

New features in Nuendo 2.1

*NUENDO*₂

MEDIA PRODUCTION SYSTEM



Manual by Ludvig Carlson, Anders Nordmark, Roger Wiklander
Quality Control: C. Bachmann, H. Bischoff, S. Pfeifer, C. Schomburg

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Features

Introduction

Welcome to Nuendo 2.1! This document lists and describes all features that have been added to the program since the original 2.0 version. To read more about a feature listed below, please click the green cross-reference.

Recording

- The “Stacked” cycle recording mode provides an easy way to compile different takes (cycle laps) into one “perfect take”, allowing you to view and edit the takes directly in the Project window. See [page 10](#). This makes use of the Lane Display Mode, where overlapping events or parts are placed on separate lanes on the track. See [page 13](#).
- The Constrain Delay Compensation function provides a quick way to temporarily disable delay compensation, useful for minimizing the latency when recording audio or playing VST Instruments in real time. See [page 19](#).
- You can now choose whether a precount should follow the tempo track (including tempo changes) or simply use the tempo at the record start position.
To make the precount follow the tempo track, select the “From Tempo Track” option in the Metronome Setup dialog (Precount Options section).

Networking

- The Network feature is described in a separate pdf document.

VST Plug-ins and VST Instruments

- The Instrument Freeze function renders the output of a VST Instrument to a file, disables the instrument and plays back the rendered audio from an “invisible” audio track instead, thereby saving CPU power. Frozen VST Instruments can be unfrozen at any time if you need to edit the source MIDI or adjust instrument settings. See [page 16](#).

Editing – general

- Events and parts can be repeated using tools. See [page 20](#).
- There is now a separate Pencil tool (for entering single events or notes) and a Line tool (with a variety of modes, for drawing several events or notes).
Previously, all these modes were available for a single Pencil tool.
- You can choose to have a dedicated toolbox open when you right-click (Windows) or [Ctrl]-click (Mac). See [page 20](#).

Audio editing

- It is now possible to open several audio parts (on the same or different tracks) in a single Audio Part Editor window. See [page 21](#).

MIDI editing

- When you open a part for editing, the MIDI editor window will now show the whole MIDI track. If you like, the boundaries of the edited part can be indicated in the editor. See [page 24](#).
- Editing several parts in a MIDI editor has been simplified: You can now specify which part should be active, have this indicated in the editor and, if needed, restrict editing to that part only.
You can make a part active by selecting it from a list, by using key commands or by selecting an event belonging to the part. See [page 23](#).
- You can now open several parts from different tracks in the List Editor, just as in the other MIDI editors.
Other List Editor changes include improved filtering and masking and the possibility to hide the Value display from view. See [page 25](#).
- The Project window info line contains Transpose and Velocity settings, allowing you to make independent transpose and velocity shift settings for different MIDI parts. See [page 26](#).
- The main Transpose function now includes a Scale Correction setting, allowing you to keep transposed notes within a specified scale. See [page 26](#).
- New functions have been added to the Select menu. See [page 27](#).
- When you draw notes in a MIDI editor, their velocity values are determined by the Insert Velocity setting.
You can specify key commands for different Insert Velocity settings, making note entry much quicker. See [page 27](#).

- The Key and List Editors can now show the chord made up by the notes currently under the project cursor. See [page 28](#).
- The Part to Groove function lets you extract the timing of a MIDI part and turn it into a groove template.
The groove is available for selection from the Quantize menu and can be edited if needed. See [page 28](#).
- The editors have been changed graphically in two ways:
In the Key and Drum Editor, controllers are now displayed with their names and their MIDI Controller numbers.
The Key Editor grid has been improved, making it easier to find the correct pitch.

Score editing

- The MIDI Meaning function interprets note symbols and dynamics, affecting the length and velocity of notes during playback.
This means you can play back your score and hear all accents and dynamics you have added. See [page 29](#).
- A “dynamic” crescendo symbol has been added, making use of the MIDI Meaning function. See [page 30](#).
- When you create guitar symbols, you can choose from several symbol sizes.
- You can now create tablature for up to 12 strings.
- Notes can be colorized. See [page 31](#).
- The handling of text and lyrics has been improved: You can assign lyrics to different verses and paste text or lyrics from the clipboard. See [page 32](#).
- The Auto Layout functions have been improved. See [page 33](#).

Tempo editing

- The Time Warp tool provides a unique and efficient way to adjust the Tempo track so that “musical time based” material (positions related to the tempo) matches “linear time based” material (positions in time). See [page 34](#).
- You can now tap the tempo to an audio recording, record your tapping as a MIDI part and use the function Merge Tempo from Tapping to create a complete tempo track based on your tapping.
This function replaces the “Insert Multiple Tempi” feature in the Beat Calculator. See [page 45](#).

- In the Tempo Track Editor you will find a slider which allows you to record tempo changes in real time. See [page 46](#).
- Tempo tracks can be imported and exported, allowing you to use the same tempo track for different projects. See [page 46](#).

File handling

- When you import or export MIDI files, several options and settings have been added for greater versatility. See [page 47](#).
- You can now import a MIDI file by dragging it into a Project window.

Other improvements

- A preference has been added, allowing you to choose whether audio effect sends in pre-fader mode should be muted or not when you mute a mixer channel.
You will find this setting in the Preferences dialog on the VST page.
- The Appearance section in the Preferences dialog has been improved, allowing for more control over the look and feel of the program. See [page 48](#).
- You can use key commands to move the project cursor position forwards or backwards in steps of one bar.
This is done by assigning key commands to the functions "Step Bar" and "Step Back Bar", found in the Transport category in the Key Commands dialog.
- The Cycle function has been improved for smoother playback.
- The Chase MIDI Events function has been improved for better chase performance.

The Stacked cycle record mode

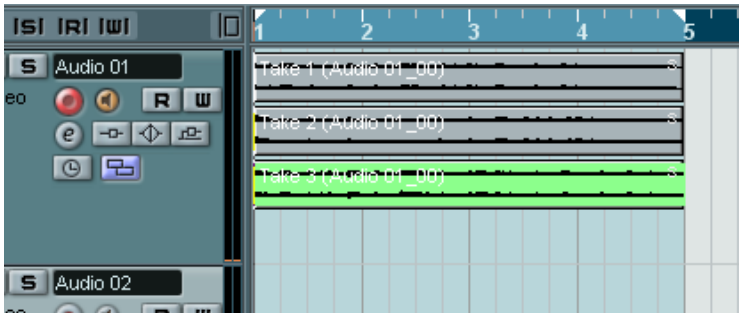
When you record in cycle mode and Stacked is selected on the cycle record mode pop-up menu on the Transport panel, each take will appear as an event or part on a separate “lane” on the track.

