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## Using this Manual

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This help manual applies to open source ModPlug Tracker (MPT) build **1.18**, available as of December 18, 2009.

The ModPlugTracker Offline Help Manual (OHM) is designed for both the beginner and the veteran tracker alike. Many end-users prefer to just jump right to an application and start exploring without a manual at their fingertips. But others like to have a help manual in case they get stuck or don't want to waste time trying to find a function or a feature. This manual is for the latter group.

The OHM is organized in an outlined way so that you can explore MPT while going along with the manual, until you reach the Reference sections, which is provided for more experienced MPT users who need more detailed information. There are plenty of images so you can see the subject at hand as if you were there in the ModPlug application. The text is also bookmarked and linked with text that looks like [this](#) if you want to jump to another section in the OHM for more information. None of the links take you to an Internet site.

### Terms

**Track:** One entire song file. Interchangeable with the term **module**, but "track" connotes the musical content, while "module" implies a complete file in a more data-oriented perspective.

**Page:** A window found under a "tab".

**Channel:** One vertical set of event data in a tracking file. This is the equivalent of a sequencer's "track".

**Column:** One vertical row of information in a channel. ModPlug has 4 columns in a channel.

**Field:** One column in one row. For some fields, this may include a "prefix" and a value.

**Event:** One action executed in a channel, including the note and its assigned instrument (if any), the "Note Effect", and the Channel Effect. In MPT, only one event per channel can be played at a time. Chords for an instrument must be divided as several events spread over several channels.

**Note Effect:** Data entered in the third column of a channel. Most of these are note-driven — hence the term.

**Channel Effect:** Data entered in the fourth column of a channel. Most of these are Effect commands which affect only the channel — hence the term.

### Understanding hexadecimal

A few places in ModPlug, as with most trackers, use two-digit hexadecimal numbers as data and it's important to understand how this is translated to and from decimal. It's not hard to learn, but it may take some time before it becomes second-nature to you.

In decimal numeration, the system based on tens that we've always been taught with, a two-digit number shows us two things: how many tens (the first digit) and how many ones (the second digit). For example, the decimal number 34 tells us we have three tens and four ones.

In hexadecimal (we call it 'hex' for short), a two-digit number tells us how many sixteens by the first digit, and how many ones by the second. So the hex number \$34 means we have 3 sixteens and 4 ones. (We use a \$ sign as one way of reminding us the number is hexadecimal; another way is to use 0x, as in 0x34.)

Translating a hex number is easy: multiply the first digit by sixteen and add the second digit; we do the same thing intuitively with decimal — multiply the first digit by ten and add the second. So the hex number \$34 is 52 in decimal (16 x 3, plus 4). If you know the decimal and you want to translate to hex, simply divide your decimal value by 16 for the first digit and whatever's left over is the second digit. So, 52 divided by 16 is 3, with 4 remaining — \$34.

However, in hex notation we only have enough digits to represent 0 thru 9, which we borrow from decimal; what about numbers 10 – 15? For those we use letters A – F, where A = 10, B = 11, and so on. So two-digit numbers counting from 9 to 17 goes like this: \$09, 0A, 0B, 0C, 0D, 0E, 0F, 10, and 11.

Translating to decimal with hex letters needs some getting used to, but certain numbers will become automatic with use, such as these:

**\$40** = 64: The highest value of many global settings within ModPlug.

**\$7F** = 127: The highest applicable value for Channel FX (except for the SF0 macro) and other parameters.

**\$FF** = 255: The highest possible value for any one-byte setting (a two-digit hex number represents a single byte)

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# 1. What is ModPlug Tracker?

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To put it simply, ModPlug Tracker has always been and will always be an application that makes it easy to compose music. Using mostly a text-based event editing system, plus several expanded features including MIDI input and VSTs, this free software has enough user-friendliness and flexibility to please both the EDM tracker and classical composer.

ModPlug Tracker (MPT) is first and foremost "tracking" software (self-contained, NOT a plugin), but many features have been added to give it a few "sequencing" capabilities. It can play software plugins that adhere to Cubase's Virtual Synthesis Technology, called VSTs for short. It's also possible to not only set up external MIDI devices for both input and output, but also chain together many sets of output routes that lead to the Master Audio.

## MPT features

1. Totally FREE!
2. Intuitive but simple Windows-oriented interface, with plenty of tooltips on most interactive items, and separating specific sections of work into tabs.
3. A rich set of options and preferences, including:
  - A. Ability to customize the GUI color (but no skins yet), including loading and saving color schemes.
  - B. Full mixing capabilities, including a global equalizer and other effects, up to 127 channels for pattern data (each with their own volume, pan, and plugin settings, as well as customizable channel names), and separate volume controls for sample playback, VST instruments, and global output.
  - C. Customizable event detail (ticks per row), audio playback detail (sample and bit rates), polyphony, and latency buffer.
  - D. Ability to automatically back up the current file at intervals of your choosing, to a folder of your choosing.
  - E. Ability to customize most actions with keyboard shortcuts, including navigation, input, and opening dialog boxes.
4. Side panel with expandable directory view to locate relevant files quickly.
5. Excellent range of readable track formats, including backward compatibility with files saved under previous versions of ModPlug Tracker.
6. Can export to .wav or .mp3 audio formats.
7. Can use General MIDI instruments installed with Windows, or loaded from other sources.
8. Good MIDI implementation through channel effects, including input and playback with external MIDI devices.
9. Full use of VST technology
10. Ability to apply alternate tunings (including scales and temperaments) to sample playback.
11. A complete offline help manual for beginners and veterans alike!
12. Ongoing development and improvements
13. A thriving community with its own website and forums.

## Limitations

1. Limited control for editing of sample data.
2. Inability to directly load banks for VSTi's.
3. Alternate temperaments cannot be applied to VSTi's.
4. Can only use a text-based editing system; no piano-roll or musical score editing.

## History

ModPlug was originally developed in 1997 by Olivier Lopicque as a plugin for Internet browsers to listen to tracking files (such as .mod and .it files). From this plugin he developed the ModPlug Player and the ModPlug Tracker. ModPlug Player can play a very wide variety of tracking files, and uses many different audio effects, such as graphic equalization, reverb, and Surround Sound. Although it is still available, the Player is not open-source nor is it being developed.

ModPlug Tracker became completely open-source in 2004, allowing the actual application to be developed and the code altered for the correction of long-standing bugs and the implementation of new features, such as the use of VSTs and alternate tunings. It has been rated as one of the top five free music trackers, and has a vibrant community at [lpchip.com/modplug](http://lpchip.com/modplug).

In this manual we will refer to this open-source version simply as ModPlug Tracker, or MPT for short, even as the application refers to itself as OpenMPT (to differentiate itself from the original program).

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## 2. System Setup

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### System requirements

System requirements are few. All you need to run and use ModPlug Tracker is:

- A Windows-compatible, 32-bit computer, the newer the better
- A working sound card, the newer the better
- Windows 98 or later.

### Expandibility

Other options to make MPT a great user-friendly application:

- MIDI-compatible external device, with the correct plug into your computer. See [here](#) for setting up a MIDI device for use in MPT.
- External speakers or headphones, including Surround Sound or Quad-Stereo systems for soundcards that can allow those send configurations
- Software plugins, called VSTi's, that are compatible with your processor speed and Windows OS

### Installation

- Download the latest build of ModPlug Tracker that will work on your computer. (For developers who wish to work with the source code, download from [sourceforge.net](#).) The application and its supplemental files are maintained in a .zip archive.
- Unzip the archive to the folder of your choice; usually this would be "Program Files" but you are free to choose your own accessible folder.
- When you open MPT for the first time, the General Options dialog will appear automatically to allow you to set up how you want MPT to run. There are many ways to customize MPT, but the main thing you want to start out with is setting options for the Soundcard. Click on the Sound Card tab, and consult [this](#) section for determining how best to set up for your computer system. However, for most Windows systems, you should be able to use the default settings to jump right in.

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## 4. Basics of tracking

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### What is tracking?

To clear up initial confusion, a "track" in this context is a file of event data, usually denoting a single musical production. A track is often interchanged with the term "song," but a song implies a musical progression in a complete form, which a track does not have to be. Assembling a track is of course called "tracking."

Tracking in its simplest form is the control of timed data, called "events." Much like sequencing, groups of events are assembled into "patterns," which can then be arranged in an order list. Unlike sequencing, track events play samples that are part of the file. Tracking in its purest form does not call sounds from external sources, only from those within the file. ModPlug Tracker, however, allows for the use of external sounds sources as well as file-saved samples.

### Difference between tracking and sequencing

"Sequencing" is the playback of event data from ONLY sound sources that are external to the song file. Most sequencing software is MIDI-ready, and often uses "libraries" to store data on how to configure the sound parameters within the synthesizer. Like tracking, sequencing events are grouped into patterns, but unlike tracking, each channel (called a "track" if it wasn't confusing enough!) is assigned one instrument, unless a MIDI Program Change event is called within the track. Also, while sequencing software uses a more graphic interface which displays editable bars along a time line, tracking interfaces are more textual in nature, showing events in an alphanumeric list (although many sequencers have this event list to show details of note data). The best sequencers even display events in musical notation!

One of the differences between tracking and sequencing is how concurrent channels are played together. Generally in sequencing each channel has a pattern, and since each channel usually has its own instrument, a pattern played in one channel will sound different when the same pattern is played in another channel. Not so with tracking — patterns hold data for all channels at once; you cannot apply patterns to separate channels. (ModPlug uses the latter technology.)

Sequencing is almost entirely MIDI-driven, while tracking relies on simply altering internal sound data, called "samples." Few trackers can edit very many aspects of the sample waveform, but they can manipulate the playback of them with Channel Effects. Sequencers by and large have very little manipulation of sample playback, instead relying on altering sound parameters within the sound source, but this control is minimal (which is why sounds must be set up before running them thru a sequencer). In almost all trackers and sequencers, true sample alteration is practically non-existent; editing of samples must be done with third-party applications.

The advantage of sequencing over tracking is that a sequence file is a fraction in size of an equivalent track file. But the trade-off is that sequence files are not portable, as they can only play if connected to the external synthesizer from which the instruments originate AND it is run from its application. Tracking files, however, only need the correct application or plugin that can read the file format of the track.

To determine if an application is a tracker, just remember, it is NOT a tracker if it does not allow playback of internally stored sample data.

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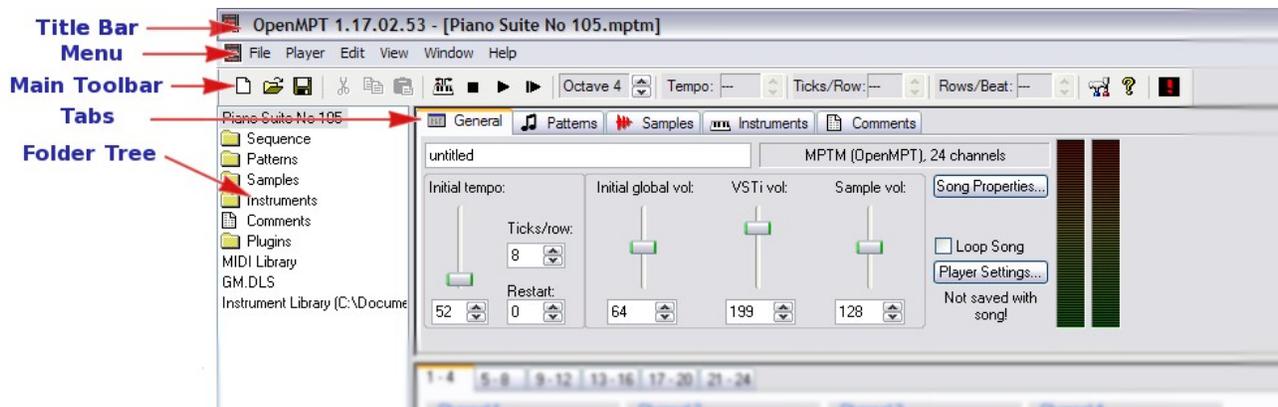
## 5. Basics of ModPlug Tracker

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### Overview of the tracking interface

ModPlug Tracker was originally a tracking application, but through open development has gained some sequencer capabilities -- the ability to play from external sound generators, including external MIDI synthesizers and "virtual synthesizers" called VSTi's. Furthermore, MPT makes excellent use of the Windows environment, especially in Windows XP, using sliders and buttons for visual-based input, and allowing in many places for different types of parameter setting. The editor interface is mostly still textual in nature, but can be customized for better readability.

Shown below is the top part of the opening page. ModPlug Tracker's window is resizable and movable, and you can expand it to full-screen viewing. If a file is open, it has its own within MPT's window, and can be minimized, restored, maximized to MPT's window, or closed without quitting ModPlug. Several files with their own windows can be open simultaneously, but only one can be active, receiving the input "focus."



#### The Title Bar

The window title bar shows the version number and the file that is currently active. If there is an asterisk next to the track title, this indicates the track has been altered and changes will need to be saved to disk.

#### The Main Menu

ModPlug Tracker's menu is accessible from any part of the program, altho some of its features may not be. Like most Windows applications, the menu is openable by keystrokes; just press the option key, then the letter that is underlined to choose the menu or a menu item. [Here](#) is the section detailing the menu items.

#### The Main Toolbar

Below the menu is the Main toolbar, which is visible and accessible from anywhere in the application. You can even pull the toolbar out of its slot and place it anywhere on the screen, by left-clicking on an empty space within the toolbar, holding the mouse down, and dragging it out of its slot. You can also click-and-drag one of the borders to reshape the toolbar. Each of the items in the Main toolbar can be assigned a keystroke, so it doesn't have to be visible. You can hide (or show) the Main toolbar by right-clicking on any open spot in MPT's window, and selecting "Main" from the contextual menu.

#### The Tabs

The interface is divided into five sections, placed within window tabs, which can be accessed from anywhere within the application. These tabs are labeled **General**, **Patterns**, **Samples**, **Instruments**, and **Comments**. (There is a Reference chapter devoted to details of these tabs [here](#).)

#### The Folder Tree

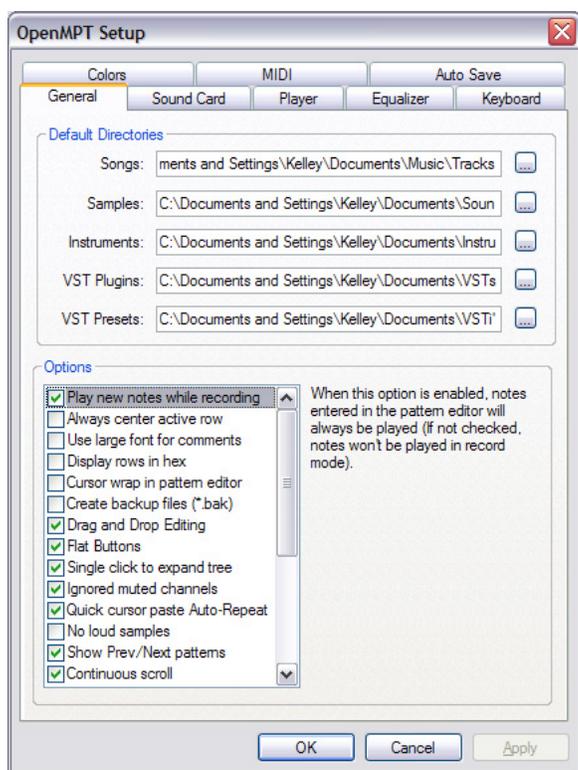
On the left is the Folder Tree, which shows a list of all volumes on your system, and can be opened to show individual folders. This way you can easily locate samples, instruments, and other files to help you in assembling your tracks. To hide this panel, either click on the pane divider between the panel and the tabs, and slide it all the way to the left, or right-click on any open spot of MPT's window, and select "Tree" from the contextual menu that appears.

## 6. General setup

When you open ModPlug Tracker for the first time, the Options page is immediately visible, but you can dismiss this if you want to just dive right in. You can also open this dialog box any time by clicking on the Setup icon in the Main toolbar or opening the View menu in the Main menubar and selecting "Setup".

Most of the preferences that are set in the Options page are stored in the file `mpttrack.ini` and can be edited in a simple text editor. Generally, however, you want to make these changes within MPT so you can tell what you're doing. Besides the `.ini` file, there are the `.mkb` files (which save the keyboard shortcuts), the `.tun` and `.tc` files (which store individual and collections of tunings respectively), and the `plugin.cache` file (which saves the locations and flags for the plugins that are being used for MPT). All of these are kept in the root directory of the ModPlug Tracker application.

Below is a description of the changes can be made in the Options page, divided into 8 tabs of information.



### Miscellaneous options

The first tab of the Options page holds miscellaneous settings — namely the paths to various relevant folders, and flags that make using MPT easier depending on what you're used to.

Most of the settings you can leave at their default setting if you're new to tracking, but you can get details on these settings in the Reference section on the [Options page](#). If you'd like MPT to revert to default folders when loading or saving songs, samples, instruments, plugins, or plugin presets, you can enter the path to them in the appropriate fields, or press the Browse button on the right to locate the folder directly.

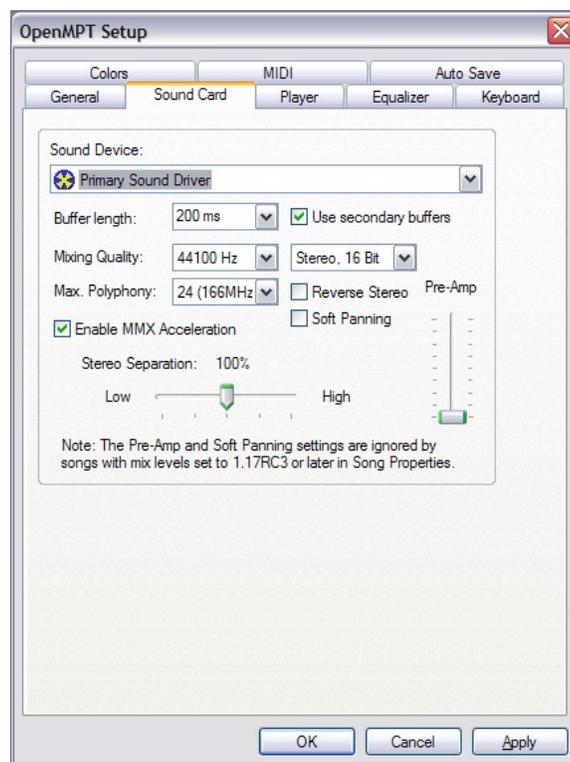
### Audio setup

There are 3 Options pages designed for setting up the audio input and output for MPT, under the Soundcard, Player, and Equalizer tabs. Here are the basics for applying these settings. More detailed information can be found in the Reference Section for each tab.

### Soundcard Page

In this page you can select MPT's output device thru your computer. Generally this would be your Primary Sound Driver, but if you have more than one you can select it by clicking on the Sound Device field.

The Buffer Length field is the amount of Latency you want to employ while using MPT. Basically the Latency setting describes the timing difference between the input or visual display and the audio output. For slower systems you should set this higher. If you have a really good system (especially with DirectX components) and you're using few or no plugins, you can set this to a very low setting (plugins, however, increase processing load, so you would probably want to set it in the midrange buffer length if you're using any). For users who



have chosen ASIO as their primary sound driver, you can set the Buffer Length to its lowest. For a more detailed description of this setting, see the Reference for the [Soundcard page](#).

The Sample Rate (Mixing Quality) and Bit Depth can also be set, and normally you would leave this at the default setting, UNLESS you have a very slow system that will not be able to handle heavy amounts of audio processing (in which case you want to decrease the Sample Rate), OR if you are doing high-end "professional" tracking and your system can handle the processing load (in which case you want to increase the Sample Rate). By decreasing either of these amounts, you may lose audial quality, but you gain processing power.

The Polyphony is the allowable number of notes that MPT will process at once. High-end computers can generally handle 32 or more, while low-end computers should have this set at 16 or less.

SUMMARY: If you find that your track "stutters" during playback, you may be trying to process more audio than your computer can handle. To troubleshoot, try doing the following in this order.

1. Increase Buffer Length to 200 ms.
2. Reduce the polyphony setting as much as you can. For a solo piano piece, you can probably reduce this to 8 with no tonal loss.
3. Reduce the Mixing Quality one step at a time to a minimum of 22050 Hz. Anything less than this can create a vast difference between what you hear and what will be recorded when you export the file to audio.

If you still encounter stuttering in playback, you'll have to reduce the number of plugins you're using. If you have a VSTi that plays only a few notes or less, consider transferring their playback to a sample. MPT can handle sample playback MUCH easier than VSTi processing. Also, many VSTs have very high CPU usage and can soak up a large percentage of your processing power.

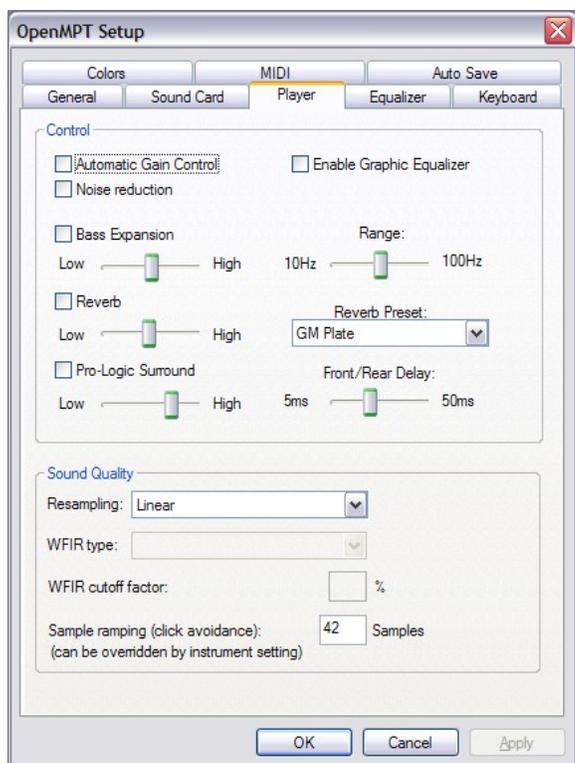
## ModPlug Player page

This page has settings that depend on how you want your Windows machine to process audio, and is largely dependent on your machine's capabilities and limitations. Keep in mind these settings are NOT saved with modules, but ARE applied to ALL tracks during playback and when exporting tracks to WAV or MP3 format.

In the upper part of the page, the Controls section, you can apply various playback functions to the master audio output. Most are self-explanatory, but in order for any of them to be applied, you must enable the appropriate checkboxes. For more details about this page, see the Reference section on the [Player Options](#).

The Automatic Gain Control applies a limiter/compressor to the Master Audio, increasing soft sounds while dampening loud volumes. You can also enable the Graphic Equalizer (the settings of which you can alter in the Equalizer page).

Check the ProLogic Surround box to have ModPlug use Surround Sound by dividing the signal between the output components. You must have an audio driver capable of Surround Sound for this to be effective. You can set the level of the Surround Sound mix as well as the delay to apply to the Front and Rear components.



The lower part of the page, the Sound Quality section, allows you to set how ModPlug interpolates all samples it plays. If you're using high quality samples, this section can be ignored. However, for samples with either low bit or sample rates, this will be important if you intend to play back or export to a bit or sample rate higher than these samples. The Reference section concerning [Audio](#) has more detailed explanations, but for the beginner it probably only helps to know what testing has taught us concerning resampling low-grade samples.

Testers have found that resampling with the Linear setting is the most primitive in mathematics but the harshest in sound quality. Cubic was found to be slightly better. With Polyphase, there is a definite improvement with only about 10% more processing power. Attenuating each sample's cutoff is said to improve the overall "warmth" of the output. XMMS/Hamming has about the same results but with less CPU usage than even Linear. XMMS/Hann resampling sounds as if the midrange frequencies are "backgrounded" a little, while XMMS/Blackmann backgrounds the bass frequencies slightly.

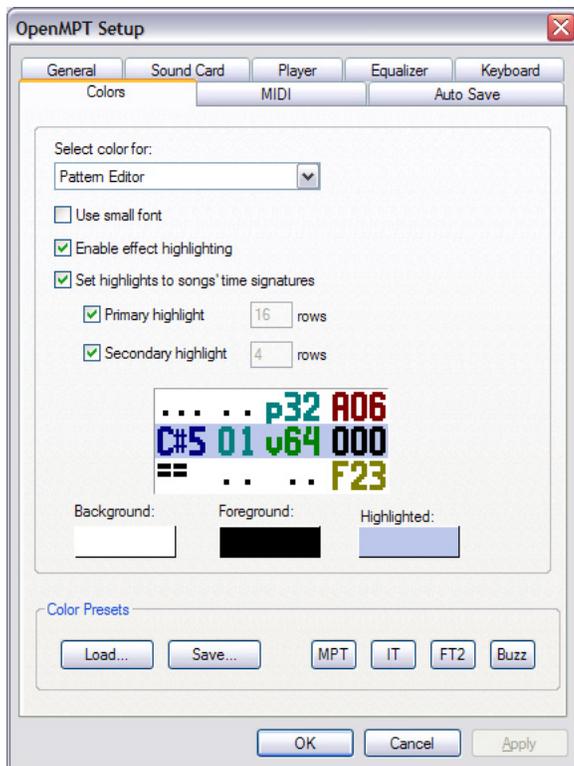
Although determining the best resampling method is subjective, testers have picked XMMS/Hamming the best overall in sample interpolation quality. Before exporting tracks that use low-grade samples to audio, however, it's best to do your own experimentation with the different algorithms.

## MIDI Setup

ModPlug's onboard MIDI implementation is limited, but thru free third-party plugins, it's possible to expand MPT's MIDI capabilities. If you're using an external keyboard controller to input notes, make sure the controller is read by Windows (follow [these instructions](#)), then in the first field of this page you can specify the MIDI controller for input.

For details on these options see the Reference section on [MIDI Options](#).

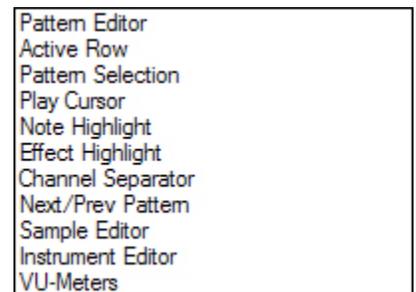
## Display setup



While MPT doesn't use skins or themes in its display scheme, you can set the colorization of some of the more important GUI elements from within the Colors page.

You can apply any of the four preset color schemes at the bottom if you're used to using particular colors when tracking. Each of these are borrowed from other tracker applications so they may seem familiar. On the other hand you can devise your own color scheme, whether to help with the inspiration process or for better readability. You can also load a scheme someone else created or save one you did.

There are four categories whose colors can be modified, which you can access by clicking on the Category Selection menu, shown on the right. The first 8 are for colors within the Pattern Editor.



As you select a different component to set colors for, various color boxes will appear below the Preview box at the bottom. Click on any of these to call up a standard Windows color selection dialog, where you can choose your color. As you change a color the Preview box allows you to see what it will look like in its context (except for the VU-Meters).

There are also some basic settings for the Pattern Editor display here.

**Use Small Font:** Check this to use a less readable font size in exchange for displaying more rows and channels in the Pattern Editor.

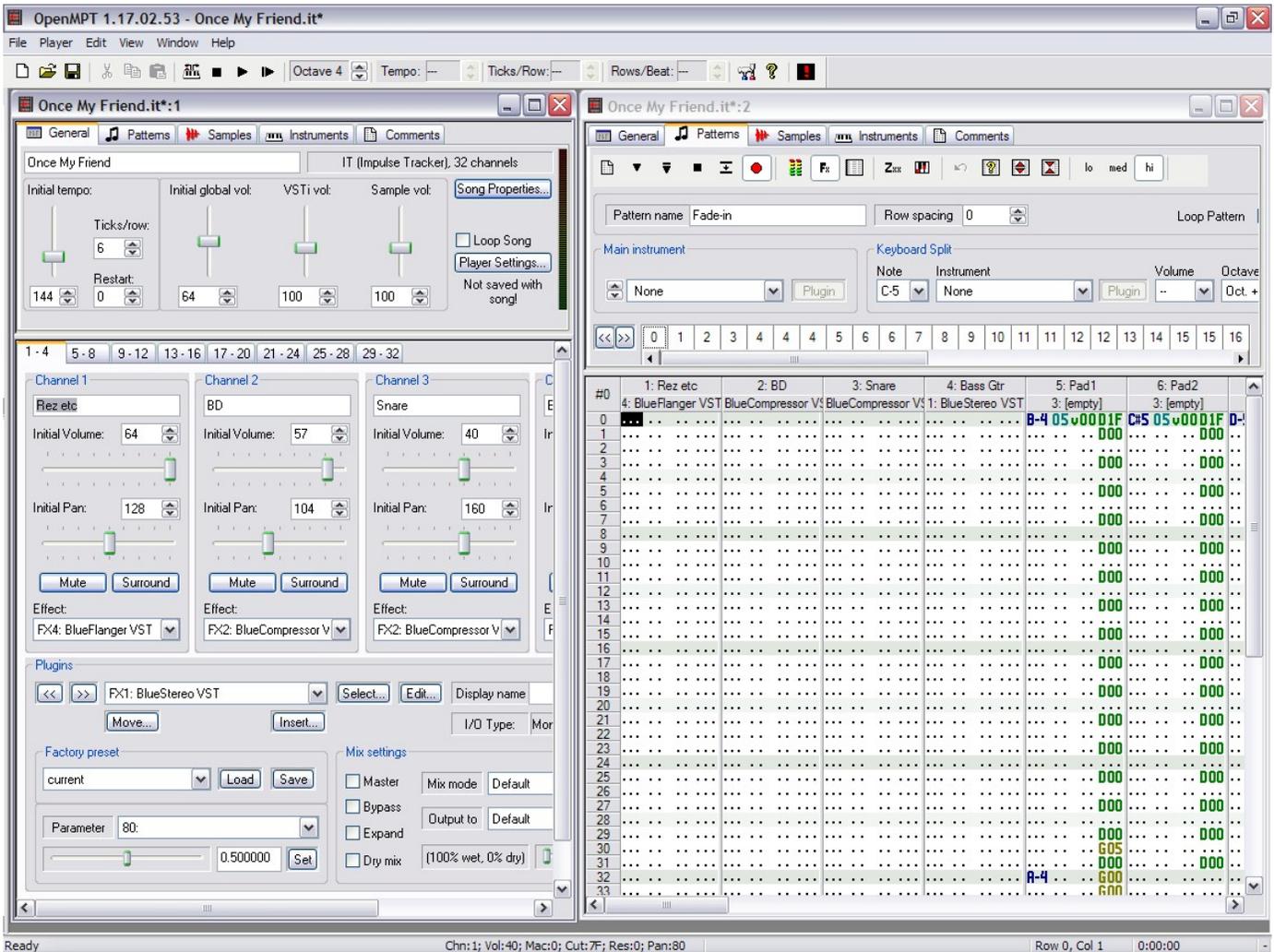
**Enable Effect Highlighting:** Check this to use the colorization scheme you've selected for the text in the Pattern Editor. If this is not checked, the text is not colorized.

**Set Highlights to Time Signature:** Check this box to use MPT's "time signature" to determine how the rows are highlighted. The time signature is set in the Song Properties dialog. If this box is not checked you can set a global highlighting for all songs. The Primary Highlight is the same color as the "Highlighted" box for the Pattern Editor component, and is equivalent to the Rows per Measure of MPT's time signature. The Secondary Highlight is a lighter version of the Primary Highlight, and equates to the Rows-per-Beat highlight of the time signature.

## Multiview

While you can't move the tabs to their own position, you can get a more complete look at your track with Multiview, as shown in the graphic below.

