.

Any frequencies higher than one-half the sampling rate, called the nyquist point, falsely appear as lower frequencies. This effect is called aliasing. The nyquist point in the spectrum is where the alias effect is mostly heard. Alias Factor has a built in resonant low pass filter. The low pass filter can be adjusted to accentuate those frequencies by cranking up the resonance. Alternatively, you can adjust the lowpass filter to eliminate frequencies above the nyquist point and lower the resonance. In that case, the aliasing approximates the sound of aliasing often found on old samplers.

Alias factor lets you go from understated aliasing, as if you were using an old classic sampler, to overly exagerated aliasing, like what you would get from a talking toy from Japan.

Using Alias Factor

Alias Factor Controls

## Using Alias Factor

The following procedures show you how to use Alias Factor:

### To Adjust the Alias Factor Knobs

Click on a knob and drag it up to move the knob clockwise or down to move it counter-clockwise.

### To Bypass Alias Factor

You can hear how your track sounds without the Alias Factor plug-in by bypassing it. To bypass, click the blue Power button at the left of the plug-in.

### To Save a Preset

1. Enter a name in the Preset field.
2. Click the Save button.

You can recall saved presets by clicking the Preset drop-down menu and selecting one from the options that appear.

How Alias Factor Works

Alias Factor Controls

## Alias Factor Controls

The following is a description of the Alias Factor controls:

### Cutoff Mode

Alias Factor has the following Cutoff modes

- Free—Filter cutoff is adjusted by itself.
- Under—Filter cutoff is just under the Nyquist point. Smooth aliasing.
- At—Filter cutoff is at the Nyquist point. Slightly rougher aliasing.
- Over—Filter cutoff is just above the Nyquist point. Much rougher aliasing.

To really exagerate aliasing, you can use the Over setting and turn up resonance. The resonant peak is actually past

the Nyquist point, so you hear the resonant peaks' mirror image as it is folded back into the range that can be reproduced, as well as the overall spectrum's mirror images as they fold all the way up.

For smooth sampler-like aliasing, you can use Under and medium low resonance.

Under, smoother aliasing, at, slightly rougher, above, much rougher.

### Sampling Frequency

Adjusts the emulated sampling rate of AliasFactor. Possible values range from 100 Hertz to 32 kHz

### Filter Cutoff

This control is only functional if the Filter Cutoff mode is set to Free. In the Free Cutoff Mode this control sets the cutoff mode of the built-in low-pass filter, which cuts frequencies above the cutoff point.

### Filter Resolution

Controls the amount of emphasis around the filter cutoff point. The higher the setting the more the filter cutoff is emphasized.

### Bit Depth

Alias factor emulates bit reduction, which increases distortion and noise as if the sound was created with the corresponding bit depth.

### Mix

Adjusts the mix between the incoming signal and the AliasFactor output.

### Level

Cut or boost the output of AliasFactor.

How Alias Factor Works

Using Alias Factor

# Project5 Arpeggiator

You can play any synth through Project5's arpeggiator to create rich tapestries of sound by a single note on your MIDI keyboard (or any MIDI instrument). Project5's arpeggiator is highly customizable. You can change the speed at which notes are played, set the octave range of the notes played and mix chords with arpeggiated notes. You can get a quick introduction to the Arpeggiator in the Tutorials chapter.

## Playing Through the Arpeggiator

Follow this procedure to use the Arpeggiator.

1. Select a track or tracks in the Track view. Make sure there is a synth assigned to the track..
2. Click the Enable button located in the upper left corner of the Arpeggiator.
3. Select a preset or adjust the arpeggiator settings. You may need to click the Show/Hide Controls button in the upper right corner to display the Arpeggiator settings.
4. Play your MIDI device. If you do not hear anything, make sure the MIDI input you are using is connected to your computer via a MIDI port and the MIDI input is assigned in the MIDI Devices dialog (select ***Options-MIDI Devices*** to open the MIDI Devices dialog).
5. Make changes to the Arpeggiator's settings as desired.

## Adjusting the Arpeggiator's Settings

Use the following procedures to change the Arpeggiator's settings.

### To Play Notes Faster or Slower

Adjusting the Rate control changes the tempo at which arpeggiated notes play. Use the following procedure to change the rate.

1. If you have not already done so, select a track, enable the Arpeggiator and show the Arpeggiator's controls.
2. Click on one of the Rate control arrows. The left arrow decreases the rate while the right arrow increases the rate.

### To Set the Octave Range for the Arpeggiator

Adjusting the Octave range increases or decreases the number of octaves represented in the arpeggiated notes. Use the following procedure to change the Octave Range.

1. If you have not already done so, select a track, enable the Arpeggiator and show the Arpeggiator's controls.
2. Click on one of the Octave Range control arrows. The left arrow decreases the range while the right arrow increases the range.

### To Mix Chords and Arpeggios

You can adjust the mix of the notes and chords you play and the arpeggiated notes that are played. The default setting plays both the held chord notes and the arpeggiated notes derived from them.

1. If you have not already done so, select a track, enable the Arpeggiator and show the Arpeggiator's controls.
2. Adjust the Hold Mix setting. At 0% you hear none of the held note. At 100% you hear none of the arpeggiated notes.

### To Make Notes Play Even After Releasing the Key

1. If you have not already done so, select a track, enable the Arpeggiator and show the Arpeggiator's controls.
2. Click the Latch button at the bottom-right of the Arpeggiator.

### To Change the Order Notes Are Played

1. If you have not already done so, select a track, enable the Arpeggiator and show the Arpeggiator's controls.
2. Select a playback option on the right side of the Arpeggiator.

# Spectral Transformer

## Getting Started

### About Spectral Transformer

Spectral Transformer is a multi-functional plug-in designed as a real-time sound modifying instrument. It has several 'tools' or functions which can be chained, so that the effect of processing is cumulative. The original functions have been developed by the internationally known composer/ programmer, Trevor Wishart, and formed part of the Composers' Desktop Project (PhaseVocoder) sound transformation software package. They have been further developed with additional functionality and made into this plug-in by Richard Dobson.

Spectral Transformer is based on the Phase Vocoder, which converts incoming audio to an overlapping series of analysis frames. Each analysis frame represents the spectrum of the sound at that moment in time. These frames are then passed through a series of transformations (effects in Spectral Transformer) before being converted back into audio. The advantage of this design, unique to Spectral Transformer, is that the expensive analysis and resynthesis is done only once: i.e., at the beginning and end of the effects chain.

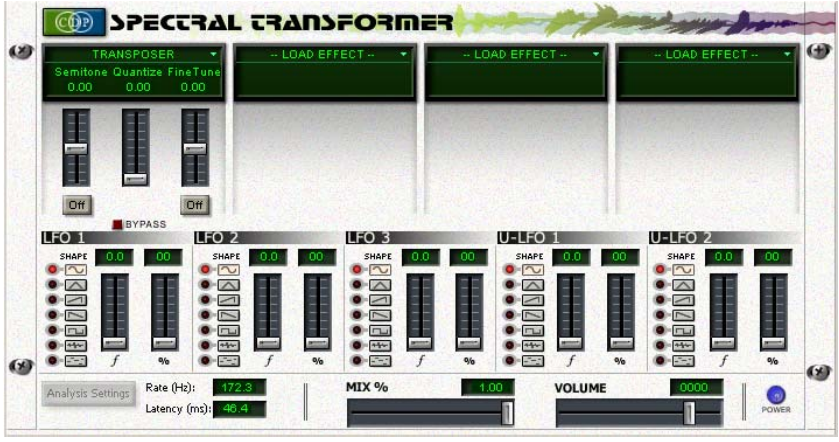
**Note**: When you load and then unload some of the preset effects in the Spectral Transformer, it's possible for the effects to still function (to a lesser degree) even when no preset is currently loaded. Also, the Bypass buttons at the bottom of the Load Effect bins do not function completely for some presets. To completely unload these effects from the bin, you need to make any kind of change to the Analysis settings (the Power button must be off to change Analysis settings).

There are 7 effects available within the Spectral Transformer plug-in. They may be selected in any order.

- **ACCUMULATOR** – sustain data across analysis windows
- **BANDSHIFT** – additive shift frequency bands (moves frequencies by adding or subtracting values to the various frequency components)**.**
- **EXAGGERATOR** – emphasise contours of spectral envelope
- **LoHi FILTER** – filter out frequency regions
- **TRACE** – retain loudest channels, discarding the rest
- **TRANSPOSE** – pitch shifting
- **VOC-TRANSP** – transpose with formants preserved

### Accessing the plug-in

Within the application, you **access the plug-in** by clicking on the AUDIO FX downward pointing list button and selecting the Spectral Transformer plug-in from the list of plug-ins. The plug-in box now displays Spectral Transformer. Double-click on this to load the plug-in. (Note that when Spectral Transformer is still enabled, you can close its window with the 'X' box in its right hand top corner, and it will still be active and responsive to the real-time parameter control buttons at the bottom right of the Project5 main window. – See Set Parameter Values.




Once the plug-in is opened, you see this screen, which is mostly blank, waiting for you to select one or other of the 6 functions provided. There are several components to take note of, most of which are discussed at greater length in separate paragraphs.

- **Load Effect** – select one of the plug-in functions; the parameter sliders for that function appear when it is selected. Clicking on this box after a plug-in function has been set clears it, ready for setting a new plug-in function.
- **Bypass** – when ticked, this turns off the plug-in; it is, in effect, a mute function.
- **Note**: When you load the Bandshift effect, the VOC-transp effect, or the Transpose effect, the Bypass buttons at the bottom of the Load Effect bins do not function completely. Also, unloading these effects from the bins does not completely bypass them. To completely unload these effects from the bin, you need to make any kind of change to the Analysis settings (Power button must be off to make changes).
- **LFO** – this box is where you select which LFO (or none) a given parameter uses
- **LFO 1 - 3** – these are the LFOs themselves, and the bar on the left contains the waveform shapes which can be selected for the LFO.
- **U-LFO 1 - 2** – these are Ultra-LFOs, with a frequency range of only 0 to 1. They are useful for achieving very controlled effects. As with the LFOs, the bar on the left contains the available waveform shapes.
- **LFO frequency** – the number of times per second the LFO waveform repeats its cycle.
- **LFO%** – the amount the plug-in function's parameter values are displaced, as a percentage of the full range available.

- Analysis Settings – fine tune the FFT analysis to achieve best results with a particular sound, and minimum latency.
- Rate (Hz) – display informing you about the analysis rate, i.e., how many frames per second the analysis is creating. This is an indication of what the CPU load will be, i.e., what proportion of its processing capacity will be used. If too high, you can adjust the analysis settings to reduce the load. The analysis rate is calculated as the sample rate divided by the FFT overlap (in number of samples).
- latency – this displays the time in milliseconds between playback of the sound going into the plug-in and the processed sound coming out of the plug-in. Values > 20ms may produce an audible delay. The analysis settings can be adjusted to reduce latency. The key factors which affect latency are FFT size * Window size, higher values meaning more latency.
- **Mix** – this slider is controlling the balance between the presence of the original sound input to the plug-in and the sound after the plug-in has done its work.
- **Volume** – this slider adjusts the volume of the plug-in that is sent to the soundcard. It is a gain control working on the analysis data, primarily to prevent clipping.
- **Power** – turn on Spectral Transformer by clicking on this button.

### Presets

The standard DXi Preset mechanism operates from within Project5 for all the plug-ins. When used for Spectral Transformer, a preset saves all the settings which have been made to create an effect, including all parameter values and chained effects. When loaded, all settings are restored and the effect is ready to run.

**Save Spectral Transformer Preset**—Enter a name for the preset and click on the Disk icon to save a preset. This saves which effects are selected, the user parameter settings, LFO assignments and slider settings, volume and mix settings. The analysis settings are NOT saved.

**Load Spectral Transformer Preset**—Select a previously saved Spectral Transformer Preset from the list shown by clicking on the down arrow to the right of the list box. When you click on the name, Spectral Transformer is immediately reconfigured with the saved settings.

**Delete a Spectral Transformer Preset**—Select the preset to be deleted and click on the Delete icon to delete a preset from the list of saved presets. The preset currently displayed in the list box is deleted.

### Audio

As with any plug-in, Spectral Transformer processes the audio stream supplied by the plug-in host. Project5 is a real-time synthesis instrument, with effects processing. A passage of music will usually be created with one of the software synthesisers available, and the audio stream generated is then modified by one or other of the plug-in effects.

**Spectral Transformer operates on both mono and stereo input, but its output is always mono.**

### Power

When the **Power** button is pressed, it changes color and Spectral Transformer is active. When you click on it again, Spectral Transformer is disabled and processing stops. The Analysis Settings can be altered *only* when processing is disabled, when **Power** is inactive.

### Volume slider

The **volume slider** on the bottom right hand of the plug-in enables you to adjust the gain on the analysis data. It is important to realise what this means. The whole Spectral Transformer processing chain takes place in between analysing the incoming audio signal and resynthesising an audio signal. Thus the operation of the volume slider is taking place *within* the processing loop. Any overload which

might occur during processing can therefore be removed effectively and safely by reducing the amplitude of the analysis data before the audio signal is resynthesised. **NB -** Some effects can *remove* a lot of the energy in the signal, so the **volume slider** can also be used to boost the signal by up to 12 dB.

### Mix Slider

A very powerful feature of Spectral Transformer, the **mix slider** moves between 'Wet' on the right to 'Dry' on the left. This is controlling the balance between the presence of the original sound input to the plug-in and the sound after the plug-in has done its work. The 'dry' end favours the original sound, the 'wet' end the transformed sound. When using TRANSPOSER, for example, with the Mix Slider set somewhere in the mid-range, you will hear both the original sound at its original pitch and the transformed sound at its new pitch: i.e., **both pitches at once**. If there is some 'latency' (i.e., the transformed sound is a little late), a lower FFT size and Overlap can be set in Analysis Settings – turn off the plug-in to access these settings (click on the **Power** button).

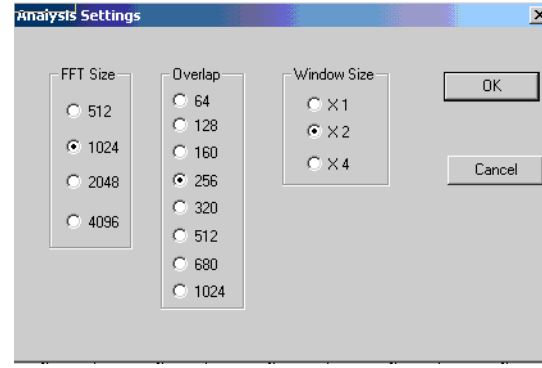
### Analysis Settings

These settings can only be accessed when the Spectral Transformer plug-in is turned off (**Power** is off). This plug-in operates in the spectral domain, meaning that it manipulates what is known as analysis data. Normally, a sound is represented as a series of samples. Each sample has two data items: an *amplitude* and a *time*. This is the 'time domain' and changes made in this domain can, therefore, adjust the amplitude or the time data items.

The 'spectral domain' also has two data items: *frequency* and *amplitude*, and this is derived from the sample data by means of a nifty mathematical manouevre known as a Fast Fourier Transform (FFT). Thus it is directly concerned with which frequencies are present at any given moment in time (they are always changing) and how loud each of them is.

Note that time is not represented here – time is represented by the regular stream of frames.

There are three ways in which we can fine-tune this FFT analysis process, and in considering what they are, we get a reasonably clear picture of what the analysis is doing.




- FFT size – The FFT analysis works on incoming samples in groups. FFT size is the number of samples in each group used to make each analysis frame. The larger the group, the better the frequency resolution is. However, the larger number of samples also means a longer chunk of time, so time resolution is coarsened. Thus there is a frequency - time trade-off. Higher values for FFT size improves pitch tracking, and therefore transposition accuracy.
- FFT Overlap – The analysis overlaps frames so that it produces smoother results. The overlap is given in number of samples from the start of the previous frame, so smaller values mean more overlap. The FFT size divided by the number of overlap samples gives the overlap factor, which is normally kept at 4. E.g., 1024 ÷ 256 = 4, 2048 ÷ 512 = 4. Making the overlap tighter than this will increase the CPU load. The main reason for doing so would be to improve

quality in extreme transpositions.

- Window size – This is a multiple of FFT size. Normally set to 2, it can be set to 1 in order to reduce latency. This will, however, reduce frequency resolution and increase time resolution – but this also means more frames per analysis, more data and higher CPU load.

**3 Rules of Thumb** provide guidelines for adjusting the above settings:

**Audio quality** – Audio quality is enhanced with **larger FFT sizes and small overlaps**.

Latency – FFT size * Window size is the main factor in determining latency, higher values causing more latency. E.g., 1024 * 2 = 2048 (samples in an analysis frame), 2048 * 4 = 8192 (samples in an analysis frame). **Use low values for low latency.**

**CPU load** – The analysis rate is the number of frames to process per second. It is calculated by dividing the number of overlap samples into the sample rate: e.g., 44100 ÷ 256 = 172 frames per second. **The higher the rate, the higher the CPU load.**

**Recommended settings:**

- most situations: 1024 - 256 - 2 (current default for low CPU load, but not lowest latency)
- high resolution pitch transposition: 2048 - 320 - 1, especially if transposing up more than 7 semitones.
- drum sounds: 512 - 64 - 1 (Smearing on drum sounds with the phase vocoder is a classic problem. This very small window, low latency setting gives the best results.)
- good quality pitch transposition while retaining a lower latency: 1024 - 160 - 1, a good high quality setting, e.g., for transposition up an octave without increasing latency too much.

### Select an Effect: ~ LOAD EFFECT ~ (1 - 4)

Any one of the 7 component plug-in functions can be selected in each of these four slots. When selected, its parameter sliders appear. When more than one is selected, the program processes the sound from left to right. The open architecture allows you to select any plug-in function in any of the slots, thus changing the way one plug-in function feeds into another. Plug-ins may be changed while the audio is running.

### Bypass this effect

When this box is clicked On, the operation of the associated effect is bypassed. Clicking Bypass to Off reactivates the effect with the current parameter settings. You will find that this does not cause clicks or interrupt the audio. Spectral Transformer is designed to maintain a continuous glitch-free signal despite possibly extreme transformations. This can however sometimes lead to unexpected artifacts.

Side effects of frequency modifications.

In most cases, bypassing an effect fully removes its effect on the signal through the plug-in. However, due to the nature of the phase vocoder, effects that modify the frequency information (i.e. TRANSPOSE, VOC-TRANSP and BANDSHIFT) can introduce phase smearing artefacts (most noticeable with highly transient sounds such as drums - see "Recommended Settings" above) which will persist even after the effect is removed or bypassed. Sometimes, of course, this is exactly what the user wants!

To clear such smearing effects, you need to turn Spectral Transformer off using the Power button, and change the analysis Settings (leaving them unchanged and clicking OK is not sufficient). This will cause the phase vocoder to be reset to its startup state. Spectral Transformer does not do this automatically each time a frequency-oriented effect is unloaded or bypassed, as to do so would inevitably result in a bad interruption to the audio.

### Set Parameter Values

When a plug-in function is selected, its parameter slider(s) appear. By moving the sliders the parameter value is set. Because this is a real-time plug-in, you will hear it sound change as the parameter values are altered. These manual slider movements can also be recorded, i.e., 'automated' within the Project5 host.

**NB: Any parameter can be accessed and altered with special controls at the bottom of the screen.** This facility is supplied so that the parameters can be adjusted in real-time even when the plug-in window is closed (the plug-in will still be active). The four controls supplied are set by accessing the list of parameters with the right mouse button and selecting the parameter with the left button. The parameter selected (including Enabled, Volume and Mix) is now shown in the control and you can now click on the control with the left mouse button, continue holding it down and move the mouse vertically up and down. The parameter values now change in real time.

### Parameter adjustment from the keyboard.

All Spectral Transformer parameters can changed under keyboard control, in the usual Windows way, using the Tab, space bar, Home/End, Page Up/Down, and the arrow keys. In the case of the slider controls, the arrow keys enable finer adjustment of parameters than can be done moving the sliders directly.

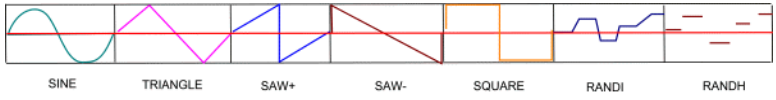
### LFO: Low Frequency Oscillator

This is a relatively slow, repeating waveform, though higher values speed it up considerably. Connected to a given parameter, it cycles through parameter values according to the shape of the waveform. The frequency slider controls numbers of oscillations per second. An oscillation is a movement through the whole waveform.