The details are slightly different for audio recording (described below) and MIDI recording (described on [page 12](#)).

Recording audio in Stacked mode

When you record audio in cycle mode and the “Stacked” Cycle Record Mode is selected, the following happens:

- Each complete recorded cycle lap is turned into a separate audio event.
- The track is divided into “lanes”, one for each cycle lap.
- The events are stacked on top of each other, each on a different lane.



This makes it easy to create a “perfect take” by combining the best parts from the different cycle laps:

1. Zoom in so you can work comfortably with the stacked events. If you play back the recorded section, only the lowest (last) take will be heard.
2. To audition another take, either mute the lower take(s) with the Mute tool or move the takes between the lanes. This can be done by dragging or by using the functions Move to Next Lane/Previous Lane on the Quick menu or Edit menu.

3. Edit the takes so that only the parts you want to keep can be heard. You can cut events with the Scissors tool, resize them, mute them or delete them.



The sections that will be heard are indicated in green.

4. When you are satisfied with the result, select all events on all lanes and select “Delete Overlaps” from the Advanced submenu on the Audio menu.

This puts all events back on a single lane and resizes events so that overlapped sections are removed.



5. To turn off the lane display mode for the track, click the Lane Display Type button in the track list and select “Lanes Off”.

If the button is hidden, you can bring it to view in the Track Controls Settings dialog – see the Operation Manual.



The Lane Display Type button.

Recording MIDI in Stacked mode

When you record MIDI in cycle mode and the “Stacked” cycle record mode is selected, the following happens:

- Each recorded cycle lap is turned into a separate MIDI part.
- The track is divided into “lanes”, one for each cycle lap.
- The parts are stacked on top of each other, each on a different lane.
- All takes but the last one are muted.



This makes it easy to create a “perfect take” by combining the best parts from the different cycle laps. You can edit the parts in the Project window (by cutting, resizing and deleting) or you can use a MIDI editor as in the following example:

1. Unmute the muted takes by clicking the parts with the Mute tool.
2. Select all takes (parts) and open them in the Key Editor for example.
3. Use the part list pop-up menu on the toolbar to select which part to edit.
See [page 23](#).
4. Remove or edit notes as desired.
5. When you are happy with the result, close the editor.
6. To turn it all into a single MIDI part (containing your “perfect take”), select all parts and select Merge MIDI in Loop from the MIDI menu.
7. In the dialog that appears, activate the Erase Destination option and click OK.

The remaining events in the parts are merged together into a single part.

Editing in Lane Display mode

When you are recording in Stacked cycle recording mode, each take ends up on a separate lane on the track as described on [page 10](#). However, you can also select this lane mode manually for individual tracks, and use it when editing in the Project window. This makes it easier to view and handle overlapping events and parts.

Audio tracks

1. Make sure the Lane Display Type button is visible in the track list. If it is hidden, you need to select Track Controls Settings from the context menu for the track and add the Lane Display Type item in the dialog that appears.



2. Click the Lane Display Type button and select “Lanes Fixed” from the pop-up menu that appears. The audio track is divided vertically into two lanes. By default, all audio events end up in the first (top) lane.
3. Now you can move events or parts between lanes, either by dragging or by using the “Move to Next Lane/Previous Lane” commands on the Edit menu or Quick menu. Note that if there are overlapping audio events, the audio on the lowest lane has playback priority – moving events between lanes affects what will be heard!



If the vertical zoom factor is sufficiently high, the sections that will be heard on playback are indicated in green.

- Note that there will always be an extra, empty lane at the bottom of the track – if you move an event there, another lane will be added and so on.
Depending on the number of lanes used, you may want to adjust the vertical zoom for the track – simply drag the track edges in the track list.
4. After rearranging the overlapping events so that you hear what you want, you can select all events and select “Delete Overlaps” from the Advanced submenu on the Audio menu.
This puts all events in the top lane and resizes events so that overlapping sections are removed.
 5. To turn off Lanes mode, select “Lanes Off” from the Lane Display Type pop-up menu.
If you do this without using the “Delete Overlaps” function, all overlapping sections will be kept. However, the sections that were green will now be the sections visible (“on top”) and thus the sections that will be heard.

MIDI tracks

1. Make sure the Lane Display Type button is visible in the track list.
If it is hidden, you need to select Track Controls Settings from the context menu for the track and add the Lane Display Type item in the dialog that appears.



2. Click the Lane Display Type button and select “Lanes Auto” or “Lanes Fixed”.
- In Lanes Auto mode, extra lanes will automatically be added where necessary – if two MIDI parts overlap, they will automatically be put on separate lanes.

- In Lanes Fixed mode, you have to move MIDI parts between lanes manually (by dragging them or by using the “Move to Next Lane/Previous Lane” commands on the Edit menu or Quick menu).
In this mode, there will always be an extra, empty lane at the bottom of the track – if you move a part there, another lane will be added and so on.
- 3. You can edit the overlapping parts as usual – by cutting, deleting or muting sections in the Project window or by opening them in a MIDI editor.
In an editor, parts on different lanes will be treated just like parts on different tracks – you can use the part list pop-up menu to select an active part for editing, etc.
Note that there is no playback priority between lanes on a MIDI track – all unmuted parts will be heard during playback.
- 4. To merge all overlapping parts into one, make sure the MIDI track is selected, position the left and right locator around the parts and select “Merge MIDI in Loop” from the MIDI menu.
In the dialog that appears, activate the Erase Destination option and click OK. This merges all unmuted MIDI between the locators to a single part.
- 5. To turn off Lanes mode, select “Lanes Off” from the Lane Display Type pop-up menu.

The Instrument Freeze function

Like all plug-ins, VST Instruments can sometimes require a lot of processor power. If you are using a moderately powerful computer or if you are using a large number of VST Instruments, you may come to a point where your computer cannot handle all VST Instruments playing back in real time (the CPU overload indicator in the VST Performance window lights up, you get crackling sounds, etc.).

Enter the Instrument Freeze function! This is how it works:

- When you freeze a VST Instrument, the program renders an audio file of its output (taking into account all unmuted MIDI parts routed to that VST Instrument). This file is placed in the “Freeze” folder within the Project folder.
- All MIDI tracks routed to the VST Instrument are muted and locked (the controls for these tracks will appear “greyed-out” in the Project window and Inspector, and the parameters for the VST instrument).
- When you play back, the rendered audio file is played back from an “invisible” audio track, routed to the VST Instrument’s mixer channel. Thus, any effects, EQ or mixing automation will still be applied.

The result of all this is that you get exactly the same sound as before, but the computer processor doesn’t have to calculate the sound of the VST Instrument in real time.

- If you need to edit the MIDI parts routed to the VST Instrument or adjust the settings on the instrument itself, you need to unfreeze the instrument first. This removes the rendered file and restores the MIDI tracks and VST Instrument. Once you have made the necessary adjustments you can freeze the instrument again.