Here we're looking at the same track under two different tabs at the same time.



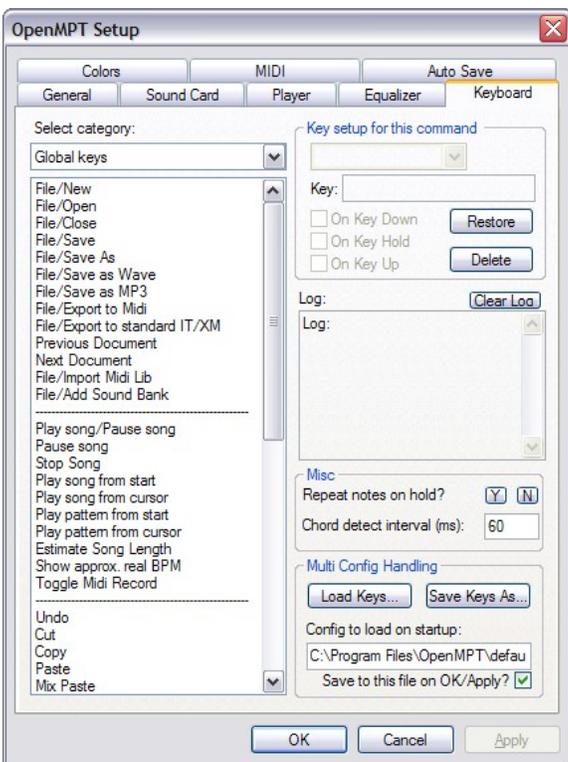
To view more than one tab at once, open a song and select "New Window" from the Windows menu. This opens an auxiliary window of the current track, which you can reposition and resize within ModPlug's window. From here you can choose one tab, such as the General page, in one window, and the Pattern page in the other window. You can even open a window for each tab using the same method. To autoposition the windows, you can choose one of the functions in the Window menu — Cascade, Tile Horizontally, or Tile Vertically.

Unfortunately there are two important limitations. First, the windows don't update automatically in the Pattern, Sample, and Instrument pages, so that changes that you make in one window of Multiview will not show up immediately in the other window (if it's open in Patterns, Samples, or Instruments). Second, the window positions are not saved with the song, no matter what format the track is in.

### Key Entry Setup

In this page you can choose or edit keyboard shortcuts for many of the actions in ModPlug Tracker, which are active as long as the input focus is not within a textbox. MPT keeps an internal default layout, but you can save your own or load others that have been proven to be useful to other MPT trackers. You can load other shortcut files by clicking on the Load button near the bottom of the page.

To view or edit keyboard shortcuts, first find the context to which the keypress would be applied by clicking on the Category field. A



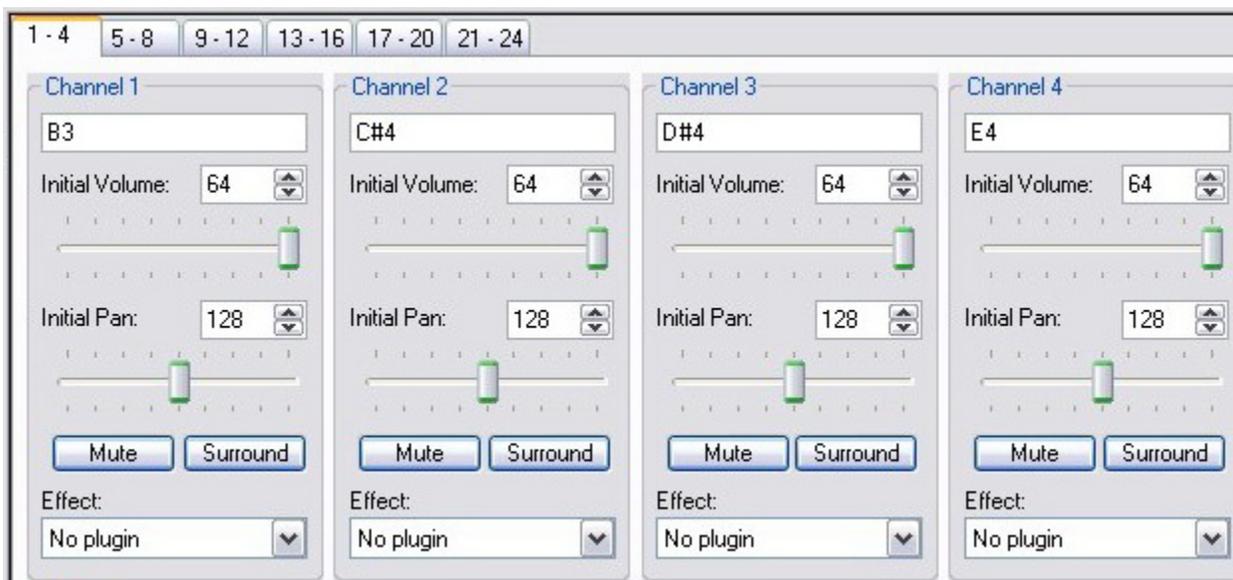
popup menu will open and you can choose the context to view. If you wanted, for example, to assign the Z key to C4 when inputting a note in a pattern, this keypress would be needed in the Pattern Editor for the note column. So you would select "Pattern Editor – Notes" from the popup menu. The list of assignable note messages will be displayed in the field below it. Scroll down to the "C4" entry and select it. If one or more keys is assigned for that note input, it will be shown on the right under Key Setup. If you want to create a new shortcut, select <new> from the popup menu on the top right, then click inside the "Key" field. Press the key you want and it will update the assignment. You can also dictate if the entry will be input when the key is first pressed, when it's held, or when it is released.

If there is a conflict between a new keyboard shortcut and one already assigned, you will be notified in the log window. If the conflicting key assignments cannot co-exist, the old one is deleted.

At the bottom right you can save your key assignments, and set up which key file you want to load when ModPlug starts up each time. Make sure the last checkbox is enabled in order to save edits you make to this shortcut file when you close MPT. For more details on this page, see the Reference on the [Keyboard Setup Options](#).

## Channel Setup

In the bottom half of the General page is the channel mixer and setup section. Four channels at a time (divided into tabs) can be viewed and edited. Below this graphic is some general help in setting up your channels before entering events in the Pattern Editor.



You can apply a label to each channel, which will show up the Pattern Editor as channel headers, so it's advisable to use short names. A label isn't necessary but it helps to keep up with what you're doing within a channel. There is a limit of 19 characters in these fields.

You can also set the initial volume and stereo pan for each channel as well. These can be changed by various Channel FX commands. For the Volume the range is from 0 to 64, and for Pan the values are from 0 (far left) to 128 (center) to 256 (far right). In the Pattern Editor in the Channel FX column these values in hexadecimal are \$00 - 40 and \$00 - FF respectively.

You can disable audio processing of a channel by clicking on the Mute button for that channel. You can apply Surround Stereo for a channel by clicking on the Surround button, but keep in mind this will effectively disable panning and other stereo effects by Channel FX commands.

To apply a VST to a channel, click on the Effect field to open a menu which will allow you to choose an available plugin. All notes played thru this channel will be processed through the plugin.

## Tempo and Speed

As in classical notation, tempo is defined as the rate of speed the song needs to go when played. For ModPlug, there are 4 variables that control the playback speed: the "tempo" setting (either the field on the General tab, or by the effect command Txx/Fxx), the "speed" setting (either the "ticks per row" field in the General tab, or by the effect command Axx/Fxx), as well as MPT's "time signature" setting in the Song Properties page (Rows per Beat and Rows per Measure).

Using these 4 variables, MPT has 3 Tempo Modes defined below. (NOTE: for XM files, the "tempo" value is derived from the Channel Effect Fxx, when xx is \$20 or greater, while the "speed" is the value of xx when it's less than \$20. IT formats use the Txx and Axx commands respectively.)

While you can change a Tempo Mode after a track is started, keep in mind that it could change a lot more than playback speed. Many playback effects, such as vibrato, use ticks per row to determine execution. Furthermore, many plugins calculate from the Tempo setting to determine its own synthesis effects, like arpeggiation and LFO speed.

**Classic:** This is the default algorithm for MPT. Early tracking software did not use floating-point arithmetic to calculate tempo, so it tended to be inexact. It is kept for backward compatibility with older modules as well as for ease of use for many track composers.

SETTINGS	EFFECT
Txx (Tempo value)	Fixes the duration of a tick
Axx	Sets the number of ticks per row
Rows per Beat	No effect (used for highlighting only)
Rows per Measure	Calculates beats per measure

**Modern:** This Mode is better than Classic in the sense that the Tempo setting is more accurate. Whatever you set the tempo value to is the exact Beats per Minute found in traditional tempo.

SETTINGS	EFFECT
Txx (Tempo value)	Fixes the BPM (true tempo)
Axx	Sets the number of ticks per row. Since BPM is fixed, this changes the duration of a tick.
Rows per Beat	Sets the number of rows per beat, thus the number of rows per minute.
Rows per Measure	Calculates beats per measure

**Alternative:** Allows for greater detail based on Speed (ticks per row). This means changing the Speed setting does not change the rate of playback, but rather the detail of each row.

SETTINGS	EFFECT
Txx (Tempo value)	Fixes the number of ticks per second
Axx	Sets the number of ticks per row
Rows per Beat	No effect (used for highlighting only)
Rows per Measure	Calculates beats per measure

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## 7. Using Samples

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### What are samples, and where do I get them?

The word "sample" has 2 meanings in audio usage. In a generic context, it is a sound file made up of audio points, which are levels of volume within a waveform. In a specific context, when talking about these individual points, each of these is technically also called a sample. To avoid confusion, we'll reserve the use of "sample" to the first meaning, and for the second meaning we'll use the term "sample point" or "sample data value." Here it's not important to know how samples make sound, which is discussed in the Reference Section. We are concerned mostly with how to use them in tracking with ModPlug.

Samples have always been integral to MPT, and even when you use VSTi's, you will find that samples can save a composition where VSTi's might fail. The reason is that samples can be easily and immediately be manipulated during playback without actually altering the sound data itself or having to assign macros to controllers. This is done with the use of Channel Effects, which are detailed [here](#).

ModPlug tracker, however, does not come with a supply of samples. The quickest way to get some is to separate them from the General MIDI instruments that come with Windows. If you load normal tracking files, you can borrow from those. You can also download samples from various websites; some of the trusted ones include [looperman.com](#), [sampleswap.com](#), and [Freesound.org](#).

Most samples come in either WAV or AIFF format, but ModPlug can load other formats – namely, XI, ITS, S3I, SMP, SND, RAW, PAT, 8SVX, and PCM samples.

### Can I alter the samples in MPT?

First and foremost, ModPlug has never been an audio waveform editor. If this feature is ever to be added, it will take the commitment and inspiration of a musician/programmer who will have to know the inner workings of not only sound and graphics programming in a Windows environment, but also how MPT has set up its graphics and playback routines in relation to the other aspects of tracking. In other words, it's probably better to use a third-party application to modify your samples. Fortunately MPT can seamlessly import samples and sound files, so it's as easy as it can be made. Keep in mind that many samples do not need a lot of modification because MPT can apply playback effects which can vary the audio drastically.

With that said, there are a few basic alterations that can be made to samples that have been loaded into a tracking file. Here is a summary of a few.

**Select:** You can select any contiguous number of sample points by clicking in the waveform display. When you use a modification it will only apply to the selection. If no selection is made, changes are applied to the whole sample.

**Trim:** Once a selection is made, you can delete either the selection ("cut") or all except the selection ("trim").

**Loop:** You can set up start and end points that will cause the sample to loop during playback. There is even a separate Sustain Loop which allows you to better control what happens before and after the loop.

**Amplify:** You can increase or decrease the value of sample points by percentage, in effect increasing their volume. You can also apply a fade in or fade out, which ramps the data values up or down either starting or ending at a value of 0.

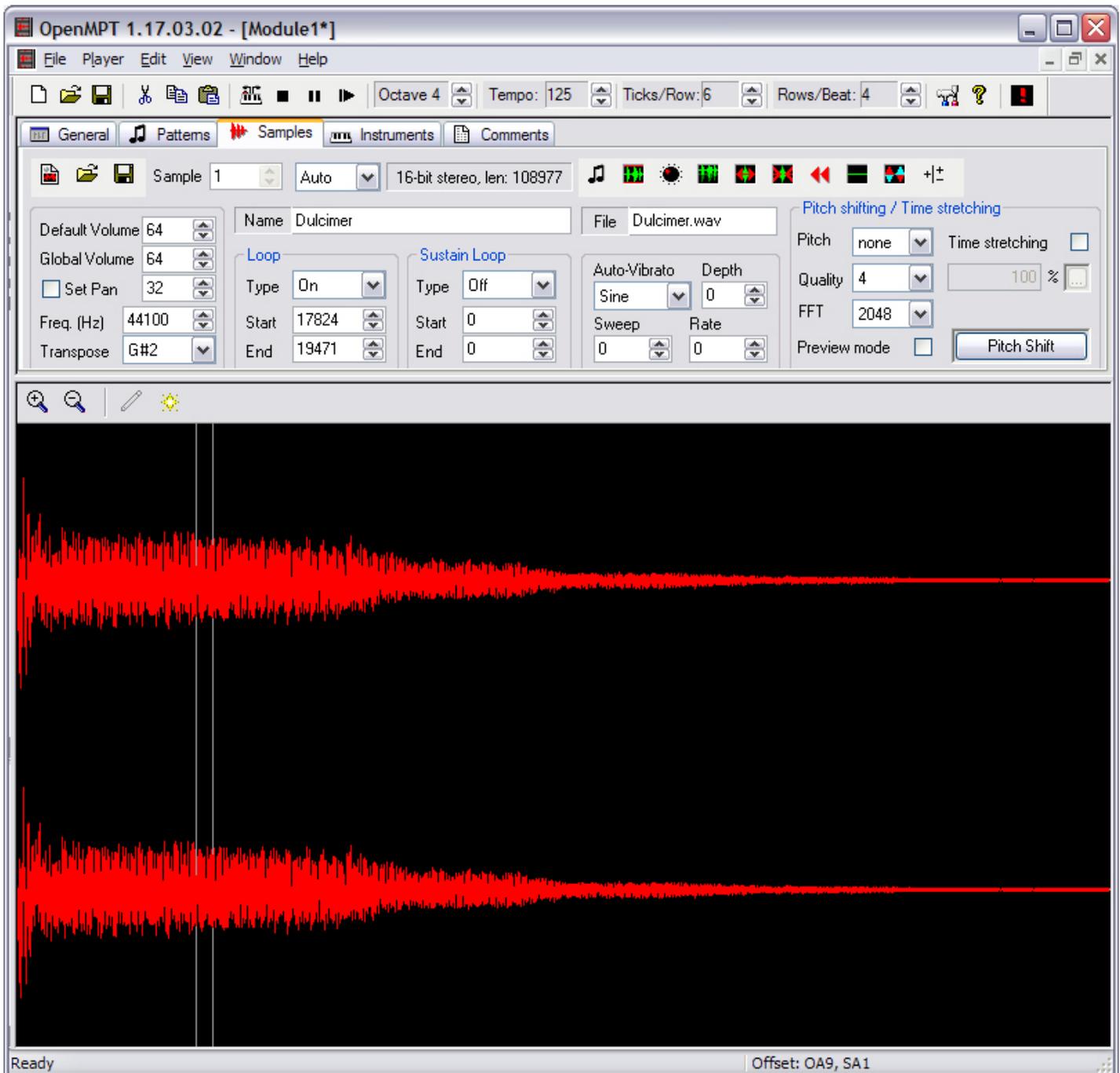
**Normalize:** This is like a conditional amplification. Normalizing amplifies sample points by the same amount until the highest value of the sample (or selection) equals the highest possible value (255). This has the effect of amplifying quiet samples a lot, but amplifying already loud samples a little.

**Reverse:** This will reverse the order of the sample values, so that playing it forward makes it sound like it's playing it backwards.

You can also DRAW a waveform for sound experimentation or cleaning up a sample's waveform. For more detailed description of MPT's sample altering functions, see [this section](#).

### The Samples Page

Below is an example view when clicking on the Samples tab. What follows is a brief description of the page.



Below the Main Toolbar in the Samples page are the row of buttons that execute certain functions relevant to the samples. Below that are the many Sample Attributes, such as the volume, pan, and pitch settings, the parameters for the sample's repeat loops, and others. The main part of the page is the display for the sample waveform, the Sample Display. And at the very bottom is the Status Bar, which shows the cursor location within the waveform. For more detailed descriptions of each element of this page, refer to the Reference section concerning the [Samples page](#). For now let's get a working knowledge of how to use this page.

## Importing samples

There are 2 ways to load samples into a track for use — drag-and-drop and file import. Drag-and-drop works from the Folder Tree on the left side of the window or from any open folder on the desktop, dragging the file icon itself from the folder to the Sample Display. File Import works by clicking on the Import Sample icon on this page; you'll be prompted with an Open File dialog so you can locate the file yourself.

If the sample file's format is not recognized by ModPlug, it will try to translate it to its proper sound, but you must input whether it's 8-bit or 16-bit, whether it's signed or unsigned, and whether it's stereo or mono. If you're not sure, just experiment; all data is translated to an audio wave — if you get it wrong it won't crash the application. If there is any

extra data other than audio, such as the file header, it will become audio data, but you can cut this out of the sample after translation. The only type of sound file that can't be translated properly is sound data with an alternate byte structure, namely those created on Macintosh computers (the type of byte structure is called *endianness*).

## Sample attributes

With a pattern in the slot you can preview it by clicking on the Preview icon or its keyboard equivalent. You can also Control-click in the Sample Display, which will play the sample from where the click is. To make changes to how the sample is played you can alter its attributes, as described below.

## Volume

The initial volume is set in the Samples page, in both the Default and Global Volume. The Global Volume is the MAXIMUM the sample's volume will be played (ranging from 0 – 64), and will affect all of the sample's playback volume by this amount in 64ths. So for example if the global sample volume is set at 48, it will never be played at more than 75% of its internal volume, no matter what commands are passed or its other volumes are set at. An alternative to setting the sample's Global Volume is altering the sample's waveform loudness by clicking on the Amplify icon.

If the sample is played in a pattern as is, without a volume command BUT WITH AN INSTRUMENT/SAMPLE ASSIGNMENT, it will play at the Default volume, so if you set the Default volume at 32, it's the same as calling a volume command at that amount — for example,

```
C-5 01 v32 ...
```

would be the same as 

```
C-5 01 .. ...
```

but neither are the same as 

```
C-5 .. .. ...
```

In the last example, the sample or instrument is not designated so the note will play at the most recent note volume, which may have been altered by Random Variations or other functions.

Note that during playback you can't change the Default Volume setting, only the CURRENT volume of the sample.

## Pitch

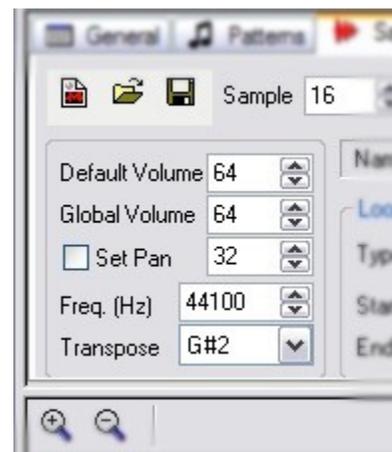
For tuned notes, it's also important to know the correct pitch the sample is tuned to. If you're not sure, you'll have to compare it to a sample whose pitch you're certain of. You use the Frequency and Transpose fields to fine tune the pitch of the sample if it needs it. You may discover the sample plays back at a pitch that doesn't match the frequency or the note in the fields. This is an internal problem of the sample itself, where the playback frequency is incongruent with the actual pitch. For this reason it's best to use a third-party audio editor to determine the actual pitch and set it to a global frequency. As an idea you should set all of your tuned instrumental samples to one note, so that if you played them at the same time in MPT, they would be playing the same note. (This can be time-consuming, but it will save you time when you're ready to track.) There is more information on accounting for or correcting audio pitch of samples in the [Audio Help Section](#).

## Loops

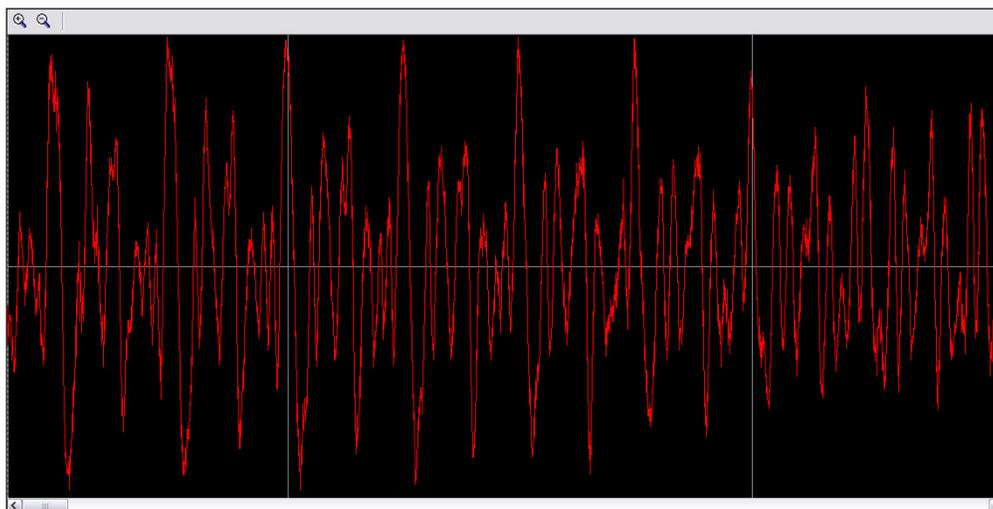
For sustained sounds, you may have to set the loop in your sample if it isn't included in the sound file, so that playing the sample will sustain the note. A good loop can save thousands of bytes in actual audio, and reduce the size of your tracking file. But it takes a good ear to set the start and end points of the loop so that the sustained note is seamless. ModPlug Tracker allows for normal "tape" loops that simply repeat audio over and over, as well as bidirectional loops, where the playback goes forward then backward in the same cycle. There is also another layer of loops that instruments use, but see the section on [Instruments](#) to understand how these work.

To set a **Sample Loop**, you can enter numbers in the Start and End fields. Or you can click-and-drag on the sample display to highlight the part of the audio you want to cycle; then right-clicking on the selection brings up a contextual menu so you can choose "Set As Loop". You can also specify in the same way a **Sustain Loop**.

Play a note; chances are that it will not be a clean-sounding cycle, so you have to fine-tune the loop. For simple waveforms, if you just click on the arrow keys next to the Start or End points, MPT is sophisticated enough to pick the next closest sample point that most nearly matches the value at the other end, in effect alleviating the click that you hear in imperfect loops. For example, let's say your loop starts at 10000 and ends at sample 40000. If the audio value at the sample 10000 was 40 and the value at 40000 was -32, clicking on an arrow next to the End field would reset the ending sample value to one that was very close in value to the first (40) at a higher or lower sample point (depending on the arrow you clicked).



For more complex waveforms (such as vocal or layered sounds), you'll have to visually determine yourself where the best loop points might be. The human eye has a better chance than most computer algorithms at determining repeating patterns, even in the squiggly lines of an evolving waveform. The object is to get the loop points to end nearly at the same place in the waveform where it began more than a few iterations ago. Here is a picture to get an idea of what you're looking for:



You can see the repeating waveform between the loop points. The multisample repeats 4 times.

Once you determine where you want to place a loop point, make sure nothing is selected, position the mouse at the right spot, and right-click for the contextual menu. Choose "Set Loop Start" (or "Set Loop End") to adjust it.

Bidirectional looping works but usually only for "symmetrical" waveforms, and sometimes for "heavy" waveforms. A symmetrical waveform, like a sine wave, is easy because finding the start and end points means little fine-tuning is needed. "Heavy" waveforms which have a repeating audio wave, with few effects in the audio, are difficult, but not impossible, to find the right loop points. Examples of "heavy" waveforms are choral samples, electric guitar ostinatos, and synthesized sounds with flat or symmetrical envelopes. Experimentation determines if a Bidi loop can be set up.

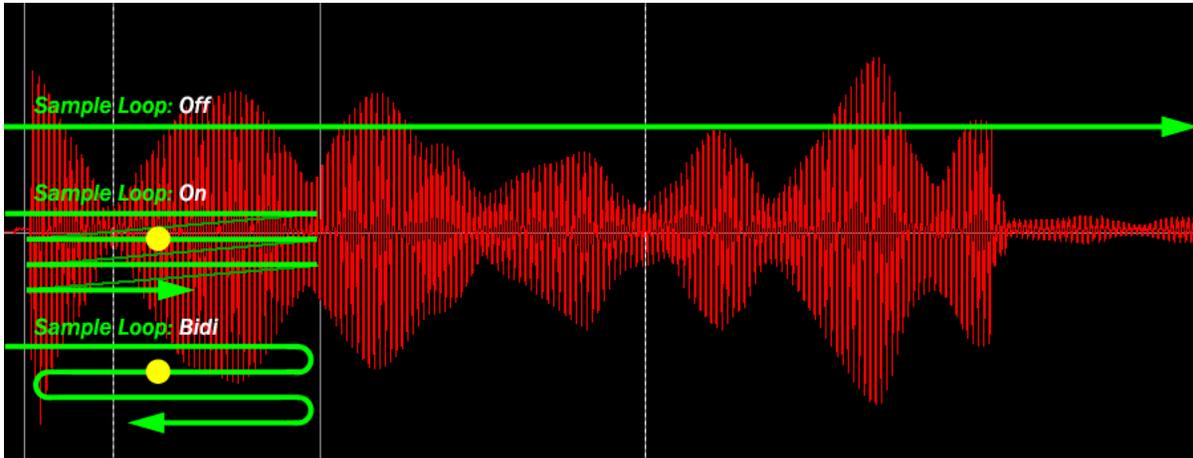
## Setting Up Waveform Loops

There are two types of loops that can be cycled in a waveform — a **Sample Loop** and a **Sustain Loop**. They can be set up together if desired and even intersect each other, but it's important to know a few things. First of all, **Sustain Loops** are not available in MOD and S3M tracks.

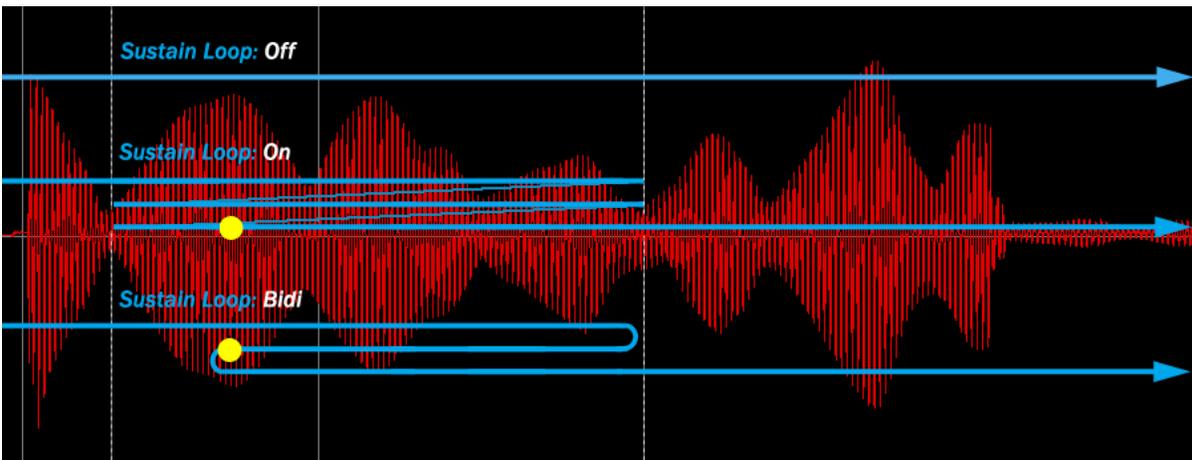
Secondly, when **Sample Loops** and **Sustain Loops** intersect, the **Sustain Loop** takes precedence until note-off. The only way a **Sustain Loop** is ignored is when its Start point is placed AFTER the **Sample Loop's** End point.

Here are the rules on how loops proceed during playback:

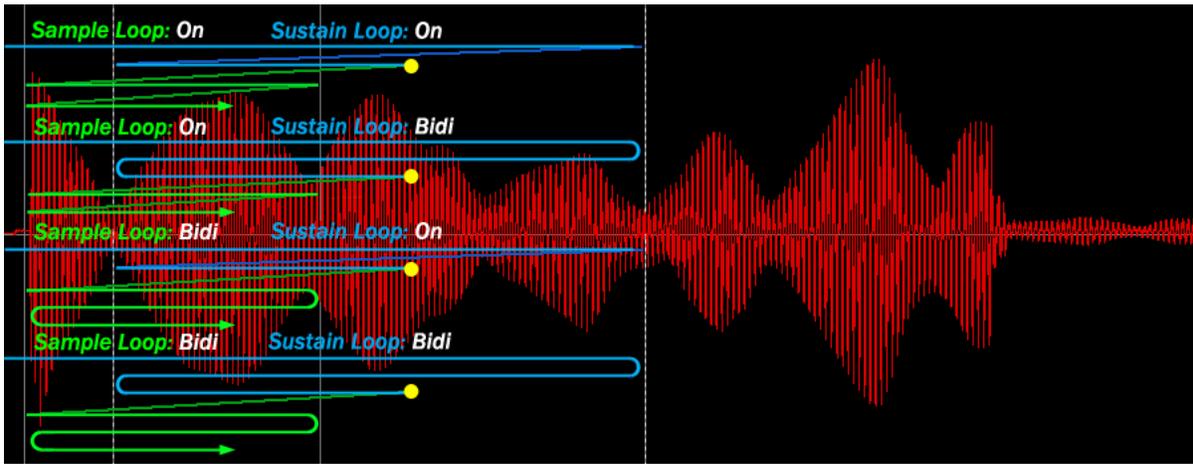
- If there is no **Sample Loop** or **Sustain Loop** set in the Samples page (both types show "Off"), every time a note is called the sample plays from start to finish in one pass.
- If only the **Sample Loop** is active, a note trigger will cause the sample to be played from start to an endless loop within the **Sample Loop** points, even after a Note Off (signified by the yellow dot  along the playback path). The end of the sample is never reached.



- However, if only the **Sustain Loop** is active, the sample will be played and cycled between the **Sustain Loop** points. If a Note Off is reached, the sample playback will stop looping between the **Sustain** points and finish the sample from the playback pointer. (If the playback is in the middle of the reverse leg of a bidirectional loop, it re-reverses playback from there and plays the sample forward until the end of the sample.)



- If BOTH **Sample** and **Sustain Loops** are active, the playback will follow the **Sustain Loop**, but when a Note Off is reached, it will continue playback WITHIN THE **SAMPLE LOOP** POINTS, and the end of the sample is never reached. If the Note Off is not within the **Sample Loop**, it continues playing from the start of the **Sample Loop**.



If you use instruments, there is another layer of loops that envelopes apply. See the section on [Envelope Modes](#) for info.

## The difference between samples and instruments

It's important to determine early on if you want to stick to samples for playback or if you want to use instruments. Except for MOD and S3M files, which don't use instruments, once a track is flagged as using instruments, not only is it difficult to reverse, but also you won't be able to call up the samples within patterns. Normally this is not a problem unless you MUST minimize file size, or MUST simplify the composition or playback process.

There are 5 main situations when you would want to use instruments as opposed to only samples:

1. to control the sample playback with amplitude, pan, or filter envelopes,
2. to use multiple samples for one instrument,
3. to introduce randomness in the sample playback, such as for resonance or volume,
4. to define what happens when one sample is stopped because of a new or duplicate note in the channel, or
5. to use or control VSTs or MIDI devices.