A parameter can be connected with an LFO, providing a shaped alteration of parameter values. The % slider controls the range of values affected, i.e., the width of the LFO movement: a low %age uses only a few adjacent values (narrow band), whereas a high %age uses many (wide band).

How the LFO is affecting the parameter to which it is connected, and therefore the resulting sound, can best be observed by selecting a *low frequency* (slow speed) with a *high % age* (wide value band).

**LFO waveform options** – there are 7 waveform shapes which can be selected for use in the LFO operators. The waveform is the contour shape that the oscillator will follow. The box immediately below each operator has 'SINE' by default. When you move the little horizontal slider below this box, you move through a list of all the waveforms available:




It is useful to imagine a pitch moving along the trajectory contour of these shapes. This provides a mental/aural image of the way the values will change – with the understanding that these value changes often affect parameters which do not involve pitch. In general, what they do is alter the value of the parameter to which they are attached, increasing and decreasing these values *according to the pattern of the waveform selected*. **These shapes have been chosen with their aural characteristics in mind, becoming sharper and more discrete (less continuous) as you move from SINE to RANDH.** Let us therefore look at each of them more closely.

**SINE** – for continuous, smooth, sinuous motion

**TRIANGLE** – sharp peaks, more edgy

**SAWTOOTH+** – smooth ascending motion

**SAWTOOTH-** – smooth descending motion

**SQUARE** – the two 'hold' areas at top and bottom have the potential to become separate pitches, and the sharpness of the changes gives it a strong, usually buzzing character

**RANDI** – random changes of pitch level, with interpolation in between, i.e., they are joined up by glissandi

**RANDH** – random changes of pitch level which are not joined up, i.e., they are 'discrete', heard as separate pitches. This is a 'sample-hold' effect.

Whatever the parameter, these shapes produce similar results: smoother and softer at the start of the list (1 & 2), becoming sharper (3, 4, 5) and then separate pitch levels, joined up (6) and discrete (7). Thus, the order of these LFO shapes provide an important indication about how to use them.

The two **Ultra Low Frequency Operators** work in the same way as the LFOs, but with a very restricted frequency range (0 - 1) to make it possible to introduce extremely slowly moving changes.

**OFF** – this box appears under each parameter. When you click on the box, you see a list of 3 LFOs and 2 U-LFOs, beginning with OFF. This means that you can **connect this parameter** under which the box appears to one of the LFO or U-LFO operators below. Again, the LFOs and U-LFOs can be *freely assigned* to any parameter, and multiple parameters can access the same LFO.

**LFO frequency** – this is the number of times per second at which the LFO oscillates. With some parameters, the perception of this movement is quite subtle, at other times it is quite dramatic.

**LFO% of range** – this is how the LFO relates to the parameter values which it is controlling. Each parameter has a valid range of values. When the LFO is able to make use of this full range of values, it is operating at 100%. When it is using only a few of the values, it is operating at only a few %. **Thus the LFO *displaces* the parameter values up and down around its current parameter setting.**

### Chain plug-in effects

The plug-in functions can be chained in any order. Signal processing moves from left to right along the 4 effects slots. This is one of the most flexible and powerful features of Spectral Transformer, making possible endless combinations of effects.

### Automation

Automation, the recording of parameter value changes, storing them and playing them back, is part of the overall host (Project5) functionality. All Spectral Transformer parameters, including which (changing) effect is in which slot and which (changing) LFO waveform is selected can be automated. The Analysis settings are NOT saved with the Presets and cannot be automated: Spectral Transformer must be disabled – processing stopped by unticking the **Enable** box – in order to change the Analysis Settings.

## Effects

Spectral Transformer Sound Effect Toolbox, Quick Reference:

| Plug-in Effect & Parameters | Role |
|---|---|

| | | | |
|---|---|---|---|
| TRANSPOSER<br>• semitones – 12th part of an octave in equal temperament. Range: 24 semitones: 1 octave higher to 1 octave lower than the central 0.00 setting (no transposition).<br>• quantize – set size of microtonal step: 0,.25,.50 or.75 of a semitone<br>• fine tune – adjust microtonal portion of transposition: any value between 0.00 to 1.00 (of a semitone) | Continuous pitch shift, moving through the 100 microtonal divisions ('cents')<br>• the *semitones* slider now moves in *quantize* steps<br>• further adjust the microtonal transposition step (adds this decimal value to the *quantize* value)<br>• TRANSPOSE Terrain Map | ACCUMULATOR<br>• glissando – changes the speed of an internal pitch slide (glissando). Range: 2 to -2, with the central 0.00 position for no glissando.<br>• decay – spectral reverb. Range: 0.00 (no reverb effect) to 1.00 (maximum reverb).<br>• *slope* – speeds up the decay rate. Range: 0.00 (max reverb effect) to 1.00 (no reverb). | Overall: smooths out a sound. Tiny values such as -0.07 give a slow pitch bend, while higher values such as 1.8 give a wavering, fluttering, trembling effect. Best heard with short sounds.<br>• *Decay* produces a reverberation effect which increases the smoothing effect while adding illusions of increasingly large spaces.<br>• The *decay* parameter can be so effective that the reverb effect becomes hard to control. *Slope* introduces more control by enabling you to increase the rate of decay, thus reducing the amount of reverberation.<br>• ACCUMULATOR Terrain Map |
| VOC-TRANSP<br>• The parameters are the same as for TRANSPOSE | This is a different transposition method that involves formants. It is better at retaining the tonal characteristics of voices and can have an interesting effect on instrumental sounds. Note that it also increases the CPU load because of the extra formants processing. | | |

EXAGGERAT0R

*emphasis* – alters the frequency focus of loud partials. Range: -1 to 4, with 0.00 giving no change.

< 0 makes the peaks steeper, which brings out the high frequencies, acting rather like a resonant filter. > 0 makes the peaks broader, thus encompassing more of the surrounding region and bringing out noise elements. EXAGGERATOR Terrain Map

LoHi FILTER

- *LF Cut* – remove frequencies **below** the frequency selected on the slider
- *HF Cut* – remove frequencies **above** the frequency selected on the slider

- as slider rises: low part removed, high part retained (thin & bright)
- as slider descends: high part removed, low part retained (becomes soft and muffled)
- the area between the sliders is a retained frequency band
- LoHi FILTER Terrain Map

TRACE

*components* – number of loudest channels to retain. Range: 1 to 100

Higher values leave much of the sound, but it may sound cleaner'. Very low values (< 10) reduce the sound to a mere 'trace' of its former self. TRACE Terrain Map

BANDSHIFT EFFECT (BSHIFT)

- *Low Freq* – set lower frequency limit for the band to be affected
- *Hi Freq* – set upper frequency limit for the band to be affected
- *Amount* – number of Hz to add to (or subtract from) each partial in the selected frequency band

- As amount increases, higher and higher frequencies are added, thus moving the whole band higher (up to 1000 Hz).
- As amount decreases, lower and lower frequencies are subtracted, thus moving the whole band lower (down to -1000 Hz).
- How much this affects the sound partly depends where the strongest frequencies are located: you can select a frequency band which has few frequencies, or frequencies of low amplitude, so very little change will be heard. Fortunately, it is easy with a real-time instrument such as this to move the band up and down until the best frequency region is found.
- BANDSHIFT Terrain Map

### Introduction to the Spectral Transformer Functions

Spectral Transformer is designed as a real-time instrument for transforming sounds in a number of ways.

- The TRANSPOSER effect is perhaps the primary effect, producing major tonal changes by raising or lowering the pitch of the input sound. Higher produces a slightly thinner, reedy sound, and lower produces a somewhat thicker, richer sound – but not at all as much as happens in the time domain. TRANSPOSE spectral domain continuous or stepped real-time pitch shift (transposition).
- The VOC-TRANSP effect has the same functionality as TRANSPOSE, but carries out the transposition using a different method in order to preserve the tonal characteristics of voices. It does this by determining where the formants are located – the regions of resonant frequencies – and keeping them at the same frequency location while the rest of the sound transposes around them.
- The ACCUMULATOR effect holds data over from previous windows. Along with glissando and delay controls, it introduces a pitch sliding motion (pitch bends) and reverberation effects.
- The EXAGGERATOR effect cranks up (or down) the peaks and troughs of the spectral envelope. This is dealing with *frequency content*, so moving the *emphasis* parameter brings out the high frequencies (thin, bright, metallic ...), and moving it lower brings out the low frequencies (thick, deep, muffled ...).
- The LoHi FILTER effect removes frequencies above or below specified frequency levels. It therefore constrains the operation of the other effects to specific parts (bands) of the sound.
- The TRACE effect deals with channels, retaining a specified number of the channels containing the loudest partials. As the number of channels is reduced, the sound becomes thinner and thinner, until only a 'trace' of its former self remains.
- The BANDSHIFT effect moves frequencies by adding or subtracting the same value to the various frequency components, i.e., a linear shift, as opposed to the logarithmic shifting of pitches used for pitch transposition.

These various effects need not be used only separately. Up to 4 can be combined at once by setting the 4 plug-in slots to their own effect, and the same effect can be placed in more than one slot, for example to transpose a transposition effect in another way. The flexibility of chaining effects in this way leads to innumerable combinations, giving a great deal of scope for exciting voyages of discovery.

In a section devoted to combinations, a few generic possibilities are described.

### Exploration Maps

Explorers usually start off with a map, using it to find what's known already, and then keep looking, eventually creating their own map. Sound explorers are no exception. The general idea in both cases is to 'map out the terrain': to find natural boundaries, the edges, the extremes. The rest will be somewhere in the middle.

In the examples which follow, this is the approach taken: to find settings which mark out clear differences and reveal the extreme edges of the possibilities on offer. The rest will be somewhere in the middle – and the rest can be fine-tuned to the $n^{th}$ degree. The possible combinations of parameters, LFO settings and chained plug-in effects runs into the thousands, so exploration is the name of the game. The **terrain maps** are provided as a guide to possibilities, not a comprehensive list!

The other important aspect of terrain maps is that the nature of the input sound greatly influences the results. We can identify four basic types of sound:

1. timbrally rich, where the partial content, the spectrum, is complex and constantly changing
2. transient, where the sounds are short, such as drum loops
3. sustained, where the sound remains pretty much in a steady state
4. melodic, where there is a series of pitches of relatively short duration

For example, the ACCUMULATOR will have little effect on sustained sounds: it holds over the data in analysis windows, and as this doesn't change very much in a sustained sound, very little change is perceived.

## TRANSPOSER EFFECT

### TRANSPOSER & VOC-TRANSP: General Introduction

Transposition is one of the easiest ways to alter the tonal characteristics of a sound. The Spectral Transformer function transposes and alters the tone *without changing the duration*. This means that its durational, rhythmic and tonal features do not go askew when the transpositions are made. Transposition of voices is even more accurate with VOC-TRANSP because the formants are preserved. (Other than the difference in transposition method, the two transpose effects work in exactly the same way.)

Automation introduces glissandi (sliding pitches) into the sound. This usually makes the original sound somewhat unrecognisable, and the idea and shapes of the slides becomes important. Using the LFO can have a similar affect, with the LFO wave type influencing the nature of the changing pattern. However, the *quantize* parameter causes the settings of the *semitone* parameter to move in partial or full semitone steps, possibly further fine-tuned with *fine-tune*.

The Analysis Settings of 1024 FFT size and 256 Overlap should be OK for most sounds, but for drum sounds, the smallest settings should be used in order to avoid smearing the precise attacks, i.e., 512 FFT size, 64 (or 128) Overlap and 1 for window size.

VOC-TRANSP: Some amplitude overload may result when using VOC-TRANSP. Formants are being preserved, and formants are by definition regions of relatively high amplitude. When a frequency region of the sound being processed is already high and it ends up being moved into a formant region, the amplitudes are summed and overload may occur. **This may be controlled by lowering the** Volume slider, which is adjusting the gain of the *analysis* amplitude, not the audio signal: it is acting on the analysis data prior to resynthesis.

VOC-TRANSP formant preservation really only has an effect with *upward pitch shift*. Any audio changes with downward pitch shift are negligible.

### TRANSPOSE Terrain Map

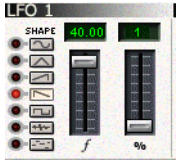
We can map out the terrain that TRANSPOSE occupies by looking at 8 different settings. In the first 7, both *quantize* and *fine-tune* are set to zero. In the 8$^{th}$ we observe the

transposition in fixed steps that these additional parameters enable.

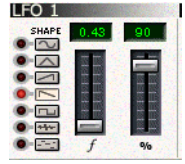

**Ex 1.** *Semitones* = 0 – no change to the original input sound


**Ex 2.** *Semitones* = 12 – highest position: higher and thinner

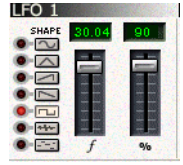

**Ex 3.** *Semitones* = -12 – lowest position: lower and deeper



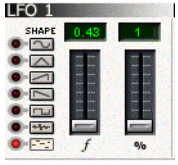

**Ex 4.** *Semitones* = any value; LFO wave = SAW-, *frequency* = 40 (very high),% = 1 (very low) – rapid fluctuations focus around a very tight transposition movement. With SAW- we hear these rapid, focused, fluctuations gliding downwards, and then repeating.



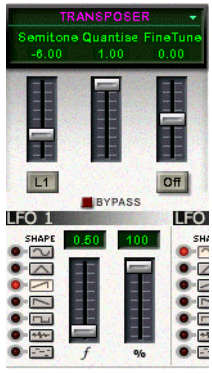

**Ex 5.** *Semitones* = any value; LFO wave = SAW-, *frequency* = 0.43 (very low),% = 90 (very high) – a very slow fluctuation is applied to a very wide transposition movement, producing big pitch slides, with SAW- producing additional slow downward glides.




**Ex 6.** *Semitones* = any value; LFO wave = SQR, *frequency* = 30.04 (high),% = 90 (very high) – rapid fluctuations are applied to a very wide transposition movement, producing a rough fluttering, with SQR producing a double pitch (obscured by the rough fluttering).




**Ex 7.** *Semitones* = any value; LFO wave = RANDH, *frequency* = 0.43 (very low),% = 1 (very low) – slow fluctuations are applied to a very tight transposition movement, with RANDH producing randomly placed discrete transposed tones.




**Ex 8.** *Semitones* = any value; *quantize* = 1.00 (full semitone steps); *fine-tune* = 0.00. LFO wave = SAW+, *frequency* = 0.50 (very low),% = 100 (full range) – slow upward transposition that moves in clearly audible fixed semitone steps. *quantize* can be used simply to move the slider to the desired value more easily, but when used together with the LFO function, stepped glissandi result. *Fine-tune* can be used to add additional microtonal values (anything from .01 to 1.00) to the step set with *quantize*

One more observation about TRANSPOSER: the MIX function makes it possible to create double notes (dyad chords). When MIX is set at about 1/3$^{rd}$ to ½ from the bottom position, the original (non-transposed) sound is heard at the same time as the transposed sound, thus producing two pitch levels at the same time. As the *semitones* slider is moved, you can hear this interval expand and contract! Adding in the LFO SQUARE waveform and a controlled use of the ACCUMULATOR can enhance this effect.

## ACCUMULATOR EFFECT

### ACCUMULATOR: General Introduction

The ACCUMULATOR effect retains data across analysis windows. We can perhaps visualise this to be like a shadow falling across a picket fence, making the individual slats seem to merge. Thus it has a smoothing effect, which is done by means of pitch slide (*glissando*) and a reverberation effect (*delay*).

The *slope* parameter can be used to control the amount of reverberation that takes place. At the 0.00 setting, the *delay* parameter is given full scope. At the 1.00 setting, the rate of decay is increased so much that there is virtually no reverberation remaining. This enables you to put on precisely the amount of reverberation that seems right.

While the ACCUMULATOR effects are interesting in themselves, they really come into their own when used in combination with the other effects.

### ACCUMULATOR Terrain Map

When we begin to map out the terrain for ACCUMULATOR, it is useful to start with the minimum settings and then move to the outer extremes. Slope is kept at 0.00 for these examples so that the full effect of decay is illustrated.

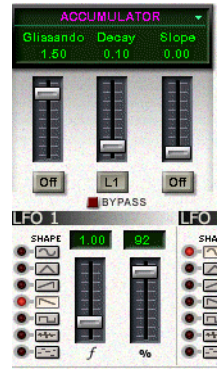
As slope is moved upwards towards 1.00, the reverberation caused by decay is reduced.


**Ex 1.** *glissando* = -0.07, *decay* = 0.20 – tight, reverberant effect, like early reflections


**Ex 2.** *glissando* = -0.07 *decay* = 0.90 – a very slow pitch slide with a great deal of reverberation, causing multiple overlapping glides


**Ex 3.** *glissando* = 2.00 *decay* = 0.10 – the high *glissando* setting produces a wavering, trembling effect, which remains reasonably audible because the *decay* is minimal.


**Ex 4.** *glissando* = 1.50 *decay* = 0.88 – here the wavering effect is increased by a long reverberation effect, producing a fluid, watery feel.




**Ex 5.** *glissando* = 1.50 *decay* = 0.10, LFO connected to *decay*, with SAW- *freq* = 1,% = 92 – additional fluctuations are introduced as the LFO affects the *decay* time. The glissandi (pitch bends) are most clearly heard at the end of short sounds.

## EXAGGERATOR EFFECT

### EXAGGERATOR: General Introduction

EXAGGERATOR can be compared with two different types of mountain range.

- In the first, the peaks are narrow and tall, with precipitous slopes and deep valleys in between.
- In the second, the peaks are broader, even if equally tall, with more gradual slopes which don't go so deep.

In EXAGGERATOR we are dealing with partials, the *frequency content* of the sound, which is what causes tone color, such as 'tinny' or 'warm'. (The words don't exist to

describe all the different tone colors – we just have to listen, feel and remember). The frequency content is a vertical layer-cake of slow to fast vibrations, and each of these vibrations has an amplitude, a loudness. If we turn this layer-cake on its side (through 90°), we have the vibrations going from slow on the left to fast on the right, and the loudness bar of each rising vertically to different heights, making a contour that looks like the top edge of a mountain range.

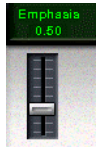
Thus in EXAGGERATOR we have two basic situations:

- In the first, the frequency loudness peaks are narrow and tall, with precipitous and deep valleys in between. This means that the areas of frequency are loud, tightly focused, and have little in between. It is no surprise, then, that we hear these focused frequency areas as a group of pitches, and whatever else may be in the sound is significantly reduced: we hear the sound as a high and bright colored harmony. The result is similar to that of a resonant filter, but here the process acts on the existing frequency loudness pattern, whereas in the filter one selects the precise frequency areas to alter.
- In the second, the peaks are broader, even if equally tall, with more gradual slopes which don't go so deep. This means that much more of the original sound is included, and at the lower parameter values, the broadening frequency ranges produces fuzziness.

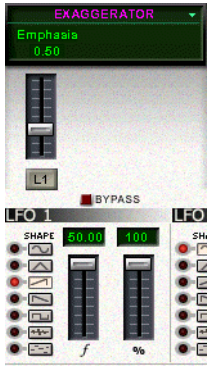
### EXAGGERATOR Terrain Map

The map of the EXAGGERATOR terrain can therefore begin with these two situations, and then ring some more changes to outline other extremes.


**Ex 1.** *emphasis* = 3.00 – the high *emphasis* value narrows the peaks: the sound is cleaner, focused in on tight, resonant pitches




**Ex 2.** *emphasis* = 0.50 – the low *emphasis* value broadens the peaks: now we hear a fuzzy, noisy quality




**Ex 3.** *emphasis* = 0.50, LFO with SAW+, *Freq* = 50.00 and% = 100 – the fuzziness is reduced, and there is a rapid fluctuation on the sound as the rising sawtooth pattern repeats, changing the *emphasis* value so rapidly that we hear it as a fluctuation. But if we move the LFO frequency down to e.g., 1.00, we clearly hear the sound swinging from fuzzy to resonant twice a second (both the positive peak and negative trough of the waveform take place each second). Slower still, e.g., *freq* = 0.54, and we really hear the transition from fuzzy to resonant.

The main sound transformation that EXAGGERATOR performs, then, is the movement from resonant pitches to fuzzy noise. The LFO at a slow frequency value and a high % (= wide *emphasis* range) really makes this clear, but at higher frequency values, the sound begins to warble. The warbling becomes clear and bird-like when the *emphasis* parameter is also at a high value.