Performing the Freeze

1. Set up the Project so that the VST Instrument plays back the way you want it.
This includes editing the MIDI parts routed to the VST Instrument and making parameter settings for the VST Instrument itself. If you have automated parameter changes for the VST instrument, make sure the Read (R) button is activated.
2. Open the Project Setup dialog and make sure the Length setting matches the actual project length.
The rendered freeze file will span the whole project length. Although empty (silent) sections will not affect the size of the freeze file, the Instrument Freeze operation will take longer if you have an unnecessarily high Length setting.
3. Open the VST Instruments window from the Devices menu.



4. Click the Freeze button for the VST Instrument (the button to the left of the VST Instrument slot).
A progress dialog is shown while the program renders the VST Instrument audio to a file on your hard disk.
The Freeze button lights up and the power, bypass and edit buttons for the VST Instrument are greyed out (and the control panel closes if it was open). If you check the Project window at this point you will find that the relevant MIDI tracks have greyed out controls in the Track list and Inspector. Furthermore, the MIDI parts are locked and cannot be moved.
5. Try playing back the project.
You will hear exactly the same sound as before Freezing the VST Instrument – but the CPU load will be considerably less! You can make settings for the VST Instrument channel in the Mixer as usual – add EQ, effects, make level adjustments, etc.

Unfreezing

If you need to make adjustments (either to the MIDI tracks or to the VST instrument parameters) you need to unfreeze the VST Instrument:

1. Click the Freeze button for the VST Instrument slot again.
You will be asked whether you really want to unfreeze the instrument.
2. Click “Unfreeze”.
The MIDI tracks and VST Instrument are restored and the rendered “freeze file” is deleted.

Constrain Delay Compensation

Nuendo features full delay compensation throughout the entire audio path. This means that any delay inherent in the VST plug-ins you use will automatically be compensated for during playback, so that all channels are kept in perfect sync.

However, when you play a VST Instrument in real time or record live audio (with monitoring through Nuendo activated), this delay compensation may sometimes result in added latency – the delay between when you press a key and hear the sound of the VST Instrument. To avoid this, you can click the Constrain Delay Compensation button on the Project window toolbar. This function tries to minimize the latency effects of the delay compensation, while maintaining the sound of the mix as far as possible.



- In the Preferences dialog on the VST page you will find a setting called Delay Compensation Threshold. Only plug-ins with a delay higher than this setting will be affected by the Constrain Delay Compensation function.
- VST plug-ins (with higher delay than the threshold value) which are activated for VST Instrument channels, audio track channels that are record enabled, group channels and output channels will be turned off when you activate Constrain Delay Compensation.
- VST plug-ins activated for FX channels are not turned off but their delay is disregarded by the program (delay compensation is turned off).

After recording or using a VST Instrument with Constrain Delay Compensation, you should turn off the function to restore full delay compensation.

Repeating parts and events

In addition to the Repeat function on the Edit menu, you can also repeat parts or events (in the Project window or in an editor) in the following way:

1. Select the part(s) or event(s) to repeat.
2. Make sure the Arrow tool is selected and press [Alt]/[Option].
If you point on the lower right corner of the selected event it turns into a pencil.
3. Click and drag with the pencil tool to the right.
The longer to the right you drag, the more copies are created (as indicated by the tool-tip).



4. When you release the mouse button, the parts or events are repeated to fill the rectangle you have drawn.

Using a dedicated toolbox

Normally, right-clicking (or [Ctrl]-clicking under Mac OS X) will bring up the Quick menu, listing the tools and the most relevant menu items for the current window. If the option “Popup toolbox on right click” is activated in the Preferences (Editing page), right-clicking will bring up the toolbox instead. This shows the tools only and you select tools as if from a menu.



Note that you can still bring up the Quick menu in this mode by pressing a modifier key (e.g. [Shift]) and right-clicking/[Ctrl]-clicking). Similarly, if the option isn't activated in the Preferences dialog, you can bring up the toolbox in that way.

Editing several audio parts

You can select several audio parts, on the same or different tracks, and open them in the same Audio Part Editor window by double clicking one of the parts (or by using the Edit-Open key command, by default [Ctrl]/[Command]-[E]).

In the Audio Part Editor, parts from different tracks appear on different lanes. On the toolbar you will find a few functions to make working with multiple parts easier and more comprehensive:

- The Part List menu lists all parts that were selected when you opened the editor, and lets you select which part should be active for editing. When you select a part from the list, it is automatically made active and centered in the display.



- **Note that it is also possible to activate a part by using the Arrow tool and clicking on it.**
- The button “Edit Active Part Only” lets you restrict editing operations to the active part only. If you for example select “All” from the Select submenu on the Edit menu with this option activated, all events in the active part will be selected but not the events in other parts.



“Edit Active Part Only” activated on the toolbar.

- You can zoom in on an active part so that it fills the screen by selecting “Zoom to Event” from the Zoom submenu on the Edit menu.

- The button “Show Part Borders” can be used if you want to see clearly defined borders for the active part. When this is activated, all parts except the active one are grayed out, making the borders easily discernible. There are also two “markers” in the ruler with the name of the active part, marking its beginning and end. These can be moved freely to change the part borders.



“Show Part Borders” activated on the toolbar.

- It is possible to cycle between parts, making them active, with key commands. In the Key Commands dialog – Edit category, there are two functions: “Activate Next Part” and “Activate Previous Part”. If you assign key commands to these, you can use them to cycle between parts.

Handling several parts in a MIDI editor

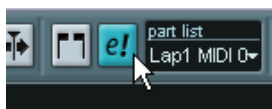
When you open a MIDI editor with several parts (or a MIDI track containing several parts) selected, you might find it somewhat hard to get an overlook of the different parts when editing.

If so, the editor toolbar features a few functions to make working with multiple parts easier and more comprehensive:

- The Part List menu lists all parts that were selected when you opened the editor (or all parts on the track, if no parts were selected), and lets you select which part should be active for editing. When you select a part from the list, it is automatically made active and centered in the note display.



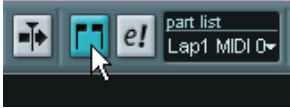
- **Note that it is also possible to activate a part by using the Arrow tool and clicking on an event in a part.**
- The button “Edit Active Part Only” lets you restrict editing operations to the active part only. If you for example select “All” from the Select submenu on the Edit menu with this option activated, only events in the active part will be selected. Similarly, if you select notes by dragging with the Arrow tool (making a selection rectangle), only the notes in the active part will be selected.



“Edit Active Part Only” activated on the toolbar.

- You can zoom in on the active part so that it fills the screen by selecting “Zoom to Event” from the Zoom submenu on the Edit menu.