All of these functions can be called for instruments but not samples. But note that not all track formats allow you to use instruments (namely, MOD and S3M tracks).

## Assigning samples to instruments

As long as there are no instruments in the track, all samples will show up in the Main Instrument field in the Pattern page. If you have already loaded many samples and then decide you want to use an instrument (by clicking on the New Instrument icon in the Instruments page), you will be prompted if you wish all unassigned samples to be assigned to instruments. The only time you would NOT want to do this is if you intend one instrument to hold many samples (more on that later). By clicking "Yes", enough slots for instruments are created so that each instrument holds one unassigned sample. Any unassigned samples by themselves are no longer accessible from the Pattern page (to be entered into a channel); they must be assigned to an instrument if you want to play them.

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## 8. Using Instruments

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### How are instruments used in MPT?

In Modplug Tracker, instruments are like an extra layer of playback parameters that answer the question, “How should we produce sound?” Instruments have three ways of accomplishing this:

1. Directly playing samples, one per note, applying the following: envelopes for volume, panning, filter, and pitch; maps for more than one sample; and temporal polyphonic control with New Note Actions (NNAs).
2. Passing audio and note events to internally “mounted” software plugins called VSTs, trading control of sample playback commands for a wider variety of sound synthesis/processing mechanisms.
3. Similarly sending note events to external synthesis devices via MIDI, freeing up processing speed of audio playback and manipulation and at the same time turning over control of audio processing to the external device.

ModPlug Tracker can make use of instruments in all of its native track formats except the MOD and S3M formats, which are confined to samples. If you're using those track types exclusively, you can skip this chapter.

### Importing instruments

Like samples, instruments can be imported with drag-and-drop from the Folder Tree or the desktop, or by clicking on the Import button in the Instruments page. If you click on the Import Instrument button, and there are samples that are not assigned to an instrument, ModPlug will ask if you want to assign the samples to their own instruments. If you want to use all of your loaded samples in the track, you must assign them to instruments once you have set up for even one instrument (even if the instrument is for a VST). Keep in mind that whenever a new instrument is loaded or created, a new sample slot is also created.

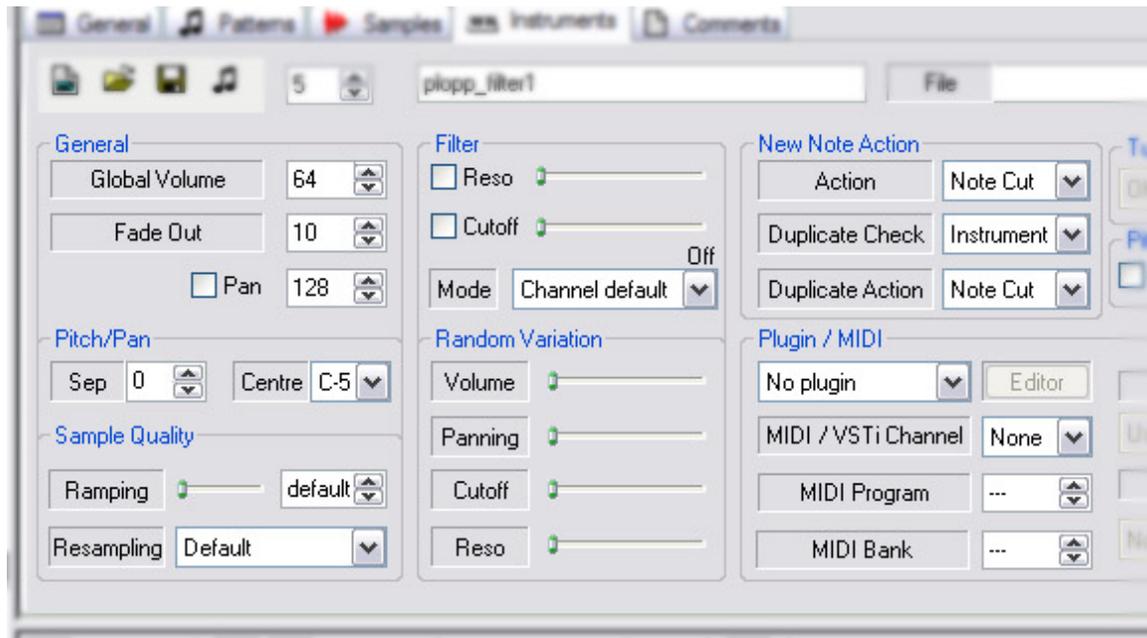
Windows also has a set of ready-made instruments in the General MIDI directory. To access them, just open the GM subfolder on the Tree, find the instrument you want to use, and click-and-drag the icon to the Envelope display. The instrument attributes are changed according to the specifics of the instrument, and whatever samples it uses is loaded into new slots. It's not uncommon to find these instruments use multiple samples, usually between 4 and 10, because the instrumental sounds have different waveforms at different octaves (but drums use different instrument sounds for each note).

ModPlug Tracker can load a few instrument formats — namely those in ITI, XI or PAT format. Generally, however, you will be constructing your own instrument when you import samples for your track. There is also limited support for soundfont instruments, described below.

### Instrument attributes

When instruments are assigned to samples, various attributes determine how MPT will process the samples. Note that when no sample is assigned and the instrument is mostly a vehicle for activating VSTs or MIDI devices, almost all of these attributes have no bearing on the sound synthesis. The only attributes that determine how event data is translated for VSTs and MIDI devices are those in the Plugin section of the Instruments page, namely the assignment of the synthesis module, the MIDI route it will use, and how key velocity and note volume is handled from the pattern context. It's important to remember when using VSTs and MIDI that no other parameters on the Instruments page affect either synthesis or playback of sounds than those within the Plugin section. This also extends to most Channel and Note FX (except those found in the list [here](#)).

For now we will assume that the Instrument uses at least one sample, in which case the parameters below will affect its audio processing.



The first and most obvious attributes that you can set are the initial instrument volume (which attenuates the Global Volume of the sample or samples), the panning position (as long as the samples' pan settings are not set), and perhaps the filtering (which is applied to the sample before playback).

## Volume

The Instrument's Global Volume ranges from 0 to 64 and corresponds to the percentage of the sample's Global volume to play through. For example if the sample's Global Volume is 64 (100%), and the Instrument's Global Volume is 48 (75%), the two volumes are multiplied together and processed at that volume (75%). If, on the other hand, the Sample Global Volume is 32 (50%) and the Instrument's is also 32, the volume will be 25% (50% of 50%). Plus the instrument's volume is altered further by the Note volume, as well as temporally by Envelopes.

The main reason the sample's volume levels are attenuated by the instrument instead of overridden is because more than one instrument can call a single sample, and each instrument may have its own volume level for the same sample use. Furthermore, using Note or Channel FX for volume changes the instrument's volume, not the sample's (unless there are no instruments).

The sample will fade from this volume when a Note-Off command (but not a Note-Cut command) is passed, at the rate entered in the Fade field. Generally the default is fine, but some samples may require a faster or shorter fade rate. Adjust the value in this field to a higher amount for a quicker fade, and lower for a longer fade out. This value is also important for NNAs (see below).

## Panning

If the sample being called by the Instrument is a stereo sample, its panning positions will be used by default. If the Sample's Pan setting is enabled, that will re-center the relative stereo position of the Sample. If the Instrument's Pan setting is enabled, it is only active if the Sample's Pan setting is not enabled, in which case the value in the accompanying field will set the initial pan position.

Using panning effects in a Pattern is applied relative to this setting, so when you call for pxx in the Note FX column, or 8xx or Xxx in the Channel FX column, it sets the pan position relative to this initial Pan. This means that a note with Channel FX value of XFF (far right) on an instrument whose Pan is set to 0 (far left), will play back exactly in the center of the stereo panning field.

For extra effect, you can apply a pan value based on the note that's being played, like sitting at a piano, where the basser notes are heard from the left, and the higher-pitched notes are heard from the right. To activate this, set the value of the Pitch/Pan Separation to a number from -32 to 32, where  $\pm 32$  is the highest amount of panning separation (a negative value puts the bass pan on the right instead of the left). Then set the Center note, the note value where the pan will be dead center. For a piano, you can leave this to C5, but for a bass synth you can set it one or two octaves lower.

## Filtering

Many times you'd like to apply a resonance filter to the sample for better audial clarity ("image"), such as a high-pass filter for a crash cymbal, or a low-pass filter for a kick drum. To do any kind of filtering, you have to first check the Cutoff box and move the slider from the Off position. This will adjust the frequency band where the filtering will be limited. If you leave the Filter Mode to "Channel default," a Low Pass (LP) filter will be applied unless the channel was set to High Pass (HP). If you then want to narrow the line of frequencies that will be filtered, you can check the Resonance box, and move the slider up to narrow the band (often called the 'Q' setting). Depending on the Mode, the Resonance value has different effects on the sample filtering.

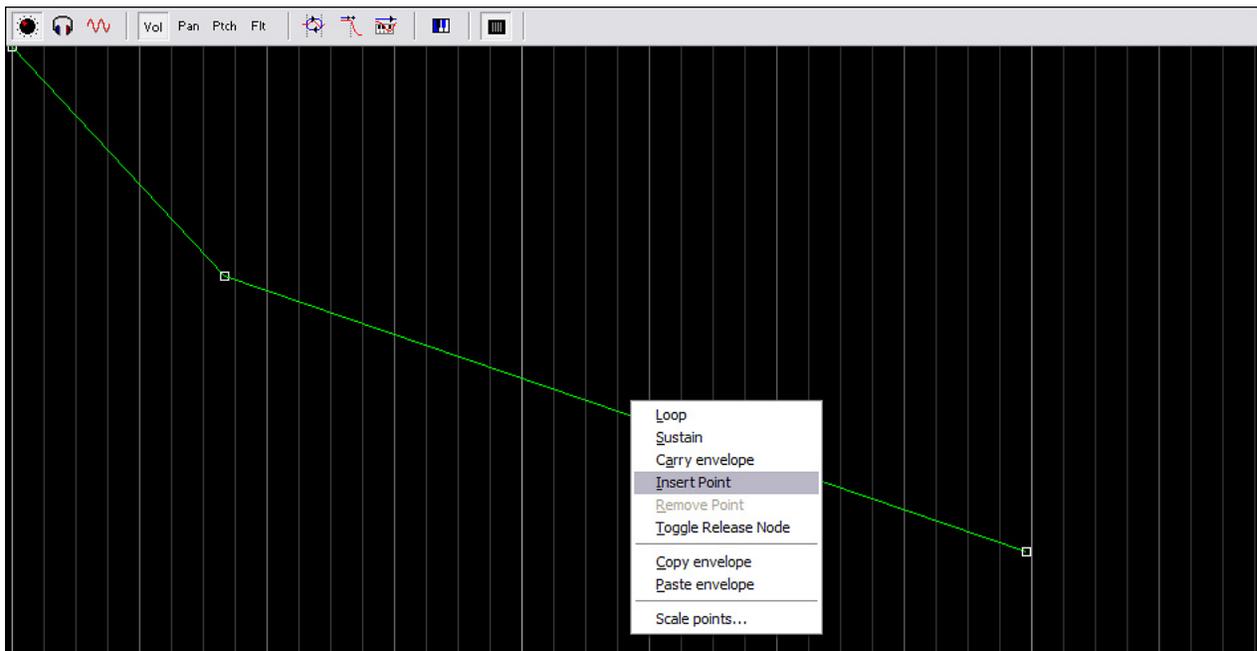
## Envelopes

One of the primary reasons for using a sample-based instrument is to apply envelopes to any note. ModPlug has some interesting features when applying envelopes. First, there are four different, independent envelope applications — volume, pan, pitch, and resonance filter (although you can't use the last two simultaneously within one instrument). Secondly, you can assign up to 25 points to the envelope (MPTM tracks can use 240 points in the envelope). Thirdly, the envelope can last virtually as long as needed. This means theoretically you can assign one sustained sample to last the whole track with 25 points of gradual variation in volume, panning, and pitch or filtering via a single envelope for each.

To set up an envelope for an instrument's sample, first display the envelope points for the correct attribute. Click on one of the first 3 icons of the Envelope Window, shown above. Here we'll look at the Volume envelope, since there's some important object lessons here. For a visual aid you can also click on the Grid icon if it's not already on. If you don't see a colored line in the Envelope Display, click on the Volume Apply icon to activate the envelope.



To shape the envelope, click on any of the envelope points, the little squares that demarcate the line segment. The first point always stays at the leftmost longitude of the window, but you can drag the other point anywhere else. To add more points to the envelope, choose a spot anywhere on the graph and Shift-click (or open the contextual menu and select "Insert Point"), and a new point will be placed there. To remove a point, you can again use the contextual menu, or if your mouse has a middle button, just click that while the cursor is pointing to an envelope point.



For the Volume envelope, silence is at the bottommost latitude of the graph, and the maximum volume for the Instrument is at the top (this maximum is set by the instrument's Global Volume). The other envelope windows also have a "horizon" line, indicating direct center in a Pan envelope, the played (or "base") note in a Pitch envelope, or the base resonance frequency in a Filter envelope. (The horizon line is also present in the Volume graph, but only represents the absolute midpoint value of loudness, 64.)

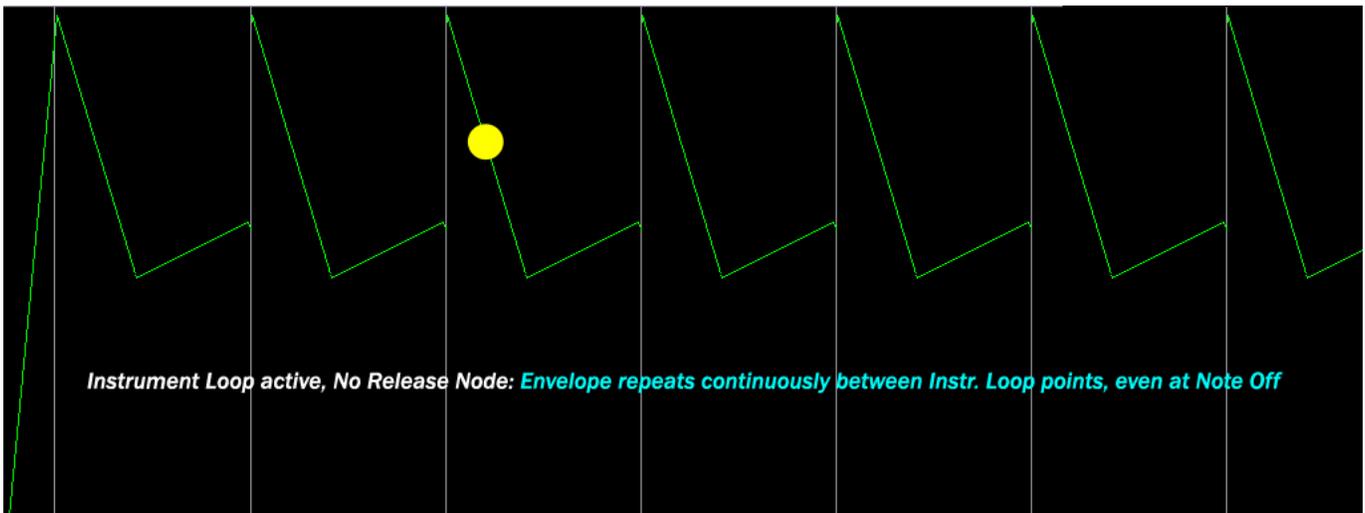
## Envelope Modes & Loops

While you apply Envelopes to different Instrument attributes, there are also 2 different ways envelopes can be processed: with an Instrument Loop or a Sustain Envelope. In order to activate one or both of these Modes, either choose them from the contextual menu, or click on the icon that represents it (located in the top part of the Envelope window).

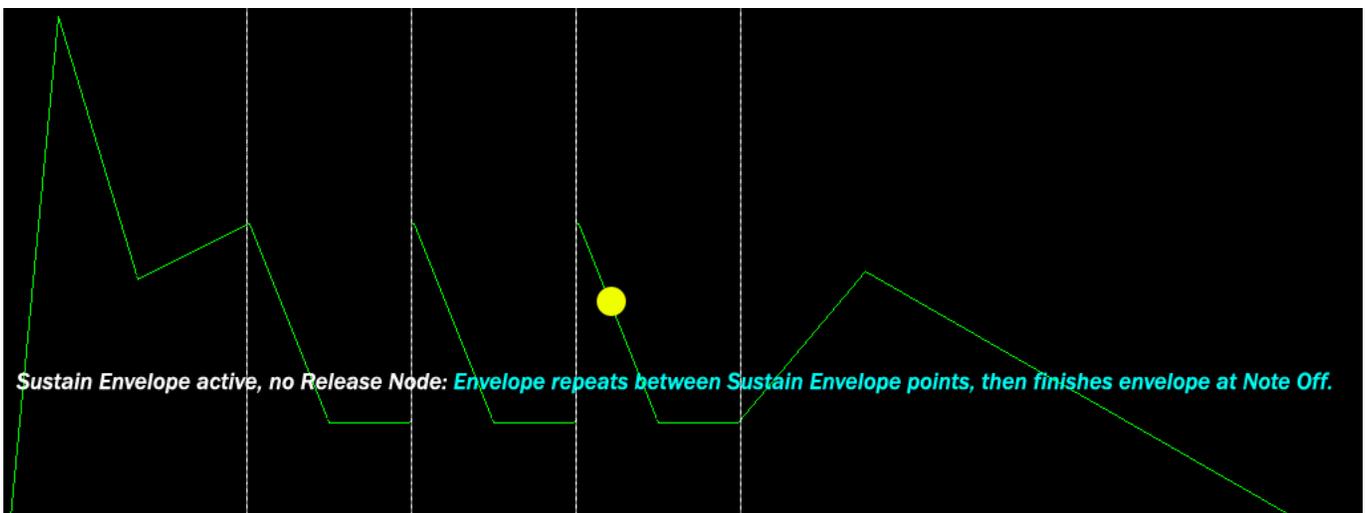
Loop Mode and Sustain Mode have special bracket indicators in the Envelope Window to let you know where the envelope repeats. Loop brackets are unbroken vertical lines, while Sustain brackets are dashed. You can move these brackets by clicking-and-dragging them. An Instrument Loop will cycle between its brackets while playing the sample, never exiting the loop unless the Release Node is active (discussed later). A Sustain Envelope is different in that the loop will be interrupted with a note stop.

When applying loops from the Envelope window, the envelopes will be applied and will repeat with these rules:

- ❶ If neither the Instrument Loop or Sustain Envelope is active, the sample will be played back (using its own loop rules) along the ENTIRE envelope timeline in one pass.
- ❷ An Instrument Loop will repeat its envelope endlessly, even after a note stop. The end of the envelope is never reached.



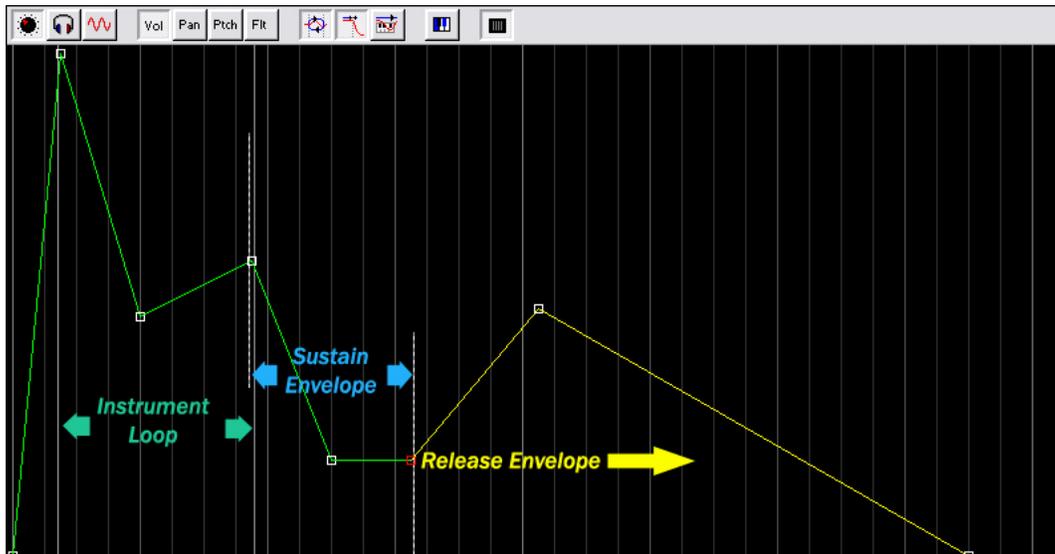
- ❸ A Sustain Envelope will repeat its envelope endlessly UNTIL playback reaches a note stop command or action; then it will stop cycling and finish the envelope from there.



- ❹ The Instrument Loop and Sustain Envelope can intersect, but once playback reaches the end of one of the loops, playback returns to that loop's start point and repeats that loop.
- ❺ There is no bidirectional cycling in Envelope Loops.

## Release Node

The Release Node is available only to IT and IT-type tracks, and can only be applied to the Volume envelope. It changes the normal Note Off behavior by allowing for an alternate playback "route." Where a Release Node is not active, playback follows the normal path as described above. To activate any envelope point as a Release Node, right-click on the point and choose "Toggle Release Node" from the contextual menu. The node is highlighted red, and the remaining envelope segments after that point are colored yellow.



When a Release Node is active, and whenever a note is stopped (except for Note Cut), playback of the envelope jumps immediately to the Release Envelope IN ALL CASES. However, the envelope points are then relative to the current volume, unlike the normal envelope which shows absolute settings between 0 and 64. The Release Node represents the current volume at Note Off, whatever volume it is at the time, and the envelope represents how the volume will be attenuated from that level.

Keep in mind, however, that the Release Node part of the envelope is part of the whole envelope and will be reached if there are no Envelope loops active. If you wish to keep the Release Envelope from being played (when no Note Off is called), put the end of a Sustain Envelope at the last point before the Release Node.

This table should summarize logically what happens with each setting, in case you're still confused. Keep in mind these apply to any and all envelopes (Volume, Pan, etc.) that are active for an instrument — except that the Release Node only applies to Volume Envelopes in IT tracks and their variants:

Envelope Mode			
	None	Instrument Loop	Sustain Envelope

<b>Sample Loop AND Sustain Loop Off:</b> Whole sample plays in one pass from start to finish			
--	--	--	--

<b>Playback Action</b>	Plays envelope in one pass	Repeats between Instr. Loop points	Repeats between Sustain Env. points
<b>Note Off</b>	Finishes envelope	Finishes envelope	Interrupts Sust. Env. to finish envelope
<b>Note Off Action, with Release Node</b>	Finishes sample; jumps to Rel. Node & finishes envelope	Interrupts Instr. Loop to finish envelope from Release Node	Finishes sample; interrupts Sustain Env. to finish envelope from Release Node

<b>Sample Loop On:</b> Sample plays from start, and repeats between <b>Sample Loop</b> points during envelope			
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<b>Playback Action</b>	Plays envelope in one pass	Repeats between Instr. Loop points	Repeats between Sustain Env. points
<b>Note Off</b>	Finishes envelope	Finishes envelope	Interrupts Sust. Env. to finish envelope
<b>Note Off Action, with Release Node</b>	Goes to Rel. Node & finishes envelope	Interrupts Instr. Loop to finish envelope from Release Node	Interrupts Sustain Envelope to finish envelope from Release Node

<b>Sustain Loop On:</b> Sample plays from start, and repeats between <b>Sustain Loop</b> points until Note Off			
--	--	--	--

<b>Playback Action</b>	Plays envelope in one pass	Repeats between Instr. Loop points	Repeats between Sustain Env. points
<b>Note Off</b>	Finishes envelope	Finishes envelope	Interrupts Sust. Env. to finish envelope
<b>Note Off Action, with Release Node</b>	Goes to Rel. Node & finishes envelope	Interrupts Instr. Loop to finish envelope from Release Node	Interrupts Sustain Envelope to finish envelope from Release Node

<b>Sample Loop AND Sustain Loop On:</b> Sample plays from start, and repeats between first-ending loop points until Note Off, which sends sample playback to Sample Loop			
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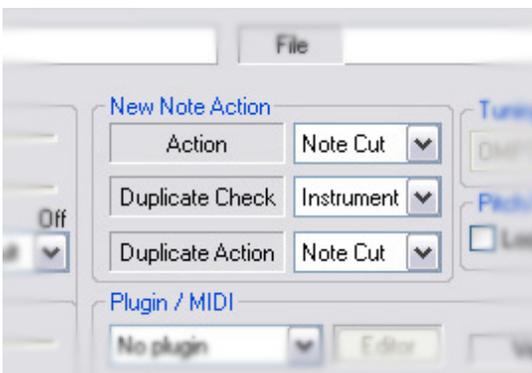
<b>Playback Action</b>	Plays envelope in one pass	Repeats between Instr. Loop points	Repeats between Sustain Env. points
<b>Note Off</b>	Finishes envelope	Finishes envelope	Interrupts Sust. Env. to finish envelope
<b>Note Off Action, with Release Node</b>	Finishes envelope from Release Node	Interrupts Instr. Loop to finish envelope from Release Node	Interrupts Sustain Envelope to finish envelope from Release Node

### Random Variation

You can also call for small amounts of random variation during playback for a sample's volume, pan, cutoff frequency, or resonance frequency, just by adjusting the sliders in the Random Variation section of the Instruments page. Note, however, that variations occur to the instrument's Global Volume, Pan, Cutoff, and Resonance settings respectively, and the last two must be enabled (the checkbox toggled on and the value not 0 or off).

NOTE: Remember that MPT applies the random variation to the last given value of that parameter. For example, if you have Random Variation for Volume set at 50%, and you call a note within a channel, the variation is applied before playback and the note is given a new volume. If you don't reset the volume to its default (by calling a note WITH an instrument tagged), as shown in Channel 4 of the example on the right, the next randomness will apply to that new volume, meaning the volume will more than likely over the course of a pattern will be reduced eventually to a very low value, even silence. To avoid this "drifting silence", call each new note with its instrument so it will revert to the original default volume and apply a new randomness, as shown in Channel 5.

Channel 4		Channel 5	
C-5	01	C-5	01
D-5	..	D-5	01
E-5	..	E-5	01
F-5	..	F-5	01
G-5	..	G-5	01
A-5	..	A-5	01
B-5	..	B-5	01
C-5	..	C-5	01
D-5	..	D-5	01
E-5	..	E-5	01
F-5	..	F-5	01
G-5	..	G-5	01
A-5	..	A-5	01
B-5	..	B-5	01
C-5	..	C-5	01



### New Note Actions (NNAs)

New Note Actions are applied during playback to instruments every time a new note within a channel is called, according to the rule on when and how the action is enforced, which you can set for each instrument. The main purpose is to reduce the polyphony and therefore the processing load of the sample playback, but it can also be used for interesting effects. NNA settings are found in the Instruments page, and there are 3 settings that can be applied:

- ACTION:** This is the action that will be used when trimming a replaced note, using one of the following:
- Note Cut** will immediately cease the playback of the sample and any

applicable envelopes. It will NOT set the instrument's current volume to 0, so the instrument is not required to be called to reset the volume.

**Continue** will allow the playback to continue through the sample; if the sample is looped, it will stay within the loop (CAREFUL! Polyphony will get eaten up quickly with this setting!). This means the note will not dissipate until the end of the sample is reached, the end of the envelope is reached, or the limit in Polyphony has been reached, whichever comes first. (An explicit Note Cut or Note Off will not stop a Continued note, only the current, playing note. To stop a Continued note, use the NNA commands S70, S71, and S72.)

**Note Off** does the same but will ignore the sample loop (abiding by the envelope loop if it is set), and not stopping until the envelope is complete.

**Note Fade** will apply the Fade setting while continuing the sample the same way as Continue does, releasing the note when the note's immediate volume reaches 0 from the Fade algorithm.

**DUPLICATE CHECK:** A second part of the NNA is the check for duplicates in the same channel. You may want one instrument to continue while playing a second instrument in the same channel for example. The Duplicate Check (D/C) will take action if it tries to play a note, sample, instrument, or plugin that is still playing; this is the trigger for initiating an Action.

**DUPLICATE ACTION:** This is the action that MPT will take when a D/C is verified. These are the same actions as found in the New Note Action list, except Continue is not an option.

## Advanced Attributes: Tunings and Sample Quality

You can use alternate note names or temperaments for instruments by using MPT's Tuning feature, but there are a couple of important conditions:

1. Tunings of any kind are only available with MPT's internal track format MPTM.
2. Temperaments (which change the pitch data of notes) can only be applied to sample-based instruments, not MIDI synthesizers or VSTi's. You can, however, use Scale Tunings (which only change the note labels, such as Db instead of C#) for notes passed to those types of instruments.

Beginners will probably want to wait before using Tunings, but more info on using them is located in the [chapter](#) devoted to them.

Instruments can also apply alternate algorithms for adjusting Sample Quality. ([more to be written later](#))

## Using Plugins

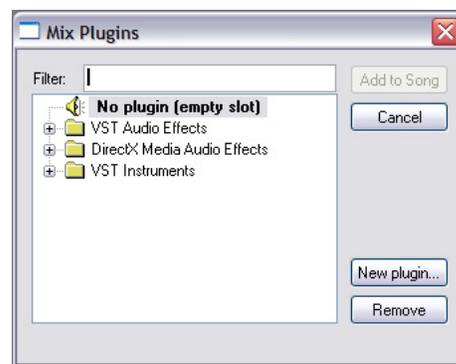
ModPlug Tracker has the capability of hosting Cubase-standard Virtual Synthesis Technology plugins (called VSTs). ModPlug differentiates between the two types of these plugins; one is for manipulating incoming audio or MIDI signals (VST effects, or VST FX for short), and the other generates or synthesizes audio (VST instruments, or VSTi's) — although occasionally that differentiation in practice can be blurred. The type of VST is actually decided by its author, and some VSTs also have nothing to do with audio creation or modification (as in the case of MIDI or audio output routing, or the display of waveforms or volume levels).

In the OHM, we'll use the term VST to apply to any Cubase-based plugin, and use VST FX or VSTi for specific context. It should also be noted that MPT can use DirectX audio plugins; these are Windows-based and are used by Windows audio players (both internal and third-party). In the Plugin Manager window, these are automatically located from the Windows OS, and listed with VST plugins, as shown below.

An Effect plugin is usually designed to alter an audio stream (such as by echoing it or highlighting certain frequency bands), but others can route an audio or MIDI channel to, thru, or around other plugins. Still others simply display the audio or MIDI signal for sound engineering purposes.

An Instrument plugin, on the other hand, synthesizes its own sound. VSTi's are like the synthesizers you buy at the music store, except there is no tangible keyboard, tangled cords, audio or MIDI inputs, extra data cards with fragile electronics, nor the concern for taking care of it all. A folder full of VSTi's is like a studio full of virtual synths, and even better, there are a LOT of pretty decent FREE ones out there.