## LoHi FILTER EFFECT

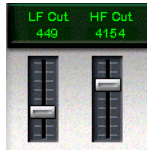
### LoHi FILTER: General Introduction

To filter is to remove part of, and LoHi FILTER removes all the frequencies **below** a specified frequency (*LF Cut*) and all the frequencies **above** a specified frequency (*HF Cut*), leaving a band of frequencies in between. It makes a sloping cut at the specified points so that it is not too abrupt and the remaining band has edges that sound natural. This slope can be adjusted to include less or more of the neighboring frequencies.

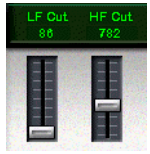
This is a fairly straightforward effect and easy to map out, though it does take a bit of pro-active visualising to imagine how the slider movements are affecting the sound, so that you understand what it is that you are hearing. This is especially true when *LF Cut* slider is higher than the *HF Cut*.

### LoHi FILTER Terrain Map

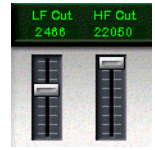
So let's look at the LoHi FILTER terrain.



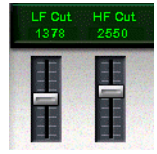

**Ex 1.** *LF Cut* = 449.60, *HF Cut* = 4154.59 – the outer frequency edges of the sound (below LF and above HF) are trimmed only a little bit – it still sounds very much like the original.




**Ex 2.** *LF Cut* = 86.13, *HF Cut* = 782.80 – now nothing at the bottom of the sound is cut, but everything above 782.80 Hz is removed. Thus the only the low frequencies of the sound are allowed through (= 'Low Pass'), and we hear a very soft and muffled version of the original.




**Ex 3.** *LF Cut* = 2466.91, *HF Cut* = 22050 – nothing at the top of the sound is but, but everything below 2466.91 Hz is removed. Thus only the high frequencies of the sound are allowed through (= 'High Pass'), and we hear a very thin and reedy version of the original.




**Ex 4.** *LF Cut* = 1378.13, *HF Cut* = 2550.37 – only the frequencies between 1378.13 and 2550.37 remain, and the original sound is as if squeezing through a tight space.

This spectral realisation of Low Pass, High Pass and Band Pass filtering is very effective. In itself, it is a common enough effect, but here it can be used in combination with the other Spectral Transformer effects to make their effects more precise.

## TRACE EFFECT

### TRACE: General Introduction

The word 'trace' is meant to indicate outlining something, or reducing to a faint shadow of its former self. The TRACE effect does this by examining the analysis data to find out which channels (bands of frequencies) have the loudest partials. It then retains only the user-specified *components* number of the loudest channels, eliminating all the others.

A surprising amount of data is contained in only a few channels. The highest value of *components* is 100 channels, which is only 1/10$^{th}$ of e.g., 1024 analysis channels.

When this highest value is used, we still hear most of the sound, perhaps 'cleaner' because some of the fuzz has gone. It is only when the number of *components* becomes quite small, e.g., <10, that we begin to feel that the original sound is being 'outlined', reduced to gentle, clear bubbling effect. The soft edges of the bubbling come from smoothing over the gaps left by eliminated material.

### TRACE Terrain Map

The terrain map for TRACE is therefore reasonably straightforward. It can be interesting to play with the region in which the original sound begins to lose its recognisability.


**Ex 1.** *components* = 100 – the result is pretty much like the original sound, even though only 100 of the loudest channels (out of 1024) are retained. There must be some loss, however, and in some cases it effectively cleans out some of the noise in a sound.


**Ex 2.** *components* = 1.00 – With only the one loudest channel retained, it is wonder that we hear anything at all. What we do hear is a thin, warbling, with some of the warbling effect being an artefact caused by interpolating across so much empty frequency space.


**Ex 3.** *components* = 20.00 – At this setting, some of the sound appears to remain fairly normal, while other parts are considerably reduced. These other parts will have had a richer and more varied frequency content and therefore will have lost more in the reduction to the 20 loudest channels.


**Ex 4.** *components* = 7.00 – Now the sound is much reduced and recognisablity is diminished, but there is still some balance between hearing the original and hearing the warbling trace of the original.

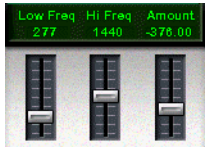
TRACE is a simple enough process, but extremely useful in isolating key components of the sound, whether at the extremes or striking a balance of sonic material in the mid-range of the component parameter. The range of possibilities is enormously extended when used in combination with other Spectral Transformer effects, especially the ACCUMULATOR.

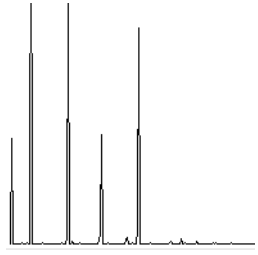
## BANDSHIFT EFFECT

### BANDSHIFT (BSHIFT): General Introduction

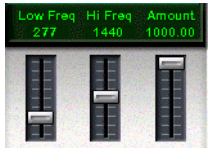
With BANDSHIFT, you can define a band of frequencies with lower and upper frequency limits, as with LoHi FILTER. However, what happens to the band is completely different. Instead of removing frequencies below and above the limits, BANDSHIFT adds frequencies to or subtracts frequencies from those within the band.

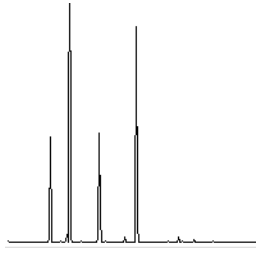
**BANDSHIFT Terrain Map**
The terrain map for BANDSHIFT, using a bell-like sound as input.



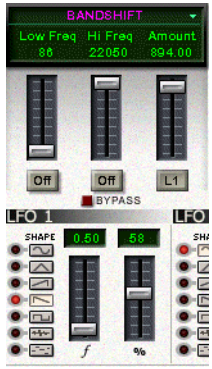



**Ex 1.** *Low Freq* = 277.53, *Hi Freq* = 1440.64, *Amount* = -376 – This band contains the main part of this sound, and we hear that it is now deeper and richer. The snapshot of the frequencies show them moved from their original position to locations further left, i.e., lower.



**Ex 2.** *Low Freq* = 277.53, *Hi Freq* = 1440.64, *Amount* = 1000 – Using the same band, we hear that it is now much higher and brighter. The snapshot of the frequencies show them moved from their original position to locations further right and compressed, i.e., higher and closer together.




**Ex 3.** *Low Freq* = 86.13, *Hi Freq* = 22050, *Amount* = 894, LFO = SAW- (downward sweep), with *frequency* = 0.50 (very slow) and % = 58 – The band specified encompases just about the whole sound. The slow LFO swings through 58% of the possible *amount*, around the fairly high *amount* setting of 894 Hz. We hear a slow downward glissando effect that will in many cases overlap and phase against the input sound.

The BANDSHIFT effect most noticeably alters pitched sounds, i.e., with mostly harmonic partials. The BANDSHIFT effect, because it is adding or subtracting frequencies, will change these to inharmonic partials. Thus the clear, focused, sound becomes more diffuse, with several different, rather than one clear partial vying for attention.

Addition makes the frequencies faster and compresses the proportional relationship of the partials, making the sound brighter or even metallic. Subtraction makes the frequencies slower and expands the proportional relationship of the partials, making the sound richer and warmer.

### Spectral Transformer Presets: Emphasising Combinations of Effects

The real power of Spectral Transformer lies in creating combinations. These can be used both to fine-tune and to generate quite mad textures.

The effects can be combined with LFO and/or U-LFO operators and effects can also be chained, the processing moving from left to right across the various plug-in effects selected. The same effect can be repeated in more than one slot. Because of the architecture of the plug-in, even outrageous combinations can be set up with, in most cases, very little change to CPU load.

The following list of presets, created by plug-in author Richard Dobson, should help to get a feel for how to make combinations to achieve many different types of effects.

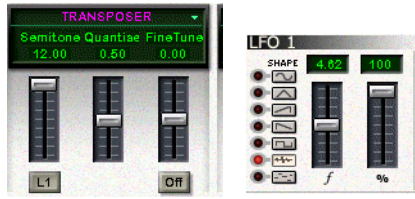
You are recommended to try out these presets with a variety of sounds: pitched, percussive and complex sounds with noise elements.

## BassLift


**Key Features:**

- A band within the main part of the sound is selected, i.e., not its overtones, and is raised a small *Amount*: 70 out of 1000
- U-LFO 1 is connected to the *Amount* parameter and then increases ('lifts') the band higher (only 15%) over 0.4 sec.
- Thus the U-LFO is used to create this slow, controlled sense of lift.

## BirdSong




**Key Features:**

- The original sound (use a complex source sound) is raised an octave with TRANSPOSER (*Semitones* = 12).
- Then a modest flutter is put onto this by connecting *Semitones* to LFO 1, oscillating 4.62 times a second over 100% of the transposition range (i.e., an octave above and below the 12 semitones higher *Semitones* setting). The RANDI (interpolating random) waveform is used, to create sliding effects between different, randomly chosen, pitch levels. *Quantize* is set at 0.50 to provide a little more regularity in the pitch levels.
- This somewhat wild texture is then put through TRACE, with only 1 bin retained.
- It is the combination of RANDI and TRACE which mainly produces the ever-changing warbles and slides. The speed of the warbles is effectively altered with the LFO 1 *frequency* slider.

## ColorHarmoniz


**Key Features:**

- The very tiny *Decay* (0.06) introduces a little reverb, which is constrained by the mid-range *Slope* (0.54), Try pushing *Decay* up and/or *Slope* down to see how different this could be.
- The fairly high LFO 1 frequency (36.12) should create some pitch vibrato because it is connected to the main pitch transpose parameter, *Semitones*. This is fairly tightly constrained by the 18% range. However, we don't hear vibrato in this Preset. Why? First of all, the Square waveform is selected, thus pushing the

frequencies into discrete upper and lower pitches. You can hear the effect of the Square wave both by selecting RANDI or RANDH instead, and by bypassing the ACCUMULATOR (click on the Bypass button: it is red when the effect is bypassed).

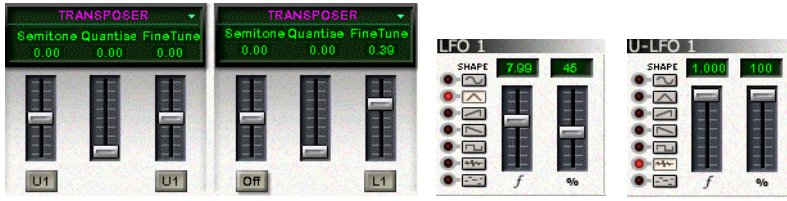
- Secondly, setting *quantize* to 1 gives clean semitone steps and eliminates the random selection of anything in between.
- Thirdly, hearing the result with the ACCUMULATOR bypassed also reveals what the ACCUMULATOR is doing in ColorHarmoniz: i.e., smoothing out the two-pitch oscillation so that the two pitches sound in a smooth and continuous manner. This is how the 'harmonising' effect is achieved, a very important and useful facility within Spectral Transformer.
- Because the *Semitone* parameter is set to 0, the effect starts with the sound at its original pitch.
- Finally, notice that MIX is set to 1, i.e., fully 'wet': all output is coming through the effect. Try lowering this and hearing what happens when there is more of a balance between original and effect.


**Key Features:**

- The slow 'Wah' is achieved with the U-LFOs.
- We notice that BANDSHIFT covers the full frequency range of the sound (available for processing), whilst LoHi Filter defines a much more restricted band.
- The BANDSHIFT (whole sound) band is shifted 140 out of possible 1000, i.e., about a 6$^{th}$ of the range.
- U-LFO 1 slowly moves the *HF Cut* limit up and down, i.e., opening up the higher frequencies of the sound.
- In the meantime, the full frequency range of the sound, i.e., the whole sound as selected in BANDSHIFT, is shifted up and down, because *Amount* is connected to U-LFO 2. This is happening about twice as fast as the *HF Cut* parameter is being moved, so that the two U-LFO oscillations are phased.
- Thus there is quite a lot of interactive movement at work in shaping the changing 'wah' effect.


**Key Features:**

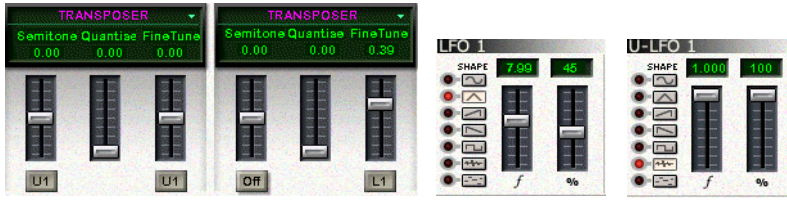
- Two TRANSPOSER effects are chained, the first focusing on the original pitch (*Semitones* = 0) and the second focusing on a transposition 3 semitones higher (*Semitones* = 3).
- The first TRANSPOSER is connected to LFO 1 which adjusts the transposition over 10% of its (possible) 2 octave range, moving the transposition to the upper and lower positions of the Square wave at a *frequency* of 10.48 times per second. Setting *quantize* to 1 constrains the transposition movement to semitones.
- The effect is then fed into the second TRANSPOSER, where the transposition parameter is connected to LFO 2. This moves the transposition according to an interpolating random function, RANDI (i.e., creating glissandi between the transposition positions), at a *frequency* of 8.89 times per second. You might also try the RANDH waveform to clarify what the RANDI interpolating waveform is doing.
- The two LFO oscillations are therefore phased, so that the relationship between the two transposition movements is constantly changing.
- Finally, a slow overall rise and fall is achieved by connecting the second *FineTune* to U-LFO 1. Try exaggerating this by moving % to 100.




**Key Features:**

- As with MadTrills, two TRANSPOSER functions are chained – but rather surprisingly, most of their parameters are set to 0. only the second *FineTune* has a value: 0.39 of a semitone.
- Thus, most of this effect is being achieved via the LFOs. Let's try to see what is happening by isolating the functions.
- If we turn off the two U-LFO 1 connections, we can hear LFO 1 on its own. Its Triangle waveform is oscillating at a *frequency* of 7.99 times a second, with 100% of the range affected. This is quite a strong wobble. However, it is constrained by being connected to *FineTune*, which is set at a modest 0.39. You can hear the wobble more clearly when it set at 1.00, but even this is quite constrained.
- If we reconnect the U-LFOs to *Semitones* and *FineTune* in the first TRANSPOSER, we hear how the wobbling is sent on a slow trajectory up and down. The RANDI function is what is causing the glissando movement. This is a good opportunity to try out the other waveforms: you hear the full range of their shape traversed every second, so it is very clear what effect each is having.

**MetalRain**




**Key Features:**

- 3 effects are chained, processing beginning with the first ACCUMULATOR, moving into TRACE and ending with the second ACCUMULATOR.
- Both ACCUMULATORS have a very modest and *Slope*-constrained reverb. This puts some liveliness into the sound, a liveliness made more supple by the slow U-LFO changes to which they are connected. Meanwhile, a little pitch bend is introduced by connecting the first ACCUMULATOR's *Glissando* parameter to U-LFO 1.
- The main transformation is coming from the TRACE function, allowing only the 3 loudest bins (analysis channels) to come through – all the rest are discarded. This reduces the input to a mere 'trace' of itself and also creates separate 'pings' because of all the discarded material.
- The TRACE *FBins* parameter is connected to U-LFO 2, so the number of retained bins is actually changing. We therefore hear an oscillation gradually moving between more and less of the original sound.

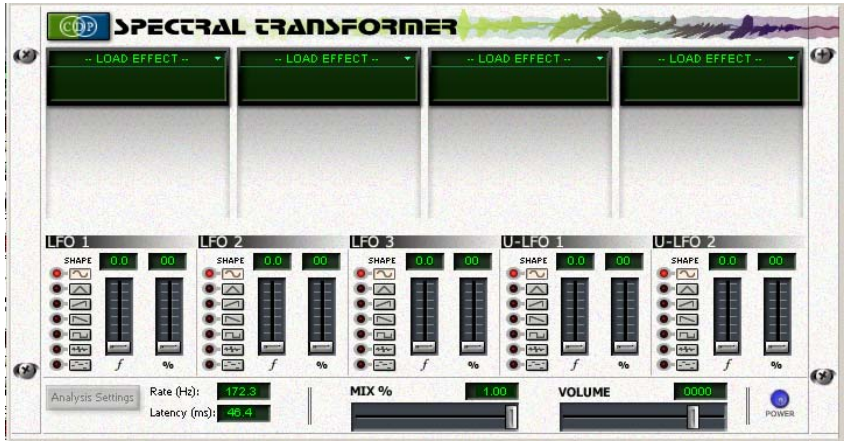
**Octave Up**


**Key Features:**

- This simply raises the original sound, making it 1 octave higher (i.e., 12 semitones).
- Try moving the *Semitones* slider to the bottom, thus lowering the sound by 1 octave.
- Note that this is Spectral Domain transposition and does not affect the duration of the sound and has very little effect on its tone color.
- With vocal sounds, the VOC-Transp Effect maintains the original tone color even more because the

formants are being retained.

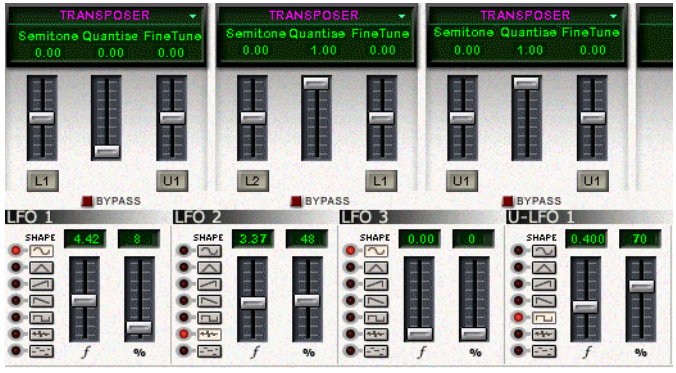
**ResetFX**




**Key Features:**

- All effects are cleared.
- All LFO and U-LFOs are zeroed.
- You are now ready to enter your own settings.

**Schizo**




**Key Features:**

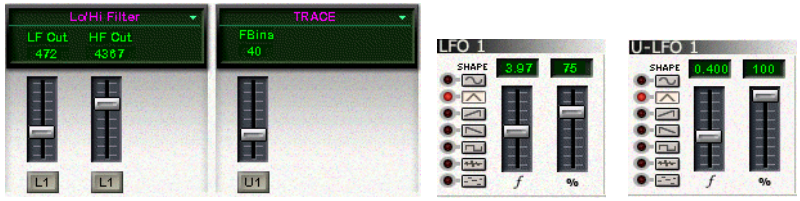
- These crazily changing transpositions use a triple TRANSPOSER effect, with each of the *Semitones* transposition parameters connected to LFOs.
- LFO 1 is relatively slow and uses only 8% of the transposition range. LFO 2 is a little slower, but uses almost ½ of the transposition range. It therefore swings more widely and a little more slowly, phasing against the first TRANSPOSER. It is also more random because it is making use of the RANDI waveform. *quantize* = 1 locks the pitch shifts to semitones.
- The third TRANSPOSER calls upon U-LFO 1 to produce a very slow pitch change over a wide (70%) transposition range. It also uses the Square waveform to move the pitch levels sharply up and down in discrete steps, aided by setting *Quantize* to 1.
- The relatively slow *frequency* settings give some changing definition to the Preset: higher values will tend to mush things together.

## SeaSaw


**Key Features:**

- Two ACCUMULATORS plus TRACE help this Preset to live up to its name.
- The two *Glissando* settings provide the main sea-sawing effect, the 2nd moving very much slower than the first: the phasing changes slowly. The 2nd is also further modified by U-LFO 2, so that there is yet another level of glissando effect. The Square waveform here produces discrete changes.
- Reverb is constrained by the low *Decay* and *Slope* settings, but not static, as 3 of the 4 parameters are connected to U-LFOs.
- Even so, the reverb would be much more prominent were the Preset not rounded off by running the signal through TRACE. The mid-range setting at 60 bins retained cleans up the sound sufficiently without reducing it to mere glimpses of its former self.

## SweepTrace




**Key Features:**

- Having selected a filter band which comprises a good part of the input's frequencies (472 to 4367 Hz), the 'sweep' idea is implemented by assigning both filter parameters to the same LFO.
- LFO 1 moves the *FL Cut* and *HF Cut* boundaries in a parallel motion through a Triangle waveform shape across 75% of the frequency range, 3.97 times per second. Slower makes the movement very obvious, and faster produces a fluttering effect, so 3.97 is a happy medium.
- The output of LoHi Filter is fed into TRACE, which is set at a fairly generous 40 bins. This setting would normally let most of the sound through. However, it is connected to U-LFO 1, which, also moving in a Triangle waveform shape, swings through 100% of the 100 bin range every 4 tenths of a second.
- At the bottom of the *FBins* range, very little of the sound arriving from LoHi Filter is let through, and much more at the top of the range. Thus the overall sound changes in tone color at a rate slower than the filter band sweep defined in LoHi Filter.
- Again, the speed of the *FBins* change is nicely judged to create a smooth, subtle effect: at 1.00 a pulsation becomes rather noticeable, and at e.g., 0.1 the change of tone color is quite slow and obvious.