- The button “Show Part Borders” can be used if you want to see clearly defined borders for the active part. When this is activated, all parts except the active one are grayed out, making the borders easily discernible. In the Key Editor, there are also two “markers” in the ruler with the name of the active part, marking its beginning and end. These can be moved freely to change the size of the part.



“Show Part Borders” activated on the toolbar.

- It is possible to cycle between parts, making them active, with key commands. In the Key Commands dialog – Edit category, there are two functions: “Activate Next Part” and “Activate Previous Part”. If you assign key commands to these, you can use them to cycle between parts in the editors.

List Editor features

Filtering

When you are using the filter bar to hide specific event types from view, there is a quick way to view one event type only: Press [Ctrl]/[Command] and click its checkbox. If you [Ctrl]/[Command]-click again, all checkboxes are cleared (all events will be visible).

Masking

The Mask pop-up menu now contains the following options:

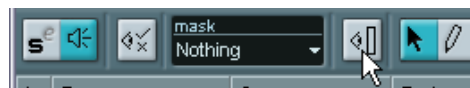
Option	Description
Event Types	Only events with the type of the selected event will be shown. This does the same as the filter view but is quicker if you only want to view a single event type.
Event Types and Data 1	Only events of the same type and with the same “Data 1” value will be shown. For example, if a note event is selected, only notes with the same pitch will be shown. If a controller event is selected, only controllers of the same type will be shown.
Event Channels	Only events with the same MIDI channel value as the selected event will be shown.

In addition to the above options, the menu also gives you access to the same presets available in the Logical Editor. Furthermore, the “Setup...” item on the Mask pop-up menu gives you direct access to the Logical Editor, with the aid of which you can create very complex masking settings.

- When you apply any of the presets from the Logical Editor or use the Logical Editor to create masking settings yourself, only the events that meet the criteria specified will be visible.

Hiding the Value display

You can hide or show the value display to the right of the event display by clicking the Show List Value View button on the toolbar.

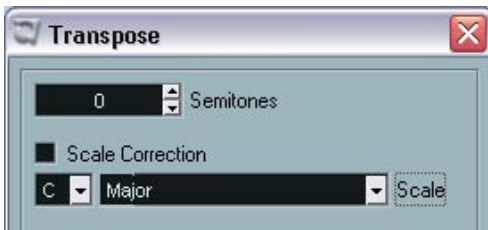


Editing Transpose and Velocity for MIDI parts

When one or several MIDI parts are selected in the Project window, the info line contains Transpose and Velocity fields.

- Adjusting the Transpose field transposes the selected parts in semi-tone steps.
Note that this transposition doesn't change the actual notes in the part – it's just a “play parameter”, affecting the notes on playback. The transposition you specify for a part on the info line is added to the transposition set for the whole track with the Transpose track parameter in the Inspector.
- Adjusting the Velocity field shifts the velocity for the selected parts – the value you specify is added to the velocities of the notes in the parts. Again, this velocity shift only affects the notes on playback, and again, the value you specify is added to the Vel.Shift. value set for the whole MIDI track in the Inspector.

Transpose – Scale Correction



The Transpose dialog (accessed from the MIDI menu) now contains Scale Correction settings. Scale Correction transposes the selected notes by forcing them to the closest note of the selected scale type. This can be used for creating interesting key and tonal changes, either by itself or in conjunction with the other settings in the dialog.

- To activate Scale Correction, click the checkbox.
- Select a root note for the scale from the note drop-down menu. Make sure to select the correct root note if you want to keep the result in the same key as the original notes, or select an entirely different key if you want to experiment.
- Select the desired scale type from the Scale drop-down menu.

New Select options

Two new options have been added to the Select submenu on the Edit menu. Both are available in the MIDI editors only:

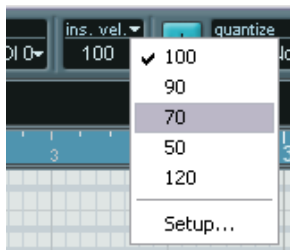
Option	Description
Equal Pitch – all Octaves	This function requires that a single note is selected. It selects all following notes that have the same pitch (in any octave) as the currently selected note.
Equal Pitch – same Octave	As above, but selects notes of the exact same pitch only (same octave).

Insert Velocity

When you draw notes in a MIDI editor, the notes will get the value set in the insert velocity field on the toolbar.

You can use one of three methods for setting the insert velocity:

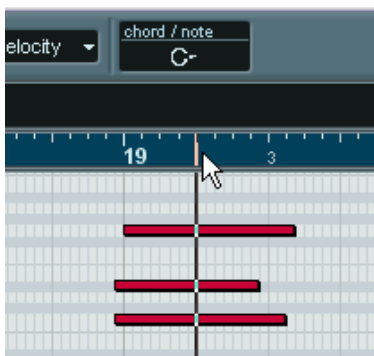
- Selecting a predefined velocity value from the insert velocity pop-up menu. The menu contains five different predefined velocity values. The “Setup...” item opens a dialog that allows you to specify which five velocity values should be available on the pop-up menu (you can also open this dialog by selecting “Insert Velocities...” from the MIDI menu).



- Manually entering the desired velocity value by clicking in the insert velocity field and typing the desired value.
- Using a key command. You can assign a key command to each of the five available velocity values in the Key Commands dialog (MIDI category – the items Insert Velocity 1-5). This allows for quick switching between different velocity values when entering notes.

The chord recognition function

Nuendo features a handy chord recognition function that helps you identify chords in the Key Editor or List Editor. To find out which chord some simultaneously played notes make up, place the project cursor over the notes. All MIDI notes currently “touched” by the project cursor are analyzed and the chord recognition display in the toolbar shows you which chord the notes form.



In the picture above, the project cursor touches the notes C, Eb and G. As shown in the chord recognition display, this results in a C minor chord.

Part to Groove

To extract the groove from a MIDI part, select the part and select “Part to Groove” from the Advanced Quantize submenu on the MIDI menu. The resulting groove appears on the Quantize menus and you apply it as you would any Quantize preset. You can also view and edit the resulting quantize settings in the Quantize Setup dialog.

- To extract the groove from an audio event, you use hitpoints and the “Create Groove Quantize” function, as described in the Operation Manual.

Score features

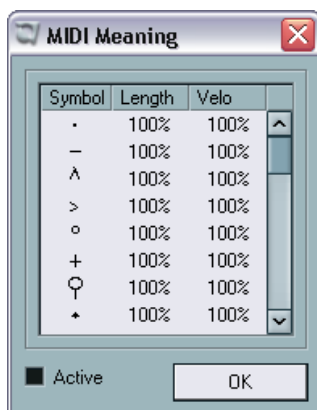
The MIDI Meaning function

The MIDI Meaning function interprets note symbols and dynamics, affecting the length and velocity of notes during playback. This means you can play back your score and hear all accents and dynamics you have added.