For users new to tracking in general, it's been suggested by veteran track composers that you should start out learning to assemble tracks that use samples before graduating to VSTi's. The main reason is that you should teach yourself to control the direction of a composition by relying on your own skill in applying commands that will alter the sample playback. Secondly, it's very easy to become "addicted" to VSTi's, and relying on the synthesis methods of



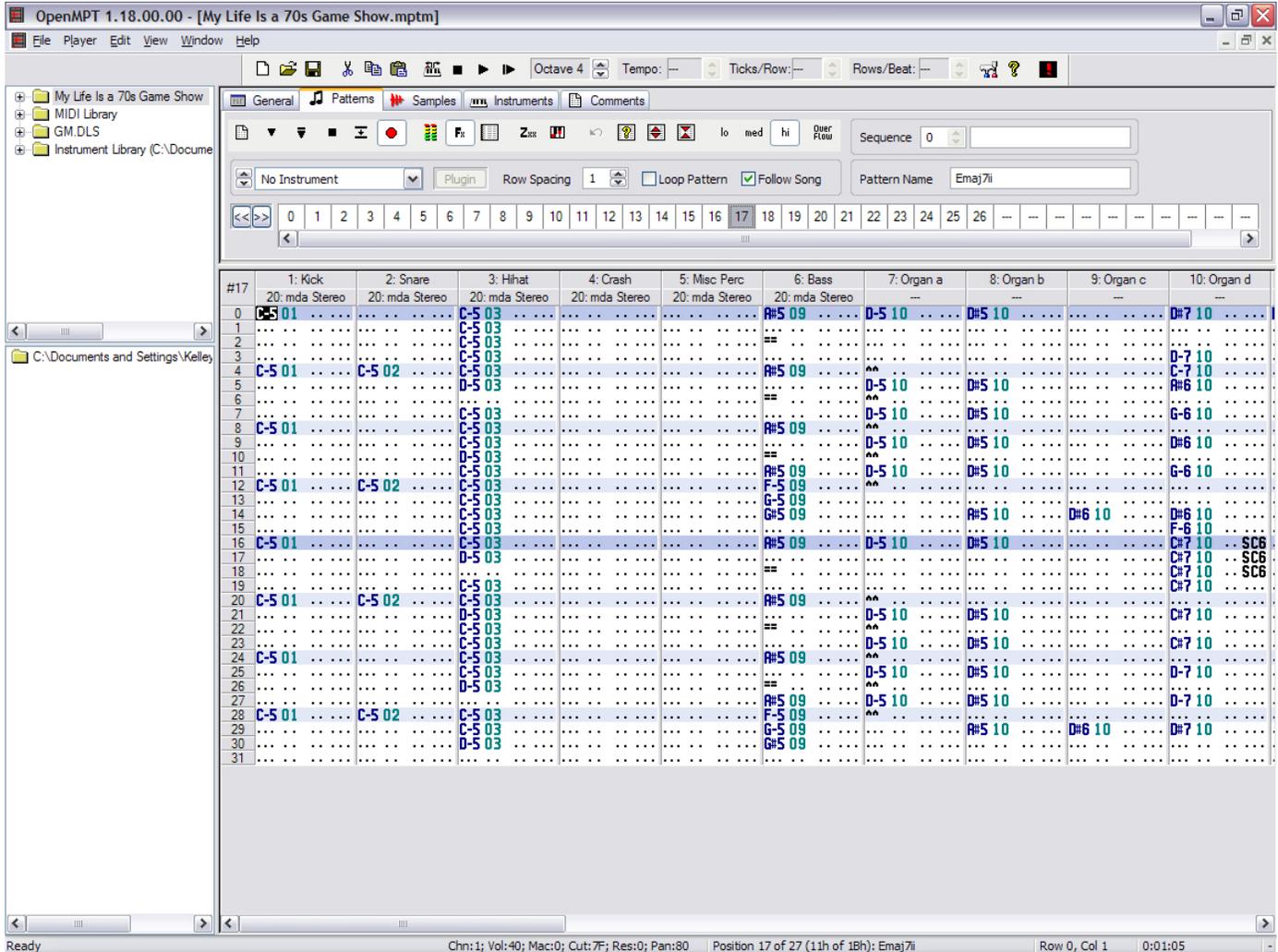
plugins (rather than synthesizing the sounds yourself with effect commands) can somewhat blind you when determining the sound of the song you're going for. You'll find that singular samples in which YOU control how it sounds is often closer to your vision for a song than the pre-modeled algorithms of VSTi modules. And there will be many times while composing when you're looking for that particular timbre and sonic progression that you just can't seem to get with a VSTi; that's when you'll be glad you know how to manipulate samples with ease.

When you're ready to try to work with VSTs, there is an entire chapter devoted to them [here](#).

# 9. All about Patterns

## What are patterns in MPT?

A pattern, simply put, is a group of events that the computer will process and output. In tracking, a pattern holds data for every event in every row of every channel (each pattern has its own set number of rows). Patterns are then listed in an Order List, defining how the patterns will be played. Patterns are also kept in a secondary list, visible in the Folder Tree on the left, where each pattern ID holds its own data and is listed in order of its creation. A pattern can be identified by its ID (index) or its place in the Order List (position).



## The Pattern Page

The upper portion holds the settings for the pattern control and input. You see the Pattern Icon Bar at the top, a place to name the shown pattern below it, navigation and playback settings, a menu to choose the instrument that will be assigned to entered notes, and how the input will be entered based on the keyboard split.

Below that is the Order List, which is a line of pattern IDs that determines the order of how the patterns will be played or exported. And below that is the all-important Pattern Editor, where most of your work will be done. Both of these have their own sections below.

The Folder Tree (not shown here) will also contain a folder icon within each open track's folder, which holds the running list of all of the Patterns you've created, identified by ID number and the name you've given them.

## Creating a pattern

There are 2 primary ways to create a new pattern: right-click in the Order List on a block that has no pattern number, and choose "Create Pattern" or "Insert Pattern" from the contextual menu, or click on the New Pattern button in the Pattern Icon Bar (the first on the left). There are also 2 secondary ways to create patterns (based on already existing patterns): copy an existing pattern ID and paste it into a new location in the Order List, or select a blank pattern in the Order List and type in the ID of another pattern.

If you choose "Create Pattern" on a blank pattern ID, a new blank pattern will be placed in the Order List where you clicked, or after the last "official" pattern, whichever is closest to the front. This blank pattern will have the default number of rows (64). But doing the same on an already existing pattern will create a blank one after that selected pattern, containing the same number of rows.

If you choose "Insert Pattern," the selected pattern (ID'd or not) will be copied and pasted right there, basically duplicating the selected pattern.

Clicking on the New Pattern button has different effects based on what is selected in the Order List. With a blank pattern, clicking on New Pattern places a new blank pattern with the default number of rows in the next available blank spot in the Order List. On an ID'd pattern, the same is done, but the number of rows is the same as the selected pattern.

## Using the Pattern Order List

The Order List shows the list of patterns by their IDs, in the order they will be output either to audio or to the file when the track is saved. Each block in the list is a Pattern Position, which can be filled with a Pattern ID. There are different ways you can assign patterns to the Order List:

- You can easily re-arrange the pattern order by dragging one or more patterns at a time anywhere up or down the list. In order to select multiple patterns, click one, then Shift-click on another; all patterns between them in the Order List will be selected and highlighted.
- Click on a blank block (showing a dash "—" and also called a null pattern) and create or insert a pattern as detailed in the previous section.
- Click on a pattern and type the ID number of an existing pattern (MPT will not allow you to enter the numbers of non-existing patterns). You can also use the arrow keys on a selected pattern ID to increase or decrease the number.
- You can drag-and-drop pattern numbers from the Tree. The block where you drop the pattern will replace the ID (THERE IS NO UNDO WITH THIS METHOD!).

The "official" patterns are those that will be processed for output, and include all continuous patterns from the first block (at the leftmost position in the list) up to, but not including, the first null pattern. You can move patterns out of the official list by dragging them beyond the first null pattern.

To set the pattern where playback will begin, click on the pattern number in the Order List with the "middle" mouse button (which for some, may mean pressing the wheel button); this will underline the pattern. If the playback pointer is already in another pattern, continuing playback will finish that pattern then go to the underlined pattern. During playback, the current played pattern in the list will be "overlined." The mark will follow the current playback pattern even if Follow Song is not checked. The overline cannot be set or reset by clicking on it.

When assembling a track, it helps to work in sections. One way to divide your work by sections in the Order List is to enter a separator, which looks like a row of plusses ("+++"). However, there is no keypress that will enter this in the order list. Currently the only way is to move a null pattern to the place where you want to end a section, then press the minus key until you see the separator mark. During playback, MPT will simply skip over this block.

You can also create an audio clip of one or more patterns; this is called "rendering." To do this, select any patterns and right-click on the group to show the contextual menu, where you can choose "Render to WAV." You will then be presented with a dialog to set the save file options. See [here](#) for more details on saving to WAV.

## Navigating the Order List

- To move down the list (towards the right), press the down arrow or right arrow key, or click on the Right button next to the Order List.
- To move up the list (towards the beginning), press the up arrow or left arrow key, or click on the Left button.
- To move to the first official pattern, press the Home key.
- To move to the last official pattern, press the End key.

With any of the above methods, moving the selection will also scroll the list. When moving up or down the Order List when multiple patterns were selected, the first clicked pattern (not the Shift-clicked pattern) is considered the Order List "cursor."

To scroll the list (without moving to a new pattern) click on the scroll keys below the Order List, as with any Windows GUI control. Moving the scroll bar, however, will reset the scroll amount, so that you can't drag-scroll past the end of the Order List.



the instrument column, on the other hand, will do nothing, as MPT is expecting a number to be entered. Furthermore, some keypresses are allowed but MPT may limit the value. For example in the Note FX column, you can enter **v** for volume, and you can then enter **7** for a volume of 7, but you cannot then enter **0** for a value of 70; the highest parameter value in Note FX is 64. Instead, the 0 replaces the 7.

You can also move data by selecting a contiguous block, then clicking on the selection and dragging it to a new location. Pressing the Shift key AFTER beginning a mouse drag will move a COPY of the block, leaving behind the original data. When moving a selection, MPT will automatically constrain it to its appropriate fields (for example, a block of Channel FX data will be constrained to the fourth column as you move it thru other channels).

## Copying and Pasting

After a selection is made, you can copy it to the clipboard by pressing the shortcut key (default is Control-C), by right-clicking on the selection and choosing "Copy" in the contextual menu, or by choosing "Copy" from the Edit menu. If you wish to at the same time delete what was copied, use "Cut" instead.

Now to write the data in the clipboard to another part of the pattern, or another pattern, or another song, click on the row and the channel where you wish to start the paste. It doesn't matter which column in the channel you choose, as the appropriate data will be placed starting in that row of that channel.

There are 4 different ways to paste data into the pattern rows — standard paste, mix-paste, "push-forward" paste, and "paste flood". By default, pasting overwrites all data in the same range as that of the clipboard (where the data was copied from). Mix-pasting enters all data in the same range EXCEPT into any field which already contains data. Alternatively you can insert the pasted data, which will push the data below the range forward. (However, this means data at the end or the bottom of the pattern in the selected channels will be deleted.) If you wish to do multiple consecutive pastes within a pattern (such as a 4/4 drum pattern or a repeating melodic motif), you can use Paste Flood, which pastes the data from the starting row to the last row of the pattern, overwriting existing data, and continually pasting according to the range of the selection one chunk after another.

When pasting between different-format tracks, MPT will exclude or alter commands based on the format. For example, if the clipboard contains a Note Cut command from an IT pattern, pasting into an XM pattern will change the Note Cut to a Note Off.

There is another type of cut and paste which uses ModPlug's internal clipboard; more can be read about it [here](#).

## Navigating

The arrow keys are the easiest way to navigate between rows, columns and channels, but other keys can be of use, such as the "Word Processor" keypad (Page Down, Home, etc.) and the Numeric keypad. Again, all of these can be assigned, with or without modifier keys, to help make it easy to move the cursor within the Pattern Editor.

## Playback

Playback can start in one of three locations: beginning of the song, beginning of the current pattern, or the cursor (the active row). Each of these can also be assigned to their own keyboard shortcuts as well as their own button.

-  Playback from the beginning of the song will continue from the first row of the first "official" pattern to the last row of the last "official" pattern.
-  Song playback can also start from the cursor, continuing to the last row of the last "official" pattern.
-  However, activating playback from the beginning of the pattern not only starts playback at the first row of the current pattern, it also sets the Loop Pattern checkbox.
-  The same occurs when playing from the cursor in the pattern.
-  One-row playback plays all notes and FX in unmuted channels, but does not stop the playback.

## Note events

The first column of a channel holds the note name and the octave it belongs to. When playing samples, the note played is relative to the Frequency setting of the sample (in the Samples page). When playing a VSTi, a "Note On" MIDI message is sent to its instrument (if an instrument is called and assigned) or the channel (if no instrument is called). When playing an external MIDI synth, the "Note On" message is sent out of the computer to the synthesizer, where it triggers the external audio processing at the specified note. Note On messages hold the value of the pitch.

Besides notes you can also send "note stop" messages (the opposite of Note On), which is any message that triggers the end of processing a note. MPT understands 3 explicit Note Stops: "Note Off," "Note Cut," and "Note Fade."

Note Off (N/O), which look like two equals signs: == , is processed differently depending on the file type and the sound generation source.

- For non-instrument samples (such as those for MOD and S3M tracks), Note Off is ignored.
- For instrument-assigned samples, the note is prepared for stopping, but this depends on the the Fade time (found in the Instrument page) — the higher the fade, the QUICKER the note sound dissipates (256 is slow, but 8192 is virtually immediate). The fading note is also subject to the Instrument's [envelope](#).
- For VSTs and MIDI instruments, a "Key Off" MIDI message is sent, which is the same as releasing the note on a keyboard. However there is no MIDI "Off Velocity" sent (some MIDI instruments make use of the strike of a key when its being released).

For Note Cut (N/C), which looks like double carets: ^^ , samples, whether assigned to instruments or not, are immediately stopped AND the instrument is "forgotten" (Note Cut commands are not standard in XM tracks). This means, for instruments, the envelopes cease immediately and are reset. For VSTs and MIDI instruments, the sound for the ENTIRE instrument is stopped and, in most cases, its sound generators are reset to the beginning of their envelopes, gate sequencers, and arpeggio sequencers (whichever apply). There are 3 important caveats:

- Any notes that follow a N/C in the same channel MUST be designated an instrument for it to play sound again. In other words the instrument assignment must be reset.
- Even though the sound generation is cut on one instrument, sound handling will still pass through any chained VSTs, such as Reverb or Delay FX. If you want to cut the sound COMPLETELY, use an Sfx assignment and Zxx macro to turn off the volume of the last VST in the chain.
- Since N/C turns off the entire instrument, even multichannel instruments or effects, only one N/C to the VST will suffice. But if you have more notes on the same row in channels that FOLLOW the N/C channel, the notes called in the higher channels will begin immediately (the next tick) after the Note Cut.

For IT-type tracks, you can also enter the "Note Fade" message (N/F), which looks like a double tilde (~~). This applies a sort of release envelope to the note, decaying according to the rate found in the Fade field. Otherwise, it acts the same as a Note-Off message. BUG: XM tracks do not call or use Note Fade, but when applied by pasting from the clipboard, they function as normal.

It's also important to remember that when a note is played in one channel, and a new note is called in the same channel even for a different instrument, different things will happen depending on the sound source:

- For samples not assigned to instruments, the previous note is cut immediately and the new note is played (with the new waveform if its a different sample).
- For instruments, the previous note will be let go according to the New Note Action designated for it, found on the Instruments page. There is a section devoted to NNAs [here](#).
- For VSTs and MIDI instruments, since the audio is processed outside of ModPlug, each new note in the same channel will have its own implementation. It can be said, however, that monophonic (single-tone) synthesizers will simply cut the first note and go to the following note, usually within the same place of the sound envelope (unless a Retrigger setting has been enabled).

Here is a table showing what each track format and instrument type does with each note stop command. Dashes (—) indicate the note stop type is not used (they are nonstandard for that format).

	Note Cut	Note Off	Note Fade
MOD	—	—	—
S3M	Cuts sample note	—	—
XM Sample	—	Cuts sample note	—
XM Instrument	—	Fades instrument	—
XM Plugin	—	Sends channel MIDI Note Off	—
IT* Sample	Cuts sample note	Finishes sample based on Sample Loop	Finishes sample based on Sustain Loop
IT* Instrument	Cuts sample and envelopes	Fades instrument	Fades instrument
IT* Plugin	Sends channel MIDI Note Off	Sends channel MIDI Note Off	Sends channel MIDI Note Off

\* including IT variants ITP and MPTM

## Instrument designation

The second column holds a decimal ID of the instrument to assign to the given note. (You can enter numbers of non-existing instruments but no sound will play until an instrument with that ID is created.) In this context an "instrument" is either a raw sample or assigned instrument, whatever shows up in the "Main Instrument" list in the Pattern page.

If you call an instrument without a note, it will play the most recently played note in the channel. The only exceptions, when no note will be played, is if no note has been played in the channel (at the very beginning), or if an explicit Note Cut command was called before the non-note instrument (except for IT-type tracks).

For example let's assume these next commands are at the very beginning of a track:

01 . . . 01 . . SF1	01 C-4 . . . . .	01 C-4 . . . . .
02 . . . . . Z00	02 . . . 01 . . . .	02 . . . 01 . . . .
03 C-4 . . . . .	03 ==. . . . .	03 ^^ . . . . .
	04 . . . 02 . . . .	04 . . . 02 . . . .

Does not play a note until row 3; instr 1 will be played at C4. (This method is useful for setting up macros at the beginning of a track.)

Does not play a note until row 2, when C4 will play using instr 1. C4 will also be played at row 4 but using instr 2.

Does not play a note until row 2, when C4 will play using instr 1. At row 4, C4 will NOT play using instr 2, because the Note Cut resets the channel.

Instruments are remembered within a channel as well. This means that if you call a note and designate a instrument, such as C-4 01 . . . . ., any following data you call in that channel, even into other patterns, will use that instrument, the last one called, until a new one is designated. Keep in mind, however, that strange things can happen if you do not "reset" an instrument designation, such as Random Variation and certain Note FX, as examples. Whenever you call an instrument in a channel, its Default Volume and envelope are reset, unless you intentionally set those with an FX command.

You do not have to reserve one instrument to one track, although it does help to keep things organized. You will find, as a matter of fact, many older modules, especially for games, will use as few channels as possible, throwing different instruments into any available channel.

## Note FX

Note Effects are something akin to Channel Effects (see the next section), but these occupy the third column, use decimal numbers, and are limited in scope. They are also called volume effects because the original intent of the third column was to allow for volume control independent of effect commands (Channel FX). All formats can use Note FX (except MOD files), but they may have different targets depending on the track format. Note that S3M files only use volume and panning Note FX. See [Appendix B](#) for the list of Note FX.

To enter a Note Effect, make sure the cursor is in the third column of the channel, and press the key corresponding to the effect symbol (these keyboard shortcuts can be modified in the Options page, in the Keyboard tab, and choosing the menu item "Pattern Editor – Volume Column").

A couple of notes: when a Channel Effect command is in the same row as an equivalent Note Effect, the Channel FX override Note FX. Furthermore, Note FX a – h "memorize" their values, so that if the value 00 is called (such as e00), the value of the most recent non-zero setting (for that effect or effect group) is used. (The volume slide commands — axx, bxx, cxx, and dxx — share their memory, as do the pitch slide commands — exx and fxx.)

Examples:

C-5 01 v32 . . .	Play instrument 1 at C-5 with volume 32
. . . . . c02 . . .	Slide volume up by 2 every tick
. . . . . b00 . . .	Slide volume up by 2 (previous cxx value)
. . . . . e00 . . .	Will not slide pitch because there was no previous value

## Channel FX

Channel Effect commands are placed in the fourth column of the channel, and serve to alter how playback is executed, either on the sample or instrument, the channel, or the song. However, each track format type has its own set of commands, though most overlap in function.

When typing prefixes and their values, usually you must enter the command letter in the prefix column then navigate the cursor to the value column. But with IT and its variant tracks, you can enter the prefix while the cursor is in the value column (except for commands A – F).

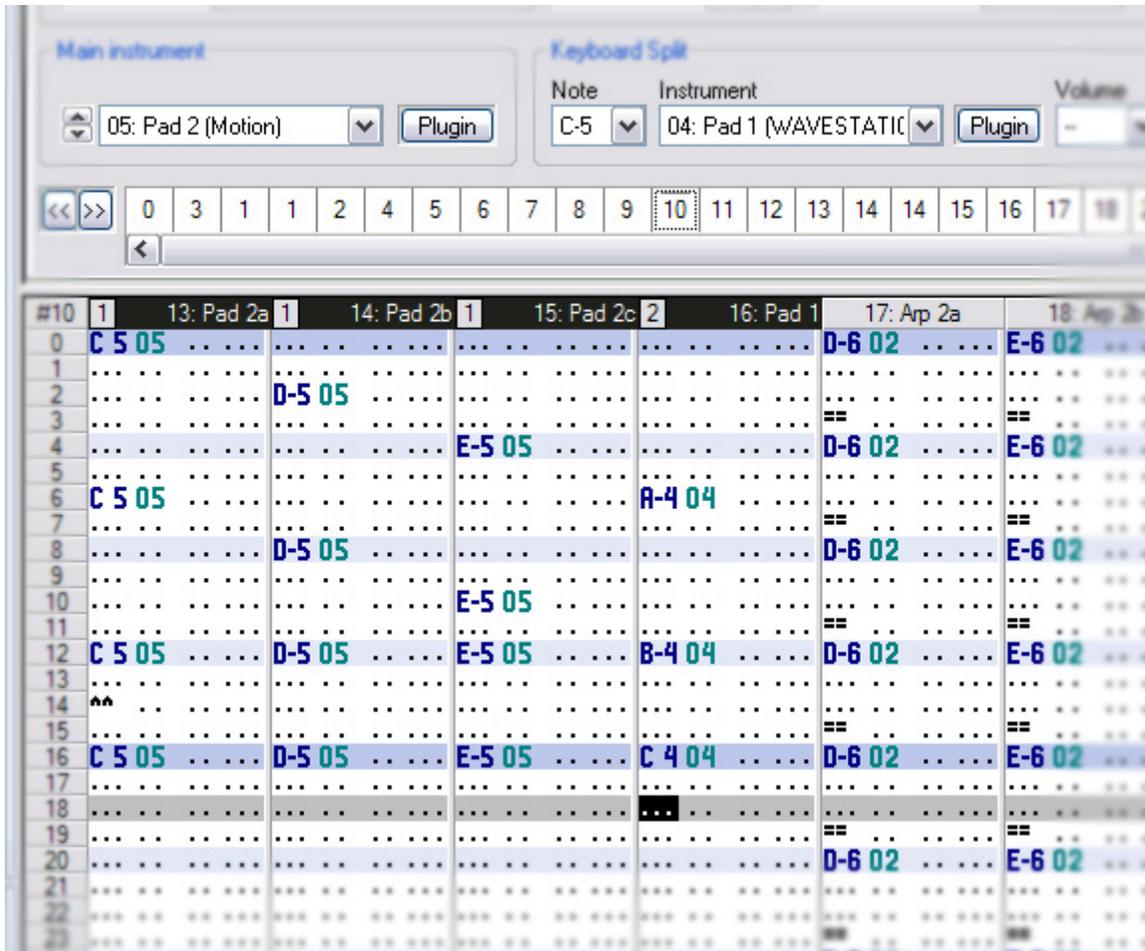
An entire [Appendix](#) delineates and describes each command, separated into sections based on the track format.

## Record Select

Many track composers like to record during playback with MIDI keyboard (and some with a computer keyboard!); Record Select allows you to do this, even allowing chords. Any track format can use this feature.

Make sure Record Enable is ON (the red dot on the Main Toolbar), and if using a MIDI keyboard for input, make sure that's hooked up properly. You can use a sample/instrument if you'd like, but it's not necessary, though without an instrument assignment, MPT will not play one when you enter notes.

Enable a channel for Record Select by Shift-clicking the label box in the channel header; the label box will inverse its color, and a '1' will appear on the left side of it, signifying that it will apply instrument 1 — the current Main instrument. (You can also use instrument 2 — the alternate (Split) instrument — by Shift-RIGHT-clicking in the label box; this will reserve a second set of channels of the alternate instrument.) You can, if you wish, Record-Select more than one channel, even with different instruments. If you'd like to Record-Select many channels at once, use the [Channel Manager](#) for time-saving.



Now when you input notes within the Record-Selected channels, whether during playback or not, the notes are entered IN ALTERNATING CHANNELS as you play. If you are step-recording (without playback or without following playback), the notes are entered using the Jump value (the number in the Row Spacing field). If you are live-recording (during playback), the notes are entered faithfully adhering to the input time, entering Note Delay commands where necessary, BUT the latency setting (Buffer Length in Soundcard Options) is the primary factor in determining when MPT "hears" the input note. Lower the latency as much as possible.

**TIP:** Using ASIO drivers can reduce latency to virtual imperceptibility. One good free ASIO driver is called ASIO4ALL. Install as directed, then choose it from the Soundcard Options page.

Any channel can be left open for Record Select, even while you're step-recording into other channels — just move the cursor to another channel to enter notes there. Record-Select simply divides the input among more than one channel and allow for entering chords, when the cursor is within those channels.

To enter chords, press more than one note key at once; every note within 60 milliseconds of the first note is entered on the same row in different Record-Selected channels (this time capture can be set in the [Keyboard Options](#) page).

Note that when using the computer keyboard to enter notes, not all key combinations will be recognized, due to inherent problems with most computer input devices.

To turn off Record-Select, Shift-click each channel header. (If you have a LOT of Record-Selected channels, you can use the Channel Manager to turn them all off at once; click on the Select All button, then Instrument 1, then repeat.)

## MPTM Sequences

With ModPlug Tracker, your track is comprised of a single series of patterns in the Order List. However, when you use the MPTM format, you can build more than one Order List; each of these series of patterns is called a Sequence. Sequences are merely individual Order Lists with their own sets of patterns, except that the patterns can be moved between Sequences. When you switch between Sequences, the display will show its own pattern series in the Order List.

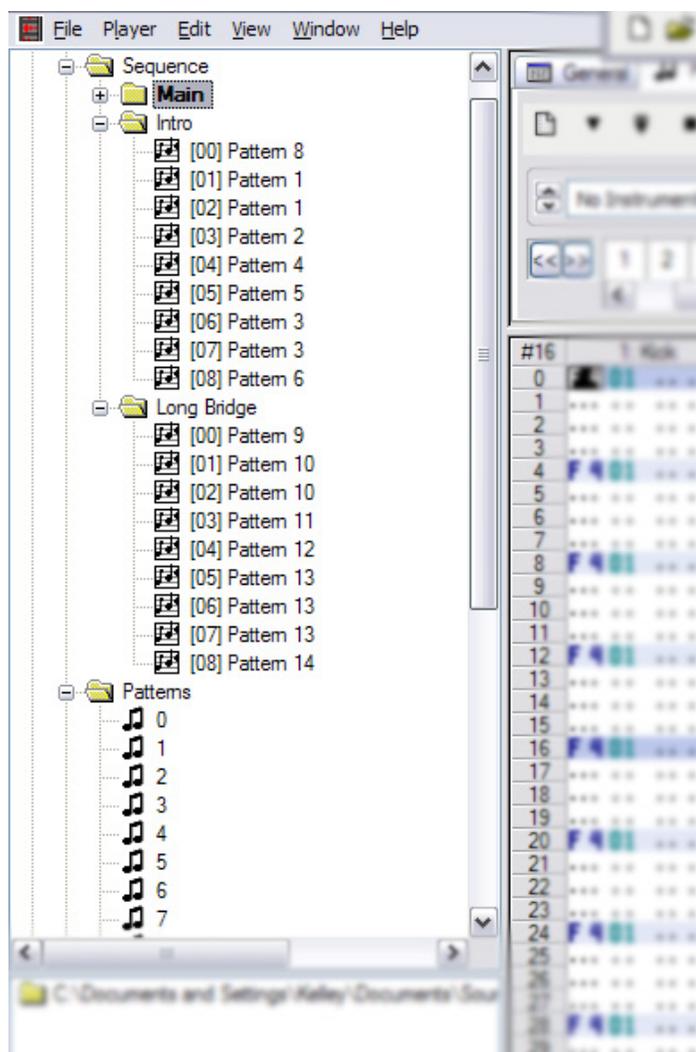
Sequences are handy for composing one section of your track at a time. Normally with a single Order List, when you press the Play Song button, it starts at the beginning of the track, and when you're previewing a section you just assembled, this means you have to listen to the whole song to preview that section you're working on. If you divide your song into Sequences, with each section belonging to one sequence, pressing the Play Song button will only begin playback from the beginning of the Order List your Sequence has specified.

With this feature, therefore, you are free to experiment like never before. By keeping a single Main sequence, you can paste together different Sequences into your primary Order List to see how the patterns sound when run as a single track. You can also interchange bridges more easily, or build alternate choruses from the original chorus, for example.

Without specifying Sequences when using the MPTM format, your Order List belongs to Sequence 0, and is the same as using the format before version 1.17.3.02. When you want to create a new Sequence, either click on the arrow controls at the Sequence Name field to get to an unused slot, or right-click on the Order List and choose "New Sequence" from the Sequences submenu in the contextual menu. The Order List will be replaced by a fresh one, and

you can begin building patterns in it. You can bring in previous patterns (from other Sequences) using cut-and-paste, or by typing in the Pattern ID numbers in any Order List box. You can still use skipped patterns (those marked with "+++") in any Sequence.

To make it even easier, your sequences can be accessed and controlled from the Folder Tree, an example of which is on the left. Each track has its own Sequence folder, as does each Sequence. Each pattern is listed in order, showing its position in the Order List, its Pattern ID, and its name if you gave it one. You can drag-and-drop any single pattern in any Sequence to reposition it or move it to another Sequence.



## All About Zxx Macros

This section is about controlling MPT built-in filters or external VSTs or MIDI devices. If you are not up to using these yet, you can skip this whole section.

A "macro" in ModPlug Tracker is a Channel Effect command which sets a value to a parameter or controller. For example, it allows you to virtually "turn a knob" of a software synthesizer during playback of your track. Special macros can also change the resonance or cutoff of samples, applying a filter which can, for example, hi-pass a bass or lo-pass a whistle, creating interesting audio effects. You can also use macros to send MIDI controller messages. However, macros can only be used with the IT format or any of its similar formats (such as XM and MPTM). MPTM tracks can also make use of Parameter Control Events, described [here](#).

Another term for a macro is a "Zxx command," as this is the channel effect command which makes it happen. There is a simple process to use macros but it's not readily knowable in MPT's interface. Here's a brief summary on how it's done; details follow.

### For sample macros:

- Make sure you have one assigned to an instrument.
- Set the value of the resonance or cutoff with a Zxx command.

### For VST macros:

- Make sure you have one assigned to an instrument.
- Determine which parameter (like a knob or slider) in the VST you wish to control and find its ID number or label.
- Assign this controller ID to an Sfx command.
- In the channel where you wish to set up control for the parameter, call the Sfx command with a note.
- Set the value of the controller with a Zxx command. This has to be done AFTER the Sfx command has been called.

### For MIDI macros:

- Make sure you have one assigned to a MIDI instrument.
- Determine which parameter (like a knob or slider) in the MIDI synth you wish to control and find its MIDI controller number.
- Assign this controller ID to an Sfx command.
- In the channel where you wish to set up control for the parameter, call the Sfx command with a note.
- Set the value of the controller with a Zxx command. This has to be done AFTER the Sfx command has been called.

## Applying Resonance and Cutoff

Using Zxx to apply resonance and cutoff to samples during playback is done the same way as applying other Channel FX — enter Z and the value of the res/cutoff you wish to apply to the sound, as shown here.