**Key Features:**

- 4 different effects are chained to produce a sound which seems to be coming out through a long tube: i.e., filtered, with resonance.
- If you Bypass all the other effects, you can hear how the EXAGGERATOR 'sharpens' the sound considerably. The high 2.99 setting pushes up the amplitude peaks of the frequencies, making the 'valleys' in between narrow and precipitous, thus literally sharpening the sound. This creates a somewhat thin and resonant sound...
- ...which then travels through a generously sized LoHi Filter band which removes the frequencies below 522 and above 12318 Hz. How this affects the sound will depend on where the main frequency range of the input lies. It will probably do no more than tidy up the lower and upper edges.
- The ACCUMULATOR then adds a small amount of *Decay*, which is given the minimum reverb possible by setting the *Slope* parameter to 1.00. Try moving this down to 0.3 and listen to how much more volatile the reverb is. The ACCUMULATOR is what achieves the extra resonance of the 'tube' simulation.
- Finally, BANDSHIFT sets a band which includes the full frequency range of the sound, therefore shifting the whole sound up 132Hz, out of a possible 1000Hz. At 132, the result maintains an aural link with the original sound. At 1000, the whole thing is shifted up so high that it becomes something else again, wispy and ethereal.

## Musical Aspects of Working with Sound

The Spectral Transformer plug-in is designed to transform sounds in weird and wonderful ways, and with extreme subtlety in the fine-tuning. This touches on today's forays into 'sonic art': composing with the qualities of sound itself as well as with notes and rhythms. The realm of orchestral scoring has always dealt with tonal qualities in its own way, but music has moved much deeper into this realm since the advent of the 'classic' sound studio based on the use of tape recorders, synthesisers and samplers, FFT analysis and manipulation of digital data by computer, using software algorithms.

Working with sound in this way in an effective manner requires a fundamental extension of musical aesthetic. We are now exploring the inner regions of sound in a way never before possible. This is exciting enough as a scien-

tific and technical endeavour. It becomes even more exciting when the tremendous richness of sounds begins to be employed in the service of musical expression. To do this, we have to use the technical, but move beyond it, making connections with the basics of shaping time: musical art. The terms described in this musical glossary are familiar enough. Here, however, a special effort is being made to connect these familiar terms with relevant aspects of the electronic manipulation of sound, to show how the latter can be used in the service of musical art.

## accelerando

**an increase in tempo**

Accelerando means getting faster. Music moves along at a given tempo, meaning the rate at which the main beats occur. During an accelerando, this tempo increases. Just as the heartbeat accelerates when running or in a fear-inducing situation, accelerando implies excitement, the nature of which is determined by the surrounding context. The opposite is a decelerando.

## articulation

**the changing amplitude and timbral character of a sound, usually the result of how a performer plays a musical instrument**

The word 'articulated' is used to describe flexibility in movement, such as an 'articulated truck' in which the cab and storage section are independent units connected by a ball joint. The term is used in music to describe flexibility in a performer's movements, such that the manner of performance is always changing: extra energy at the beginning of a sound (attack transient), increasing and decreasing pressure on the bow or mouthpiece (crescendo / decrescendo), staccatto and saltando bouncing, dancing) effects, use of mutes to alter the tone, whisperingly quiet, etc. This performance flexibility brings a piece of music to life, distinguishes one performer from another, projects the inner intention of the music, and is altogether one of the most important aspects of music-making. When working with electronically generated sound, every effort needs to be made to achieve a similar flexibility: the music should not just play back through the speakers, *the listener should feel that it is being performed*.

## crescendo

**gradually becoming louder**

During a crescendo, the music gradually becomes louder. The opposite is a decrescendo. As music is a time-based art, every change over time has a poetic meaning. A crescendo indicates a gradual increase in excitement or tension, a decrescendo, a relaxation of effort or an easing of tension. These changes of volume are one of the most basic ways to give the music a living, organic feel. Similarly, moving along at the same volume can be part of communicating a steady state, contented, or resigned frame of mind.

Crescendo and decrescendo can also be realised in an 'orchestral' way. Sometimes this is accompanied by a change of volume, but not necessarily. An 'orchestral crescendo' is achieved by adding in more instruments, so that the overall sound and tone becomes more complex, fuller, richer.

An 'orchestral crescendo' can also be achieved in the electronic domain. The sound itself can be enriched by changes which make it timnbrally denser and more complex: i.e., by compressing or adding in more frequency components. We can also layer in more instruments or effects by chaining processes and mixing operations.

## form

**the temporal design resulting from the basic idea for a piece**

A musical form is really the idea behind a piece worked out in both the inner pattern detail and the overall temporal design. The verse and chorus sections of a song, for example, alternate narrative detail and general statements which capture the essence of attitude or mood. The musi-

cal setting of these words usually supports their meaning with gestural shapes, harmony, rhythm, articulations and tonal qualities, unless deliberate irony is sought.

Suppose the idea for a song or piece of music were to be urban complexity. This might suggest interleaving widely divergent sonic material, fast cutting from one scene to another, tonal complexes, angular rhythms, and incisive articulations. Putting all these features in place constitutes the practical, step-by-step process of form-building.

Another idea for a song or piece of music might be isolation and loneliness, perhaps poignantly summed up in the song's chorus section. The task of realising this idea in the music might focus on this chorus section, approaching it and leaving it through moments of quietly sustained material. Gestures and contour shapes might maintain low, slowly changing profiles.

The basic idea as expressed in words, or just a simple abstract idea such as 'rising' becomes the guide to building a form, shape by shape, step by step, until the whole emerges from the detail. The overall idea guides the shaping of the detail, but it is also a fact that what happens when working on the detail can affect and reshape the original idea. The various musical terms described here show how the realm of sound, electronically manipulated, can be used to create this detail. But the purpose, the basic idea, needs to remain in focus as the guiding light in order to achieve organic unity and emotional power.

## gesture

**dramatic meaning of a contour and articulation pattern over time**

We are most familiar with the concept of gesture from the realm of theatre and dance. We perceive it as a distinctive and commanding shape which conveys psychological intent (or just pure form). It is also a key ingredient in music, giving it intent, purpose, 'feel'. Perhaps we could describe gesture as **contour with meaning**. Similarly, the underlying contour shapes in a painting play an important role in its interpretation.

Changing parameter values inevitably create a **contour** as they move higher and lower. Whether this contour is gradual with soft edges, abrupt, slowly changing or jagged already has feeling / psychological implications. The amount of displacement and rate of change are major factors in gesture because they create varying levels of intensity: the shape itself implies different levels of energy needed to create it. The sonic artist continues to develop the meaning of this contour in many other ways, matching attack transients, tonal color and other articulations to give it the right energy profile.

Sometimes an artform is full of 'dramatic' gestures. At other times, the gestures are soft, supple, relaxed or elegant. Getting the gestures to match the overall form, character and intent of the artistic creation is a key task. The organic unity of a piece is to some degree tied into the repetition of gestural shapes, often in different parameter fields and time levels. These are, then, important considerations to bear in mind when designing envelope contours and automating parameters.

## glissando

**gradual change of pitch perceived as a sliding movement**

Except for the odd humorous trombone slide or expressive slide across the strings of a violin or the keys of a piano, glissando has been a rarity in the music of the past. In our own time, this has changed enormously. A glissando is a pitch slide, and pitch slide (or pitch 'bend') has been used extensively in all forms of jazz and popular music, both in voice and instruments. Particularly with the voice, pitch slides with timbral changes (e.g., rough to smooth) are an incredibly important and skillful aspect of performance. Similarly, composers such as Iannis Xenakis have astonished audiences by making whole pieces dominated by glissandi.

Even so, Nature has been way ahead of us. What do we hear when a flock of 100+ starlings gather but a whole texture of glissandi? What about the roar of volcanoes and the whooshes of avalanches, the fluid movements of landslides and mountain streams and waterfalls? Now that we are working directly with sonic material, these shapes become relevant, become possible! Paradoxically, while working with the most advanced computerised systems, we find ourselves coming closer to Nature.

The ability to create glissandi is, therefore, a key feature of the Spectral Transformer plug-in. Using either the TRANSPOSER or the ACCUMULATOR, finely crafted pitch bends, gigantic slides or flowing, throbbing complexes can be created. Emotional nuances, sensations of flying or falling, flowing, fluid turbulence found in Nature – all have a sliding, flowing form and can be evoked by musical glissandi.

### granulate

**to separate into very tiny segments of sound**

We are familiar with grains of sand, salt and sugar, but not necessarily grains of sound. Yet this is entirely possible with the computer, which can divide up and play with the stream of numbers representing the sound in any way one likes. A granulated sound usually comes out as a series of tiny pulsations, a sonic surface like sandpaper, with the degree of coarse or fine depending on the size of the grains and overlap factors.

By extension, any sound with a noticeably rough surface of regular pulsations can be said to be 'granulated'. In Spectral Transformer this often happens when the LFO is set at a high speed, especially with the ramp waves SAW- and SAW+. This internal energy can then be smoothed to varying degrees with the ACCUMULATOR.

### harmony

**vertical relationship that forms the basis for sonority**

Harmony takes on a new, much broader meaning when creating music with sounds. One of the reasons for this is that many sounds from the natural world are very complex. Some birds, such as the wood thrush, can sing three pitches at once, warbling on two of them and sustaining the third. The sound of a train is a veritable compendium of sounds.

We are mostly used to 'pitches' in music: clear tones in which one main pitch (called the 'fundamental') is loud and clear, while the other partials in the sound are harmonious with it: locked into it by being frequency multiples: 'harmonics'). Large bells have such a big surface area that they can create more than one pitch at the same time, easily perceived as separate. I recall hearing a beautiful bell ringing out across a valley in Switzerland: two pitches a fifth apart were audible and slowly phased against each other.

As we move into the realms of nature and machines, sounds become altogether more complex, so if we are going to use these sounds at all in music, much less use them effectively, we need to broaden our understanding of harmony.

- Harmony can mean more than a chord made up of pitches. It can be any sonority and indeed any prolongation which becomes an aural reference to which other pitch levels relate.
- An extended concept of harmony needs to include **noise** (random frequency complexes), and recognise that there are many different flavours of noise. Filters are often used to modify noise so that it acquires the right tonal qualities for the situation: soft and low, high and thin, broad and fuzzy.
- Different types of noise can be overlapped and layered, producing changing densities and transitions.
- The harmonics (partials which are integer multiples) of a sound can be thrown askew by adding fixed

frequency intervals to them, thus altering the timbral qualities of the sound. This process is called linear shift, used in the Spectral Transformer effect BANDSHIFT (see: BANDSHIFT (BSHIFT): General Introduction).

- Sound complexes are handled in terms of their density and tonal qualities (e.g., high, bright, thin, warm, deep and fuzzy, rumbling etc.), rather than simply as pitches belonging to scales and chords. The concept of a scale becomes broadened to include gradients of tonal qualities, and chords become sonic layer cakes.

### loop effects
**repeating patterns**

In general, this refers to repeating patterns. In Project5, the input musical sound from the software synthesiser repeatedly loops back to the beginning to give a continuous sound output. Using the LFOs in Spectral Transformer, various parameters can be set to loop round a waveform pattern, whether quickly or slowly – more noticeably when the LFO is set to a slow speed. This repeating pattern of parameter change is then phased across the repeating input sound. The result can be a wild, churning sound, or one with slow, controlled timbral evolution. There is, then, also looping which affects small internal segments of the sound.

### rhythm
**patterns of event-timing, sometimes randomised**

Working with sound also requires, at times, a more flexible approach to rhythm. For much of the time, altering the tonal qualities is designed to give just the right feel to the beat, whether with the type of attack transient, the brightness or warmth of the sound, or the pitch bend which shapes its pitch. A slight randomisation of where the beats fall has been shown to 'humanise' the rhythm, to sound less mechanical and more as if produced by live performers.

At other times, the sounds and textures are more complex, and we come closer to the world of Nature, in which regular rhythms are the exception rather than the rule. If we recall the texture of birdsong emitted by a seagulls or listen to the wind moving through the leaves of an aspen, we realise that there is a significant random dimension in the sounds of Nature. When using natural sounds, or abstract sound complexes for which there are no known equivalents, it is often useful to make use of some degree of randomisation in the rhythmic feel.

In the Spectral Transformer effects, the LFO waveshapes RANDI and RANDH are randomising functions, the first interpolating between random values (usually creating glissandi), and the latter keeping each random value as separate and discrete steps. The other LFO waveshapes create changes which repeat, but possibly at speeds which blur the internal structure of the sound, all the time phasing against the rhythm of the unfolding sonic input.

Effective use of these possibilities requires daring and imagination, but also a regard for the overall idea for the music.

### semitones
**the 12th part of an octave**

Western music divides up the octave into 12 more or less equal divisions, called semitones. Because of variants in temperament (tuning method), the actual size of semitone divisions can vary. Semitones are themselves divided into 100 cents. The Spectral Transformer plug-in allows the specification of semitones to 2 decimal places, i.e., from .01 to .99, which in effect are cents. A whole tone comprises two semitones. Thus 1.50 means 1 semitone + ½ semitone, i.e., ¾ of a whole tone. Microtones of great precision are therefore catered for in the Spectral Transformer plug-in.

### smooth
**to level out variations in pitch or other data**

'Smooth; is a simple word, but enormously relevant in this context. It can refer to soft tones, harmonious spectrum, gentle onsets and decays, and relaxed, lilting rhythms. It can also refer to effects such as ACCUMULATOR, LO-HI FILTER and TRACER which average or otherwise iron out discrepancies of amplitude, LFO-based pulsations or tone changes. The computer sound manipulation tools therefore make it possible to affect the smoothness of a sound in many different ways.

### tempo
**rate of beat flow per second**

The number of beats per second, usually as expressed as a note (to signify which type of note) over 60. For example, a quarter note over 60 means one quarter note beat per second: each beat lasts 1 second. A quarter note over 120 means 2 quarter note beats per second ('march time'): each beat lasts ½ second. To determine how long a beat is at any given tempo, replace the note type symbol by 60 and divide. Examples: 60÷60 = 1 sec. (1 every second), 60÷120 = 0.5 sec. (1 every ½ second), 60÷84 = 0.714 sec. (1 every .714 second).

Tempo is directly related to human biological activity: the heart-rate increases when there is more activity in order to increase the blood flow to the muscles. Thus tempo is a component in expressing action or relaxation, excitement or peacefulness, and fear or feeling comfortable. Which tempo to use, as well as changes in tempo, immediate or gradual, are therefore musically important features.

In Spectral Transformer, the concept of tempo is further extended by including the rate of movement of features internal to the sound. The *glissando* parameter in ACCUMULATOR controls the rate of internal pitch bend, and the LFOs control the rate at which the parameter connected to it moves through its %age-controlled range.

### vary over time
**like a graph, the shape created when a line is drawn through a sequence of values active at changing times**

The automation tools of Project5 make it possible to record and have automatic playback of time-varying parameter changes.

As a time-based art, music is intensely concerned with how all its component ingredients change over time. These patterns of change, these time contours, create a sonorous symbol which is perceived both by the mind and the body as the experience of music. Without time-varying sonic events, nothing is happening, from a musical point of view.

However, it should also be remembered that temporal changes, as with gestures, need to be in step with the overall musical form and intention. It is easy to create helter skelter wild textures with computer tools in general and Spectral Transformer in particular. While this is sometimes fun and appropriate, the other end of the spectrum should be explored: where the changes over time are slow, easily perceived, and tied in with the overall form and gestural nature of the music.

In the electronic domain, therefore, it is essential that the component parameters for a sound vary over time one way or another and that these changes are consonant with the overall form and intent of the music – unless a contrast of outer form and inner pattern is deliberately intended.

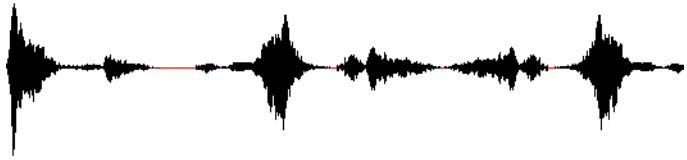
## Spectral Transformer: A Friendly Guide to Technical Terms

### amplitude
**the loudness level of a sound (of a sample or a frequency)**

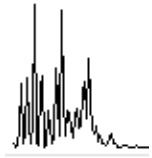
Referring to the loudness, the intensity of a sound, the power driving a loudspeaker, the volume of playback, amplitude refers to the overall energy level of the waveform. It is often represented graphically by locating the

amplitude value for each digital sample on a vertical scale, such as from -32766 to +32767.

This is the *amplitude time* representation of a waveform in the time domain. It is the shape made by a bouncing ball.



Spectral Transformer operates in the spectral domain, in which amplitude (vertical axis) is plotted for each frequency (horizontal axis) component. Here one frame of the same bouncing ball sound is captured in the FFT analysis data stream, showing an *amplitude* + frequency graph. It can also be represented in several other forms: a bar graph, a sonogram, a spectrogram, or a 3-D 'mountain' graph.



What is relevant here is to realise that altering the amplitude of frequency components affects the timbre, the tonal qualities of the sound: depending on which frequencies are louder. This effect is special to the spectral domain. In the time domain, where the amplitude of each sample is involved, altering amplitude simply makes the *whole sound* louder or softer, without changing tonal characteristics.

The Spectral Transformer EXAGGERATOR effect plays with the amplitude of frequency components and therefore has a direct effect on the timbral quality of the sound.

## attack transients

**the angle of amplitude increase at the beginning, the 'onset' of a sound**

The way a sound begins is one of its most important features. When we imagine beating a drum, or starting a violin string vibrating by moving the bow across it, or blowing into a trumpet with that extra umph to get the note sounding, we realise that the act of producing the sound differs according to the physical nature of the instrument. In fact, it is in hearing this start to the sound that we can recognise what instrument is being played. If we take away the beginning or reverse the sound, the nature of the instrument – whatever it was that made that sound – becomes surprisingly ambiguous.

This beginning is known as the **attack** of a sound, and it has both amplitude (loudness curve) and frequency (timbral) components. Striking or blowing an instrument with great force increases the amplitude of many frequency components, especially the higher frequencies. This makes the sound brighter, like the piercing, clarion call of a trumpet. This would be a 'sharp' attack with a fast attack 'transient', meaning that the slope of the amplitude rises steeply, such as from zero to its full volume in 0.1 sec. A slow attack has an amplitude that rises more slowly, such as from zero to its full volume in 2 sec.

Trumpets are known for their sharp attacks, strings for their gentle attacks, while instruments such as the clarinet or saxophone are really good at doing either. Computer sound editors alter the attack transient by drawing an amplitude slope and adjusting the amplitude values to stay within this slope.

The overall amplitude shape of a sound is called its envelope.

## band

**width of a group of frequencies**

If we think of the whole range of frequencies that make up a sound, a **band** of frequencies will be a section, a 'ribbon' as it were of *adjacent* frequencies lying between a low frequency limit and a high frequency limit.

Using computer tools, we can isolate bands of frequency, either retaining them while removing what is above and/or below, or removing them, a process known as filtering. Altering significant chunks of frequency components has a major effect on the sound.

Another type of frequency band is known as a formant, fixed frequency bands of relatively high amplitude which more than anything else define the timbral character of a sound.

## blur / smear

**result of averaging data, smoothing over features of the original**

When water gets on writing done with water soluble ink, such as used by an ink-jet printer, the ink begins to dissolve and the edges of the letters begin to blur. At first it is hard to read, but you can still make out the letters. But when the dissolving ink from one letter begins to overlap and mix with the ink from another letter, it becomes more difficult to read the text. It's a bit like what comes out when you try to speak without moving your lips. Clear precise diction becomes a kind of verbal porridge as the sharp contrasts between consonants, vowels, pitch levels and amplitudes become smeared together.

It is very exciting that this kind of effect can also be achieved with sounds. In the spectral domain, the two components of the analysis, the amplitude and the frequency, are calculated for e.g., 1024 vertical bands in the layer cake of the sound for every e.g., $100^{th}$ part of a second (which is called a 'frame' – usually several frames overlap to form a 'window' in order to ensure a smooth result). We can therefore picture 100 windows of amplitude & frequency information for every second of sound. Blurring effects can be achieved in Spectral Transformer by accumulating the data of several windows, or by removing some of the frequency components (such as those with lesser amplitude). The ACCUMULATOR and TRACE employ these two methods, respectively.