- **This is done in real time during playback – the actual notes are not affected!**

Setting up

1. Select MIDI Meaning from the Score – Global Settings submenu. A dialog appears.



As you can see, the dialog lists all note symbols and static dynamic symbols to the left. To the right are two columns, allowing you to specify in which way each symbol should affect the length and velocity of the notes as they are played back.

2. Set up the note symbols (at the top of the list) to your liking. The Length and Velocity settings are expressed as percentages, with 100% meaning no change from the actual note lengths and velocities on playback. For example, if you set up a short accent symbol (^) to mean Length=50%, Velocity=130%, notes with this accent would be played back with half their actual length and 1.3 times their actual velocity.

3. Set up the dynamic symbols (at the bottom of the list).
These can only affect note velocity. If you set the fortissimo symbol (ff) to mean Velocity=150% and insert a fortissimo symbol in the score, all notes will be played back with 1.5 times their actual velocity, from that point in the score until the next dynamic symbol.
 4. To turn MIDI Meaning on, click the Active checkbox.
 5. Click OK to close the dialog.
Now, note symbols and dynamics will affect the notes on playback.
- **For dynamic changes to take effect, the MIDI sound source must respond to velocity.**
Also, note that the maximum note velocity is always 127. If all notes were recorded or entered with maximum velocity, velocity settings over 100% will not have any effect.

Dynamic crescendo symbols

In the Dynamics palette you will find a special crescendo symbol:



This allows you to enter a crescendo or diminuendo in the score and have the note velocity adjusted accordingly during playback. The same rules apply as for MIDI Meaning:

- The actual notes aren't affected – the change happens on playback only.
- For the crescendo/diminuendo to be heard, the MIDI sound source must respond to velocity.
- The maximum note velocity is always 127. If the notes are recorded or entered with high velocity values, you may not hear any difference between e.g. forte and fortissimo.

Proceed as follows:

1. Select the dynamic crescendo symbol and make sure the Pencil tool is selected.
2. Click where you want the crescendo or diminuendo to start, drag to its end position and release the mouse button.
By default this inserts a crescendo from piano (p) to forte (f).



3. To adjust the dynamics at either end of the crescendo, right-click (Windows) or [Ctrl]-click (Mac) to bring up a palette from which to select the desired dynamic symbol.
If you select a dynamic symbol at the start that is “louder” than the one at the end, the crescendo symbol is automatically changed to a diminuendo symbol.
 - In the palette for the start symbol you will find three additional options: “cresc”, “dim” and “None” (no symbol is shown).
When any of these is selected, the crescendo or diminuendo will start from the “current dynamic”, i.e. with the level according to the previous dynamics symbol in the staff.
4. Select MIDI Meaning from the Global Settings submenu on the Score menu and make sure the Active checkbox is ticked.
The dynamic crescendo/diminuendo makes use of the MIDI Meaning function and uses the velocity scaling you have set up for the dynamics symbols in this dialog.
5. Try playing back.
You should now hear the crescendo or diminuendo affect the note velocities.

Coloring notes

You can use the color pop-up menu on the toolbar to colorize selected notes, e.g. for educational purposes.

- Only the note heads will be colored.
- The colors will be included when you print the score.
- **Notes can also be colored automatically if the option Use Colors for Additional meanings is activated in the Preferences dialog (Scores page).**
When this option is activated, color is used to indicate elements that are “special” in any way (hidden notes, slurs and note symbols that are moved from their default positions, etc.)

Working with text and lyrics

Pasting text

You can paste text (e.g. from another program) into a text symbol in the score by selecting the text symbol and selecting “Text from Clipboard” from the Text submenu on the Scores menu.

Adding a second verse

To insert a second line of lyrics, proceed as follows:

1. Enter the new lyrics above or below the existing verse.
2. Select all the words that should be in the new verse.
3. Pull down the Score menu and bring up the Text submenu.
4. Select the appropriate verse from the list at the bottom of the submenu (Verse 1-6).

This assigns the selected lyrics to the selected verse.

To indicate that the words belong to another verse, they are automatically displayed in another color. However, all verses will print in black as usual.

- To select all words in one verse only, press [Shift] and double click on the first word in that verse.
This selects all following words in the verse.

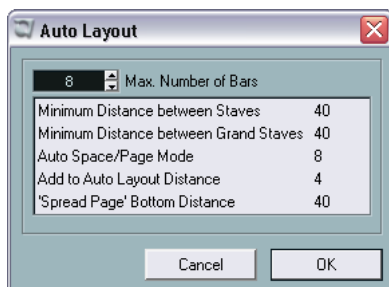
Adding lyrics from the clipboard

If you want to prepare your lyrics in another program, you can import them into Nuendo in the following way:

1. Create the lyrics in another program.
Separate words with space as usual, syllables within words with dash signs (-).
2. Copy the text.
3. In Nuendo, select the first note to which the lyrics should be added.
4. Pull down the Scores menu and select “Lyrics from Clipboard” from the Text submenu.

The lyrics are added, starting at the selected note.

The Auto Layout dialog



The settings for the Auto Layout functions are now located in a separate Auto Layout dialog.

- The dialog appears when you use the Bars and Staves or Optimize All functions (or click the Auto Layout icon on the score toolbar). To make settings in the Auto Layout dialog, select e.g. the Bars and Staves option to open the dialog, make all desired settings and click OK to apply the layout.

The dialog contains the following settings:

Setting	Description
Max. Number of Bars	This allows you to specify the maximum number of bars per staff when using the “Bars and Staves” or “Optimize All” functions.
Minimum Distance between Staves	When you use an Auto Layout function that moves staves (changes the vertical staff distance), this setting determines the minimum allowed distance between the staves.
Minimum Distance between Grand Staves	This sets the minimum allowed distance between Grand Staves in the same way.
Auto Space/Page Mode	The higher the value the more space is allowed for each element in the score (and thus, the fewer the bars across the page).
Add to Auto Layout Distance	This number adds to the distance between staves that will be added when you use any of the Auto Layout functions. The higher the number, the larger the distance between staves.
‘Spread Page’ Bottom Distance	This adds to the white space that will appear on the bottom of a page when using the Spread Page functions.

The Time Warp tool

The Time Warp tool lets you adjust the Tempo track so that “musical time based” material (positions related to the tempo) matches “linear time based” material (positions in time). Some typical applications:

- When you have recorded music (audio or MIDI) without tempo reference or metronome click the Time Warp tool can be used for creating a tempo map that fits the recording (allowing you to rearrange or add sequenced material).
- When you are creating music for a movie and want to match certain positions in the video with certain positions in the music.