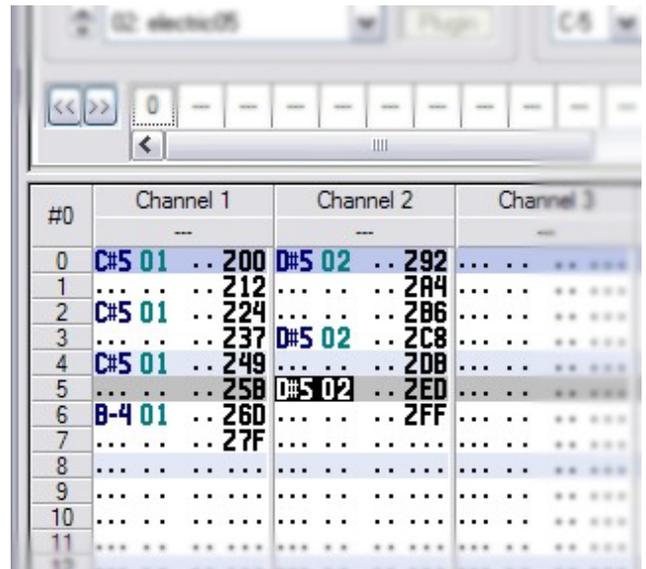
Values Z00 – Z7F will filter the sample resonance, while Z80 – ZFF will filter its cutoff. (These can be changed in the Macro window.) Keep in mind this assumes that no other Sfx values have been previously entered. If so, you will need to pass an SF0 value before using the Zxx parameters for res/cutoff control. (It is also possible to reconfigure the SF0 res/cutoff control to another Sfx, or to use SF0 for VST control, omitting the res/cutoff control capability.)

When applied to instruments, this is the same as altering the respective sliders in the Instrument Tab.

## Controlling MIDI instruments

Zxx can also be used for passing MIDI messages to external MIDI synthesizers. First you must set up the MIDI hardware so that it can be used in MPT (check [this](#) section), then assign MIDI controllers to Sfx commands. From there you can use Zxx commands to send controller messages to the hardware.

After you've set up your MIDI synth, open the View menu and select the MIDI Mapping menu item. A dialog box will appear that allows you to map which parameters will be controlled. More of this is covered in the Reference section on the [MIDI Mapping](#) window.



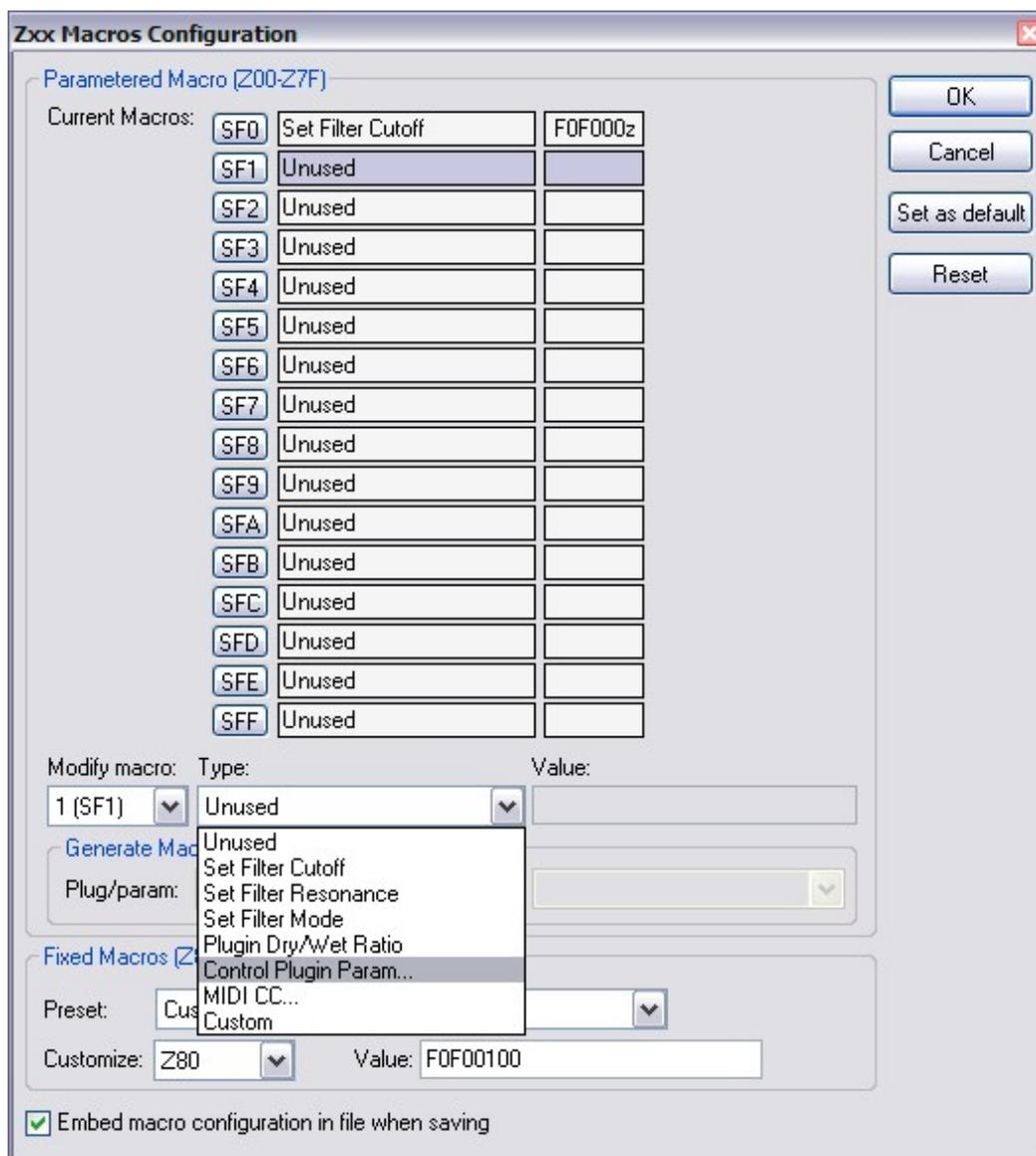
## Controlling VSTs

If you use VST Effects or VST Instruments, however, you will more likely be using macros to alter their settings, which is equivalent to turning knobs and clicking buttons on the VST, except that it's done during playback of the track or pattern. The next section details how to use Zxx macros for controlling your software synth (if you're unsure what VSTs are, see the [chapter](#) on VSTs to get an understanding of what this feature is).

Before getting started, make sure you have a VST applied to an instrument. See the [chapter](#) on VSTs to familiarize yourself with this procedure.

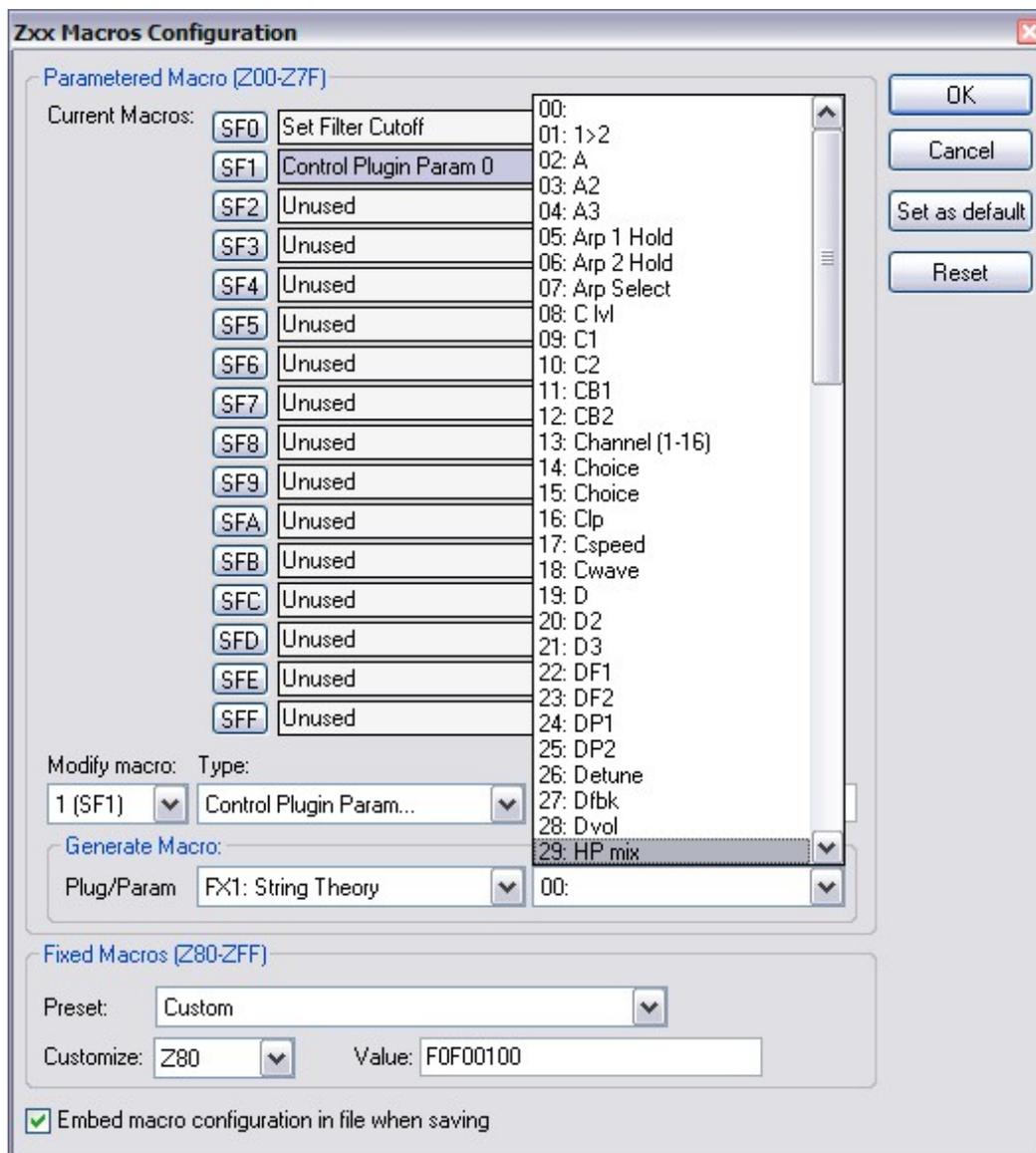
### Configuring Macros Manually

1. Macros must be able to know which control to alter, so you must affix an SFx to a control of your VST. You can do this one of two ways — Manual Entry or Learning. If you know the value of the control, then you can enter it manually in the Zxx Macro window. Go to the Pattern page and click on the Zxx icon (or press your keyboard shortcut); this will bring up the Zxx dialog.



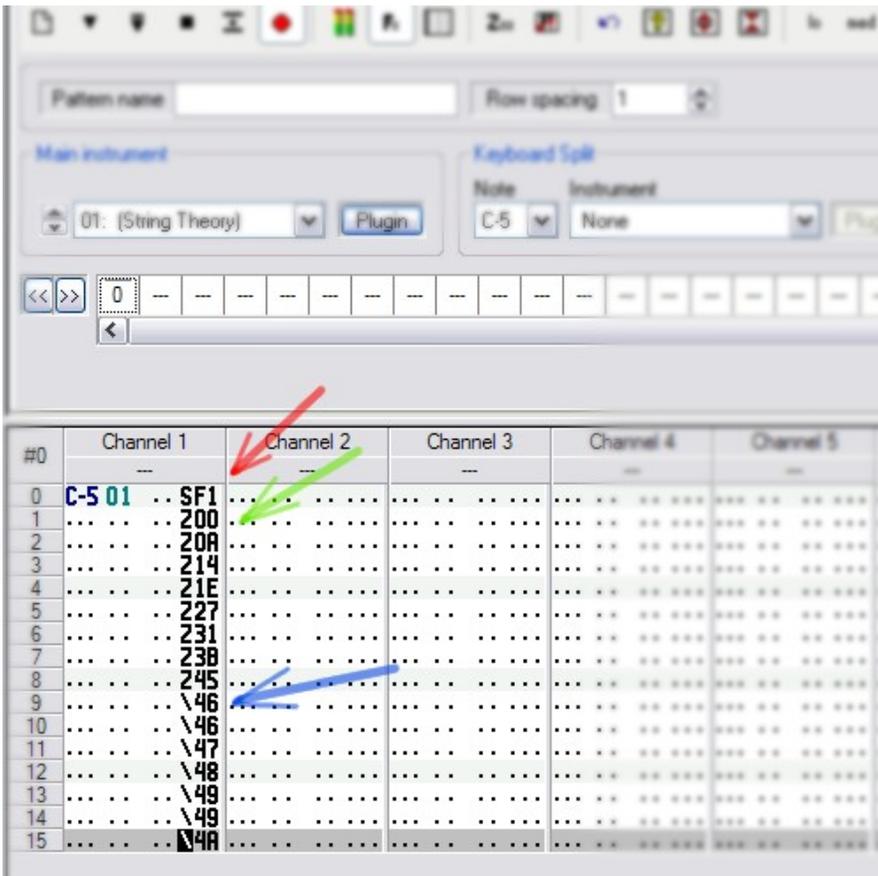
2. Click the button of one of the SF numbers you wish to use for controlling the particular VST setting; you can choose SF0 – SFF. This means there is a limit of 16 VST/MIDI parameters per plugin that can be controlled in a song (but see the section on [SFx Limits](#)). This SF number is the channel FX you will call up before using macros.
3. Select "Control Plugin Param" from the Macro Type popup menu, as shown above.

4. You will be presented with a list of VST plugins that this SFX will apply to. Choose the plugin. Now choose the controller value from the Macro Value popup menu.



A well-written VST will have descriptions to help you choose the slider you wish to alter in the song. In this example we want to control the High Pass mix (controller 29) for our String Theory plugin.

5. Close this dialog window (click OK) and open the Pattern page.
6. In the Pattern Editor, input the note, then enter the SFX value that we wish to alter — in this case SF1, as shown by the red arrow in the next graphic. It's important to remember, that the first time an SFX control is used in a channel, it must accompany an instrument assignment (the number in the Instrument column of the Pattern Editor), but not necessarily a note assignment. The instrument must use a VST. Any subsequent SFX calls are applied to the MOST RECENT instrument. (It is therefore a good idea to keep one instrument per channel when using SFX controls, as it can get confusing pretty quickly when using many of them.) The exception to this is if the VST has been assigned to the CHANNEL (as opposed to an INSTRUMENT), in which case all SFX's will apply to the channel's VST if it is not accompanied by an instrument call.



- Now you can enter Zxx values to alter the setting in realtime playback. Here, as indicated by the green arrow, we've entered Z values between 0 and 69 (hex \$45). **IMPORTANT:** to alter any given setting, the desired SFx must be called **BEFORE** altering it with Zxx values. Any subsequent Zxx values alters the **MOST RECENT** SFx control that was called in that channel for that instrument.
- Zxx sets an absolute value to that SFx control for that one row, but if you need to slide between two values smoothly, use the backslash effect instead of Z, shown by the blue arrow. This will slide the setting of your VST smoothly, based on the ticks you set in the General Tab. If you set the ticks to 8 (which is per row), ModPlug will turn the VST's knob gradually from one \xx value to the next in 8 levels of gradation. This can be useful for quick knob turns on your synth.

### Assigning Controllers with Learning

The other way of assigning SFx to VST controllers is to get the VST to "learn" which knob goes to which SFx. The first thing you have to do is open the VST interface. (If the VST does not have its own GUI, this will still work. ModPlug Tracker puts VSTs in their own dialog window, and affixes a special VST menu to it, so that every VST can be accessed the same way. ) For this exercise, we'll use the String Theory VSTi. Make sure also that a song is not playing.

- In the "Info" menu, open the "Macros" submenu. Here you will see what each of the SFx controllers is assigned to. To



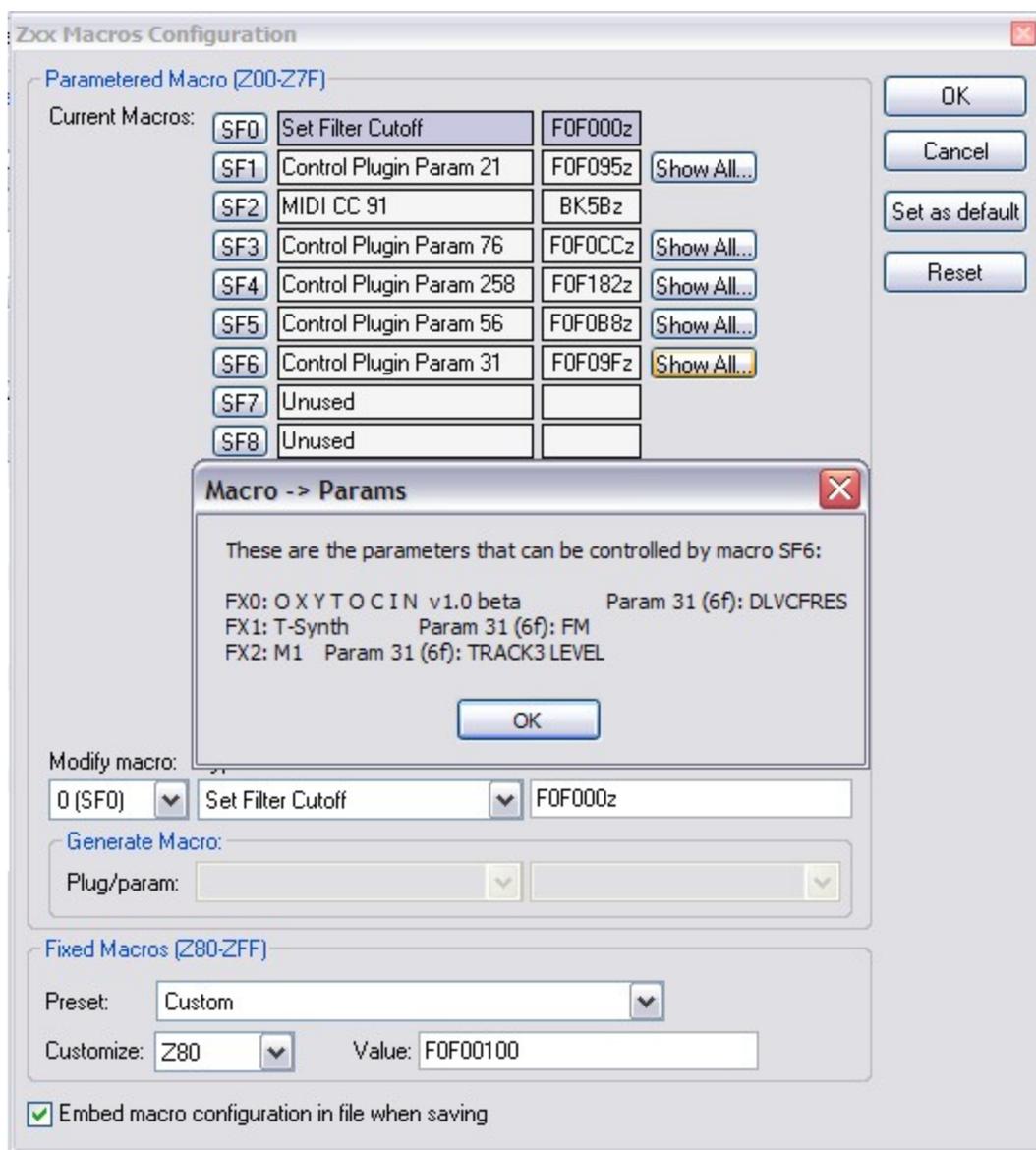
- "teach" MPT which knob to turn in this VST, select one of the empty SFx slots (in this example, SF1) and release the mouse button.
- Then click on the slider or button of the GUI (you may have to move it a little). When MPT understands the control you wish to assign, a dialog will appear to remind you what controller goes to which SFx. (Keep in mind, if you don't click on a GUI element, then MPT gets buggy. MPT either waits until you open the GUI later or it may read the control from another VST during playback; the "learning" behavior is not fully trapped.)
- If you decide you want to reassign the SFx to some other VST controller, you must open the Zxx dialog and assign that SFx to "Unused" and start over.

## SFx Limits

There are slots for only 16 different controllers for any one VST, including MIDI Control Assignments (numbered \$F0 – \$FF). However, the SFX assignments apply to different controllers for each VST. So even though the controller numbers are the same no matter what instrument is used, each instrument can have a different control that is accessed.

For example, suppose we set SF1 to control param 29. Keep in mind that MPT does not allow us to alter SF1's assignment in a track. However, Control 29 may apply to Hi Pass Mix in Instrument 1, but in Instrument 2 it may control Band Pass Cut, and in Instrument 3, it may control Delay Wet/Dry. If you apply SF1 to these 3 different instruments, you will get different parameter controls, even if all called the same time (albeit you must use different channels if you want them applied at the same time).

To determine what one SFX assignment controls in ALL instruments, click on the Show All button next to the SFX you want info on. A list appears of what parameters for each VST are affected by that SFX assignment.



## Assigning Parameter Values With Record Param

You can use the Zxx commands after an SFX has been declared in a channel to set the assigned controller to a particular parameter. But sometimes you're not sure what exactly the value should be. Sometimes sliders are not obvious in the range they can be set, and other times you can't tell how to activate a button so a feature is switched on. Still other times you need an EXACT value to for the playback to render the sound synthesis a very particular way.

Instead of guessing what the value might be, you can have the value recorded into the pattern editor as you control the GUI slider, knob, or button for the assigned controller. Here's how:

1. First, select a field in the fourth column where you want to have the setting altered when it reached that point in the

playback. You can choose either the prefix place (where the channel FX letter or symbol goes) or the parameter (where the value would be entered).

2. It's usually best to hear how the setting is applied to the note, so you may want to play the pattern before going to the next step. If you do so, make sure the Loop Pattern checkbox is enabled. Also turn off Follow Song, and make sure the cursor is in the field you want to record the value.
3. Next open the VST's (instrument or effect) window. From the Pattern Editor window, this is done by clicking on the Plugin button next to the Main instrument field.
4. In the GUI window, select the Options Menu, then the Record Params menu item, as shown here.



5. Now click on the slider or button you wish to manipulate (you may have to move the mouse a little while you adjust the control). The correct value should be entered into the field where you left the cursor\*. The prefix is designated as the Slider symbol (the backslash \ ) as this is usually the preferred method of assigning macro values. You can, however, go back and set it to Z if so desired. NOTE: When using MPTM format, using Record Params enters a Parameter Control Event rather than a macro, but it includes all the proper data. If you still wish to use Macros instead, either manually change it back to a Zxx or \xx command, or for multiple instances, use Find and Replace to alter the commands.
6. If you don't need to record any values from any VST's window, you must TURN OFF THE RECORD PARAMS OPTION. It doesn't reset itself, even if you close the window or open another VST.
7. Just remember, this value will change the last Sfx assignment that was last passed in that channel. So be sure to assign the controller to an Sfx assignment.

\* If an assigned controller has not been declared in or set to a channel, the controller assignment will be updated rather than the controller value. That is, the value placed into the Channel FX column will be an Sfx assignment as opposed to a \xx value. Once a channel has a controller assigned to it, moving the slider will affix values in the Channel FX column (unless another assigned controller is adjusted).

## 10. Saving modules & Exporting audio files

### Saving tracks

Saving your track is done the same way as with most Windows applications; these functions are found under the File menu. You can also set up MPT to automatically save your work in intervals. This is done in the AutoSave page in the Options page, shown on the right and described below.

### AutoSave Options

To use AutoSave, the first thing you need to do is activate it by checking the Enable box. Then enter the number of minutes should wait between saves. You can also enter the number of previous versions you want to maintain.

In the Location section, you can choose where you want to hold the backups of your work. Keep in mind that this folder will fill up over time with backups modules, so from time to time you may want to empty the folder of obsolete backups.

The Filename is simply a reminder of the format that will be used in naming these backups (users can no longer edit this format).

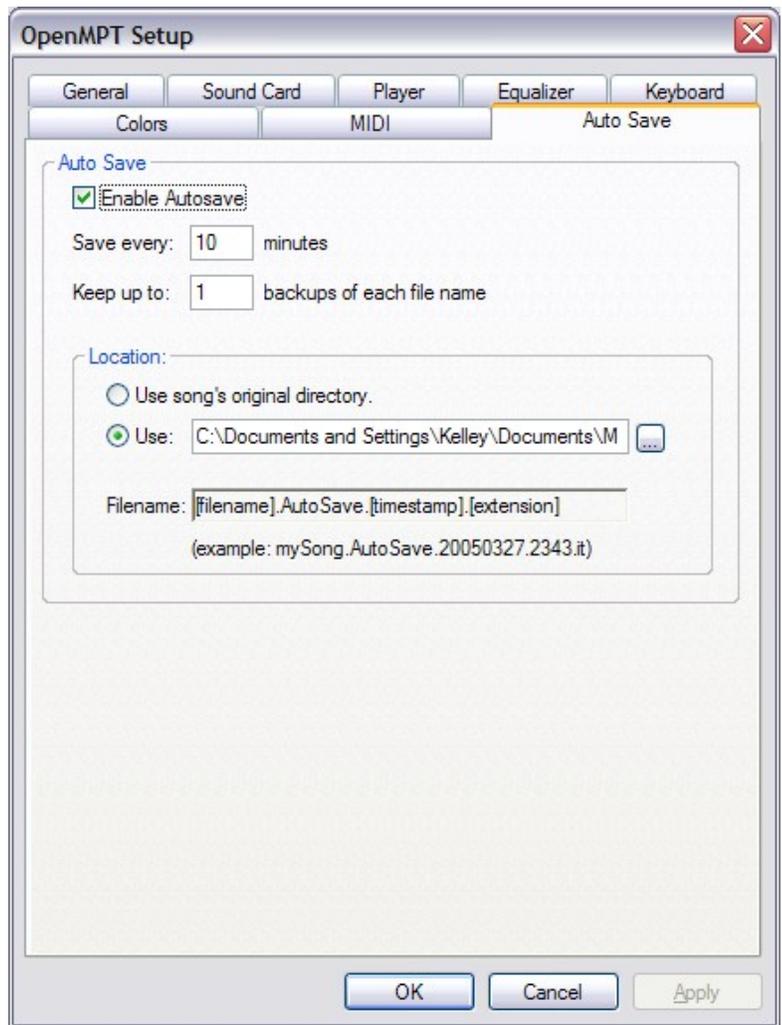
When AutoSave kicks in at its scheduled time, it will pause any kind of input as it saves, but it will not interrupt playback or file output.

NOTE: If you use a Briefcase to keep autosave files, the file will not be saved if the Briefcase or a file in it is open in MPT or another application.

### Exporting with MPT

Exporting is different from saving in that it does not change the file in its current format, instead saving a copy in the way you desire. You can export to 4 different formats — as a WAV audio file, an MP3 audio file, a MIDI sequence file, or a “pure” version of the track format called a “compatibility” file (that doesn't have any MPT “hacks”).

Also unlike saving the file, export will apply MPT's Soundcard options if they are enabled, including the Equalizer settings.



## WAV Export

When exporting to WAV, you are first prompted how you want to export the audio from the track, as shown in the dialog box on the right. Here is a brief description of your options in this page.

**Audio Quality:** You can change both the Sample Rate and the Channel/Bit Depth of the resulting audio file, but keep in mind that the sound quality may be noticeably worse than expected if you composed the track in one setting and export it with a lower-quality setting.

**Change Player Options:** When exporting to audio, ALL of the player settings including MPT's Equalizer will be applied. Click on this button to change the options or to disable these settings.

**Channel Mode:** If you check the Channel Mode box, it will export each channel separately. These alternative settings enable you to export an effected sample or VST note or chord to its own .wav sample.

**Normalize Output:** After the render, the entire audio wave is normalized. See [here](#) for more info on normalization.

**Slow Render:** ModPlug's export routine has a problem with a few VSTI's that output differently than just a simple audio route. If you are using one of these (Kontakt is the most popular example), MPT will use a different algorithm when exporting to WAV, but the process will be much slower.

**Limit File Size:** Check this box to limit the export based on the maximum file size in kilobytes. This does not change any of the conversion factors, but simply stops the export when the file size you fill in has been reached.

**Limit Song Length:** Check this box to limit the export based on the file size in seconds. Fill in the number of seconds in the box. This and the previous option are ideal for creating previews of the track audio.

**Play:** You have one of two options on how to output the track to its audio file — either the entire song or a section of the song. If you want to save part of the song, click the "From Position" radio button, and fill in the start and end pattern positions (inclusive) to output.

## MP3 Export

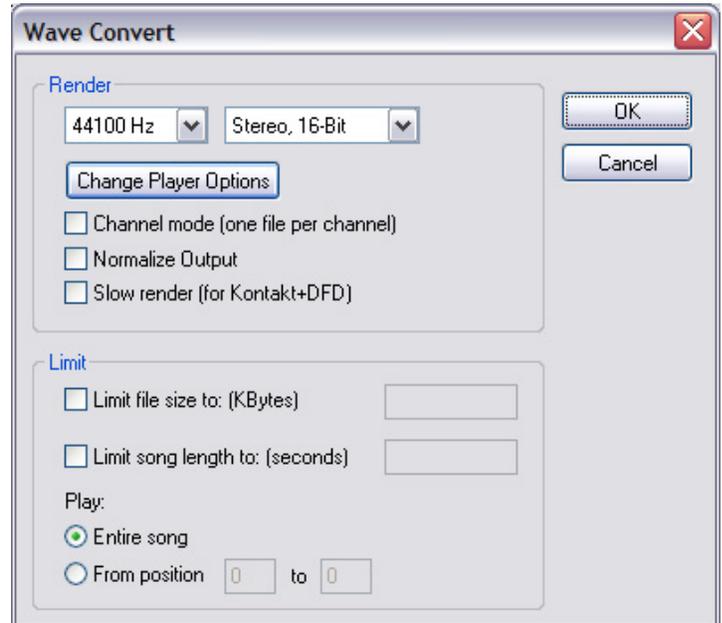
When exporting the track to an .mp3 file, you will first be prompted for the location where you wish to save it, THEN you will be given the Export options (the opposite procedure from the WAV export). Here is a brief description of the settings in the MP3 Export dialog.

**Driver:** If you have more than one MP3 codec, you'll have more than one option listed here. Click on the field or the arrow to open the menu where you can choose the driver.

**Format:** Click on the field or the arrow to open a menu which shows the choices in the bit rate, sample rate, and number of channels you can export to.

**Limit File Size:** Check this box to limit the export based on the maximum file size in kilobytes. This does not change any of the conversion factors, but simply stops the export when the file size you fill in has been reached.

**Limit Song Length:** Check this box to limit the export based on the file size in seconds, which you can enter in the box. This and the previous option are ideal for creating uploadable MP3 previews of the track audio.



**Song Information:** For .mp3 files, you can create information about the track in what's called *metadata*. MPT allows only a few of these metadata types to be entered, but you can check the box and fill in the data if you wish MPT to include this data into the mp3.

## MIDI Export

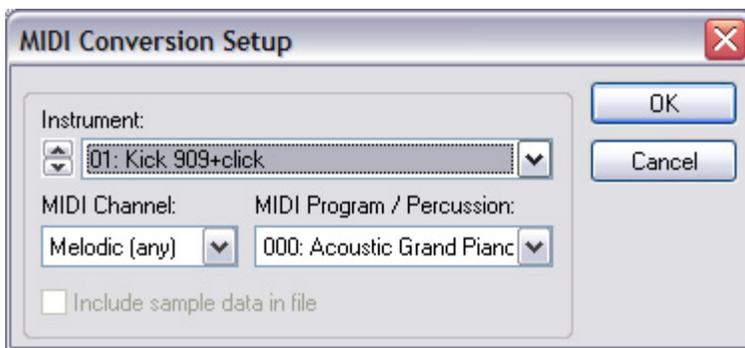
With MIDI Export, you can save your track as an equivalent MIDI file. Keep in mind that this will effectively erase all of the track commands and almost all of MPT's playback settings.