The overall effect is to smooth out differences by reducing the differences from one window to the next: amplitudes (of the frequencies) are more consistent, meaning that the tonal characteristics are spread over a greater period of time, and the frequency content, even when it becomes more complex, changes more gradually. The result is softer-edged, gentler, more slowly changing sounds, but full of (changing) timbral interest. The ACCUMULATOR adds a glissando effect as well, further blurring with pitch bends.

The blurring effect reduces the recognisability of the original sound, making it more abstract. Thus it is a route towards original sounds with a flowing, sonorous character. These may be used for 'ambient', 'cool-off' music and to create flowing, abstract sonic imagery.

## channels

**the frequency bands or 'bins' into which the sound is analysed, i.e., frequency resolution**

'Channels' in this context has a specific technical meaning. Normally, we think of 2 or 4+ channels on a tape or in a digital sound file, each of which is eventually routed to a

different loudspeaker. In the spectral domain, 'channels' means the number (and size) of the frequency bands into which the sound is analyzed. Normally around 85 Hz apart, more and smaller bands means higher frequency resolution, fewer and larger bands means lower frequency resolution. The FFT analysis examines each of these bands, these channels, these 'bins' to see what is in it: i.e., which frequency/frequencies and its/their amplitude(s). Some of the channels may be empty.

Which frequencies are present in the various frequency bands of an analysis frame determines the tonal quality of the sound *at that moment*. Each frame covers only a tiny fraction of the length of the sound, and the contents of the successive frame of analysis data are constantly changing.

This contour profile of the data in a frame is called the spectral envelope, and the overall, constantly changing set of profiles for the whole sound, can be referred to as its 'timbral envelope'.

## decay

**data values reducing over time**

Decay refers to a gradual lowering of a set of values, usually amplitude. If a sound ends with the amplitude values descending from full to zero over 2 or 3 seconds, it is said to decay slowly. When applied to other parameters, the effect differs according to the function of the parameter. With the Spectral Transformer ACCUMULATOR, *decay* is controlling reverberation. When the value is higher, the reverberation time increases, when at zero, there is no reverberation at all.

## digital noise

**artefacts related to the sample rate**

Digital noise is an artefact created by the digital sound sampling process. If there are (only) 22050 samples per second, each with its own amplitude value, then it is possible to have fairly large changes in amplitude level from sample to sample, and if the actual sound is changing during the time of this sample, that change is not captured by the sampling process. When these relatively sudden changes are eventually translated into the power driving the loudspeaker cones, the lack of smoothness in the motion of the cones introduces a noise factor (random frequencies).

This is why higher sampling rates have been sought: 44100, 96000, and even 192000 samples per second: it captures the moment to moment changes in the sound more smoothly, resulting in less information loss, cleaner loudspeaker movement and higher fidelity in the output sound.

The potential presence of digital noise means that applying digital gain needs to be done with care. The reason is simple: if the amplitude level is jacked up indiscriminately, the changes from sample to sample may also be increased to the point where digital noise is created by the irregularities produced.

## envelope

**amplitude contour**

When we put a letter in an envelope, the envelope contains and covers the letter: we see the shape of the envelope. Similarly, the word 'envelope' is used in music to describe the amplitude profile of the whole sound, or of a group of frequencies.

In the time domain, *time* runs horizontally, and *amplitude* vertically. Thus each vertical bar will be potentially at a different height. When we connect up the tops of all these vertical bars, we get the envelope shape, as displayed by sound editors which act on the stream of *time amplitude* samples.

In the spectral domain, *frequency* runs horizontally, and *amplitude* vertically. Similarly, then, each vertical bar will be potentially at a different height, which, when connected up, yield an overall contour shape. However, this time it relates directly to the frequencies in the sound, collectively

known as its 'spectrum'. The spectral domain amplitude envelope is therefore known as the 'spectral envelope'. It actually refers only to a single analysis frame.

## FFT

**Fast Fourier Transform**

The FFT analysis is the wonderful mathematical process used by the Phase Vocoder and translates *amplitude time* sample data into *amplitude frequency* data. It does this for a whole series of frequency bands called channels for as many tiny time segments as it takes to work through the sound from start to finish. These time segments are called windows. Implied in the fact that the time segments move through the sound is the notion of 'phase', which locates you in the sound: taking into account previous states, you are *here* now, you were *there* then.

The result of the FFT analysis is an 'analysis file', which is a huge amount of *frequency amplitude* data about the sound, covering as it does every channel in every window (plus a frame overlap factor to ensure smoothness when the sound is reconstructed by a 'reverse FFT').

The FFT analysis is what creates the spectral domain and makes possible amazing sonic transformations, of which the Spectral Transformer effects represent good examples of how powerful these processes can be.

## filter

**to remove part of**

In general terms, filtering is removing part of the contents of something, like straining fruit through a cheesecloth to make a jelly.

The musical use of the term relates to the removal of part of the frequency content of a sound. Removal:

- **above** a given frequency = **lo-pass** (those above are removed, those below pass through)
- **below** a given frequency = **hi-pass** (those below are removed, those above pass through)
- **within** a pair of frequencies **retained** = **band-pass** (those above the upper limit and below the lower limit are removed, while those within the limits pass through). There can be numerous bands-to-keep specified, sometimes enabling the user to tune the sound to a chord.
- **within** a pair of frequencies **rejected** = **band-reject** (those within are removed, and those above the upper limit and below the lower limit pass through. This leaves a hole in the middle of the sound, so it is also called a notch-filter. There can be numerous bands-to-reject, creating a comb-like effect.

Another aspect of filters is a boost factor, creating resonant frequencies. The degree to which this resonance is focused on specific frequencies depends on how sharply the adjacent frequencies fall away in amplitude. The slope of this amplitude reduction is known as 'Q'. If amplitude falls away quickly, one tends to hear a focused pitch in the retained portion of the sound, if more slowly, the filter is fuzzier and one hears more of the original sound – the 'skirt' of the filter is wider and encompasses more of the neighboring frequencies.

## formant

**a fixed-position resonant frequency region**

Formants are amazing. They are what makes each person's voice identifiable, no matter what words are spoken or sung, or what pitch inflections are being used. Thus, more than anything else, they define the timbral character of a sound.

The main feature of formants is that the frequency regions are fixed. In the human body, this is caused by the variously shaped resonant cavities of the head. Each shape matches particular wavelengths, thus setting up specific resonances, i.e., frequency regions of relatively high amplitude due to the self-reinforcing sympathetic vibrations.

Except for the mouth, these cavities stay the same while speaking, so the resonant frequency regions also stay the same, no matter what the text or what the inflection. The same is true, though more subtly, for acoustic musical instruments.

Formants are present in all sounds and instruments, but most noticeably in the voice, where mouth-shape does introduce a number of variables. An instrument such as a French horn is much more consistent in its tone, but formant preservation while (upward) pitch shifting of instrumental sounds can also have an interesting effect.

In Spectral Transformer, the TRANSPOSE effect has an option to transpose while retaining formant information. This leads to a much 'truer' vocal transposition: the identity of the voice is preserved better. But it has little effect on instrumental sounds.

### frame
**unit of analysis**

The analysis frame is derived from a group of samples in the original sound. This group of samples, e.g., 882, represents a tiny time-slice of the original, e.g., 0.02 (2 $100^{ths}$ of a) second at a sample rate of 44100 per second. To ensure smoothness in analysis and resynthesis, frames are overlapped by a specified number of samples.

The overall analysis usually contains millions of bytes of data from all these frames. This is the analysis data upon which Spectral Transformer operates, and it is only recently that computers have been fast enough to handle all this work in real-time without the help of specialist outboard DSP hardware.

### frequency
**number of cycles of a waveform per second (= Herz - Hz)**

Frequency means how many times a second a given waveform repeats (oscillates). Below about ??10 Hz, this is heard as separate clicks, but above ca ??10 Hz we begin to hear steady tones. All but the most artificial of sounds contain many frequencies, also called partials.

### gain
**changes to the loudness of a sound, louder or softer**

Gain is the process of increasing or reducing the amplitude of a sound. This is done quite simply by multiplying the numbers by which the amplitude is represented in the computer, usually a range between -32766 and +32767. Thus, if a given amplitude is 10000 ($1/3^{rd}$ max), multiplying it by a gain factor of 2.5 will bring the amplitude to 25000. The use of gain needs to be balanced by an appreciation of digital noise.

### harmonic
**integer relationship, part of a focused pitch**

A harmonic is a term used for a partial which is an integer multiple of the fundamental – the fundamental is the predominant pitch. Anything vibrating produces sub-vibrations, and when these faster vibrations synchronise with the main one, they lock together aurally and are perceived as a single, timbrally colored pitch. If the fundamental is A-220 Hz (A below Middle-C), harmonics will be 2 x 220 = 440 Hz, 3 x 220 = 660 Hz, 4 x 220 = 880 Hz, 5 x 220 = 1100 Hz, etc. Subharmonics go the other way, i.e., below the fundamental.

### inharmonic
**a partial not in sync with the fundamental, i.e., overlapping it**

Inharmonic partials are those which are not integer multiples of the fundamental. If the fundamental were to be A-220 (A below Middle-C) and this were multiplied by 2.01, the resulting partial would be 442.2 Hz, just slightly higher than the octave 440 Hz. This discrepancy means that the fundamental and this partial (which is slightly more than twice as fast) do not end at the same time: the second oscillation of the partial's waveform starts a little *before* the

fundamental, thus overlapping the start of the next oscillation of the fundamental. This overlap puts the two oscillations out of sync and they begin to be heard separately rather than as a single colored pitch. There are various levels of inharmonicity:

- just slightly out and the sound is slightly denser and richer
- a little more out and we begin to hear distinct, separate pitches, as in bells and gongs
- even more out, and the timbral coloration of the sound begins to change
- when there is a jumble of all different partials, the sound acquires a noise dimension

The BANDSHIFT effect creates inharmonicity by *adding* or *subtracting* to the frequency of a partial or group of partials. Harmonic relationships are the result of multiplication: each higher octave is twice the vibration rate as the one below. When values are added, this relationship is broken and the frequencies overlap to varying degrees, with the proportions between them compressing (*amount* is > 0) or expanding (*amount* = < 0):

- **octave multiplication of 220** – 220 x 2 = 440 (220:440 = 1:2), 220 x 4 = 880 (440:880 = 1:2), 220 x 8 = 1760 (880:1760 = 1:2 etc. – each successive octave maintains an exact 1:2 proportion
- **adding 17 to the octaves of 220** – 440 + 17 = 457 (220:447 = 1:2.077), 880 + 17 = 897 (440:897 = 1:2.039), 1760 + 17 = 1777 (880:1777 = 2.019) etc. – notice how the ratio, the proportion between the 'octaves' is in fact getting a little smaller each time: i.e., the frequencies are being compressed together. This compression is more dramatic when larger values are being added to each partial.
- **subtracting 50 from the octaves of 220** – 440 - 50 = 390 (220:390 = 1:1.772), 880 - 50 = 830 (440:830 = 1:1.886), 1760 - 50 = 1710 (880:1710 = 1:1.943) etc. – when *amount* is < 0, it is subtracted, and the proportions between the partials expand.

Thus inharmonicity is created by *adding* or *subtracting* fixed values rather than *multiplying* by a fixed value. The timbral change to the sound is therefore produced by the overlapping of the frequencies and the compression or expansion of the proportions between them.

## latency

**perceptible delay in hearing the processed sound**

When processing in 'real-time', we expect to hear the processed sound with no perceptible delay. The processing does take a certain amount of time, so the key here is 'perceptible'. When the processing is completed and the sound restored to our ears within about 20ms 0.020 sec., there is normally no noticeable delay. Above this amount of time, the time gap between hearing the original sound and hearing the processed sound becomes increasingly apparent and unacceptable.

The main factor which affects latency is the window size, which is actually the multiple of FFTsize * Window size. Basically, it means how many samples are being processed in each frame, before moving on to the next frame. Lower values mean lower latency. The FFTsize and Window size can be adjusted in analysis settings.

The above latency factor is added to the latency imposed by the audio subsystem of the soundcard in the computer. Lowest latency is provided by modern cards with ASIO or WDM drivers supporting kernel streaming.

## modulator

**data which acts upon and alters other data**

Rather like a gear change, a modulator is one value or set of values acting on another value or set of values. In Spectral Transformer, the % parameter is a modulator, control-

ling the range of the main parameter which the LFO is oscillating.

## partials

**frequency components of a sound**

A partial is a frequency component of a sound, whether harmonic or inharmonic. Before starting to work with sound in the spectral domain, we may not realise that each sound is a huge amalgam of many partials. This is what gives a sound its richness, its complexity and ever-changing coloration. The task of spectral analysis is to find these partials so that the composer can then alter them in inventive ways in order to transform the sound.

## Phase Vocoder

**software tool which performs the FFT analysis**

The Phase Vocoder performs digital spectrum analysis using a complex mathematical program called a 'fast Fourier transform' (FFT). The analysis process creates a list of each sinusoidal frequency component together with its amplitude and phase. The analysis moves through the sound, capturing the changing detail in a series of analysis frames/windows.

The results of analysis can be a little confused when the input sound has a significant noise component, rather than a clear, periodic waveform. A long analysis window (larger number of samples in each one) improves capturing high frequencies (short wavelengths), while short analysis windows are good for capturing transient detail. Thus there is a constant trade-off between high-frequency resolution and tracking transient detail, and the best solution will differ from sound to sound. This is why Spectral Transformer provides the ability to adjust the analysis settings.

The Phase Vocoder used in Spectral Transformer is an evolved, 'streaming' form developed by Richard Dobson from the original Phase Vocoder created by CARL (The Computer Assisted Research Laboratory of the University of California at San Diego.)

## pitch

**the perceived frequency level of a periodic waveform**

We are so used to talking about pitches that we may not realise that it is actually a technical term with a very specific meaning. A pitch is a focused tone in which the partials present are dominated by a single frequency, which is called the fundamental. The predominant presence of this fundamental frequency happens because most of the other frequencies are in sync with the fundamental, and they are in sync because they are integer multiples of the fundamental, i.e., harmonics. The net result of these synchronised frequencies is the perception of a pulse at regular intervals (i.e., 'periodic'), heard as a 'tonal' sound as opposed to a noisy sound.

If the fundamental were to be 100 Hz, then the first harmonic would be 100 x 2, or 200 Hz. In graphic terms, this first harmonic vibrates exactly twice as fast as the fundamental, such that two cycles of the harmonic end *at the same precise moment* as one cycle of the fundamental – etc. for higher harmonics. This integer relationship synchronisation aurally locks in the harmonics with the fundamental, and we hear mainly the fundamental, but with coloration dependent on which harmonics are present.

When the partials of a sound go slightly out of sync, we begin to hear separate pitches, as in bells and some gongs. As they go further out of sync, they become spoken of as 'frequency complexes', and eventually as 'noise'. All of these terms and states of sound have a place when working with sound material.

## quantize

**snap data to a range which has regular divisions**

To quantize is to move in fixed steps. It implies that more complex data is rounded off so that it fits into these fixed steps. The term is often used in connection with rhythms. Music is usually notated in fixed steps of half-, quarter-, eighth- and sixteenth-notes, etc. But when played, it is seldom absolutely regular in this way – in fact it would sound

wooden if it was. When music is played into the computer via a MIDI instrument, notation programs would (and do) make quite a mess on the page when they respond to every timing nuance of the performer. Therefore the software sieves the performance through a time grid so that the notations use the conventional fixed steps. This is the process of quantisation.

A similar situation can occur with sliders for changing numerical values, this time causing it to take too long to move between numbers or 'land' on simple numbers if every possible division of the integer is included. Therefore the process of moving the slider is quantized, so that the movement is in steps: small enough to be useful, large enough to enable the user to move through the range of available values in a reasonable amount of time.

## spectral domain

### digital representation of sound as *frequency* and *amplitude* data

The spectral domain is really a special digital realm in which data about sound is held in a way that gives direct access to its frequency components, the partials. This data is achieved by an FFT analysis, producing a file of analysis data.

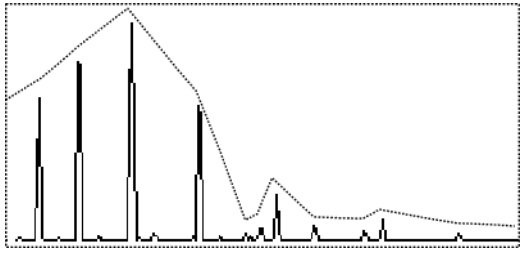
Every sound has its own frequency profile, an ever-changing mix of partial components that give the sound its (ever-changing) timbral coloration. For example, a piercing trumpet tone will start with a rich assortment of high frequency components and then settle down to a more harmonically ordered set of partials, giving a warmer steady state tone. Access to frequency components therefore means access to timbral colouration: which frequencies are present and how loud they are – and how this profile changes as the sound progresses through time (analysis windows). The frequency profile is called the spectral envelope.

What is important for the composer is to have a modest understanding of what happens when the different aspects of analysis data are altered. The main idea here is that once the data is available, play can commence.

- **channel** – The bands of frequency in which the analysis process 'looks' to see what's there, a channel can have more than one or no partials in it. And this can and usually does change as one moves from window to window in the analysis. The number of (vertical frequency) bands into which the sound is divided is the frequency resolution of the analysis, and as with windows, more channels can introduce a latency problem. Manipulating the sound by removing channels means that the partial data in those channels is eliminated, thus altering the timbral coloration or even reducing the sound to first essential components and then only a mere trace of itself.
- **partial** – This is a frequency component of a sound. A partial can be harmonic or inharmonic. The main factor in the timbral coloration of a sound, the partials can be transposed (multiplication factor), eliminated, selected by type, or shifted (addition factor).
- **amplitude** – As usual, amplitude is a measure of loudness, here relating to partials. It is the contour produced by joining up the amplitude levels of the partials that give us the graphic representation of the spectral envelope.
- **window** – As the windows are time-slots, their size relates to the temporal resolution of the analysis. If smaller, the resolution is finer, there are more of them, and therefore much more data. This can result in a smoother sound, but also an increase in the amount of data which could cause a latency problem: i.e., a perceived delay before hearing the processed sound again. Also, the order of the windows can be rearranged, shuffled like a deck of cards, something which has a big effect on what we hear! Accumulating data from previous windows both builds up frequency

components and introduces sustaining in the interior of the sound.

- **overlap** – ??is this channels or windows



Each frame of a spectral analysis contains the *frequency amplitude* information for all the partials (if any) in each of the channels of the analysis. Each frame is therefore a snapshot, as it were, of the state of the sound at that moment, with the length of the vertical bars representing amplitude level giving a contour shape. Thus the overall profile of a single analysis window is shown by its spectral envelope. The spectral envelope of each successive frame normally differs, The frame shown here is within the attack portion of a Tibetan singing bowl sound. The whole sequence of frames (of varying contents) gives the overall 'timbral envelope' of the sound.

### spectrum

**the changing frequency content of a sound**

The word 'spectrum' refers to a range of vibrations. The entire range of all vibrations is huge, comprising all of sound, light, and electro-magnetic vibrations. Sound is just one part of this overall spectrum.

The spectrum of a sound refers specifically to its overall vibrational content i.e., frequencies. Different frequencies come and go during the course of a sound, and this frequency content is always changing in some way. The FFT analysis finds the partials in each frame, and the sequence of frames gives the overall spectrum.

Most sounds are quite a complex set of (ever-changing) frequencies, and it is this which gives them their timbral coloration.

### timbre

**the tone/'color' qualities of a sound**

There are so few words with which to describe the tone quality of sounds! Those that we do find ourselves using are mostly inaccurate: thin, fuzzy, smooth, glowing, metallic, dull, bright ..., but these give us some idea of what is meant by the timbre of a sound. In particular, it refers to those qualities resulting from the frequency content of the sound: which vibrations are present, and how loud each of them is. The frequency content of the sound is its spectrum. This is not a single, fixed frequency configuration, but something which is *constantly changing*, especially as the sound moves through from the all-important attack portion to its areas of 'sustain' and 'release'. The time-varying character of a sound's timbre is therefore absolutely crucial, and this is what the Phase Vocoder FFT analysis used in Spectral Transformer captures in intimate detail.

### spectral envelope

**amplitude profile of the frequencies in one analysis frame**

We are most familiar with tone quality as the recognisable sound of different musical instruments: flute, oboe, violin, horn, clarinet, trumpet etc. In the spectral dimension, tone qualities can be transformed in many amazing and subtle ways.