The Time Warp tool makes use of the fact that tracks can be based on time positions (linear time base) or positions related to tempo (musical time base) – see the Operation Manual for a description of these modes.

Basic procedure

You use the Time Warp tool to drag a musical position (a position in bars+beats format) to a certain position in time. This can be done in the Project window or in editor windows, as described below. Here is the general procedure:

1. Make sure Tempo track mode is selected.
You cannot use the Time Warp tool in Fixed tempo mode.
2. Select the Time Warp tool.



Bars+Beats format is automatically selected for the ruler in the active window and the ruler is shown in dark red.

3. Click in the window at a musical position and drag it so that it matches a position in the material you are editing – e.g. the start of an event, a certain “hit” within an audio event, a frame in a video clip, etc.
When you click with the Time Warp tool it snaps to the grid in the window.



Dragging the start of bar 9 to the start of the audio event.

While you are dragging, the track(s) you are editing are temporarily switched to linear time base – this means that the contents of the tracks remain at the same time positions regardless of the tempo (there is an exception to this in the Project window – see below).

4. When you release the mouse button the musical position you clicked on matches the time position you dragged it to.
This is because the Time Warp tool changed the last tempo event on the Tempo track (and/or added new ones, depending on window and usage), thereby scaling the tempo track to fit.

Rules

- When you use the Time Warp tool, the tempo value of the last tempo event (before the click position) is adjusted.
- If later tempo events exist, a new tempo event will be created at the click position. This way, the later tempo event(s) will not be moved.
- If you press [Shift] and use the Time Warp tool, a new tempo event is created at the click position.
[Shift] is the default modifier for this – you can adjust this in the Preferences dialog (Editing–Tool Modifiers page, under the Warp Tool category).
- If you use the Time Warp tool in an editor, a tempo event will be created at the start of the edited part or event. Only the track being edited will be affected – but note that events after the edited events or parts (on the edited track) will be affected as well.
- If you have made a selection range (in the Project window, Audio Part Editor or Sample Editor) and use the Time Warp tool within that range, the tempo changes will be confined to that range.
This means tempo events will be inserted at the start and end of the selection range, if needed – useful if you need to adjust the tempo within a certain area but want all material outside that range to stay in place.
- When you click with the Time Warp tool, it snaps to the tempo grid in the window.

- When you drag the tempo grid to a new position, it can be magnetic to events in the window.
In the Project window, this requires that Snap is activated and “Events” is selected on the Snap pop-up menu – the grid will then snap to the start and end of events or parts, and to markers. In the Sample Editor, this requires that Snap to Zero Crossings is activated – the grid will then snap to hitpoints (if any). In the MIDI editors, this requires that Snap is activated – the grid will then snap to the start and end of notes.
- The function will create tempo values up to 300 bpm.

Viewing and adjusting tempo events

When you select the Time Warp tool, the ruler of the active window is shown in dark red. Existing tempo events are shown in the ruler as “flags” with the tempo values displayed.



This helps you see what’s going on, but you can also use this for editing the tempo track:

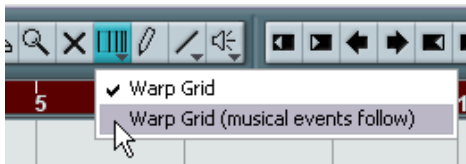
- If you press the create/erase modifier key (by default [Shift]) and click on a tempo event in the ruler, it is deleted.
- You can click on a tempo event in the ruler and drag to move it. This automatically edits the tempo value in the event so that elements to the right keep their positions.
- If you press [Alt]/[Option] and move (or delete) a tempo event in the ruler, the tempo value is not adjusted – this means elements to the right will be moved. This is the default modifier key for this – you can adjust this in the Preferences (Editing–Tool Modifiers page, under the Warp Tool category).

Using the Time Warp tool in the Project window

In the Project window there are two modes for the Time Warp tool:

- In the default mode, all tracks are temporarily switched to linear time base when you use the tool. This means that all tracks will keep their absolute time positions when you adjust the tempo track.
- In the “musical events follow” mode, no tracks are switched to linear time base. This means that all tracks (that are not set to linear time base) will follow the changes you make to the tempo track.

You select the Time Warp mode by selecting the tool, clicking on the tool icon and selecting from the pop-up menu that appears.



Matching a musical score to video

Here's an example of how to use the Time Warp tool in “musical events follow” mode. Let's say you are creating the music for a film. You have a video track, an audio track with a commentary and some audio and/or MIDI tracks with your music. Now you want to match the position of a musical cue to a position in a video film. The musical cue happens in bar 33. There are no tempo changes in the project (yet).

1. Make sure tempo track mode is selected in the Transport panel.
2. Now you need to locate the position in the video. If you don't need very high precision, you can simply locate it looking at the thumbnails on the video track – otherwise you can pinpoint the exact position and add a marker to the Marker track (that you can snap to later on). You can also make a note of the exact position and add an extra ruler track set to show time code.

3. Make sure the correct tracks are set to linear time base or musical time base, respectively.

In our example we want the video track and the audio track with a commentary voiceover to be linear time based (as well as the marker track, if you are using one). All other tracks should be set to musical time base. You change this by clicking the time base button in the Track list or Inspector.



Musical time base selected.



Linear time base selected.

4. Set up the Grid Type pop-up menu as desired.

When you click with the Time Warp tool, it snaps to the selected grid. In this case, the musical cue happens at the start of bar 33, so we can set the grid to “Bar”.

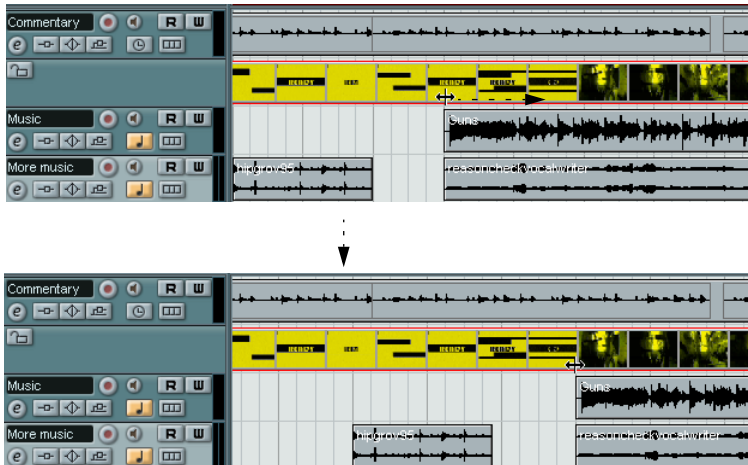
- Note that this affects the snapping to the ruler (tempo grid) *when you click!* In addition, the tool can be “magnetic” to events in the Project window *when you drag* – for this you need to activate Snap and select “Events” on the Snap pop-up menu.