You will first be prompted for the export location, then the MIDI Export dialog will be shown. Here you can go through each instrument you have set up and define which MIDI instrument will substitute for it.

When exporting to a .mid file, MPT will only export unmuted tracks.

While MPT can export to a .mid file, these sequencer files are not pattern-based, and events will often be exported incorrectly. Several users have come up with various tips on exporting an MPT track to a sequencing format. Here is the best way to export to MID format:

- ◆ Use a copy of your original track, as you will need to make some modifications to basic settings.
- ◆ In the Song Properties dialog, set the Tempo Mode to Modern.
- ◆ In the General page, set the Ticks per Row to 5 and the Tempo to 100; others have had success with 6 and 120, and 3 and 120.
- ◆ When exporting, MPT only accounts for 2 FX commands — Dxx (Pattern Break) and Fxx less than 20 (Set Speed). All others are ignored and are not considered. So if you have Pattern Jumps, you will need to delete those and re-configure the Order List to reflect the pattern sequence.
- ◆ Export to MIDI, converting each channel as "Melodic" (as shown in the graphic above). Do not export a channel to "Percussion" unless you are using Channel 10 with a GM-ordered percussion set.



## Importing MIDI Files

MPT can import many MIDI-sequenced songs in the MID format, but it's important to remember that sequence files are not the same as tracks and the data within the file does not translate well to a tracking format. The main problem that MPT has with MIDI importing is that the events are not lined up in evenly or uniformly in channels, so that, while all the events may be brought in, you have to spend hours clicking-and-dragging all the events to their proper time and channel. Another problem is that a .mid file's instruments are not properly applied to an imported track.

Users at the ModPlug forum have suggested the following to import MIDI files. Until the MIDI capabilities are quantified and streamlined, this is all we have.

1. When importing MIDI files, experiment with the File Import speed (at the bottom of this page). Usually the higher speed the more will be brought in to each pattern.
2. Use a third-party application to convert a MIDI file to a track, then open the track in MPT. Suggestions are MID2XM (a DOS-based shareware application), and Renoise (a commercial application which handles MIDI files well).
3. Quantize the original MIDI file in its original application to 120 BPM and try to import with MPT.

## Compatibility Export

Past developers of the open source version of ModPlug Tracker altered various functions and format settings for some track formats in an effort to incorporate desired features — the term for these modifications is "hacks." While they allow more flexibility for MPT to edit and play these hacked formats, they cause problems or are ignored in other tracking software, including many popular players. (There is a movement within the current development of MPT to remove these hacks and instead transfer them exclusively to the MPTM format).

Exporting to the track's original format specifications is called a Compatibility Export, and removes the MPT hacks for that format. However, this may alter the original sound of the track if it was composed in MPT (but this may be desired in order to provide for better portability). Compatibility Export only works with MOD, XM, and IT files. Here is a list of hacks that are removed when doing a Compatibility Export: [\(to be written later\)](#)

## Sharing files & Portability

When composing in ModPlug, you may wish for your own reasons to share the track file itself (rather than the audio version of the file) so that colleagues or students can see the work involved. This can be a problem if the other party is either using their own copy of ModPlug Tracker or using an entirely different tracker. If they're using MPT on their own computer, they may have different playback or audio settings (major issue), a different coloring scheme or layout (minor), or even a different version of MPT (major).

If they're using a different tracking application altogether, ideally they should be able to read and play any unhacked track format (if that application is designed to do so). This is the main reason why a Compatibility Export is necessary when sharing track files. There have been compatibility issues between different tracking applications and as long as you know what these issues are, you can work around it when you're composing with MPT.

When you open a track, open the Song Properties dialog. The settings (and availability of them) will be different for each format. (For a detailed description of each of these settings, consult the Reference section on the [Song Properties dialog](#).) Most of these settings you should not change unless you intend to update the track or export it to a different format. See the next chapter, which describes the different formats, to determine how you want to save or export the track for other users to view, edit, or play.

## ModPlug's ITP format

For sharing tracks with other users of ModPlug Tracker, you can make an IT-format track completely portable by exporting as an .itp file. The ITP format reduces the actual track file to a very small size, by "externalizing" the sample data, keeping them outside of the file but providing a link to them from the track. Described below is the method of creating and using this format for complete portability.

1. First create a folder or subfolder that will hold the samples/instruments you will be using for the track. For best results, you should keep this close to the root directory of the .itp file.
- 2A. **Converting an Existing File**
  - a. Open an IT or MPTM track. Open the Song Properties dialog and change the File Type to "Impulse Tracker Project". No other settings need to be changed.
  - b. Open the Instruments page and save each instrument as an .iti instrument file in the folder set up for this file's sounds. You might want to save them numbered so you'll know which instrument slot to bring them back to.
  - c. Open the Tree view (slide the left side of the tab window if necessary) and open the directory of the track. There will be a subdirectory for the track's instruments. Open it, and delete each instrument from this sub-directory (use the Delete shortcut or right-click on each instrument label to choose Delete from the contextual menu). When prompted to delete associated samples from their slots, click Yes or just press the Return key.
  - d. Save the file in ITP format and re-open it to verify that no instruments or samples exist, only patterns.
- 2B. **Creating a New File:** Create a new ITP file by either choosing New IT Project from the File menu, or clicking on the New File icon in the Main Toolbar and choosing Impulse Tracker Project from the Song Properties dialog.
3. Create new instruments for each in your song. If you had converted a file, be sure to put each instrument in its proper slot. Before saving, verify there are correct paths for all instruments by opening the Instrument list in the Comments page. If there are instruments without paths, MPT will pass an error to remind you and will not save the file as in ITP format.

With VSTs, tracking in the ITP format is generally pointless, unless using a VSTi will save you from referencing more than 10 MB of samples. But if you wish to use VSTi's in an .itp file, first create an empty instrument for each VSTi and save it to disk. Then you can apply the Plugin to the instrument. But make sure the "Embed instrument parameters" box is checked in the Song Properties window, or the same settings will be stored for each VSTi.

## Embedding Instrument Parameters

In the Song Properties dialog is a checkbox for embedding instrument parameters. When checked, this allows edits you make to the track's instruments (which, remember, are external) to be saved with the ITP file, without affecting the instrument file. If you leave this setting unchecked, edits to instrument settings will not be saved with the ITP track, and when you re-open the file, the settings from the original .iti file will be used and you lose changes you made to the instrument. If you want to save instrument edits WITHOUT embedding the settings, you may edit the instrument in the track but you must save it before closing the IT Project. The disadvantage to THIS is that any other ITP tracks that use that instrument — and don't embed instrument parameters — will be using a different instrument than what it was composed with, which will probably mean a drastic change in the audio output. Generally it's best to NOT embed the parameters, in order to help keep the file size to a minimum; the trade-off is that you generally must reserve the instrument for one track or set of track mixes.

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## 11.Track formats

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Tracking file formats include .mod, .s3m, .xm, and .it. Each of these formats originated with different tracking applications, but all are readable and editable in MPT. Like all module files, they store pattern information (composed of events) and sample data which are used as instrument voices.

### **.mod**

The MOD format is the original tracking format, developed for the Commodore Amiga and its application Ultimate SoundTracker. It was designed to use 4 channels each with one voice. Later, more popular variants of the MOD format made use of 32 channels. Arguably one of the most widespread tracker formats (because of its use in many computer games), it is also one of the simplest to use, but this is due to its few note-driven effects.

With MPT, you can use up to 32 tracks (the default is 8), and note data includes sample numbers (as opposed to instruments, which cannot be used in the MOD format). Initial tempo, number of rows (always 64), and the "time signature" cannot be defined (always 4 rows per beat, 4 beats per measure, 4 measures per pattern). There is limited sample control, macro definitions, and few global settings. Track comments also cannot be saved. You can apply VSTs to a .mod but MPT will not save them in the MOD format.

### **.s3m**

The S3M format was developed for ScreamTracker and added sample tuning (defining middle C for samples), increased the number of playback channels, made use of an extra column specifically for volume and panning control, and compressed pattern data for smaller file sizes.

ModPlug Tracker has similar limitations when working with .s3m files as .mod, except with the S3M format, you can set the initial tempo and speed (ticks per row) , initial global and sample volume, initial channel pan, and set each each sample's playback frequency.

### **.xm**

Originating from FastTracker, .xm files added the concept of "instruments," which applied volume and panning envelopes to samples or sample loops.

In MPT, the same limitations as .s3m files exist, except you can use up to 127 channels; define initial tempos, speeds, and time signatures; provide envelopes to samples by assigning them to instruments; set sample looping and apply a vibrato oscillation; and apply VSTs to instruments, channels, or the whole track.

### **.it**

IT-formatted files were made available from Impulse Tracker, and expounded on the XM format by allowing instruments to use multiple samples depending on the note being played, applying resonance filters to instruments, and defining "New Note Actions" (NNAs) for instruments to increase how same notes overlapped each other, which helped to increase polyphony. Samples also have decent compression in file storage.

For MPT users, the IT format represents a large leap in tracker technology, as almost all of MPT's features can be used, except those particular to the MPTM and ITP formats, described below.

### **.itp**

ITP is a version of ModPlug's IT format, which, instead of storing the samples internally, stores the relative links the sample files, making a file in this format extremely small as well as portable but still full of MPT's features, especially when using MPT on a flashdrive, or "stick". It also makes less of a memory footprint on one's hard drive, because the sample is not duplicated for storage into the track file.

### **.mptm**

MPTM is ModPlug Tracker's own format. It follows the IT format (the MPT version), except there is an added capability of [tunings](#), [Parameter Control events](#), and [Pattern Sequences](#). This is the format that the developers of open-source MPT will use when improvements and features to MPT are made.

### **.mid**

MID files are not actually tracking files, but sequencer files. They store instrument parameters and patterns in a block format that is not easily converted to a track format. MPT may be able to translate the data into a track format, but it will only use General MIDI Instrument 00 (Piano) as its sole sound source, and it will divide the sequencer tracks into its proper channels. In effect, the only thing MPT can convert are Note On messages.

## 12. VSTs

### Finding VST and other plugins

Modplug Tracker does not come with any VST plugins, but if you have DirectX loaded with your Windows OS, MPT will automatically load these on-board DirectX plugins into its cache. There are many websites where only VSTs can be downloaded (some may require you to register though). One of the favorite sites of MPT users is kvraudio.com.

If you've already used another tracker, you probably already have a folder devoted to audio plugins. If not, it's best to keep a folder specifically set up to hold all of your plugins, even though it doesn't matter where in your computer (the only exception is in a Briefcase folder; if it's open or a file is being accessed by another program, you could be denied loading or saving into that Briefcase).

### Importing and applying VSTs

Look [here](#) for an introduction to VST plugins if you have not done so already. That section is very helpful in understanding what we'll be doing in this chapter.

Any track that can create instruments can save and control VSTs: XM, IT, ITP, and MPTM tracks. When saving a track that uses VSTs, the file is saved with the parameters of the VST's program, but not with the VST plugin itself.

VSTs accessible to MPT are kept in a cache called the Plugin List, which can be viewed or edited from the Plugin Manager dialog. Then you can assign plugins from this cache to a track's slots; each slot assignment is called an **instance**.

Plugins can only be used with the following restrictions depending on the format of the track, as listed here:

Track Format	Plugin usage
MOD	Can be loaded but not saved; restricted in its usage and there is no automated control.
S3M	Can be loaded but not saved; restricted in its usage and there is no automated control.
XM	Full use and control
IT	Full use and control
ITP	Full use and control, but for portability, VSTs must be saved in a portable directory.
MPTM	Full use and control

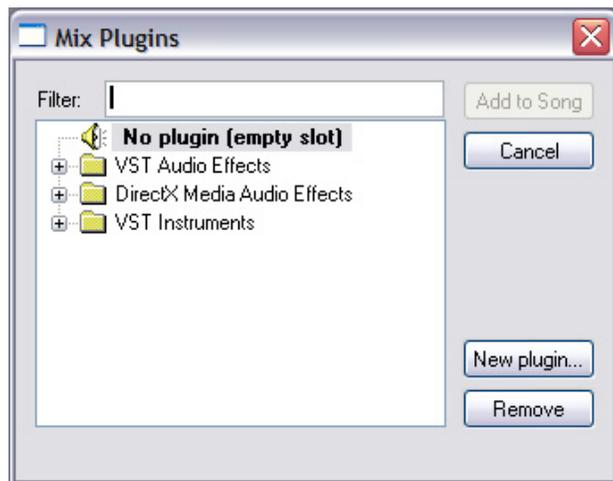
There other considerations as well when using plugins:

- When a VST is assigned to a channel, it is always applied to every instrument that is played in that channel, EXCEPT for instruments that use a VST, in which case the Instrument VST OVERRIDES the Channel VST.
- Instruments can use a sample assignment (or multiple sample assignments) with a VST assignment together. However, Effect Commands (both Note FX and Channel FX) act independently on samples and VSTs, according to their limitations.
- If a track is loaded with VST assignments, and its VSTs are not found in the Plugin List (which is displayed by opening the Plugin Manager or by viewing the plugin.cache file), the parameters for the VST's internal instrument will not be applied, and will be lost if you save the track. This means that if you then put the VST into the Plugin List AFTER the track is loaded, the parameters will not be applied, which may alter drastically the timbre of the VSTi or the audio process of the VST FX. (To prevent this, DON'T save the loaded file; exit the file, find and insert the plugin into the Plugin List, THEN open the track in question. The parameters of the plugin will be applied to it.)

### Loading VSTs into MPT

ModPlug keeps a list of all plugins available for use, and if a plugin is not within this list, it is not available for application to a track. Here is how you can load VSTs for use by MPT (DirectX plugins are automatically located and listed):

1. Open the Plugin Manager by choosing it from the View Menu. (You do not need a track loaded, nor will having one loaded change this process.) The first time you open this dialog, you



will need to manually load every VST you may wish to use in a track. All VSTs are .dll files and that's what MPT will be looking for as you browse.

2. Click on the New Plugin button to show the Open File dialog. While you can load multiple VSTs in one swipe, you can load them from only one folder at a time. Also, make sure you don't rename or move these .dll files later, as these locations are stored in the plugin.cache file (which must stay in the same folder where MPT's executable is located).

ModPlug will place the plugin into the correct folder when you load them into it, classifying it as either a VST Effect module, VST instrument, or DirectX effect. Now the plugin is ready for inclusion into a track.

## Loading VSTs into a Track

Once the plugin is made available to MPT, you must then make them available to the track. Before plugins can be assigned anywhere in a track, they must be put into "plugin slots" — a static list of plugins that will be referenced when MPT outputs a track's playback. This is the procedure for loading plugins into slots for use in the song.

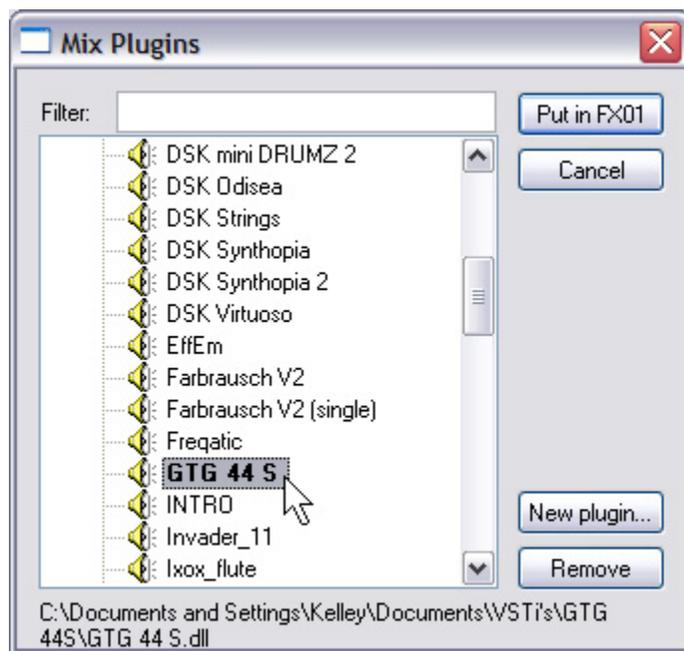
1. Create a new track, or open one in which you have not loaded any VSTs.
2. In the General page, which should be the first page displayed if you created a new track, notice at the bottom half of the page (under the channel mixer), there is an openable field which shows the current plugin slot, as shown here. For a new track it will say "FX1: undefined".



We'll load a VSTi into this plugin slot, so click on the Select button. The Plugin Manager dialog will open.

3. Select a plugin. This of course will depend on how you want to use plugins in your track (read below for more info), but for now we'll choose a free VSTi, "GTG 44S", as shown on the right. Select the text and click on the top button "Put in FX01". This will put the VSTi into slot 1 of the track's plugin list.

You can use this same method for loading more plugins into the track, but keep in mind that VSTs process audio using the computer's CPU. So as you use many VSTs at once, you are reserving a lot of processor power. When the audio demanding to be processed is more than what your computer is capable of doing, it will cause the playback to stutter. On the other hand, using samples, while it costs less in processing power, makes the track larger (except for .itp files).



## Applying Plugins to your Track

Now you must decide how you want to use the VST. There are basically 5 possible ways to apply a VST in a track:

1. As a singular sound generator, like a studio synthesizer (VST instrument);
2. As a sound modifier (effect) for samples assigned to an MPT instrument;
3. As an effect for samples played in a particular channel;
4. As an effect for VST instruments in a chain; or
5. As a global audio modifier (effect), audio/MIDI monitor, or audio/MIDI router.

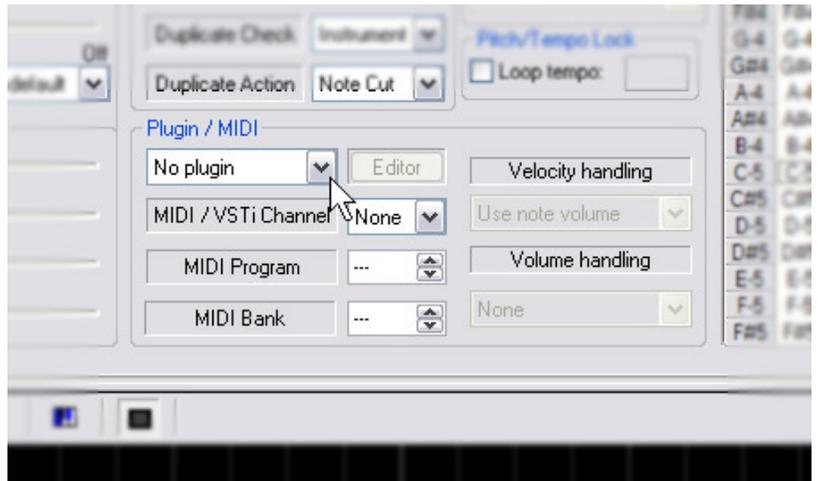
Each application has a different setup in MPT, but we should go through each one so you can see MPT's capabilities with VSTs. For these to work, you must have a new track with FX Slot 1 assigned to a VST.

## Creating a VSTi-based Instrument

1. Open the Instrument tab and click on the New Instrument icon. This will create an empty instrument slot as well as an empty sample slot. (Although sample 1 is assigned as shown in the Sample Map on the right side of the page, the sample is blank, and you can delete any sample assignments from the Sample Map if you wish.)

- Click on the Plugin menu in the Plugin/MIDI section of this page, as shown on the right. Select FX slot 1 (or one that has a VSTi loaded into it) from the Plugin assignment menu.

If you assign a VSTi with multi-channel support (such as Korg's M1 VSTi), you can assign the same VSTi instance to more than one instrument and select the MIDI channel each instrument will use. Any plugin which can receive MIDI CC messages will automatically be given channel 1 (but you can choose another channel).



New Note Actions (NNAs) can be used with limited function with VSTi's. (Whenever a new or duplicate note is encountered in the same channel, a Note-Off is applied to it UNLESS the Action is set to "Continue".) Also, you can use macros to directly control various parameters of the VSTi during playback.

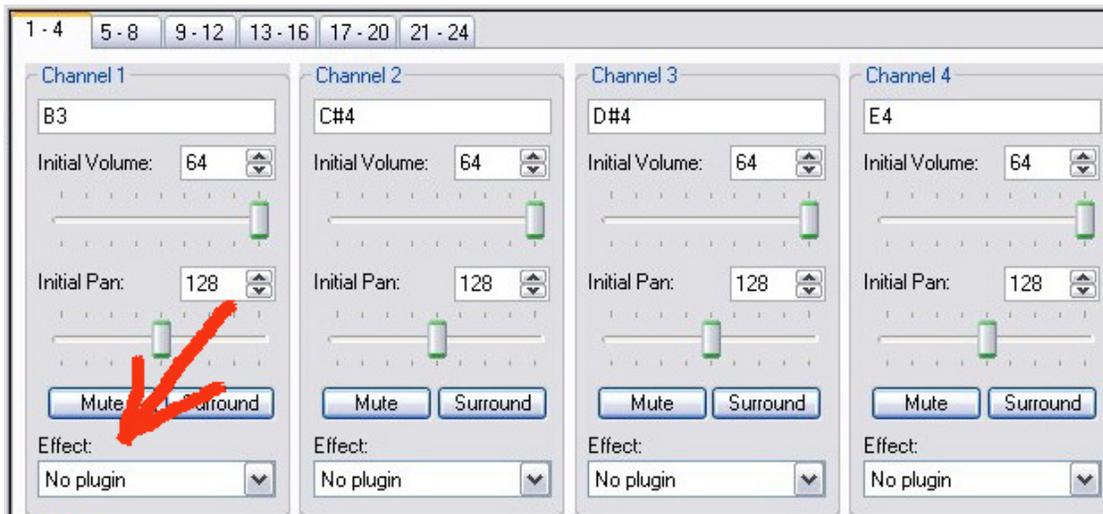
### Applying a VST FX to a Sample-based Instrument

- Open the Instrument tab and click on the New Instrument icon. Drag-and-drop an instrument file or sample .wav into the Envelope window, or load it by clicking on the Load Instrument icon. This will assign one or more samples to the instrument, as shown in the Sample Map list.
- Click on the Plugin menu in the Plugin/MIDI section of this page, as shown above. Select a VST from the Plugin assignment menu. If you choose a VST FX, the sample audio route will pass through the VST before going to the Master Audio output. If you choose a VSTi, however, the sample and the VSTi operate independently of each other.

No matter what method you choose, when using Effect commands (Note FX or Channel FX), they will be applied to samples as intended, but with VSTs there may be unintended consequences.

### Applying a VST FX to a Channel

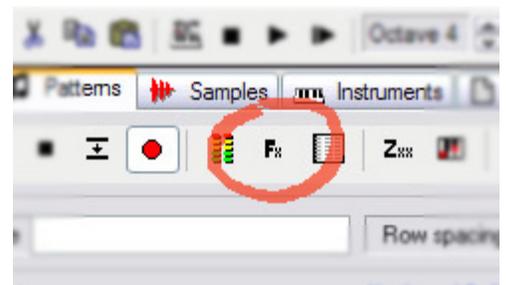
- In the General page, click on a channel's Effect field to open its menu allowing you to select a listed plugin.



- If you wish to view which channels are assigned VSTs, go to the Pattern page and click on the FX icon, as shown on the right. Channel-assigned VSTs will appear in each channel's header.

When an instrument with a VST assignment plays in a channel with a VST assignment, the instrument VST OVERRIDES the channel VST.

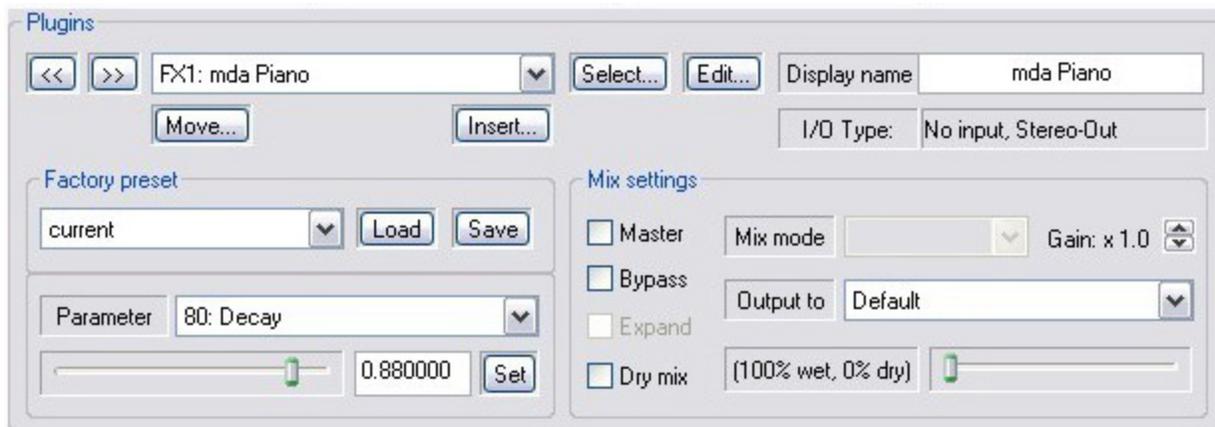
Also, when using macros, if there is a VST assignment to the channel, all macros in the channel control the channel VST. (If the plugin is part of a



chain, the macros control the first VST in the chain.) In other words, if an instrument with a VST assignment plays in a channel with a VST assignment, macros in that channel cannot control the instrument VST — you must use macros in another channel to control it.

## Creating a VST Chain

1. Select a plugin slot to include in the chain. Click on the "Output to" popup menu in the Mix Settings section to open a list of available plugins. (Plugins can only join other plugins in higher slots; that is, you can chain slots 1 to 3 to 5, but not 1 to 5 to 3.) This will route the audio path from the current plugin to this plugin.



2. To continue the chain, repeat the above step for each plugin in the chain.

Chains can be created for use in instruments, channels, or the song. Chains of plugins can only affect audio from the plugin preceding it in the chain (it is not possible to "side-chain" with MPT unless you use a third-party routing plugin, such as Xlutup's Chainer VST).

Furthermore, MIDI messages are not passed from one plugin to another. MPT cannot apply MIDI Thru to any plugin, but you can MIDI Thru a chain with external MIDI devices.

## Applying a VST FX to the Master Audio Route

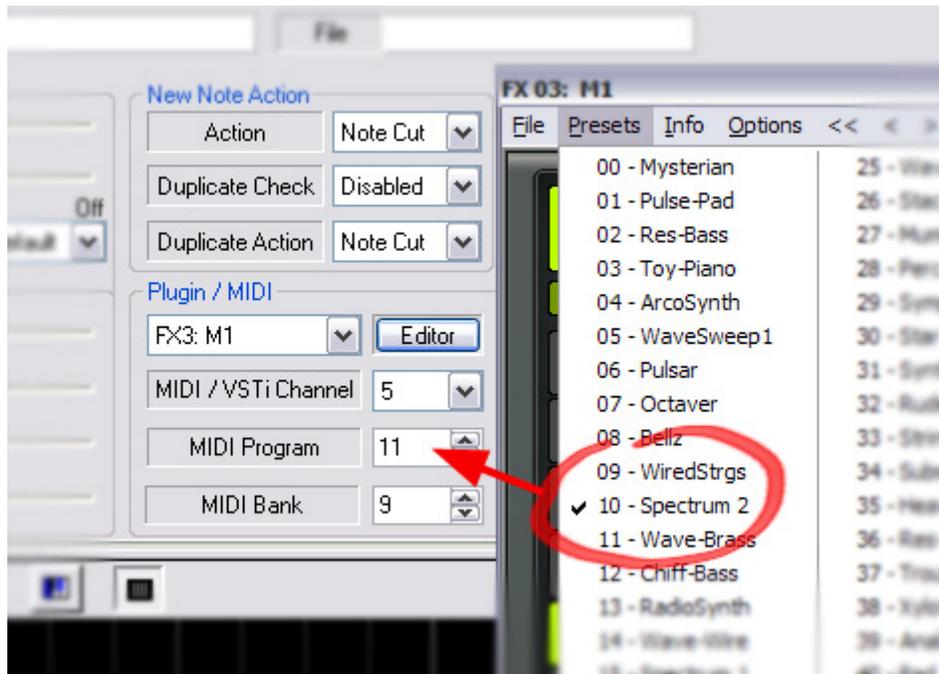
1. Select a plugin slot that you wish to apply to the final audio route. Usually this is a reverb or compression plugin, but any plugin can be used.
2. Check the "Master" box in the Mixer Settings part of the General page, which you can see in the above graphic. You can set how much the plugin affects the audio by moving the "Dry/Wet" slider at the bottom. When using an Effect module, you can even set how the Dry/Wet slider works with a Mix Mode.

You can also apply a chain of plugins to the Master Audio. Also, if you wish to control parameters of a Master plugin, you must assign it to an instrument or channel so you can use macros for it.

## Using Multiple Programs from One VST

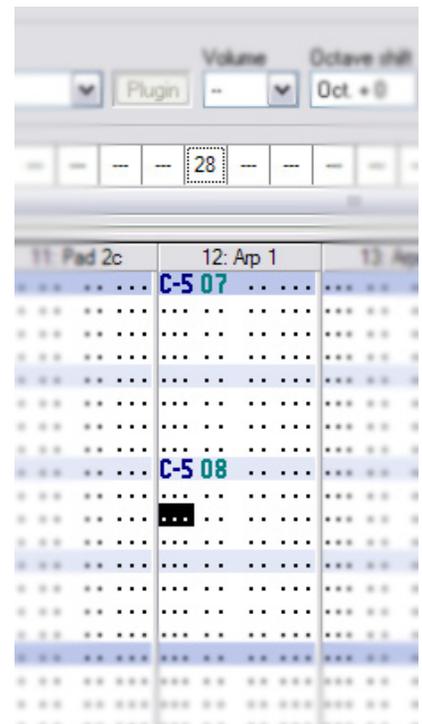
One limitation of ModPlug is that there is no means to load a VST's bank, only single programs — unless the VST provides a way in its own GUI (which is not many of them). Unfortunately, you cannot even use MIDI CC Program Changes to switch between programs or load banks. But there is a limited workaround that may be of use, but it doesn't work smoothly for all VSTs. You'll use one instance of a plugin, and if two different programs are to be played completely separately without overlap, you can do this:

1. Load your plugin into the track as normal.
2. Create an instrument and assign the plugin to it.
3. Put the bank number into the MIDI Bank field under the plugin assignment. If there is no bank to choose, leave this field blank. (If necessary, open the VST's window, and find the bank and program you want to use.)
4. Put the program number in the MIDI Program field. MPT's program index starts at 1, and if the plugin's does not, you'll need to add 1 to the program number (see the example below).



Using the M1 VSTi by Korg, the preset number is 10 in MPT's index, but we must add 1 to call the right one using a MIDI program change.

5. Shift-click on the New Instrument icon to duplicate the instrument. This will create the same exact instrument but you can assign a different bank and program to the same VST.
6. We need to test that we're calling the right bank and pattern number before we go any further. Go to the Pattern Editor and create a dummy pattern, if necessary.
7. Select the first instrument of this VST in the main instrument popup menu. In a free channel, enter a note at the first row.
8. Select the second instrument in the instrument field, and enter its note a little farther down the pattern in the same channel, as shown on the right.
9. Play this pattern in a loop, and make sure that two different sounds are being played. You can check for the proper program change by checking the VST's window. If it's not playing the right programs, but it IS switching between them, then the indexes are wrong — adjust the program/bank numbers in each instrument where needed.



Using this method allows you to keep only one instance of the plugin, and will work seamlessly as long as the programs don't overlap each other audially. Some VSTs have problems changing programs, especially while still processing audio. Here are some things to try if it doesn't switch programs properly or the audio doesn't start properly.