We see them graphed as a waveform in sound editors, showing us the amplitude profile along the duration of the sound. Some editors can zoom this display down to the individual sample. The center-line is zero, above this line is the positive and below is the negative part of the wave.

This specific digital representation of the sound creates the 'time domain', and the sound can be further manipulated by altering those two parameters: amplitude and time. For example, the amplitude contour can be reshaped, the order of the samples can be reversed or shuffled, etc. Transposition in the time domain makes sounds faster (and therefore shorter) when the pitch level is raised, slower (and therefore longer) when lowered. Thus voices become fast and squeaky, or slow and growly. This does not happen in the spectral domain, where transposition does not affect the duration of the sound.

## window

**type of contour shape used for the analysis**

Each analysis frame contains the *frequency amplitude* data for each of the channels of the FFT analysis, for a given number of samples of the original sound. The term 'window' is used for the type of contour shape used to ensure smoothness in the analysis. One example is the Hamming window. Thus the amplitude rises from and returns to zero smoothly, while maximising the data within this time frame as much as possible. Otherwise a click or glitch would be the likely result.

## time domain

**digital representation of sound as *amplitude* and *time* sample data**

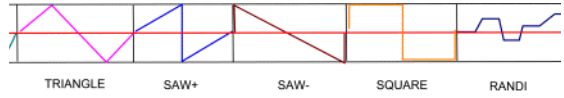
When a sound is 'sampled', its analogue features (voltages) are converted into digital samples, each of which records an *amplitude* and a *time*. The number of samples per second of the sound is its 'sample rate'.

## waveform

**a single oscillation containing a positive and negative phase**

An oscillation comprises an up/down, in/out, back and forth motion – however one wants to look at it. A vibrating drumskin goes up and down, the membrane of a speaker cone goes in and out, a violin string goes up and down before repeating. One direction is represented by positive numbers, and the other with negative numbers, with the central position being zero.

When the numbers for a waveform are shown graphically on an X-Y axis, as on an oscilloscope, we clearly see that each oscillation has a characteristic shape, normally very complex. The simplest forms of these contour shapes define a basic set of shapes, as shown in the diagram below:



# Connecting a MIDI Keyboard

You can play the instruments in Project5 from a MIDI keyboard, but first you need to connect the keyboard to your computer. You connect the keyboard to the computer by connecting the keyboard to a MIDI interface, which is connected to your computer. The MIDI interface could be built into your MIDI keyboard, or it could be part of your sound card, or it could be a stand-alone model that connects to a USB port or possibly even a parallel port on your computer.

**Note**: to get fast-enough response from Projct5 when you play your keyboard, your sound card's latency needs to be set to 20 mS or lower. You can set this value by dragging the Buffer Size slider in the Audio Options dialog (***Options-Audio*** command). If you get crackles and pops or audio dropouts after you lower the value, you may need a new audio driver for your sound card, or just a faster computer. WDM and ASIO sound card drivers offer the best performance.

Here are some procedures to use for different kinds of MIDI interfaces:

See:

If Your Keyboard Has a Built-in USB MIDI Interface

## If Your Keyboard Has a Built-in USB MIDI Interface

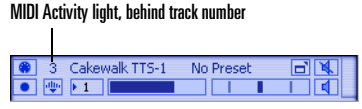
Keyboards such as the Edirol PCR models have built-in USB MIDI interfaces. These are easy to use, since the only connection you make to the computer (for both electric power and MIDI transmissions) is a USB cable.

### To Connect a Built-in USB Interface

1. Make sure you have installed the driver software that came with your keyboard. See your keyboard's documentation to install it correctly.
2. With the computer on, connect the USB cable between your MIDI keyboard and a USB port on your computer.
3. Launch Project5.
4. Use the ***Options-MIDI Devices*** command to open the MIDI Devices dialog.
5. Make sure the name of your keyboard's MIDI port is listed in the Active MIDI Input Ports window. If it isn't, select the name in the Available MIDI Input Devices window, and then click the right arrow button to move the name to the Active MIDI Input Ports window. Your keyboard may have several ports listed. Activate the ones you want to use. You may need to read your keyboard's documentation to tell them apart.
6. Click OK to close the MIDI Devices dialog.
7. Insert an instrument, and then right-click the instrument to display the Track Pane context menu.
8. On the right-click menu, make sure that ***All Ports-Omni*** is selected, unless you're using a more complicated MIDI routing setup.

Make sure no other track has its MIDI Routing Override button or Solo button depressed, and play your keyboard to hear the instrument.

**Note**: an instrument track in Project5 has a MIDI Activity light, which lights up whenever the track is receiving input from either a pattern or a MIDI keyboard.




## If You Have a Stand-alone USB MIDI Interface

Stand-alone USB MIDI interfaces frequently have more than one input port and one output port. After you install the driver software for the interface, each input port will have a unique name in Project5's MIDI Devices dialog.

### To Connect a Keyboard to a Stand-alone USB Interface

1. Make sure you have installed the driver software that came with your interface. See your interface's documentation to install it correctly.
2. With the computer on, and the interface connected to your computer, connect a standard MIDI cable from the MIDI OUT port on your MIDI keyboard to a MIDI IN port on your USB MIDI interface.
3. Launch Project5.
4. Use the ***Options-MIDI Devices*** command to open the MIDI Devices dialog.
5. Make sure the name of your interface's MIDI IN port is listed in the Active MIDI Input Ports window. If it isn't, select the name in the Available MIDI Input Devices window, and then click the right arrow button to move the name to the Active MIDI Input Ports window. Your interface may have several ports listed. Activate the ones you want to use. You may need to read your interface's documentation to tell them apart.
6. Click OK to close the MIDI Devices dialog, and then insert an instrument in Project5.
7. Insert an instrument, and then right-click the instrument to display the Track Pane context menu.
8. On the context menu, make sure that ***All Ports-Omni*** is selected, unless you're using a more complicated MIDI routing setup.

Make sure no other track has its MIDI Routing Override button or Solo button depressed, and play your keyboard to hear the instrument.

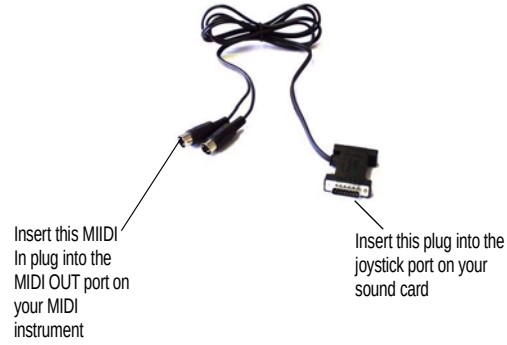
## If Your Sound Card Contains a MIDI Interface

Your sound card may contain a MIDI interface. Check its documentation if you're note sure. The MIDI ports on the sound card (if they exist) may be the standard MIDI type, or they may use the Joystick port on your computer.

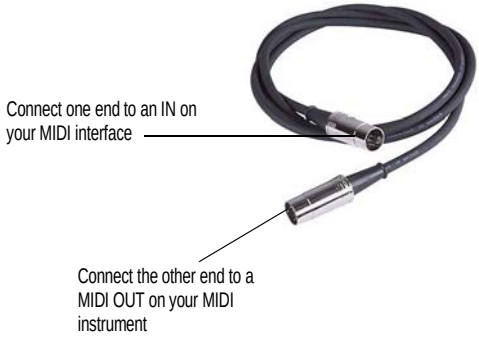
### To Connect a Keyboard to Your Sound Card's MIDI Interface

1. Make sure you have installed the MIDI driver software that came with your sound card. See your sound card's documentation to install it correctly.
2. Look at the sound card ports on your computer to see if they accept standard MIDI cables, or if only the Joystick port is present. A standard MIDI port is a round 1/2 inch socket that has holes for 5 pins, and a rectangular slot for a stabilizer pin. See the pictures below:

SoundBlaster type MIDI cable—use this if your MIDI interface is built into your sound card and uses the Joystick port on the back of your PC



Standard MIDI cable—use this if your MIID interface has standard 5-pin input and output ports




3. With the computer on, connect a standard MIDI cable from the MIDI OUT port on your MIDI keyboard to a MIDI IN port on your sound card.

   Or

   If your sound card uses the Joystick port for MIDI, connect the MIDI IN cable on a SoundBlaster type MIDI cable to the MIDI OUT port on your keyboard. Connect the other end of the cable to the Joystick port.

4. Launch Project5.

5. Use the ***Options-MIDI Devices*** command to open the MIDI Devices dialog.

6. Make sure the name of your sound card's MIDI IN port is listed in the Active MIDI Input Ports window. If it isn't, select the name in the Available MIDI Input Devices window, and then click the right arrow button to move the name to the Active MIDI Input Ports window. Your sound card may have several ports listed. Activate the ones you want to use. You may need to read your sound card's documentation to tell them apart.

7. Click OK to close the MIDI Devices dialog, and then insert an instrument in Project5.

8. Insert an instrument, and then right-click the instrument to display the Track Pane context menu.

9. On the context menu, make sure that ***All Ports-Omni*** is selected, unless you're using a more complicated MIDI routing setup.

Make sure no other track has its MIDI Routing Override button or Solo button depressed, and play your keyboard to hear the instrument.

**Note**: the MIDI IN and MIDI OUT labels on the cables of a SoundBlaster type cable can be confusing. If you're not getting any sound when you play your keyboard, try switching one end of each cable to the opposite MIDI port.

# Troubleshooting

Here are some solutions to common problems:

There's No Audio

It Takes a Long Time to Hear my Keyboard When I Play it

No Sound When I Play My Keyboard

CPU is at 100% and I Get Distortion

When I Preview a Pattern, the First Note Doesn't Sound

ReWire Client Interface Does Not Open

## There's No Audio

First, make sure your speakers or head phones are turned up and working properly. Then, make sure the correct audio driver for the sound card you're using is enabled. To check this, use the ***Options-Audio*** command to open the Audio Options dialog, and in the Device field, make sure that the name of your preferred sound card is selected. Then check the Select Output Channel field, and make sure that the audio channel that is selected there is the one that is connected to your amplifier or headphones. Also, if your sound card uses a WDM audio driver, click the Profile WDM button in the Audio Options dialog to automatically choose standard settings for your audio driver.

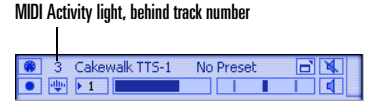
Also, make sure no tracks have their Mute or Solo buttons enabled, and that the volume sliders on the tracks and the Master track are turned up. The Master track has a volume slider and meter on the right end of the Main Control view just left of the CPU meter, and also in the Bus pane, which appears when you click the Show Aux Master Tempo button.

## No Sound When I Play My Keyboard

If you've checked your speakers and audio driver (see There's No Audio, if you haven't), then try these options:

- See if the correct MIDI input device is selected. To do this, use the ***Options-MIDI Devices*** command to open the MIDI Devices dialog, and make sure that the MIDI input interface or device you're using is listed in the Active MIDI Input Ports field. Also make sure your keyboard is turned on and your MIDI cables are connected correctly.

  **Note**: an instrument track has a MIDI Activity light, which lights up whenever the track is receiving input from either a pattern or a MIDI keyboard.




- Make sure that you have inserted an instrument into your project (click the Add Instrument Track button to insert an instrument and a track).


- Make sure that the MIDI Routing Override button on an instrument other than the one you're trying to play is not depressed.
- Make sure that the Mute button on the instrument track you're trying to play is not depressed, and that no Solo button on any other track is depressed.
- If you have a ReWire host open, make sure that the host is not monopolizing your MIDI input port (SONAR and Project5 can successfully use the same MIDI input port).
- Make sure that the MIDI channel you're transmitting on is the same as the channel your instrument is receiving on.
- If you're trying to play a multi-output instrument, make sure that the output that the instrument is using is enabled.

## It Takes a Long Time to Hear my Keyboard When I Play it

Use the ***Options-Audio*** command to open the Audio Options dialog, and drag the Buffer Size slider so that it's at 20 mS or lower. This sets the Mixing Latency to an acceptable level. If the sound distorts at 20 mS or lower, you may need to download a newer driver for your sound card. WDM and ASIO drivers offer faster response than the older Dsound type. If you're running Project5 as a slave to a ReWire host application, the host application controls the latency.

Also, if your sound card uses WDM audio driver, click the Profile WDM button in the Audio Options dialog to automatically choose standard settings for your audio driver. Then drag the Buffer Size slider so that it's at 20 mS or lower.

## CPU is at 100% and I Get Distortion

Using instruments that have multiple outputs can use up your computer's resources quickly if you have enabled more than one output. Also, instruments that use samples can be CPU-intensive if the samples have long looped sections and/or long decay times.

## When I Preview a Pattern, the First Note Doesn't Sound

If you move the Now Time in the Editor by moving the Edit Marker, you may have moved the Now Time just past the start of the note you're previewing. The note will not sound if you start playback even a millisecond after the beginning of the note. Move the Now Time to the beginning of the Editor and you'll hear the beginning note. You can move the Edit Marker by dragging it, or by double-clicking in the Editor's Time Ruler.

## ReWire Client Interface Does Not Open

**T**he property page (interface) of some ReWire clients can not be opened from Project5. Try the Show Property Page button on the Track Inspector first; if that does not work, open the ReWire application from the Start menu.

# Menus

Hold your mouse over a menu command and press the F1 key on your keyboard to open a topic about that command.

## File-New-Project

This command creates a new empty project. Creating a new project automatically closes an open project.

## File-New-Project From Template File

This command opens the template file. You can change the template file by editing it to be the way you would like it, and then using the ***File-Save As Template*** command.

## File-Open

The ***File-Open*** command opens the Open dialog.

## File-Save

Use this command to save a project in Project5.

## File-Save As

The ***File-Save As*** command opens the Save As dialog. Use the Save As command to save a project for the first time or to save a project to a new filename.

## File-Save As Template

The ***File-Save As Template*** command saves the current project settings as a template for new projects.

## File-Info

The ***File-Info*** command opens the Song Information dialog box where you can enter information about your project, including author, title and copyright. For more information, see Song Information dialog.

## File-Import

This command opens the Open dialog. Browse to any wave file or Standard MIDI File (.MID) and select it. When you click the Open button, Project5 imports the file into your project.

## File-Export

The File-Export command opens the Export Audio dialog. You can export Project5 projects as wave files (extension .WAV) or MP3s (extension .MP3).

## File-Recent File

Click a recently opened file in the File menu to open it.

## File-Exit

This command closes Project5. If you have unsaved changes in the current project, you are prompted to save before Project5 closes.

## Edit-Undo

The ***Edit-Undo*** command returns your project to its state prior to the last edit.

## Edit-Redo

The ***Edit-Redo*** command undoes an undo command.

## Edit-Undo History

The ***Edit-Undo History*** command opens the Undo History dialog.

## Edit-Cut

The ***Edit-Cut*** command deletes the selected pattern from a track or pattern data from the Editor. You can use the ***Edit-Paste*** command to paste the pattern or pattern data.

## Edit-Copy

The ***Edit-Copy*** command makes a copy of the selected pattern in a track or pattern data from the Editor. You can use the ***Edit-Paste*** command to paste the pattern or pattern data.

## Edit-Paste

The ***Edit-Paste*** command pastes a copied or cut pattern or pattern data.

## Edit-Delete

The ***Edit-Delete*** command destructively deletes a pattern from a track or pattern data from the Editor. If you delete a pattern or any pattern data it is not saved on the clipboard for the past command. If you want to cut a pattern or pattern data for use with the ***Edit-Paste*** command, use ***Edit-Cut*** instead.

## Edit-Combine Selected Clips

This command will combine selected audio or MIDI patterns that are on the same track into one pattern.

**Note**: Project5 uses the terms “clips” and “patterns” interchangeably.

## Edit-Split Selected Clips

This command will split selected audio or MIDI patterns along the Now Time.

**Note**: Project5 uses the terms “clips” and “patterns” interchangeably.

## Edit-Unlink Selected Clips

This command makes selected instances of the same pattern into independent copies.

**Note**: Project5 uses the terms “clips” and “patterns” interchangeably.

## Edit-Groove Clip Looping

This command turns an audio pattern’s ACIDized functions off or on, turning a Groove clip into a wave file, or vice versa.

## Edit-Split Until Marker

This command will not appear if the Edit Marker is set to 0 in the Editor’s Time Ruler. Right-click in the current pattern before the Edit Marker and select ***Split Until Marker*** to create a new pattern that contains all the data in the current pattern up to the Edit Marker.

## Edit-Split From Marker

This command will not appear if the Edit Marker is set to 0 in the Editor's Time Ruler. Right-click in the current pattern after the Edit Marker and select ***Split From Marker*** to create a new pattern that contains all the data in the current pattern after the Edit Marker.

## Edit-Insert Audio Track

The ***Edit-Insert Audio Track*** command creates a new audio track in the Track pane. The new track appears as the last track in the Track pane.

## Edit-Delete Track

The ***Edit-Delete Track*** command deletes the currently selected track in the Track pane.

## Edit-Freeze/Unfreeze Track

The ***Edit-Freeze Track*** command mixes down an instrument track, along with any effects that are on the track, into an audio pattern, and disables the device chain on this track. This greatly reduces the load on your CPU. The ***Edit-Unfreeze Track*** command restores the track to its original state.

## Edit-Clone Instrument Track

The ***Edit-Clone Instrument Track*** command creates another instance of the same instrument on a separate track.

## Edit-Insert Time Signature

The ***Edit-Insert Time Signature*** command opens the Insert Time Signature dialog. For more information, see Insert Time Signature and Change Time Signature dialog.

## Edit-Change Time Signature

The ***Edit-Change Time Signature*** command opens the Change Time Signature dialog. For more information, see Insert Time Signature and Change Time Signature dialog.

## Edit-Delete Time Signature

The ***Edit-Delete Time Signature*** command deletes time signature that is before the current Now Time.

## Edit-Select All

The ***Edit-Select All*** command selects all the events or patterns in both the Arrange pane and the Editor.

## Process-Quantize

The ***Process-Quantize*** command opens the Quantize dialog.

## Process-Groove Quantize

The ***Process-Groove Quantize*** command opens the Groove Quantize dialog.

This command adjusts the start time and duration of selected notes using a music piece as a pattern.

## Process-Transpose

The ***Process-Transpose*** command transposes the pitches of selected notes or patterns up or down by a fixed number of half-steps.

## Process-Slide

The ***Process-Slide*** command opens the Slide dialog. You can move selected notes or patterns by a specific amount of measures, ticks, seconds or frames. Positive numbers move the data to the right (forward) and negative numbers move the data to the left (backward)..

## Process-Length

The ***Process-Length*** command can be used to stretch or shrink selected notes or patterns. ***Process-Length*** lets you stretch or shrink the selection by a fixed percentage and makes the adjustment by altering the individual events. A value of 200 percent, for example, stretches the selection to twice its original length, while a value of 50 percent shrinks the selection to half its original length.

## Process-Scale Velocity

The ***Process-Scale Velocity*** command lets you create crescendos (volume swells) and decrescendos on those instruments that respond to MIDI velocity. Most such instruments map changes in velocity to changes in note loudness. Many synthesizer patches alter the timbre of the sound as well, so that higher velocities produce brighter, as well as louder, sounds. Changes in velocity also affect the playback of audio clips.

This command lets you set a starting and ending velocity for the entire time range of the selection. Project5 scales the velocity of each event to create a smooth linear change in velocity. As an option, you can enter a starting and ending percentage; existing velocity values are modified by the designated percentage.

## Process-Retrograde

The ***Process-Retrograde*** command reverses the order of selected events.

## View-Show/Hide Track Inspector

The ***View-Show/Hide Track Inspector*** command shows or hides the Track Inspector.

## View-Show/Hide Groove Matrix

The ***View-Show/Hide Groove Matrix,***command shows or hides the Groove Matrix.

## View-Show Editor

The ***View-Show Editor*** command displays the Editor, and moves the Loops/Patterns tab to the background.

## View-Show Loops and Patterns

The ***View-Show Loops and Patterns*** command displays the Loops/Patterns tab, and moves the Editor to the background.

## View-Maximize/Restore Track View

The ***View-Maximize/Restore Track View*** command hides or shows the Editor and Loops/Patterns tab, creating more or less space in the Track view.

## View-Show/Hide Track Automation

The ***View-Show/Hide Track Automation,***command shows or hides track automation by expanding or contracting the height of tracks.

## View-Show/Hide Bus Pane

The ***View-Show/Hide Bus Pane ,***command shows or hides the Bus Pane.

## Transport-Stop

The ***Transport-Stop*** command stops the playback of the project.

## Transport-Play

The ***Transport-Play*** command begins playback of the project beginning at the Now Time.