In our example, this would be useful if you created a marker at the desired position in the video – when you drag the grid (see below), it will snap to the marker.

5. Select the Time Warp tool and select the “musical events follow” mode.

6. Click in the event display at the start of bar 33 and drag to the desired position in the video.

As mentioned above, this can mean dragging to a position indicated by the thumbnails on the video track, to a marker on the Marker track or to a time position on an additional ruler track.



When you drag, you will see the ruler being scaled – and the music tracks will follow.

7. Release the mouse button.
If you look in the ruler at the beginning of the project, you will see that the first (and only) tempo event has been adjusted.
8. Try playing back.
The musical cue should now happen at the correct position in the video.

OK, let's say you need to match another cue to another position later on in the video. If you simply repeat this procedure, you will find that the first cue gets out of sync – since you are still changing the first (and only) tempo event on the Tempo track!

You need to create a “lock point” – a tempo event at the first cue position:

9. Press [Shift] and click with the Time Warp tool in the event display at the cue position.

In our case this is bar 33.



As you can see, a tempo event (with the same value as the first one) is added at that position.

10. Now match the next musical cue to the next video position, by dragging the musical position to the desired time position as before. The new tempo event is edited – the first tempo event is unaffected and the original cue is still matched.
- If you know you are going to match several cues this way, you should make it a habit to press [Shift] each time you use the Time Warp tool to match positions. This adds a new tempo event – that way you don't have to add tempo events afterwards as in step 9 above.

About snapping

If Snap is activated in the Project window and “Events” is selected on the Snap pop-up menu, the Time Warp tool will be magnetic to events when you drag the tempo grid. This makes it easier to snap a tempo position to a marker, the start or end of an audio event, etc.

Using the Time Warp tool in an audio editor

Using the Time Warp tool in the Sample Editor or Audio Part Editor is different from using it in the Project window, in the following ways:

- When you use the Time Warp tool, a tempo event is automatically inserted at the beginning of the edited event or part – this tempo event will be adjusted when you warp the tempo grid with the tool. This means that material before the edited events won't be affected.
- There is only one mode for the Time Warp tool in the audio editors: When you use the tool, the edited track is temporarily switched to linear time base.

Making a tempo map for a “free” recording

The following example shows how to use the Time Warp tool in the Sample Editor to create a tempo map matching freely recorded music. Let's say you have recorded a drummer, playing without a metronome – this typically means the tempo varies every so slightly. To be able to add sequenced material and easily rearrange the recorded audio, you want the tempo in Nuendo to match the recorded drum track:

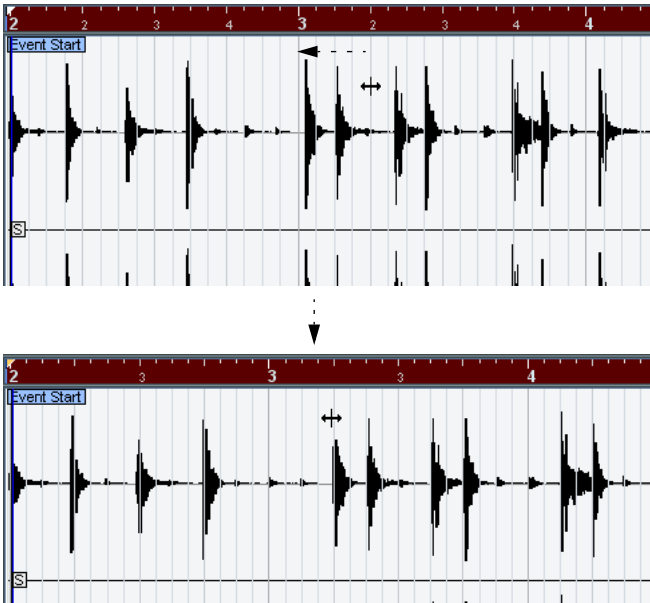
1. If necessary, move the recorded event to its desired start position. Move it so that the first downbeat (“one”) happens on the start of the desired bar – zoom in if needed.
2. Open the drum recording in the Sample Editor and make sure Hitpoint mode isn't selected.
The Time Warp tool cannot be used in Hitpoint mode – however, if you have calculated hitpoints already these will be visible when the Time Warp tool is selected (see below).
3. Set the zoom so that you can see the individual drum hits clearly.
To achieve this type of “visual” beat matching, it's important to have a fairly clean recording, such as the drum track in this example.
4. Select the Time Warp tool.
You have already matched the first downbeat with the start of a bar. However, if the recording starts before the first downbeat (with a fill, some silence, etc.) you want to “lock” the first downbeat so that it stays in position:

5. Press [Shift] and click in the event at the position of the first downbeat (the start of the bar).

When you press [Shift], the pointer turns into a pencil. Clicking adds a tempo event at the first downbeat – when you later adjust the tempo with the Time Warp tool, the first downbeat will stay in place. Note: if the event started exactly on the first downbeat (no audio before the “one”) you wouldn’t need to do this. This is because a tempo event is automatically added at the start of the edited event.

6. Now, locate the start of the next bar in the ruler.
7. Click at that position in the event display and drag the position to the downbeat of the second bar in the recording.

When you click, the pointer will snap to the ruler grid.



You mustn't necessarily match the downbeats (“ones”) – in this figure beat “2” in the second bar is matched to the “two” in the recording’s second bar (simply because the snare drum hits on the upbeats are easier to spot in the waveform image).

When you dragged the grid you changed the tempo value in the tempo event at the first downbeat. If the drummer held a fairly consistent tempo, the following bars should now match pretty well too.

8. Check the following bars and locate the first position where the audio drifts from the tempo.

Now, if you simply adjusted that beat in the tempo grid to match the beat in the recording, the tempo event at the first downbeat would be changed – this would ruin the match in the previous bars! We need to lock these by inserting a new tempo event.

9. Locate the last beat that's in sync.
This would be the beat just before the position where the audio and tempo drift apart.
10. Press [Shift] and click at that position to insert a tempo event there.
This locks this matched position – the material to the left will not be affected when you make adjustments further along.
11. Now match the tempo grid to the next (unmatched) beat by clicking and dragging with the Time Warp tool.
The tempo event you inserted in step 10 will be adjusted.
12. Work your way through the recording this way – when you find that the recording drifts from the tempo, repeat steps 9 to 11 above.

Now the Tempo track follows the recording and you can add sequenced material, rearrange the recording etc.

Matching to hitpoints

If you have calculated hitpoints for the audio event you are editing, these will be shown when the Time Warp tool is selected.