- Insert a Note Off or Note Cut either right after the first instrument is done, or right before the second instrument begins playing.
- Call the instrument from two different channels; that is, play one program from one channel and another program in a different channel.
- Apply a Note Delay (SDx) at the first note of the second instrument or move the note to another row altogether.

If you still can't get it to work, then it's probable that multiple programs can't be used with that plugin.

# 13.Tunings

## What are tunings and when do I need them?

Tunings in ModPlug Tracker are variations of the 12-tone Equal Temperament (12-TET) that most Western music has used since the 17th century. Without getting into too much history, 12-TET was developed so that all notes at any octave would sound harmonious and "in tune." Now 12-TET is the standard to which all keyboard and electronic synthesizers adhere to, and it is the default in MPT.

However, in the MPTM format, you can apply tunings to samples so that the note is different than the default format. But there are two types of tunings — scales and temperaments.

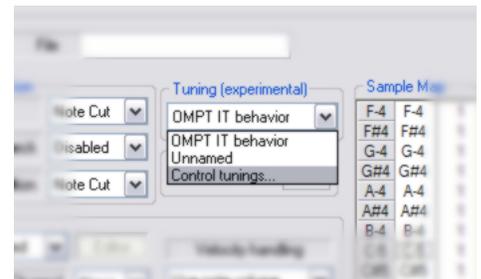
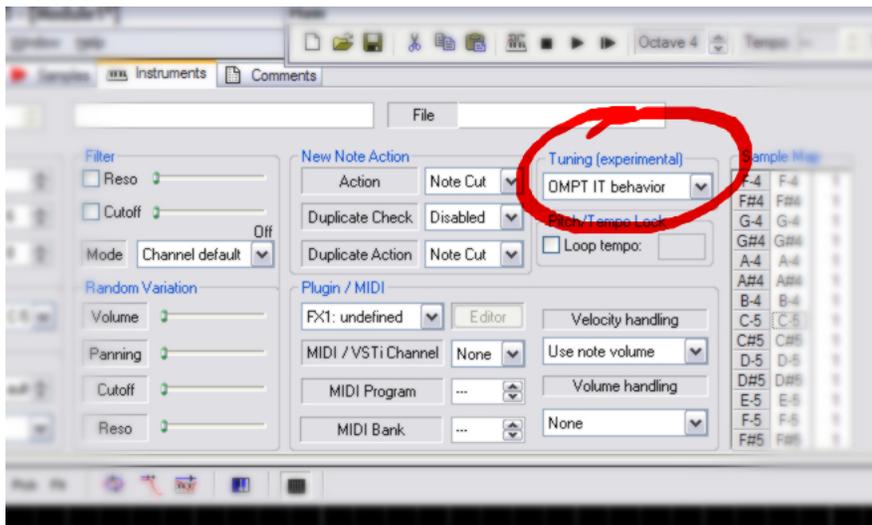
**Scales** are simply a variant of the labels that are used for the names of notes. All trackers name their notes in what could be called the "B chromatic scale" — C C# D E F F# G G# A A# and B, in which all the black keys of the keyboard use sharp notation rather than flat. ModPlug has a flat character, so it's possible to have the black keys named in flats, so that you get C Db D Eb E F Gb G Ab A Bb and B — the D-Flat chromatic scale. But in order to use flat keys, you have to use a scale that provides these new labels. While you can have a scale with both sharps and flats among the note names, you can only apply one scale to an instrument.

**Temperaments**, on the other hand, change the actual pitch of the played sample. This is useful for emulating acoustic, "non-temperable" instruments, such as flutes and saxophones, or for non-Western music, many of which use tunings that are neither 12-tone nor of equal temperament, such as Chinese or Arabic music. The pitch modifications for tempered notes are only very slight, but are quite noticeable when applied to certain scales or chords.

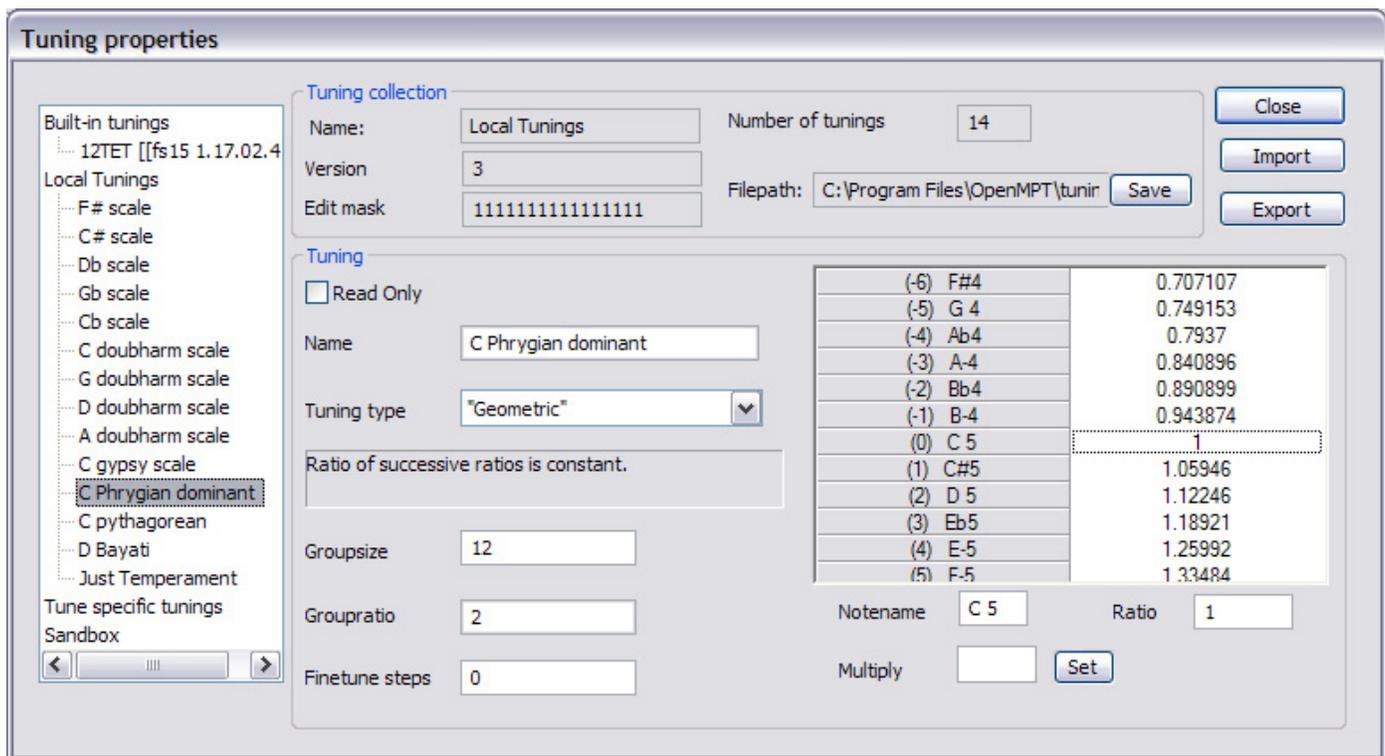
ModPlug Tracker can apply a scale to any instrument, but temperaments can only work on samples (not external MIDI instruments or VSTi's). If you wish to apply a pitch-altering tuning to these, you must use a third-party VST, such as Tobybear's MicroTuner. However, not only does this plugin NOT use MPT tuning files, but, as of this edition, the plugin has not been tested by the author.

## Creating tunings

1. Open an .mptm file, OR create a new .mptm file, OR convert another MPT track file to .mptm (tunings do not work for other track formats). Press the Song Properties button in the General Tab. When the dialog opens, select the MPTM format in the File Type menu. Note that some file types may alter how MPT plays the track.
2. Open the Instruments tab, and click on the popup menu where it says "Tuning (experimental)", and ...select the Control Tunings menu item.



3. The Tunings dialog box will appear (shown below). Notice on the left side are 4 headings for placing the tunings -- Standard, Local, Tune-specific, and Sandbox. You can right-click on any category heading to add a blank tuning, or on any listed tuning to remove it. You can click-and-drag any tuning from one of the headings to another; a context menu will appear so you can either copy or move the tuning entry.



The Built-in tuning is MPT's default tuning, which is the only one can be listed in this heading. It is not editable, but you can copy it to another category.

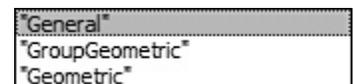
The Local tunings are any tunings you have loaded previously, and are accessible from the Tunings popup in the Instrument tab. These are kept in the LocalTunings.tc file in the Tunings folder.

The Tune-Specific tunings are saved with the song.

The Sandbox tunings are temporary in case you are experimenting; any tunings in this heading are lost when the dialog box is closed.

4. To load a tuning, click on the Import button. The standard Open dialog will appear and you can pick a tuning file (only one at a time). Any you load will automatically appear in the Sandbox heading. Select one of them to see the tuning data and the key labels.

Now you can begin changing the note names or their pitches. When using "General" tuning type, you have to rename every note and input every pitch value for every note (those you wish to modify from the default). Everything is completely manual but you can define everything independently.



Or you can use "Geometric" to have the values automatically scaled for every note. You can still relabel the notes but you can only do them for one octave (C5 thru B5); the naming standard you use will be applied to all octaves.

NOTE: When tuning by Geometric ratios, the "5" will be automatically entered as the last digit in the note name, so for example if you wanted to name that note C.5, only enter "C." — the 5 is added, and all other octaves are adjusted accordingly. So even though you can change the note name, you cannot change the octave designation.

5. To enter your tuning with Geometric ratios (that don't change for every octave), select "Geometric" tuning type. Then enter the number of notes in your octave in the Groupsize field; the "Groupsize" is the number of notes in your "octave," which doesn't have to be an octave in the traditional sense. For the classical Western temperament, there are 12, and the whole tone scale has 6 in a "Groupsize".

In the Groupratio field, enter the pitch change for every Groupsize. Usually this would be 2, meaning the pitch (in hertz) is doubled an octave higher, and halved an octave lower. Press tab (to go to the next field and apply the changes) and the tuning for each note will be adjusted in the note list.

You can easily change the labels with a little understanding of how the interface works. To select a note, click on any note or its value in the note list on the right. The note is automatically centered in the window, highlighted, and its values placed in the fields below the window.

To change the label for the currently selected note, click in the Note Name field. This is a text editing field but there are two important restrictions. First, you only have 3 spaces to work with. Second, while you can use any character your keyboard can type, the only ones that show up in the Pattern Editor (in the note column) are capitals A-Z, 0-9, and the

symbols ? # b \ : - and space. It's best to use a standard, constant format for the note labels; the default for MPT is TSO, where T is the tone (A-G), S is the symbol (such as # or b), and O is the octave (0-9).

## Applying tunings

Unfortunately you can't try the new tuning with a sample scale or by playing the note keys, nor will a playing track use the new tuning, until the dialog is closed and the tuning is applied to the song.

When you have imported or created a tuning, it is not applied until you select it from the Tuning menu. This will instantly change all the note labels everywhere that instrument plays a note (the note must have the instrument & note in the same event in the Pattern Editor). In the example on the right, even though the note sequence is the same, the first four notes with their instrument assigned will show the notes in the new scale because the instrument was called with the note; the latter four, without instrument designations, revert to MPT's default.

Generally you should apply tunings to instruments that will be using notes of the key in which you are working. You normally would not need to use a tuning for non-pitched instruments.

7: EG1		
E♭6	08	...
^^	..	...
A♭5	08	...
^^	..	...
D♭6	08	...
^^	..	...
G♭5	08	...
^^	..	...
D#6	..	...
^^	..	...
G#5	..	...
^^	..	...
C#6	..	...
^^	..	...
F#5	..	...
^^	..	...

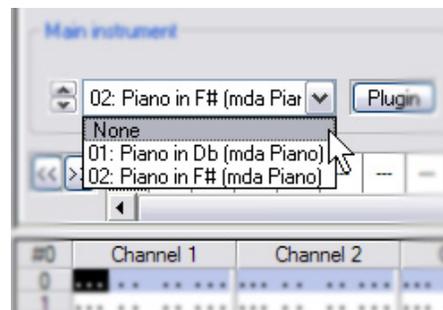
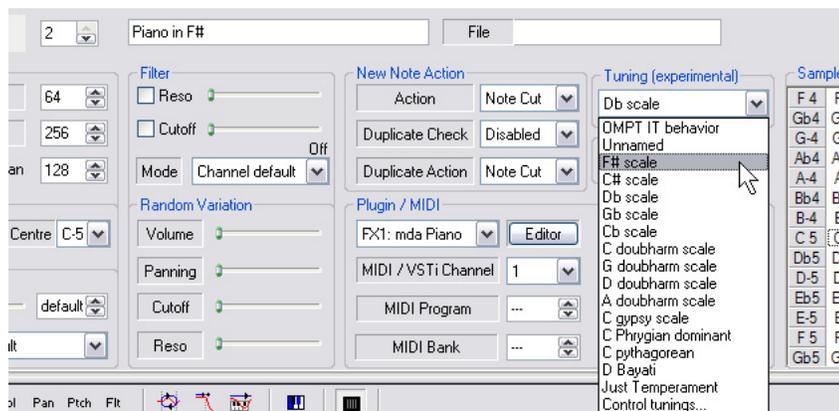
**TIP:** For VSTi's or MIDI instruments that apply different drum samples to each note, such as a kick to C5 and a snare to D5, you could create a tuning that changes the note names to abbreviations of these percussive samples. So, for example, you can relabel "C-5" to "KIK" and "D-5" to "SNA"!

## Applying Multiple Tunings to One Instrument

If you wish one instrument to use more than one tuning, such as a piano VSTi that switches from a Db scale to an F# scale, there is a workaround which allows this.

1. Create an instrument and apply a scale of your choice using the above method. You can use a sample array or VSTi, but for this example we'll use a Piano VSTi that uses a Db scale.
2. Duplicate the instrument by Shift-clicking on the New Instrument icon. This will create a copy of the instrument, including its sample/VSTi references. However, the samples nor the VSTi, whichever applies to the type of instrument, is NOT duplicated; this saves memory and file size. You can rename the instruments for clarity.
3. With the new instrument, you can choose a different scale. Here we're assigning F# to the second instrument.

Now when you look at the instrument list in the Pattern page, you will have different instruments using different scales but the same instance of the VSTi.



## Tuning issues

The main limitation, as has been stated before, is the lack of support with VSTi's, but this limitation is mostly due to the VSTi's design more than MPT's inability to apply the microtonal pitch changes. Fortunately, however, VSTi's can still use MPT's scale tunings, where only the notes are named differently, and will be applied when the instrument is declared with the note.

Furthermore, tunings can only be applied to instruments, but not channels, patterns, or songs (although theoretically a tuning file can be saved with the song data so it can be applied to its instruments).

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## 14. Known Issues

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(to be written later)

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## 15. Contributors to this Manual

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The author wishes to thank the following members of the ModPlug Central Forums, both past and present, for their help and contributions in assembling the knowledge base within this manual:

LPChip	Jojo	bvanoudtshoorn
Relabsoluness	Sam_Zen	DBlues
Rewbs	psishock	Joshiii-Kun

and all those who contributed to the OpenMPT Wiki or posted questions at ModPlug Central.

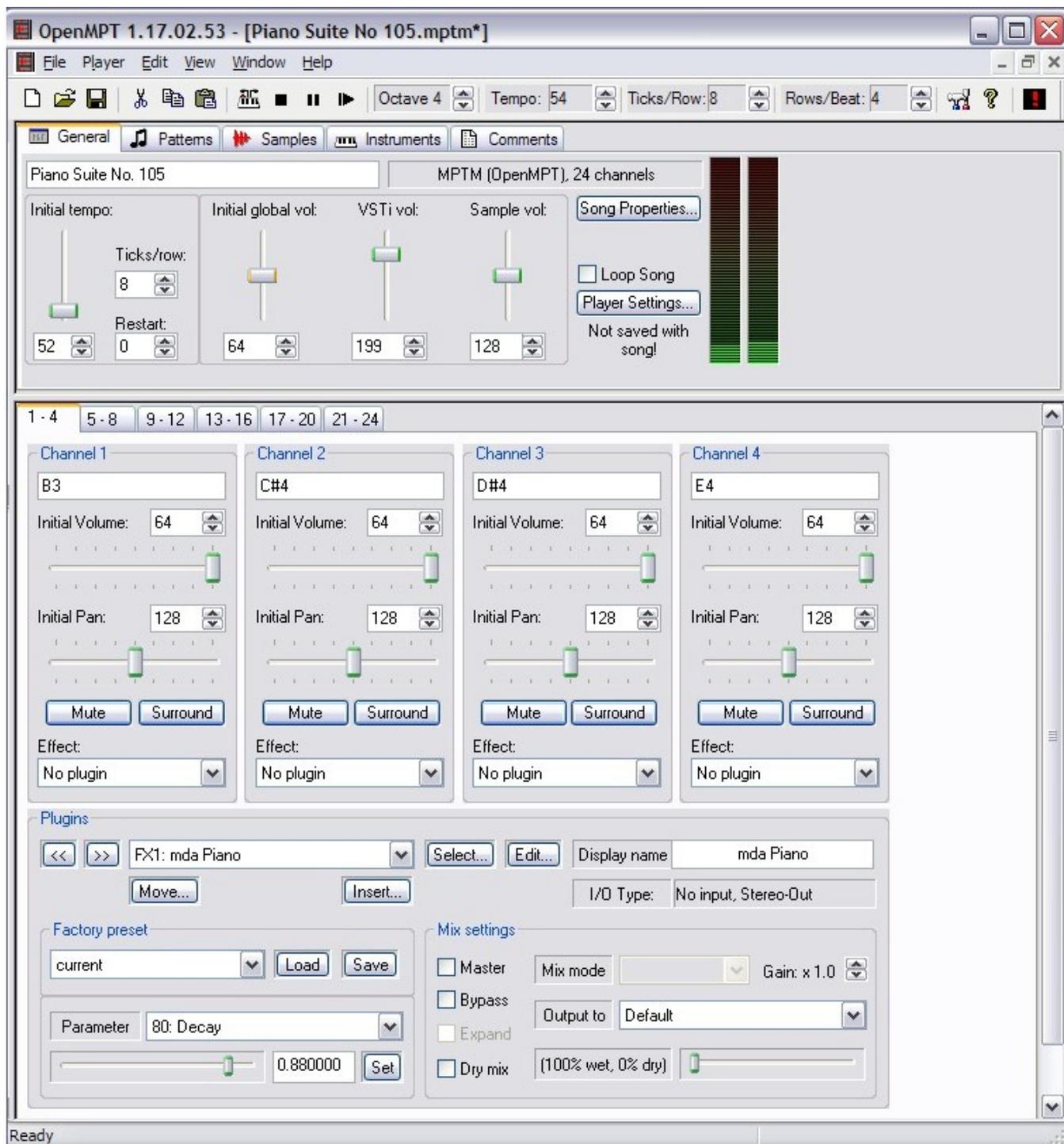
## 16. Reference: Tabs

Below are the detailed descriptions of each tab's page. Many of the settings can be made by either a slider knob (which acts as a coarse value finder), arrows (a value fine-tuner), an editable textbox (where you can tab to or click with the mouse, and enter a value), a popup menu (where a static list of values can be chosen), or some combination of these. Also, every page has a horizontal dividing bar which can be dragged to enlarge the upper or lower half of the page. A vertical bar is accessible from the left which, when dragged, will show the Folder Tree (if the Tree Toolbar in the View Menu is checked).

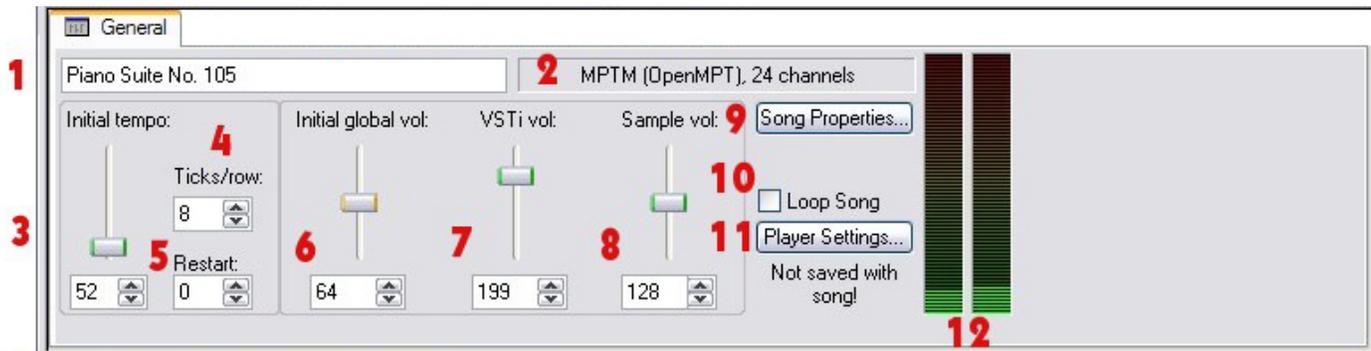
Many of the parameters can be set by an Effect Command. If so, the Description label will be followed by an asterisk (\*).

### General Setup

ModPlug opens with this page, and is regarded as the setup page for the track. Here you will find the initial and global settings for the song, each channel, loaded plugins, and the Master Audio output.



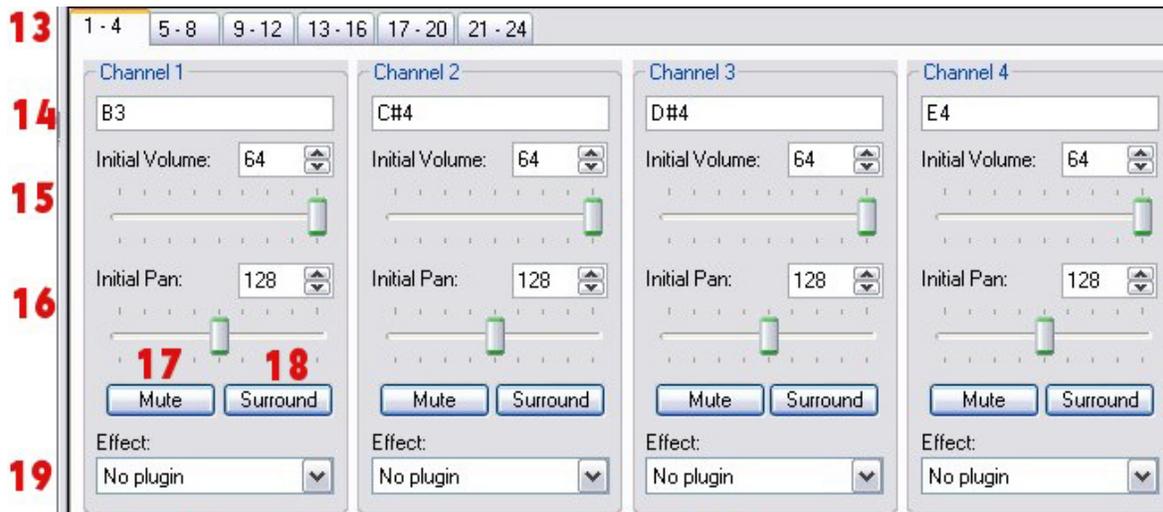
## Global Settings



- 1. Track name:** An optional text field where you can hold the track name or a brief comment.
- 2. Track format:** The track type and the number of channels the track holds. This can be altered in [Song Properties](#).
- 3. Initial Tempo\*:** The track's initial Tempo value, but this may not be the actual BPM, which is directly calculated by the [Tempo Mode](#) (set in [Song Properties](#)). For MOD/XM, the initial Tempo value can be overridden by the Fxx command (greater than F20), and for S3M/IT, it can be done with the Txx command.
- 4. Initial Speed\*:** The track's initial Speed value (the number of ticks per row), but this means different things based on the [Tempo Mode](#) (set in [Song Properties](#)). You can change the Speed with the Fxx command for MOD/XM tracks (less than F20), or Axx for S3M/IT modules.
- 5. Restart Position:** When Loop Song Mode (**10**) is on, the playback pointer will return to the first row of this Pattern POSITION (not Pattern ID) to continue playback.
- 6. Initial Global Volume\*:** The track's initial Global Volume, ranging from 0 to 128, which is applied to the Master Audio output. When you move the slider in XM and IT (and IT-type) tracks, the actual volume attenuation is shown as a ToolTip. The Global Volume can be changed with the Vxx command for IT/S3M tracks, and the Gxx command for XM (MOD tracks do not use a Global Volume command). At 128, the modification to total volume is 0 dB.
- 7. VSTi Volume:** The track's global VSTi volume, ranging from 0 to 256, which attenuates the total audio output from VSTi's; this is the equivalent of applying the same amount of Gain to all VSTi's. When you move the slider in XM and IT (and IT-type) tracks, the actual volume attenuation is shown as a ToolTip. At 128, the modification to total VSTi volume is 0 dB. The slider is disabled in S3M and MOD tracks.
- 8. Sample Volume:** The track's global Sample volume, ranging from 0 to 256, which attenuates the total audio output from MPT's sample processing, corresponding to the Pre-Amp slider found in the Soundcard options. At 128, the modification to total sample volume is 0 dB. When used in association with VSTi volume (**7**), you can balance the signal from VSTi's as a whole and samples as a whole.
- 9. Song Properties:** Clicking on this button to open the [Song Properties](#) window.
- 10. Loop Song Mode:** Toggles the function to play this track in a loop. When this box is checked and the end of the song is reached (the first row of the first null pattern), all channels are reset and the playback pointer returns to the pattern POSITION (not the Pattern ID) indicated in the Restart Position field (**5**), and continue playing. (To NOT reset the channels in Loop Song Mode, disable this option in the General section of the Options dialog.)
- 11. Player Settings:** Clicking on this button opens the Setup Options at the [Player Page](#).
- 12. Master VU Display:** Shows the left and right volume levels of the Master Audio output from MPT during playback. The VU meters do not activate during sample or instrument previews. The colors of the meter are set in the [Colors](#) page of the Options dialog.

## Channel Settings

In the middle of the page is the Channel Mixer section, which displays four channels at a time (this cannot be changed), and allows for editing each channel's initial settings. The track format determines what settings can be modified both initially and during output. The following settings can be set in each channel.



- 13. Channel Tabs:** Clicking on a tab opens that numbered set of channels. The number of channels in the track is set in [Song Properties](#).
- 14. Channel Label:** An optional text field where you can name a channel. This label will appear in the song's Pattern Folder in the Folder Tree as well as the Channel Headers of the Pattern Editor, so it's advisable to use a short name.
- 15. Channel Volume\*:** The channel's initial volume, ranging from 0 to 64, where 64 is 100% of the volume being output from the channel. This setting only affects sample-based audio output, not VSTs either assigned to the channel or playing as an instrument; however, because it affects the sample audio, it decreases the input to channel-assigned VSTs. This slider is disabled for all except IT and IT-type tracks. For MOD/XM tracks, the channel volume can be set using the Cxx command; the S3M/IT equivalent is the Mxx command.
- 16. Channel Pan\*:** The channel's initial stereo pan setting, ranging from 0 (left) to 256 (right), but is disabled for MOD and XM tracks (the initial setting is not saved in those files). This setting only affects sample-based audio output, not VSTs either assigned to the channel or playing as an instrument; however, because it affects the sample's pan location, it affects the stereo input to channel-assigned VSTs. For MOD/XM tracks, the channel pan can be set using the 8xx command; for S3M/IT, use S8x or Xxx.
- 17. Mute:** Clicking on this button enables/disables all audio output from this channel. This will be updated in the Pattern Window immediately. If "Ignore Muted Channels" is set in the General Options page, a muted channel will not be processed.
- 18. Surround\*:** Clicking on this button enables/disables Surround Stereo to the channel's output. This will effectively dilute previous pan and stereo settings, and it is nullified by calling a Note FX or Channel FX that affects pan or stereo settings. Surround Stereo can be enabled by the S91 command, and disabled by S90, but this capability only exists for XM and IT track formats.
- 19. Channel Plugin Assignment:** Clicking on this field will display a menu listing all the track's loaded plugins, which can be assigned to the channel audio output. This will in effect be the final stage of the channel's audio before being sent to the Master Audio output. NOTE: When an instrument which is assigned a VST plays in a channel assigned to a VST, the instrument VST OVERRIDES the channel VST — it does not set up a chain to the Master signal. Furthermore, any macros passed in a VST-assigned channel is sent to the CHANNEL'S VST, not the instrument's, even if an instrument was designated in the command event. For example, if instrument 1 is assigned a VSTi, and it plays in a channel assigned a VST FX, and this event is called:

C-5 01 .. Z7F

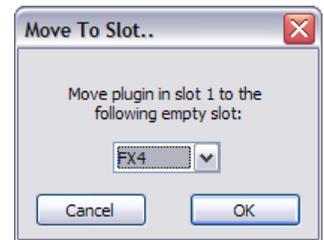
a C-5 will be played by instrument 1, but the macro will be applied the channel VST FX in all circumstances.

## Plugin Setup

The bottom part of the General Setup page allows you to load plugins that will be used in the track and determine how their audio output is mixed together. There is an entire chapter devoted to Plugins [here](#).



- 20. Plugin Slot:** Shows the current plugin; the parameters shown in this section apply to this plugin. Clicking in the field opens a popup menu where you can choose the current plugin. Clicking on the left/right arrows next to the field changes the current plugin to the previous/next one in the Plugin List. There are 100 available slots where plugins can be placed, and they don't need to be placed sequentially. However, if an output chain is set up, a VST can only output to one farther down the list (with a higher slot number). So for example, a chain can route its audio from slots 1 to 3 to 5, but not 1 to 5 to 3.
- 21. Move Plugin:** Clicking on this button allows you to move the current plugin (and the shown settings) to another slot. When moving, you will be shown a dialog box which will allow you to choose an empty slot to move the plugin to. The reference for any instruments or channels is changed, so there is no need to update those; however, if a plugin is part of a chain, and the plugin is moved to a slot AFTER its output plugin, it will lose the chain assignment — the Output field (38) will revert to Default.
- 22. Insert Slot:** Clicking on this button to create an empty slot BEFORE the current plugin's place in the list. This will effectively push the current plugin and all those after it in the list down one slot. If a plugin occupies the last slot (#100), it is deleted and any references to the plugin is lost; THIS ACTION CANNOT BE UN-DONE.
- 23. Select Plugin:** Clicking on this button opens the [Plugin Manager](#), where you can select the plugin to put into the current slot, replacing the one there if necessary. If a plugin is replaced, any references will instead point to the new plugin, and the parameters to the deleted plugin are lost (and unrecoverable unless you saved its program).
- 24. Edit Program:** Clicking on this button opens the GUI window that ModPlug uses for all plugins. If the plugin has its own GUI, it is placed within the window. See the subsection on the [Plugin dialog](#) for more details.
- 25. Plugin Label:** An optional text field where you can provide a name for the plugin. This label will appear in the Channel Header if the plugin is assigned to a channel, or the Plugin Select field in the Instruments page if it is assigned to an instrument, so it's advisable that you use a short label.
- 26. Input/Output Type:** A description of the type of audio signal going in and out of the plugin (none, mono, or stereo), in case it needs to be known.
- 27. Plugin Program:** Shows the current program or preset of the current plugin. The default is "Current Program", but you can select one of the plugin's presets by clicking on this field and choosing one from the menu. However, there are some important limitations. First, if the plugin, such as a VSTi, accesses multiple banks, the preset list will only show those from the first or default bank. Secondly, choosing a different preset from either MPT's Plugin GUI (using the Presets menu) or the plugin's own GUI does NOT alter this program choice, even though in fact the plugin will use the parameters and settings of the new preset choice.
- 28. Load Program:** Clicking on this button allows you to load a program (an .fxp file) for the plugin. If MPT detects an error trying to load a program that's not in the current plugin's specifications, you will be alerted and the data will



not be loaded. HINT: It's a good idea to keep a separate folder for each plugin where you can save or keep its programs, or otherwise use a file-naming technique to remind you which programs go to which plugins.