## Transport-Record

The ***Transport-Record*** command begins recording of all armed tracks.

## Transport-Rewind

The ***Transport-Rewind*** command moves the Now Time to the beginning of the project.

## Transport-Jog Backward

The ***Transport-Jog Backward*** command moves the Now Time back by the current snap resolution.

## Transport-Jog Forward

The ***Transport-Jog Forward*** command moves the Now Time forward by the current snap resolution.

## Transport-Loop ON/OFF

The ***Transport-Loop ON/OFF*** command toggles on/off looping. Looping is on if a check appears next to it in the menu.

## Transport-Pattern Preview

The ***Transport-Pattern Preview*** command begins playback of the current pattern in the Editor. You can also preview a pattern using the Pattern Preview button in the Editor.

## Transport-Metronome ON/OFF

The T***ransport-Metronome ON/OFF*** command toggles on/off the Metronome. The Metronome is on if a check appears next to this command in the menu.

## Transport-Count ON/OFF

The ***Transport-Count ON/OFF*** command toggles on/off the Count-in. The Count-in is on if a check appears next to this command in the menu.

## Options-MIDI Devices

This command opens the MIDI Devices dialog.

For more information about this dialog, see MIDI Devices dialog.

## Options-Audio

This command opens the Audio Options dialog.

For more information about this dialog, see Audio Options dialog.

## Options-Send MIDI Sync

The ***Options-Send MIDI Sync*** command cause Project5 to send a MIDI sync signal to a slave device. For more information, see MIDI Synchronization.

## Options-MIDI Remote Control

The ***Options-MIDI Remote Control*** command opens the MIDI Remote Control dialog. For more information, see MIDI Remote Control dialog.

## Options-Metronome

The ***Options-Metronome*** command opens the Metronome Properties dialog. For more information, see Metronome Properties dialog.

## Options-Freeze Tail Duration

The ***Options-Freeze Tail Duration*** command opens the Freeze Tail Duration dialog. When you freeze a track, any effects that the track uses frequently need some extra time at the end of the track to finish. This dialog lets you set the amount of extra time you want to leave for the effects to finish sounding.

## Options-Default Step Size for Step Sequencer-Measure

Sets the default step value to whole measures when creating notes in the Editor when in Step mode.

## Options-Default Step Size for Step Sequencer-Half Note

Sets the default step value to half notes when creating notes in the Editor when in Step mode.

## Options-Default Step Size for Step Sequencer-Quarter Note

Sets the default step value to quarter notes when creating notes in the Editor when in Step mode.

## Options-Default Step Size for Step Sequencer-Eighth Note

Sets the default step value to eighth notes when creating notes in the Editor when in Step mode.

## Options-Default Step Size for Step Sequencer-Sixteenth Note

Sets the default step value to sixteenth notes when creating notes in the Editor when in Step mode.

## Options-Default Step Size for Step Sequencer-Thirty Second Note

Sets the default step value to thirty second notes when creating notes in the Editor when in Step mode.

## Options-Default Step Size for Step Sequencer-Sixty Fourth Note

Sets the default step value to sixty fourth notes when creating notes in the Editor when in Step mode.

## Options-Default Step Size for Step Sequencer-One Twenty Eighth Note

Sets the default step value to 128th notes when creating notes in the Editor when in Step mode.

## Options-Default Step Size for Step Sequencer-Follow Snap Grid

Uses the Snap Grid to determine step size in the Editor when in Step mode.

## Options-Default Step Count for Step Sequencer-Eight Steps

Sets the number of steps in the Editor to eight when using Step mode.

## Options-Default Step Count for Step Sequencer-Sixteen Steps

Sets the number of steps in the Editor to sixteen when using Step mode.

## Options-Default Step Count for Step Sequencer-Thirty Two Steps

Sets the number of steps in the Editor to 32 when using Step mode.

## Options-Default Step Count for Step Sequencer-Sixty Four Steps

Sets the number of steps in the Editor to 64 when using Step mode.

## Options-Open Last Project At Startup

By default, when you launch Project5, the last project you worked on opens. You can change this so that Project5 opens an empty project instead, by unchecking the ***Options-Open Last Project At Startup*** option that's in the Options menu.

## Options-Scroll With Now Time

This command causes the Arrange pane to scroll along with the Now Time cursor. You can enable or disable the command from either the menu, or by pressing the Scroll Lock key on your computer keyboard.

## Options-Left Click Sets Now Time

When this option is checked, you can set the Now Time when playback is stopped by left-clicking in the Arrange pane: after you click, the Now Time jumps to the Snap-to-Grid boundary that is nearest to the place that you clicked. If the Snap-to-Grid button is off, the Now Time moves to the exact place where you clicked. You can set the Now Time *during* playback by left-clicking in the Time Ruler (this procedure also follows the Snap-to-Grid setting).

## Options-Right Click Sets Now Time

When this option is checked, you can set the Now Time when playback is stopped by right-clicking in the Arrange pane: after you click, the Now Time jumps to the Snap-to-Grid boundary that is nearest to the place that you clicked. If the Snap-to-Grid button is off, the Now Time moves to the exact place where you clicked. You can set the Now Time *during* playback by left-clicking in the Time Ruler (this procedure also follows the Snap-to-Grid setting).

## Options-Show Transport At Left (For Multiple Monitors)

When this option is checked, the Transport appears on the left monitor when you are using two monitors, instead of split down the middle.

## Help-Help Contents

The ***Help-Help Contents*** command opens the Project5 HTML Help file. Project5 Help is completely searchable and indexed.

## Help-Project5 Owner's Page

Click this link to open the Project5 Owner's Page in your web browzer.

## Help-Keyboard Shortcuts

**Note 1**: A **plus sign** (**+**) indicates that both keys must be held down at the same time. For example, Ctrl+F6.

**Menu Commands**

| **Command** | **Shortcut** |
|---|---|
| File-(any File menu command) | Alt+F+(underlined letter or number in File menu) |
| File-New Project | Ctrl+N |
| File-New Project From Template File | Ctrl+Shift+N |
| File-Open | Ctrl+O |
| File-Save | Ctrl+S |

| | |
|---|---|
| File-Save As | Ctrl+Shift+S |
| File-Exit | Ctrl+Q |
| Edit-(any Edit menu command) | Alt+E+(underlined letter in Edit menu) |
| Edit-Undo | Ctrl+Z |
| Edit-Redo | Ctrl+Shift+Z |
| Edit-Undo History | Ctrl+H |
| Edit-Cut | Ctrl+X |
| Edit-Copy | Ctrl+C |
| Edit-Paste | Ctrl+V |
| Edit-Delete | Delete key |
| Edit-Combine Selected Clips | M |
| Edit-Split Selected Clips | S |
| Edit-Unlink Selected Clips | U |
| Edit-Groove Clip Looping | Ctrl+L |
| Edit-Split Until Marker | Ctrl+U |
| Edit-Split From Marker | Ctrl+M |
| Edit-Insert Audio Track | Insert |
| Edit-Delete Track | Ctrl+Delete |
| Edit-Freeze Track | Ctrl+F |
| Edit-Clone Instrument Track | Ctrl+Alt+C |
| Edit-Select-All | Ctrl+A |
| Process-(any Process menu command) | Alt+P+(underlined letter in Process menu) |
| Process-Quantize | Ctrl+Shift+Q |
| Process-Retrograde | Ctrl+R |
| View-(any View menu command) | Alt+V+(underlined letter in View menu) |
| View-Show/Hide Track Inspector | I |
| View-Show/Hide Groove Matrix | Ctrl+G |
| View-Show Editor | Alt+1 |
| View-Show Loops and Patterns | Alt+2 |
| View-Maximize/Restore Track View | Alt+3 |
| View-Show/Hide Track Automation | Ctrl+T |
| View-Show/Hide Bus Pane | Ctrl+B |
| Transport-(any Transport menu command) | Alt+T+(underlined letter in Transport menu) |
| Transport-Play or Stop | Spacebar |
| Transport-Record | R |
| Transport-Rewind | W |
| Transport-Jog Backward | Ctrl+Page Up |
| Transport-Jog Forward | Ctrl+Page Down |
| Transport-Loop ON/OFF | L |
| Transport-Pattern Preview | Shift+Space |
| Transport-Metronome ON/OFF | C |
| Transport-Count ON/OFF | O |
| Options-(any Options menu command) | Alt+O+(underlined letter or number in Options menu) |
| Options-Scroll With Now Time | Scroll Lock |
| Help-(any Help menu command) | Alt+H+(underlined letter in Help menu) |

### Main Control View Commands

| Command | Shortcut |
|---|---|
| Tap Tempo | \ |
| Metronome (Click) ON/OFF | C |
| Play/Stop | Spacebar |
| Record | R |
| Rewind | W |
| Jog Backward | Ctrl+Page Up |
| Jog Forward | Ctrl+Page Down |
| Selection tool | T |
| Automation tool | T |
| Toggle automation lanes | Ctrl+T |
| Snap to Grid | N |
| Loop ON/OFF | L |
| Set loop points to selection | Ctrl+P |

### Track Pane Commands

| Command | Shortcut |
|---|---|
| Select track control | Left or Right Arrow |
| Select next or previous track | Up or Down Arrow |
| Increment value | + |
| Decrement value | - |
| MIDI Routing Override button ON/OFF | X |

| | |
|---|---|
| Zoom horizontally | Ctrl+Left or Right Arrow |
| Center the Now Time | G |
| Scroll with Now Time | Scroll Lock |
| Nudge selected pattern horizontally or to adjacent track | Arrow keys |
| Transpose pattern that has the black outline by half-steps | + or - |
| Snap button ON/OFF (when focus is on Track view, not the Editor) | N |

### Track Inspector Commands

| Command | Shortcut |
|---|---|
| Port/Channel filter | Shift+O |
| Reassign MIDI channel | Shift+C |
| Increment Bank/Patch menu | B and Shift+B |

### Editor and Loops/Patterns Tab Commands

| Command | Shortcut |
|---|---|
| Show Editor | Alt+1 |
| Show Loops/Patterns Tab | Alt+2 |
| Hide Editor and Loops/Patterns tab | Alt+3 |

### Loops/Patterns Tab Commands

| Command | Shortcut |
|---|---|
| Delete selected pattern | Delete |

### Editor Commands

| Command | Shortcut |
|---|---|
| New pattern | Shift+N |
| Save pattern | Shift+S |
| Duplicate pattern | Shift+D |
| Send pattern to track | Shift+T |
| Preview pattern | Shift+Spacebar |
| Record pattern | Shift+R |
| Selection tool | T, or Ctrl+Alt+S |
| Notes tool | T, or Ctrl+Alt+N |
| Automation tool | T, or Ctrl+Alt+A |
| Editor Snap button ON/OFF (when focus is on Editor, not Track view) | N |
| Step size measure | 1 |
| Step size half note | 2 |
| Step size quarter note | 4 |
| Step size eighth note | 8 |
| Step size sixteenth note | 6 |
| Step size thirty-second note | 3 |
| Step size sixty-fourth note | 9 |
| Step size one-twenty-eigth note | 0 |
| Dotted note | D |
| Triplet note | Ctrl+Shift+T |
| Snap to Grid | N |
| Cut | Ctrl+X |
| Copy | Ctrl+C |
| Paste | Ctrl+V |
| Delete | Delete |
| Split until marker | Ctrl+U |
| Split from marker | Ctrl+M |
| Show Editor | Alt+2 |
| Move selected data | Arrow keys |

### Arrange Pane Right-click Menu Commands

| Command | Shortcut |
|---|---|
| Cut | Ctrl+X |
| Copy | Ctrl+C |
| Paste | Ctrl+V |
| Delete | Delete |
| Combine selected clips | M |
| Split selected clips | S |
| Unlink selected clips | U |

## Help-Project5.com

This command opens your web browzer to the Project5.com website.

## Help-View README.rtf

Click this link to open the Project5 README file.

## Help-Order Project5 Online

Click this command to order Project5 online.

## Help-About Project5

This command displays the Project5 About box where you can find the product's version number.

# Dialogs

Click the Help button in a dialog to open a help topic about that dialog.

## Audio Options dialog

The ***Options-Audio*** command opens the Audio Options dialog. The Audio Options dialog is where you profile audio drivers and select the main outputs for Project5.

### Device

In the Device menu, select the sound card you want to use for recording and playback.

If you have multiple sound cards on your computer, or a sound card with multiple outputs, the dropdown has multiple options. Project5 supports WDM, ASIO, and Dsound drivers. Dsound is for older sound cards, and doesn't offer the low-latency performance that WDM and ASIO offer.

If you select an ASIO device, a button appears in the corner of the Audio Options dialog that allows you to open the ASIO control panel for your sound card (if it has an ASIO driver installed on your computer).

### Select Input Channel

In the Select Input Channel menu, select the input channel you want to use for recording.

### Select Output Channel

In the Select Output Channel menu, select the output channel you use for playback. This channel on your sound card should be one that is connected to your amplifier and speakers, so you can hear the sounds Project5 produces.

### Playback Bit Depth

Choose the bit depth you want your current project to use (you can change this at any time, however). If you play back 24 bit audio clips at 16 bits, Project5 dithers the clips to 16 bits. This can be useful if you want to hear what your project sounds like at 16 bits. If you play back 16 bit audio clips at 24 bits, any effects you use can produce a wider range of sounds.

Playing back at 24 bits uses more CPU than 16 bits, but not a lot more.

Bit depth options:

- 16—this is CD quality
- 24
    - Justify—if you choose 24 as a bit depth, your sound card may need the numbers to be "justified." Read your sound card's documentation to see what setting it needs, or turn down the volume on your speakers and try the 3 choices.

**Note**: the justification setting is not something the user can have a preference for, since it basically means "how the sound card likes its audio formatted." Each sound card can only understand one of those justification settings. Unfortunately there is no easy way for Project5 to know the format the sound card wishes to receive. This is why it is up to the user to try the various options (of course with volume levels set low for safety) and stick with the one that works. It is strongly suggested that the user keep the setting where the correct playback can be heard.

### Mixing Latency

- The **Buffer Size slider** enables you to set mixing latency manually, overriding the value set by Project5. A value of 20 mS or lower is about what's required to avoid a larger gap between when you play your MIDI keyboard and when you hear the sound coming from Project5.

**Note 1:** If you set the Buffer Size slider too low, you may hear glitches in the audio during playback. This is due to a sound card or CPU limitation. To eliminate these glitches, increase the buffer size, or download a new audio driver

for your sound card. WDM (Windows Driver Model), and ASIO drivers have low latency.

**Note 2:** Actual system latency may not be the latency reported by the slider, and in the case of DSound drivers, this latency is typically about 30 ms higher unless the sound card supports hardware mixing. For more information consult your sound card's documentation.

### Default Settings for New Projects

Click one of the selections to choose the file bit depth and sampling rate for new projects.

**Note**: as soon as you import audio (non-ACIDized audio), or record audio into your project, the sample rate and audio file bit depth of your project are fixed at the settings displayed in the Default Settings for New Projects fields. As soon as this happens, the project settings are displayed in the Current Project Settings field. You can still change the settings in the Default Settings for New Projects fields, but the changes only apply to future projects.

Audio File Bit Depth:

- 16—this choice uses 50% less disk space than 24. If your playback bit depth is 16, use this setting.
- 24—choose this if your playback bit depth is 24. If your playback bit depth is 24, and your file bit depth is 16, Project5 will dither the sound down to 16, however, any recording you've done at 24 bits will be stored at 16, creating extra noise and losing some detail.

Sample rate options. If you want lower or higher resolution than the default (CD-quality 44100), choose another option. If your sound card does not support a particular option, that option appears greyed-out.

- 11025 Hertz (Hz)
- 22050 Hz
- 44100 Hz—this is CD quality
- 48000 Hz
- 88200 Hz
- 96000 Hz

### Other

Maximum Number of ReWire Outputs:

- Use this field to choose how many of Project5's buses and tracks you want to expose as stereo audio outputs to your other ReWire applications. You can expose the Master track as an output, the aux buses as outputs, and each instrument or audio track as an output. The outputs will be numbered starting with the Master track, then the aux buses, then the instrument and/or audio tracks in the order that they appear in Project5's Track view.

  These outputs will show up as audio inputs in your other ReWire applications. Exposing more than you're going to use wastes memory, especially if you expose a lot of outputs.

See also:

ReWire

### Profile WDM

When you first install Project5, Project5 "profiles" all of your sound cards that use WDM drivers by testing them to see which sample rates, bit depths, and Justify settings they support, and makes these choices available in the Audio Options dialog. Whenever you add a new sound card, or make any changes to a sound card's own software application, you might need to click the Profile WDM button to re-profile your sound card(s).

## Create Shortcut dialog

Clicking the Create Shortcut button in the Loops/Ptns tab opens the Create Shortcut dialog.

The Create Shortcut dialog has the following field:

### Shortcut Name
Fill in the name you want to use for this shortcut, and click OK to close the dialog. Your new shortcut appears in the left panel of the Loops/Ptns tab.

## Export dialog

The Export dialog is where you save your project as a Wave file or MP3.

**Note**: Project5 Version 2 ships with a 30-day trial MP3 encoder. If you've never activated a Cakewalk MP3 encoder, click the Activate MP3 Encoder button in the Export dialog. This will take you to our MP3 activation web page; simply follow the instructions on the page.

If you've previously purchased any Cakewalk MP3 encoder, select Disc Contents from the main autorun menu, then select MP3 Encoder. If a previously activated Cakewalk MP3 encoder is detected, your Project5 MP3 encoder will be fully activated.

Once the encoder is activated, the Activate MP3 button will no longer be visible, and you will have unlimited use of the MP3 encoder.

The Export dialog has the following elements:

### Save in
This field, located at the top of the dialog, displays the folder where the file would be saved. Navigate to the folder you want to save your file in using the buttons to the right of the Save In field.

### File Name
Enter a file name for the file you are exporting.

### Save As Type
Select either Wave File (.WAV) or MP3.

### Bits Per Sample
Select a bit depth, either 16 (CD quality) or 24, for the file you are exporting.

### Sample Rate
Select a sample rate for the file you are exporting. 44,100Hz is CD quality.

### Effects Tails
Add up to 99 seconds after the end of a looped point or the end of your project to give room for any effects "tails" like reverb or delay.

### Export Looped Region Only
This control is only available if you have Project Looping enabled in Project5. When selected, this option creates a file of only the part of your project contained within the loop points.

### MP3 Options--Quality
Move the slider to the left to create the highest quality MP3 file. Move the slider to the right to create an MP3 as fast as possible.

### MP3 Options--Bit Rate
Select a bit rate

### MP3 Options--Stereo Mode
Select one of the following modes:

- Mono—this option creates a standard mono file for minimum bandwidth.
- Stereo—this option creates a standard stereo file.
- Joint Stereo—not a full stereo file, but most files will sound just as good, and at smaller bandwidth. If stereo separation is important for this particular file, choose Stereo or Mid/Side instead.
- Mid/Side Stereo—preserves most of the stereo effect of a file but at lower bandwidth. Not too useful at bit rates above 128 kbs.

### Enable High Pass Filter/Low Pass Filter
These filters decrease your file size by eliminating frequencies that people don't usually hear anyway.

### ID3 Tag
Clicking this button opens the ID3 Tag dialog, where you can enter identifying information that is stored in your MP3 file and can be read by most MP3 players and similar hardware.

## Freeze Tail Duration dialog

The ***Options-Freeze Tail Duration*** command opens the Freeze Tail Duration dialog. When you freeze a track, any effects that the track uses frequently need some extra time at the end of the track to finish. This dialog lets you set the amount of extra time you want to leave for the effects to finish sounding.

The Freeze Tail Duration dialog has the following field:

### Freeze Tail Duration 'n' seconds
Fill in the number of seconds that you want to add to the end of your track. If you're not sure, play the end of the track and then listen for how long the sound takes to decay completely.

## Groove Quantize dialog

The ***Process-Groove Quantize*** command opens the Groove Quantize dialog box. Groove Quantizing is a way to edit a track so that its rhythmic feeling and, optionally, controller data are similar to some other piece of music. The other piece of music forms a groove pattern that you store in a groove file, which has an extension of .GRV.

The Groove Quantize dialog box has the following fields:

### Groove File
Use this field to choose what groove file you want to choose a groove pattern from. Groove files have the extension .GRV.