- The number of hitpoints shown depends on the Hitpoint Sensitivity slider setting you've made in Hitpoint mode.
- If you activate the Snap to Zero Crossing button on the toolbar, the Time Warp tool will snap to hitpoints when you drag the tempo grid.
- If you use the Create Markers function on the Audio-Advanced submenu, markers will be created at the hitpoint positions. This can be useful when using the Time Warp tool in the Project window, as the tool will be magnetic to markers (if Snap to Events is activated on the toolbar).

Using the Time Warp tool in a MIDI editor

This is very similar to using the tool in an audio editor:

- When you use the Time Warp tool, a tempo event is automatically inserted at the beginning of the edited part – this tempo event will be adjusted when you warp the tempo grid with the tool. This means that material before the edited part won't be affected.
- There is only one mode for the Time Warp tool in the MIDI editors: When you use the tool, the edited MIDI track is temporarily switched to linear time base.
- The rulers in the MIDI editors can be set to “Time Linear” or “Bars+Beats Linear” mode (see the Operation Manual) – the Time Warp tool requires Time Linear mode. If necessary, the ruler mode will be switched when you select the Time Warp tool.
- If Snap is activated on the toolbar in the MIDI editor, the tool will snap to the start and end of MIDI notes when you drag the tempo grid.

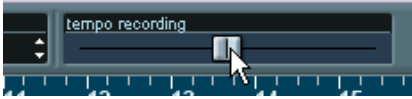
Typically, you would use the Time Warp tool in a MIDI editor to match the Nuendo tempo to freely recorded MIDI material (much like the audio example above).

Merge Tempo From Tapping

This function allows you to create a complete tempo track based on your tapping. Typically, you would use this if you have an audio file with no tempo mapping, and want to be able to add sequenced material afterwards, etc.

1. Create an empty time-based MIDI track and, while playing back your audio material, tap the new tempo on your MIDI keyboard and record the created notes onto the new MIDI track.
Note that you must create note events – pedal events cannot be used for this function.
 2. Play back the audio and check that the timing of the MIDI notes corresponds to that of the audio.
If necessary edit the MIDI notes in an editor.
 3. Select the part (or the individual notes, in an editor) that you want to use for the calculation.
 4. Select "Merge Tempo From Tapping" from the Functions submenu on the MIDI menu.
A dialog opens.
 5. In the dialog, specify what type of note (1/2, 1/4 etc.) you tapped during the recording.
If you activate the "Begin at Bar Start" option, the first note will automatically start at the beginning of a bar when calculating the new tempo curve.
 6. Click OK.
The project's tempo is adjusted to the tapped notes.
 7. Open the Project menu and select "Tempo Track" to check that the new tempo information is reflected in the tempo curve.
- **Another way of creating a tempo map for freely recorded audio would be to use the Time Warp tool – see [page 34](#).**

Recording tempo changes



The tempo record slider on the toolbar in the Tempo Track Editor allows you to record tempo changes “on the fly”: simply start playback and use the slider to raise or lower the tempo at the desired positions. Useful for creating natural sounding ritardandos, etc.

Exporting and importing Tempo tracks

On many occasions it is useful to have several different projects share the same tempo track – e.g. when you are doing music for picture-work in workgroups. You can export the current tempo track for use in other projects by selecting “Tempo Track” from the “Export” submenu on the File menu. This allows you to save the tempo track information (including time signature events) as a special xml file (file extension “.smt”).

To import a saved tempo track, select “Tempo Track” from the “Import” submenu on the File menu. Note that this replaces all tempo track data in the current project (although the operation can be undone if needed).

Exporting and importing MIDI files

Export options

After you click Save in the Export MIDI File dialog, the Export Options dialog appears, with the following settings:

Option	Description
Export Inspector Patch	If this is checked, the MIDI patch settings in the Inspector – Bank Select and Program Select (used for selecting sounds in the connected MIDI instrument) are included as MIDI Bank Select and Program Change events in the MIDI file.
Export Inspector Volume/Pan	If this is checked, Volume and Pan settings made in the Inspector are included as MIDI Volume and Pan events in the MIDI file.
Export Automation	If this is checked, recorded automation is converted to MIDI controller events and included in the MIDI file. This also includes automation recorded with the MIDI Control plug-in.
Export Inserts	If this is checked and you are using any MIDI plug-ins as insert effects, the modifications to the original MIDI notes that occur as a result of the effect(s) will be included in the MIDI file. A MIDI delay, for example, will produce a number of repeats to a MIDI note by actually adding additional, “echoing” notes at rhythmic intervals – these notes will be included in the MIDI file if the option is activated.
Export Sends	If this is checked and you are using any MIDI plug-ins as send effects, the modifications to the original MIDI notes that occur as a result of the effect(s) will be included in the MIDI file.
Export Marker	If this is checked, any markers you have added will be included in the MIDI file as Standard MIDI File Marker events.
Export as Type 0	If this is checked, the MIDI file will be of Type 0 (all data on a single track, but on different MIDI channels). If you don't check this option, the MIDI file will be of Type 1 (data on separate tracks). Which type to choose depends on what you want to do with the MIDI file (in which application or sequencer it should be used, etc.).
Export Resolution	You can specify a MIDI resolution between 24 – 960 for the MIDI file. The resolution is the number of pulses, or ticks, per quarter note (PPQ) and determines the precision with which you will be able to view and edit the MIDI data. The higher the resolution, the higher the precision. The resolution should be chosen depending on the application or sequencer with which the MIDI file should be used though, since certain applications and sequencers may not be able to handle certain resolutions.

- **You will also find these settings in the Preferences dialog (MIDI–MIDI File page).**

If you set these up once and for all in the Preferences dialog, you only need to click OK in the Export Options dialog to proceed.

Import options

When you import a MIDI file, the result depends on the contents of the MIDI file and the Import Options settings in the Preferences dialog – MIDI–MIDI File page:

Option	Description
Extract First Patch	If this is checked, the first Program Change and Bank Select events for each track are converted to Inspector settings for the track.
Extract First Volume/Pan	If this is checked, the first MIDI Volume and Pan events for each track are converted to Inspector settings for the track.
Import Volume/Pan as Automationtrack	If this is checked, all MIDI Volume and Pan events in the MIDI file will be converted to automation data for the MIDI tracks.
Import to Left Locator	If this is checked, the imported MIDI file will be placed so that it starts at the position of the left locator – otherwise it will start at the beginning of the project. Note that if you choose to have a new project created automatically, the MIDI file will always start at the beginning of the project.

- **It is also possible to import a MIDI file from disk by dragging and dropping it from the Windows Explorer or the Mac OS Finder into the Nuendo Project window.**

The Import Options apply if you use this method as well.

Appearance

The Appearance page in the Preferences dialog has been expanded with a number of Brightness/Intensity sliders, allowing you to fine-tune the brightness and contrast in various areas in the program. Changes take effect when you click Apply or OK.

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