### Groove Pattern
Use this field to choose the pattern you want to apply to the selected data.

### Resolution
Set the note resolution. The smaller the note value, the more precise the quantization.

### Window
This field determines what Project5 does to notes that are far from the quantization points. The Window fields include the following:

- Sensitivity—This value determines how far from the quantization grid Project5 looks to find notes to quantize. A value of 100 percent quantizes every note.
- If Outside Window—This field offers the following choices:
    - Do not change—Choosing this option means that Project5 leaves notes alone that lie outside the window.
    - Quantize to Resolution—Choosing this option means that Project5 quantizes out-of-window notes according to the resolution value instead of the groove pattern.
    - Move to Nearest—Choosing this option means that Project5 moves out-of-window notes to the nearest groove event.
    - Scale Time—Choosing this option means that Project5 moves out-of-window notes so that they are equally spaced.

### Only Note Events
Check this box to prevent MIDI controller, aftertouch, and xRPN data from changing.

### Strength
The values in the Strength section determine how closely Project5 changes the selected notes to match the groove's values.

The Strength section has these fields:

- Time—Drag the slider in this field to set how closely Project5 moves the start time of the selected notes to the groove's start times.
- Duration—Drag the slider in this field to set how closely Project5 moves the durations of the selected notes to the groove's durations.
- Velocity—Drag the slider in this field to set how closely Project5 moves the velocities of the selected notes to the groove's velocities.

For more information, see Groove Quantizing.

## ID3 Tag dialog

The ID3 Tag dialog is where you enter information that is stored in your MP3 file and displayed in most applications that play MP3 files. The ID3 Tag dialog has the following fields:

- Title—The Song title
- Artist—The performer
- Album—The album or collection of songs that the song comes from
- Track—The track number.
- Comment—Track notes
- Genre—Select from a list of genres
- Year—The year the song was made

## Import dialog

The Import dialog is where you import both wave files and .MID files (Standard MIDI Files) for use as patterns in Project5.

The following is a description of the controls in the Import dialog:

### Look in
Use this dropdown menu to navigate to the directory where your .MID files are saved.

### Files List pane
Select the file you want to import in the Files List pane.

### File Name
The name of the selected file appears in the File Name field.

### Files of Type
Select the kind(s) of file(s) you're looking for.

### Open button
Click this button to import the selected file.

## Insert Time Signature and Change Time Signature dialog

To open the Insert Time Signature dialog, double-click on the Time Ruler where you want the time signature change to begin or right-click in the Time Ruler and select ***Insert Time Signature*** from the menu that appears or select the command from the Edit menu.

To open the Change Time Signature dialog, right click in the Time Ruler and select ***Change Time Signature*** from

the menu that appears or select the command from the Edit menu.

Both dialogs have the same function except that the Change Time Signature command changes the time signature for the whole project and the Insert Time Signature command changes the time signature at the current Now Time.

**At Measure (Insert Time Signature dialog only)**
Set the measure at which the time signature change begins. The Change Time Signature dialog changes the time signature for the entire project, beginning at the first measure.

**Beats Per Measure**
The number of beats per measure. Valid values are 1 through 64.

**Beat value**
The length of each beat. Valid values are 1 (whole), 2 (half), 4 (quarter), 8 (eighth), 16 (sixteenth) and 32 (32nd).

## Length dialog

The ***Process-Length*** command, which opens the Length dialog, can be used to stretch or shrink notes or patterns, and/or to move their start times. ***Process-Length*** lets you stretch or shrink the selection by a fixed percentage and makes the adjustment by altering the individual events. A value of 200 percent, for example, stretches the selection to twice its original length, while a value of 50 percent shrinks the selection to half its original length.

You can also use the ***Process-Length*** command to alter only the start times or the durations of notes. For example, changing the durations of notes to 50 percent of their original length can create a staccato effect.

The Project5 box has the following fields:

**Change**
Use the fields in this section to tell Project5 what to change, including:

- Start Times—Choose this option if you want the start times of the selected events to shift by a percentage of their distance from the beginning of the selection. For example, if a note starts on beat 3 of a selection and you enter a value of 50 percent, Project5 shifts the start of the note one beat to the left, or half of 2 beats.
- Durations—Choose this option if you want the durations of the selected events to shrink by a percentage.

**By “N” Percent**
Fill in the percentage number that you want the selected events to change by, which can be positive or negative.

## Metronome Properties dialog

In the Metronome Properties dialog, you can specify what sounds you want for the first beat in a measure and the other beats in a measure. You can use an audio file or a synthesized tone for either.

**First Beat:**
Use the fields in this section to configure the sound that you want to hear on the first beat of every measure.

**Other Beats:**
Use the fields in this section to configure the sound that you want to hear on every beat except the first beat of every measure.

**Velocity**
Use the Velocity field in the First Beat section to control the volume of the wave file or pure tone that sounds on the first beat of the measure. Use the Velocity field in the Other

Beats section to control the volume of the wave file or pure tone that sounds on the other beats of the measure.

### Wave File

If you click the Wave File radio button that's in the First Beat section, the metronome will use a wave file for the metronome sound on the first beat of each measure, and if you click the Wave File radio button that's in the Other Beats section, the metronome will use a wave file for the metronome sound on the other beats of each measure. The two Wave File dropdown menus list wave files that are in the Metronome folder in your Project5 program folder. You can add files to the folder by using Windows Explorer.

Use the Wave File field in the First Beat section to select a wave file to sound on the first beat of the measure. Use the Wave File field in the Other Beats section to select a wave file to sound on the other beats of the measure.

### Pure Tone

If you click the Pure Tone radio button that's in the First Beat section, the metronome will use a pure tone for the metronome sound on the first beat of each measure, and if you click the Pure Tone radio button that's in the Other Beats section, the metronome will use a pure tone for the metronome sound on the other beats of each measure. The two Pitch menus allow you to choose the pitch of the first beat and other beat tones, respectively.

### Tone Duration

Use this field to set the duration of the pure tone in ticks (0-959). A single beat in Project5 lasts for 960 ticks.

### Count in # of Beats

If you want the metronome to start clicking a few beats before recording starts, use this field to choose the number of beats. The default is 0, which means no count-in.

To turn th count-in on before you record, use the ***Transport-Count-in On/Off*** command. When the command is enabled, a checkmark appears next to the command.

### Volume (dB)

Use this field to set the metronome volume. The range is -INF to +18.

## MIDI Devices dialog

The MIDI Devices dialog is where you select one or more MIDI input drivers with which to play MIDI notes and data into Project5. You can also set synchronization parameters in this dialog.

For example, if you have a MIDI keyboard connected to your computer through the MIDI IN port on your sound card or through your MIDI interface (possibly a USB port on the back of your keyboard), you need to make sure that the software driver that your sound card or interface uses (whichever one your keyboard is connected to), is activated in this dialog. To make a driver active, click it to highlight it, and then click the Right Arrow button to move the driver name to the Active MIDI Input Ports field.

Use the ***Options-MIDI Devices*** command to open the MIDI Devices dialog whenever you need to make changes here.

The MIDI Devices dialog has the following fields:

- Available MIDI Input Devices—this field lists all of your unused MIDI input drivers from your MIDI interface(s). To make a driver active, click it to highlight it, and then click the Right Arrow button to move the port to the Active MIDI Input Ports field.
- Active MIDI Input Ports—this field lists the MIDI input drivers currently in use by Project5.
- Show this dialog at startup if there are no MIDI Devices enabled—it's good to leave this checkbox enabled: if you have no MIDI devices enabled, you will not hear anything when you play your keyboard.

### MIDI Sync (Clock) Output

- Output Device—this field lists the MIDI output port Project5 is using to send MIDI Sync signals out through. You can select a different device in the dropdown menu in this field.
- Send SPP—check this field if the slave device you want to control requires a Song Position Pointer signal (if it has a project length or pattern that always needs to play back at the same time location as your Project5 project).
- Send Start, Never Continue—if your slave device is a drum machine, you may want the drum machine to always start playing at the beginning of its loop or pattern, even if you're restarting Project5 from the middle of a project. If that's the case, enable the Send Start, Never Continue checkbox.

See also:

MIDI Synchronization

## MIDI Remote Control dialog

Right-clicking a widget and choosing ***MIDI Remote Control*** from the popup menu opens the MIDI Remote Control dialog.

The MIDI Remote Control dialog has the following fields:

- **Mapped Parameters**—this field highlights the parameter that you're currently assigning, and lists any other parameters in this project that you've assigned. When you highlight any parameter in the list, the other fields in this dialog update automatically to show you what control source is assigned to the highlighted parameter.
- **MIDI Input Source**—use this menu to choose which MIDI input you want to send the controller messages in through.
- **MIDI Channel**—use this menu to choose which MIDI channel that you want the Project5 widget to respond. If you want the widget to respond to any MIDI channel, choose Omni.
- **Control Source**—choose the type of MIDI message that you want the Project5 widget to respond to. If you want to detach the widget from a previous assignment, choose None.
- **Learn button**—if you're not sure what MIDI message a certain slider or knob on your controller sends out, click this button, move the slider or knob, and then click Stop Learning. Project5 reads the message that the slider sends out, and assigns that message to the widget in question.

See also:

Remote Control

Using Remote Control

## MP3 Encoder Activation dialog

Enter the activation code in the Activation Code field and click OK to activate the MP3 functionality in Project5. For information about getting an activation code, select ***Help-Project5 Owner's Page***.

## No MIDI Inputs Selected dialog

This dialog appears to warn you that you have not selected a MIDI input to use with Project5. Click the Choose MIDI Devices Now button to open the MIDI Devices dialog and select a MIDI input, or Click the Continue With No MIDI Input button to work in Project5 without a MIDI Input. You can select a MIDI input at any time by selecting ***Options-MIDI*** from the Project5 menu.

## Open dialog

The following is a description of the controls in the Open dialog:

**Look in**
Use this dropdown menu to navigate to the directory where your project files are saved.

**Files List pane**
Select the project you want to import in the Files List pane.

**File Name**
The name of the selected file appears in the File Name field.

**Open button**
Click this button to open the selected file.

## Open Pattern dialog

**Look in**
Use this dropdown menu to navigate to the directory where your pattern is saved.

**Files List pane**
Select the pattern you want to open.

**File Name**
The name of the selected file appears in the File Name field.

**Open button**
Click this button to open the selected pattern.

## Open Preset dialog

Clicking the Presets menu in the Arpeggiator and choosing ***Open Preset*** from the dropdown menu opens the Open Preset dialog.

The Open Preset dialog has the following fields:

**Look in**
Use this dropdown menu to navigate to the directory where your Arpeggiator presets (.ARP extension) or Project5 patterns (.PTN extension) are stored. If you're browsing for a Project5 pattern, choose Pattern Files in the Files of Type field.

**Files List pane**
Select the file you want to import in the files list pane.

**File Name**
The name of the selected file appears in the File Name field.

**Open button**
Click this button to open the selected file.

## Quantize dialog

The Quantize dialog appears when you right-click in the Editor and choose Quantize from the popup menu. You can quantize both notes and controller data. First, select the data you want to quantize, then right-click in the Editor and choose Quantize from the popup menu.

The Quantize dialog has the following fields:

**Resolution**
- Use the Resolution field to choose what note value you want to quantize the selected data by.

**Change**
- **Start Times**—check this field if you want to move the start times of the selected notes to the nearest boundary of the note value you chose in the Resolution field.
- **Note Durations**—check this field if you want to change the durations of the selected notes to the duration of the note value you chose in the Resolution

field.

- **Include Automation**—check this field if you want to move the start time and changes of value of the selected automation to the nearest boundary of the note value you chose in the Resolution field.

### Options

- **Strength**—set this value to 100% if you want strict quantizing that conforms exactly to the Resolution value. Set lesser values if you want looser quantizing.
- **Randomize**—set this value to 0% if you want all selected data to be quantized the same way. Set higher values to vary the Strength of quantization on each selected object.

## Save As dialog

The following is a description of the controls in the Save As dialog:

**Look in**
Use this dropdown menu to navigate to the directory where you want to save your project file.

**Files List pane**
Lists the files currently saved in the target directory.

**File Name**
Enter a name for the project you are saving.

**Save button**
Click this button to save your project.

## Save Device Chain dialog

Right-clicking a track and choosing ***Save As Device Chain*** from the popup menu opens the Save Device Chain dialog.

The Save As Device Chain dialog has the following fields:

**Save in**
Use this dropdown menu to navigate to the directory where you want to save your device chain.

**Files List pane**
Lists the files currently saved in the target directory.

**File Name**
Enter a name for the device chain you are saving.

**Save button**
Click this button to save your device chain.

## Save Preset dialog

Clicking the Preset menu in the Arpeggiator and choosing ***Save Preset*** from the menu opens the Save Preset dialog. This command allows you to save the current settings of the Arpeggiator to a preset file that you can load when you want to use the same settings again.

The following is a description of the controls in the Save Preset dialog:

**Look in**
Use this dropdown menu to navigate to the directory where you want to save your preset file.

**Files List pane**
Lists the files currently saved in the target directory.

**File Name**
Enter a name for the preset you are saving.

**Save button**
Click this button to save your preset.

## Scale Velocity dialog

The ***Process-Scale Velocity*** command opens the Scale Velocity dialog box, which lets you edit selected MIDI notes or patterns to create crescendos (volume swells) and decrescendos on those instruments that respond to MIDI velocity. Most MIDI instruments map changes in velocity to changes in note loudness. Many synthesizer patches alter the timbre of the sound as well, so that higher velocities produce brighter, as well as louder, sounds.

This command lets you set a starting and ending velocity for the entire time range of the selection. Project5 scales the velocity of each event to create a smooth linear change in velocity. As an option, you can enter a starting and ending percentage; Project5 modifies existing velocity values by the designated percentage.

The Scale Velocity dialog box has the following fields:

### Begin

Enter a velocity value between 0 and 127 for the first event of the selection, unless you want to use percentages. If you use percentages, enter a number between 0 and the approximate percentage that would create a velocity of 127, when multiplied by the existing velocity of the first event. Project5 rounds off any values you create above 127 to 127.

### End

Enter a velocity value between 0 and 127 for the last event of the selection, unless you want to use percentages. If you use percentages, enter a number between 0 and the approximate percentage that would create a velocity of 127, when multiplied by the existing velocity of the last event. Project5 rounds off any values you create above 127 to 127.

### Percentages

Check this checkbox if you want to modify existing velocities by a percentage.

## Slide dialog

The ***Process-Slide*** command opens the Slide dialog box, which allows you to move selected MIDI notes or automation (not track automation) forward or backward in time.

**Note**: the ***Process-Slide*** command moves selected MIDI data, but does not move the pattern that the data occupies. After you slide your MIDI data, you may need to lengthen the boundaries of the pattern that the data is in to see and hear the data.

The Slide dialog box has the following field:

### By

Enter a number in the By field to control how many units (see below) your selected data moves. Negative numbers move the data to earlier positions in the track, but data can not move earlier than beat 1 of the first measure. Choose from the following units:

- Measures—If you choose Measures, the selected data moves by a number of whole measures.
- Ticks—If you choose Ticks, the selected data moves by a number of ticks, which are portions of a beat.
- Seconds—If you choose Seconds, the selected data moves by a number of whole seconds.
- Frames—If you choose Frames, the selected data moves by a number of frames, which are the smallest units of SMPTE time.

## Song Information dialog

The ***File-Info*** command opens the Song Information dialog box. In the Song Information dialog box, you can document the following information for your project:

**Title**
Your song's title.

**Subtitle**
Your song's subtitle.

**Author**
The author of the song.

**Copyright**
Applicable copyright information.

**Project Notes Text Box**
Project description or other information.

## Transpose dialog

The ***Process-Transpose*** command opens the Transpose dialog box, which allows you to transpose the pitches of MIDI and audio patterns up or down by a fixed number of half-steps. Enter the number of half-steps in the Amount field of the Transpose dialog box—a negative number to transpose down, a positive number to transpose up.

The Transpose dialog box contains the following field:

**Amount**
The number in this field tells Project5 how many half-steps, up or down (depending on whether you enter a positive or negative number), to transpose the selected data, unless you check the Diatonic Math checkbox (see below). If you check Diatonic Math, the number in this field tells Project5 how many scale steps to transpose the selected data.

## Undo History dialog

The ***Edit-Undo History*** command opens the Undo History dialog, which displays a history of your editing actions (the command is greyed-out if you made no edits). You can set how many editing actions you want the Undo History dialog to store by changing the number in the Maximum Undo Steps field. The default value is 16.

Use the Undo History dialog to jump to a previous time in the history of the project. Then you can continue from that point, causing all the edits you did after that action to disappear.

The Undo History dialog has the following fields:

**History list**
The History list displays a list of all the editing actions you did to this project, up to the number of actions in the Maximum Undo Steps field.

To revert to an earlier version of a project, highlight the entry in the History list that represents the point to which you'd like to return, and click OK. Project5 performs the necessary undo or redo actions to take you to that point, leaving the highlighted edit intact. Once you make any new edits, Project5 clears the History list of all the edits you made after the edit you jumped back to. Then, as you do further work, the History list grows again. Any edits that happened after the edit you jumped back to remain on the list.

**Clear button**
You can click the Clear button in the History dialog box to erase the undo history for the current project and free up some memory.

**Maximum Undo Levels**
This field lists the number of previous edits that Project5 stores. The default value is 16. You can enter any number from 1 to 128, but remember that storing all these edits consumes memory.

# Glossary

### Device Chain
Project5's term for a combination of an instrument, any effects patched into the instrument's track, paramter settings for the instrument and effects, and any remote control assignments for the instrument and effects. You can save the combination as a device chain for use in multiple projects.

### PPQ
Parts Per Quarter note, sometimes called ticks. Project5 divides each beat into 960 parts, so, for example, a time location (the Now Time) halfway between the first and second beats of measure one would be displayed as 1:1:480 (measure 1, beat 1, 480 ticks).

### Latency
The amount of time it takes between when you press a key on your MIDI controller and when you actually hear the note playing in Project5. You need a latency of 20 mS (milliseconds) or less to hear effective playback in Project5. You set latency in Project5 by using the ***Options-Audio*** command to open the Audio Options dialog, and then you drag the Buffer Size slider. If your sound card distorts at the 20 mS mark, you may need to update your sound card driver.

### MIDI
Musical Instrument Digital Interface. MIDI data, either played live or saved in MIDI files (extension .mid) triggers audio samples. Patterns in Project5 are MIDI data.

### MP3
A popular compression format for audio files. Project5 can export projects as MP3 files (***File-Export*** command).

### Now Time
The time location where your project is playing, or would start playing if it is currently stopped. You can change the Now Time display from Measure:Beat:Tick format to Hour:Minutes:Seconds format or vice versa by right-clicking the time display in Project5's Main Control view.

### Pattern
Patterns in Project5 contain MIDI data and automation, or audio data, or just automation. Pre-existing patterns are stored in the Loops/Patterns tab, but can be created in Project5 by step recording, real-time recording, or graphic editing in the Editor, or they can be imported directly to tracks using the ***File-Import*** command.

### Plug-in
A software effect or synthesizer (instrument) that you can use in multiple audio applications that support the format that the particular plug-in was created in.

### Project File
All the data that is in your project, including instruments, effects and their settings, pattern data and their arrangement, and track settings.

### Signal Flow
The order at which a pattern's sound data is processed, beginning with a track's MIDI effects (if any), an instrument patched into the pattern's track, and continuing through any effects and aux buses and finally the main output.

### Standard MIDI File
Abbreviated as SMF, a MIDI file that contains a MIDI project's essential data, such as patch and track names, notes, and controller data. Standard MIDI Files can be played back by many different hardware and software devices.

### Tempo
The number of beats per minute, or speed, that your project plays back at.

### Time Ruler
A horizontal ruler that displays the beat and measure boundaries in a project. Project5 has time rulers in the Arrange pane and in the Editor that are independent of each other.

### Time Signature
The number of beats in a measure that your Project5 project uses. You can change or edit the time signature by right-clicking the Time Ruler that's at the top of the the Arrange pane, and choosing options from the popup menu.

### Track
The beginning of the signal path, a track consists of a pattern or patterns and hosts an instrument. You can add effects to the track's signal path in the Track tab.

### Track Layer
An extra lane for a track created by right-clicking the track and choosing the ***Create Layer*** command from the popup menu. The extra lanes are useful for dragging overlapping patterns into, and can also send MIDI patterns to separate MIDI channels. The extra lanes have their own independent mute, solo, and arm buttons.

### Wave File (.WAV)
The standard format for Windows audio files: 16 bit; 44, 100 sample rate. This is the file format that standard audio CDs use. Project5 can export projects as standard.wav files, and also with different sample rates and/or bit depths.

### Width
Somewhat similar to pan. Width controls the feeling of where the speakers you're listening to are located. With the Width control at maximum, the speakers sound like they're beside you. With the Width control at minimum, the speakers sound like they're in front of you.

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