NOTE: MPT is currently unable to load program banks into VSTi's; there is a workaround detailed [here](#).

- 29. Save Program:** Clicking on this button allows you to save the current program with the settings you've made.
- 30. Program Parameter\*:** Shows the current parameter of the current program of the current plugin. Edits made to the value will be applied to this parameter. Clicking on this field will open a popup menu where you choose a different parameter to edit. To automate parameter values during playback, you must assign the parameter to a controller command (SFx) and then set its value with a macro command (Zxx); see [this section](#) for more info.
- 31. Parameter Value\*:** The editable text field shows the current value of the current parameter of the current program of the current plugin. It is a decimal number between 0 and 1, corresponding to the minimum and maximum values that is allowed for the parameter. Using the slider will roughly set the value as well. (The Set button sends the value to GUI windows for plugins that don't update their GUI elements.) To automate parameter values during playback, you must assign the parameter to a controller command (SFx) and then set its value with a macro command (Zxx); see [this section](#) for more info.
- 32. Route to Master Audio:** If checked, the plugin will be applied to the Master Audio output.
- 33. Bypass Plugin:** If checked, the plugin will be bypassed, effectively canceling its effect on audio output.
- 34. Expand Plugin Audio:** If checked, the plugin will treat the audio signal in a special way. Using an Expanded signal applies the inverted audio to the Wet/Dry attenuation. This means when the Wet/Dry slider is in the center, there is no audio output because the setting will be 0% Wet + 0% Dry audio signal. For more info on inverted sample data, see the Reference section on [Audio](#).
- 35. Apply Dry Mix:** If checked, the plugin will combine the Dry signal to the Wet signal, rather than subtracting it from the Wet signal, so that moving the slider affects the audio output this way:

0% Wet            ↔        100% Wet, plus  
100% Dry        ↔        100% Dry

This is best used for plugins that do not have wet/dry mix control.

- 36. Mix Mode:** Shows the current Mix Mode, but is only active for Effect plugins (not VSTi's). Clicking in this field shows a popup menu with 5 Mix Modes besides MPT's default algorithm (shown above).

Default Mix: As the slider moves to the left, the Dry signal is decreased proportionately to the increase of the Wet signal:

100% Wet        ↔        0% Wet, plus  
0% Dry            ↔        100% Dry

Wet Subtract: As the slider moves to the left, the Wet signal is increased and applied to the total Dry signal:

100% Wet        ↔        0% Wet, plus  
100% Dry        ↔        100% Dry

Dry Subtract: As the slider moves to the left, the Dry signal is decreased and applied to the total Wet signal:

100% Wet        ↔        100% Wet, plus  
0% Dry            ↔        100% Dry

Mix Subtract: As the slider moves to the left, the Dry signal is increased and applied to the total Wet signal:

100% Wet        ↔        100% Wet, plus  
100% Dry        ↔        0% Dry

Middle Subtract: As the slider moves to the left, the Wet signal is increased and applied to the total Dry signal:

100% Wet        ↔        0% Wet, plus  
100% Dry        ↔        100% Dry

LR Balance: The Dry signal is added the Wet signal at 100%, and the slider is treated as a stereo pan setting.

Default
Wet subtract
Dry subtract
Mix subtract
Middle subtract
LR balance

- 37. Gain:** Boosts the audio signal from the plugin by multiplying by this value, ranging from 0.1 to 8.0.
- 38. Output Route:** Shows the output of the plugin's final audio signal. By default it is combined into the Master Audio route, but you can create a plugin chain by routing it to another plugin as long as its slot number is higher than the current plugin. Clicking on this field opens a popup menu which shows the plugins available to be chained.
- 39. Dry/Wet Slider\*:** Dragging this slider changes the Wet/Dry amount of the algorithm attenuating the plugin's audio signal, based on the checkboxes and the Mix Mode. NOTE: Due to a calculation anomaly, the wet/dry amount is reversed, so that the dragging the slider to the left increases the Dry amount and to the right increases the Wet amount.

## Patterns

This page allows for pattern creation and editing, with the settings of the current pattern at the top half and the Pattern Editor at the bottom half.



### Pattern Icons

- 1. New Pattern:** With a blank pattern, clicking on New Pattern places a new blank pattern with the default number of rows in the next available blank spot in the Order List. On an ID'd pattern, the same is done, but the number of rows is the same as the selected pattern (but no less than 32).
- 2. Play Pattern from Cursor:** Starts playback from the active row, and sets the Loop Pattern checkbox (21).
- 3. Play Pattern from Start:** Starts playback at the first row of the current pattern, and sets the Loop Pattern checkbox (21).
- 4. Stop Playback:** Same as the Stop icon in the Main Toolbar, it cuts all audio and stops audio processing from VSTs. NOTE: There is currently a bug in which the audio buffers are not reset when stopping or pausing playback when using VSTs. This means that if you resume or begin playback, whatever's in the audio buffer will be played as well.
- 5. Play Active Row:** Processes all events in the active row only. Keep in mind that audio processing will not be stopped, even when envelope or VST volumes reach 0; you must manually stop playback to end the audio.
- 6. Record:** Enables editing of the pattern, both by MIDI and computer keyboard entry. If this is not enabled, notes will still be processed but will not be entered into the pattern. If disabled and you attempt to alter any settings in the pattern (paste, delete, dragging selections, etc), a reminder popup will allow you to enable recording.
- 7. Channel VU:** Toggles the display of channel VUs in the channel headers, the colors of which are set in the [Colors](#) page of the Setup Options. VUs only reflect audio from sample-based notes, not instrument-based VSTs or channel-assigned VSTs.
- 8. Channel FX:** Toggles the display of plugins assigned to each channel, which are shown in the channel headers.
- 9. Channel Manager:** Opens the [Channel Manager](#) dialog, where you can control the mute status, record status, channel plugin assignment, and the order of multiple channels.
- 10. Macro Manager:** Opens the [Zxx Macro Manager](#) dialog, where you can fix how Zxx commands control certain parameters. See [this section](#) for details on using Macros.
- 11. Chord Setup:** Opens the [Chord Setup dialog](#), where you can design chords that can be played and recorded with one keystroke or MIDI note.
- 12. Undo:** Executes the [Undo command](#).
- 13. Pattern Attributes:** Opens the [Pattern Attributes dialog](#), where you can set the number of rows in the current pattern.
- 14. Expand Pattern:** Expands the space in the current pattern by doubling the number of rows, then inserting an empty row after each row. This is useful when you need to increase the amount of detail in the pattern so MPT can process more events between notes, but keep in mind that you will need to double the tempo to keep the same playback rate.

- 15. Shrink Pattern:** Compresses the current pattern by deleting every 2nd row, in effect halving the number of rows in the pattern. This is useful when you only need to use every other row in the current pattern and you need to optimize file size or show more rows in the window.
- 16. Channel Detail:** Toggles the display of each channel to low, medium, or high. The default is "hi", which shows every column in each channel. Clicking on "med" hides the fourth column (channel FX), and clicking on "lo" hides the third column (note FX). Hiding columns allows for the display of more channels in the window.
- 17. Paste Overflow:** Toggles the Overflow Mode for pasting data. See [here](#) for more info.

## Misc. Pattern Settings

- 18. Instrument List:** Shows the current "main" instrument that will be entered into the pattern editor when inputting notes. Clicking on the field opens a popup menu showing all loaded instruments, where you can choose a new current instrument. (If the track is not using instruments, then the list will show the loaded samples. If there is a mix of samples and instruments, the samples will be preceded by an "s".)
- 19. Edit Program:** If the instrument is assigned a plugin, clicking on this button will open MPT's [Plugin window](#).
- 20. Row Spacing:** The number of rows that will be navigated after entering a note. The value in this field is the "jump" value. Rows are not jumped when entering values into any other column, or if Record is not enabled.
- 21. Loop Pattern:** Checking this box causes the playback pointer to revert to the first row of the current pattern when playback reaches its end. It is automatically set when clicking on a Play Pattern button —  or  — (or its keyboard shortcut equivalents), and unset when clicking on a Play Song button —  or  .
- 22. Follow Song:** Checking this box will shift the view of the pattern during playback so that it keeps up with the playback pointer. This also relocates the cursor to wherever the playback pointer is, so inputting notes by any means during playback (when the Record button is set) will enter those notes at the cursor.
- 23. Sequence List:** An editable text box which allows you to name the current sequence. Click on the arrow keys to switch to the previous/next sequence. See [here](#) for more info on using sequences.
- 24. Pattern Name:** An optional text field where you can enter a pattern label, which only shows up in the track's pattern list in the Folder Tree and otherwise has no bearing on any other aspect of the song. NOTE: Pattern naming is disabled in MOD and S3M tracks, as these are not saved in those formats.

**TIP:** This does not have to be a unique pattern name. You can also use this field to keep up with chord changes or macro values.
- 25. Pattern Order List:** The Order List shows the sequence of patterns in the order they will be played. See [here](#) for more info.

## Pattern Editor

The Pattern Editor is the spreadsheet where events are organized into channels. There is quite a bit of customization that can be made in the following ways:

The screenshot displays the Pattern Editor interface with 17 rows and 12 channels. Each channel header includes a name (e.g., Ch#7 29), a volume level (e.g., 009), and a plugin name (e.g., E-7 29). The grid contains musical notation such as notes (e.g., G#6 29), rests (e.g., D-6 35), and other symbols (e.g., F#6 35, D#5 27, G#6 34, B-6 35, E-6 25, A-6 28). The interface includes a status bar at the bottom with information like 'Ready', 'Chn:5; Vol:40; Mac:0; Cut:7F; Res:0; Pan:80', 'Row 22, Col 5', and '0:00:56 [17] 15ch'.

- ◆ The color scheme for almost all elements of the Pattern Editor can be made in the [Colors](#) page of the Setup Options. Here you can also toggle the size of the font, which will show more rows and columns.
- ◆ Rows can be grouped by beat, and beats can be grouped by measure, using MPT's "time signature," which is set in the [Song Properties dialog](#). (Not all track formats can use this setting.)
- ◆ Some channels can be hidden by toggling the Channel Detail buttons (**16**).
- ◆ During playback you can follow the playback pointer (**20**) as well as center the active row (by a setting found in the [General Options](#)).
- ◆ The channel headers at the top of each channel can be labeled (**14** in the [General page](#)), can show the channel audio volume (**7**), and can indicate the channel's assigned plugin (**8**).
- ◆ To see more rows, you can slide the split bar up over the Pattern Attributes section. To see more channels, you can slide the Folder Tree window closed or hide its vertical separator completely (by unchecking the Tree toolbar in the View menu).

## Input

All input is directed to the field where the cursor is located, but is filtered by the context in each column. For example, the Note column expects only keypresses that will enter notes. (The keyboard input is set in the [Keyboard](#) section of the Options page.) Here are the 4 contexts and how the input is controlled.

Column # & Name	Input Control	Description
1 Note name	Keyboard shortcut (Pattern Editor - Note col) or MIDI input	Enters note by the pitch label and the octave, according to the tuning that's used. Normally this is ModPlug's default tuning (12-TET, using the "B chromatic" scale), but if working in an MPTM file, you can apply other tunings that change the note name. See <a href="#">here</a> for more details on applying Tunings. There is also more info on entering notes <a href="#">here</a> . For input by MIDI, see <a href="#">here</a> .
2 Instrument designation	Keyboard shortcut (Pattern Editor - Instrument col) or note co-entry	Enters the sample slot ID or instrument slot ID, which can only be a decimal number from 00 – 99. The ID can also accompany a note entry automatically if there is a current instrument assigned (displayed in the Main Instrument field, or the Alternate Instrument field if using a keyboard split).
3 Note FX	Keyboard shortcut (Pattern Editor - Volume col) or note co-entry	Enters the note FX command, which consists of a one-character prefix and a two-digit decimal value (if digits are entered before the prefix is, the command is assumed to be volume (v), but the prefix can be entered afterwards). Volume commands can be entered automatically with the note if: A.) using an alternate instrument, B.) combining the volume command by a MIDI note's key velocity, or C.) recording a MIDI note's velocity (the latter two can be set in the <a href="#">MIDI page</a> of the Setup Options dialog). Note FX commands are found in <a href="#">Appendix B</a> .
4 Channel FX	Keyboard shortcut (Pattern Editor - FX col/FX param col), MIDI input, or plugin input	Enters the prefix and value of a channel FX command; these two are more independent than the note FX column. Normally you must be in the prefix field to enter the prefix, but there is a feature where you can enter the prefix from the value field if the prefix letter is "greater" than F (which means this does not apply to MOD tracks). The value is always a two-digit hexadecimal number. If you assign macros to MIDI controller messages, you can use an external MIDI device to set values in the channel FX column. When using plugins, you can record values from their GUI elements by using the Record Param feature. For more info on using MIDI to set channel FX, see <a href="#">here</a> . For info on using plugins to set channel FX, see <a href="#">here</a> . A complete list of channel FX, separated by track format, is in <a href="#">Appendix A</a> .

There is also a special type of event that is available only in ModPlug's exclusive format MPTM. It replaces the standard tracking note event and instead uses all four columns to control plugin parameters. See the section on [Parameter Control events](#) for more info.

When entering notes by MIDI (step input) or keypress, the cursor will not go beyond the current pattern UNLESS the Continuous Scroll option (in the General Options page of the Setup dialog) is enabled. When entering notes using paste, no data will be entered into the next pattern unless Overflow is enabled (in the same options dialog or by clicking the Overflow" icon at the top of the Pattern page.

## Navigation/Scrolling

**Navigation** within the Pattern Editor means moving the cursor, while **scrolling** is moving the view. Navigation is mostly done by pressing the keyboard shortcuts, but scrolling is engaged by mouse actions. Here are the possible methods of navigation:

By Row (vertical navigation):

- Move to next/previous row
- Move to row of next/previous beat ("snap")
- Move to first row of next/previous measure ("snap")
- Move to first/last row of pattern
- Move up/down set number of rows ("jump")

Means:

- Keypress
- Keypress
- Keypress
- Keypress
- Keypress, note entry

By Channel (horizontal navigation):

- Move to next/previous column
- Move to next/previous channel
- Move to first/last channel

- Keypress
- Keypress, note entry in Selected Recording
- Keypress

By Pattern:

- Move to next/previous pattern
- Move to given pattern

- Keypress, Order List click + keypress
- No keypress, Order List click + Pattern Editor click

Scrolling is done when the cursor is moved to a field outside of the current view, a region is selected outside of the current view, the scrollbars are used, or when the mousewheel is rolled or pressed. There are no keyboard shortcuts for scrolling the view, except via navigation.

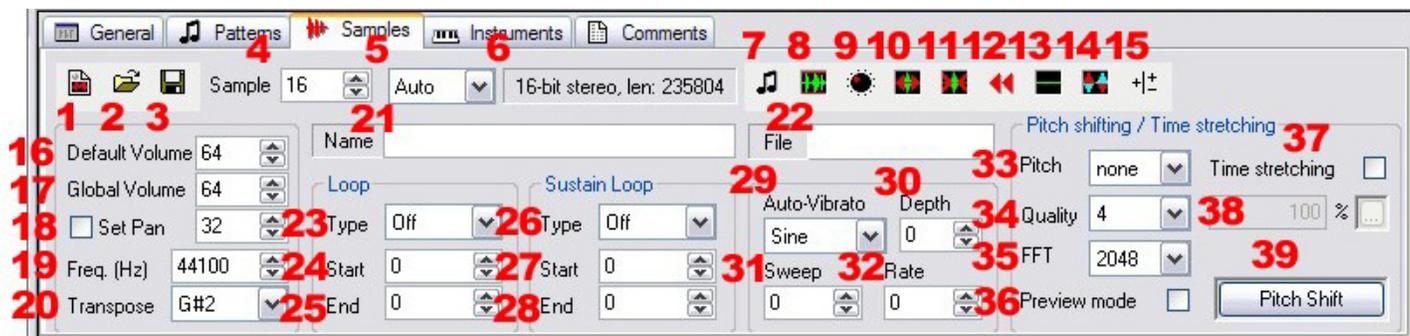
## Status Bar

The Status Bar in the Patterns page displays helpful info. However, the display size is static, so the rightmost data will not be visible using a window smaller than 864 pixels wide. From left to right, here is what is shown:

1. Help tips: meanings of certain menu items when you highlight one in a menu
2. Channel settings: the current settings of the channel where the cursor is located. The parameters are:
  - Chan:** the cursor's channel (which the following values apply to)
  - Vol:** the last given channel volume
  - Mac:** the current SFx assignment, from 0 to F (which Zxx commands will be applied to)
  - Cut:** the current cutoff setting (activated by SF0/Zxx commands)
  - Res:** the current resonance setting (activated by SF0/Zxx commands)
  - Pan:** the channel's pan position in the stereo spectrum
3. Cursor settings: when only one field is selected, this is the interpretation of the field's value, based on which field the cursor is highlighting:
  - Instrument:** shows the sample/instrument assigned and its label
  - Note FX:** shows the prefix and the command description
  - Channel FX:** shows the command description
4. Cursor location: The Row and Channel where the cursor is located; input will occur here.
5. Position timer: displays the current track time at the Active Row. Because it accounts for all Tempo changes and pattern Loops and Delays, this is the accurate time for the current pattern. When inputting notes, however, the only way to stop the counter is to click on a Stop or Pause icon (or use its keyboard shortcut).
6. Playback data: only visible during playback, this shows the pattern ID being played, as well as the number of patterns being processed.

## Samples

Each sample for the track can be loaded in this page, and its settings can be edited (altho there are few means of editing the actual sample data). The top part of the page allows for editing the sample settings, and the window at the bottom part of the page is the Sample Display.



1. **New Sample Slot:** Creates a new slot (at the end of the current list) with no assigned sample.
2. **Open Sample:** Opens the Load File dialog, so you can find a sample file to load into the current slot, replacing the current sample if present. At the same time the file name is put into the Sample Name field (21), without the extension, and the File Name field (22) with the extension, and the other sample attributes are also updated.
3. **Save Sample:** Saves the current sample (with the attributes you've assigned it) into a location of your choice. You can save samples into the following formats:
4. **Sample Slot:** Shows the current sample number within the Sample List. Clicking on the field opens a popup menu that lists the samples that occupy each slot, where you can choose a new sample. Doing so will adjust this page to

reflect its attributes.

- 5. Zoom Level:** Shows the current magnification of the Sample Display. To change the Zoom Level, you can click in this field to choose a different Zoom Level, click on the Zoom icons in the Sample Display window, or use the equivalent keyboard shortcuts. "Auto" Zoom Level shows the entire waveform in the window.
- 6. Sample Info:** Displays the Bit Depth and number of channels of the sample, as well as the length in bytes.
- 7. Preview Sample:** Plays the current sample (with the attributes applied) at C-5. Click on it again to stop playback. Keep in mind, this only plays the sample — if it is assigned to an instrument, the instrument attributes (such as envelopes, filter settings, etc.) are not applied. You can preview the sample with other notes if you have the keyboard shortcuts assigned to play those notes (make sure no text field has input focus).
- 8. Normalize:** Amplifies the selection just enough so that the highest volume peak in the waveform is at the maximum. The effect is that quieter samples are made louder, but loud samples are not. See the section on [Normalizing Audio](#) for more info. Shift-click this icon to normalize all samples in the track.
- 9. Amplify:** Opens the Amplify dialog, which allows you to not only decrease/increase the amplitude of the selection by percentage, but also apply a fade-in or fade-out to the selection (starting/ending at volume 0). If you use a negative value, the amplitude is applied and the signal is inverted.
- 10. Upsample:** Doubles the playback frequency (**19**). Changes an 8-bit sample to a 16-bit sample.
- 11. Downsample:** Halves the playback frequency (**19**). Does NOT convert a 16-bit sample to an 8-bit sample.
- 12. Reverse:** Reverses the selection's sequence of values of sample data points, in effect reversing the waveform.
- 13. Silence:** Sets the selected values of the sample data points to 0, effectively rendering the selection as silence. BUG: There is currently a bug in which the values in the selection are interpolated between the beginning data point and the final end point, instead of setting them all to 0.
- 14. Invert Phase:** Multiplies the value of each sample point by -1, inverting their waveform value. See the Audio Reference on [Waveforms](#) for more info.
- 15. Convert Sample Sign:** Subtracts 128 from each sample point, which shifts the waveform to the opposite phase, but without inverting it. See the Audio Reference on [Waveforms](#) for more info.
- 16. Default Volume:** Shows the default note volume (from 0 – 64) that will be played when no volume is assigned to this sample's note. See the section on [Volume](#) for more info on how MPT handles volume at different levels.
- 17. Global Volume:** Shows the total volume (in 64ths) that this sample will play in all circumstances. This means if you set it to 32 (50%), the sample can never be played at a volume higher than 50% of the real volume. See the section on [Volume](#) for more info on how MPT handles volume at different levels. Note that there are no FX commands to change a SAMPLE'S volume; instead the note or channel volume can be altered.
- 18. Pan Settings:** Checking this box allows you set the Pan value between 0 (left) and 64 (right). This setting shifts the entire stereo position this far, even for 2-channel (stereo) samples with a wide stereo modulation. See the section on [Stereo Pan](#) for more details. NOTE: This setting is unavailable in XM tracks.
- 19. Frequency:** Shows the playback frequency in hertz of the current sample when played at C-5. Note that this may not be the same as the actual pitch of the sample, but is instead a value given in the sample data that tells MPT which frequency to process it as. For example, if the sample rate (part of the sample data) is 22050 kHz, but the playback frequency (in this field) is 11025 kHz, and the sample is the audio waveform of a piano note at D-5, playing the sample at C-5 will process it at half of its frequency, which reduces the pitch by an octave, making it sound like it's a piano note at D-4. The actual playback frequency is calculated differently based on the played note for the sample.
- 20. Transpose:** The same as the Frequency field (**19**), except the frequency is adjusted by pitch value. Clicking in this field opens a popup menu where you can choose the playback note (this will adjust the Frequency field). NOTE: This function is disabled for MOD tracks.

- 21. Sample Name:** An optional text field where you can assign a label to this sample. When importing or dragging a file in, the name of the sample is put into this field (without its extension).
- 22. Source File:** An optional text field where you store the original file name. This is automatically filled in when importing or dragging a file in, using the DOS version of the file name with its extension. This is helpful for when you make changes to the sample file (which can't be un-done), and you need to be reminded what the original sample was, so you can load it back into this slot in its original state.

## Loop Setup

There are 2 types of repeating loops that can be set up for samples: Sample Loops and Sustain Loops. See [this section](#) for more details on using Loops. Note that Sustain Loops have no application in MOD and S3M tracks.

- 23. Sample Loop Type:** Sets the repeat mode for looping the sample. The default is , which restarts the cycle at the Loop Start when sample playback reaches the Loop End. You can also choose "Bidi" (short for bi-directional) which will play the sample forwards until it reaches the End point, then play the waveform *backwards* to the Start point, and continue in that way, back and forth between the Start and End points. If the Loop is set to none, the Start and End points will be retained but the loop will not be active.
- 24. Sample Loop Start:** Sets the first sample point that starts the Sample Loop.
- 25. Sample Loop End:** Sets the last sample point that ends the Sample Loop.
- 26. Sustain Loop Type:** Sets the repeat mode for looping during the Sustain phase of the envelope. The default is , which restarts the cycle at the Loop Start when sample playback reaches the Loop End. You can also choose "Bidi" (short for bi-directional) which will play the sample forwards until it reaches the End point, then play the waveform *backwards* to the Start point, and continue in that way, back and forth between the Start and End points. If the Loop is set to none, the Start and End points will be retained but the loop will not be active. See [here](#) for more info on using Sustain Loops.
- 27. Sustain Loop Start:** Sets the first sample point that starts the Sustain Loop.
- 28. Sustain Loop End:** Sets the last sample point that ends the Sustain Loop.

## Auto Vibrato

Modplug's sample player has an internal oscillator which can be applied to volume, creating an automatic vibrato effect. Each sample can have its own Auto Vibrato settings. While you can make various settings here to use it, Auto Vibrato cannot be changed or affected by FX commands. If you want to use a sample with this vibrato and one without, the only workaround is to have two different sample slots, each with different auto-vibrato settings.

- 29. Vibrato Waveform:** Shows the waveform for this sample's Auto Vibrato. Clicking in the field will open a popup where you can choose a different waveform.
- 30. Vibrato Depth:** Shows the auto-vibrato depth for this sample. The range can be from 0 (no effect) to 32 (one semitone).
- 31. Vibrato Sweep:** Shows the "sweep" of the auto-vibrato oscillation, which is sort of a fade-in between a depth of 0 to the auto-vibrato depth. The range is from 0 (no delay) to 255 (the longest fade-in). Currently not functional.
- 32. Vibrato Rate:** (to be written later)

## Pitch/Time Functions

You can use these functions to alter the pitch (while keeping the same sample length) or alter the sample length (but keep the same pitch). If you don't like how the function altered the sample, use the Undo to revert to the previous version.

- 33. Pitch Transposition:** Clicking on this field opens a popup menu where you can choose the transposition amount in semitones.

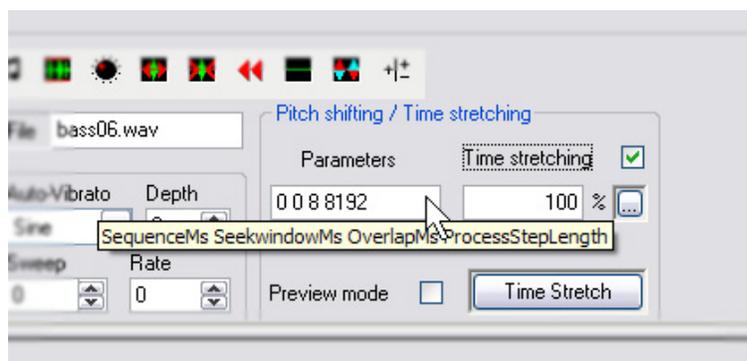
**34. Shift Quality:** Shows the resampling detail that will be applied to the pitch-shifting function, from 4 to 128. Clicking in this field opens a popup menu where you can choose the resampling quality.

**35. FFT:** (to be written later)

**37. Time Stretch:** Clicking on this checkbox toggles the Pitch-Shift and Time Stretch functions, which will display different interface elements. When Time Stretch is enabled, the function's display will change to that shown in the graphic on the right. There are two fields associated with this function:

Parameters: Time Stretch needs 4 parameters to calculate and interpolate the sample point values. Hold the mouse cursor over the field to see a description of the parameters, as shown on the right.

You can further customize the Time Stretch function by clicking on the Browse button on the far right, which opens the [Time Stretch dialog](#).



**38. Stretch Amount:** Enabled only when Time Stretch is toggled, showing the percent of change in the length of the sample when executing the function. You can enter a percentage value here to modify the sample length by a given amount using the given Parameters.

**39. Execute Function:** Shows the function that will be carried out when clicking on this button. After doing so, the appearance of the button will change, first showing a progress bar as the sample is recalculated, then, if Preview Mode is on, it changes into two buttons — “Keep” or “Restore” — which will allow you to play the sample before committing the function's modification. NOTE: 8-bit samples will be automatically converted to 16-bit when using Pitch Shift or Time Stretch.

## Sample Display

In this window you can see the sample waveform at the magnification indicated in the Zoom Level field (5). If necessary, the channels are divided between upper and lower halves of the display; so if the sample is a 2-channel stereo file, the left channel will be at the top half, and the right channel at the bottom. MPT cannot alter these settings, so changes to the channels must be done by a third-party audio waveform editor.

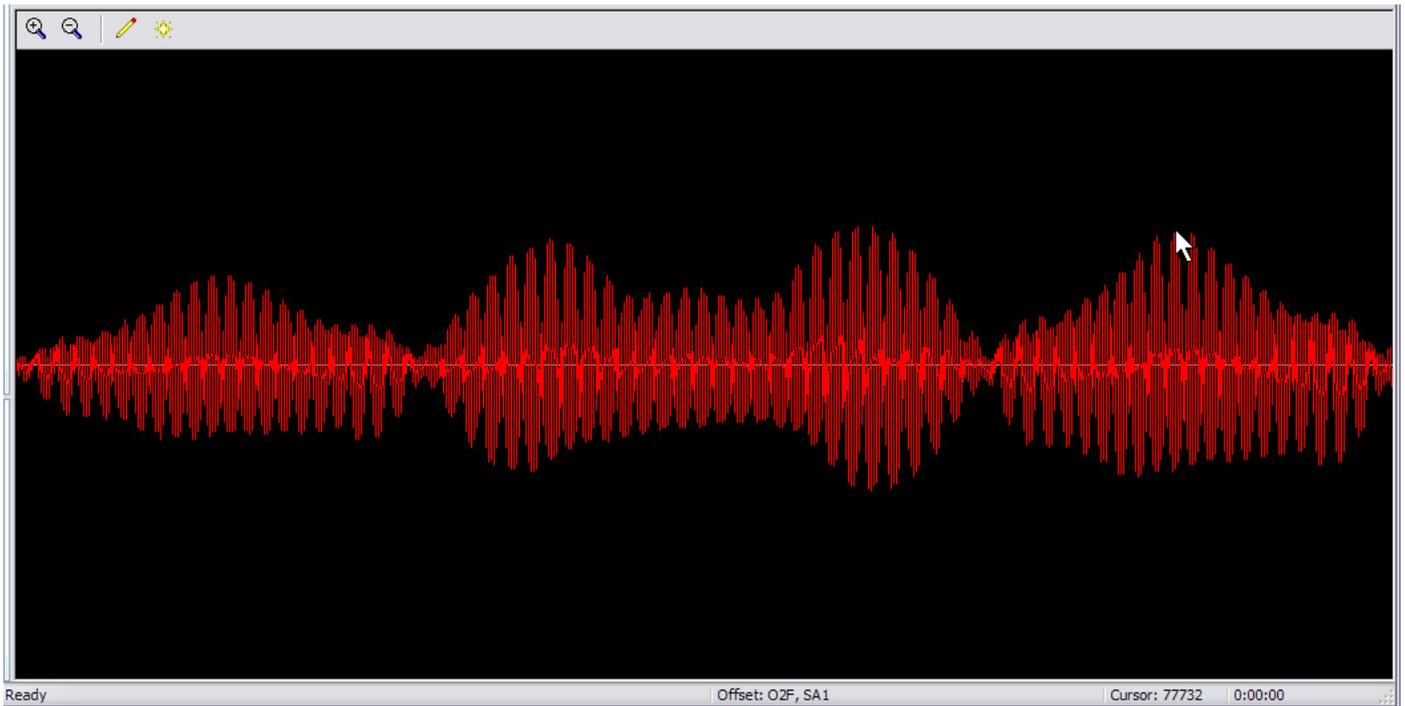
You can, however, change the color of the sample data in the [Colors](#) page of the Setup Options dialog.

To zoom in (+) or out (-) in magnification, click on the appropriate icon in the upper-left corner of the window. This also changes the setting in the Zoom Level field.

Click on the Pencil icon to draw sample values into the waveform (only works for mono samples of any bit rate).

You can also append silence of a given length (in sample points) before or after the waveform, or resize the waveform altogether, by clicking on the Magic icon. Resizing will cut off the end of the sample (if less than the total sample size), or add silence at the end (if more).

You can right-click within the window to display a contextual menu, the details of which are [here](#).



## Status Bar

At the bottom of the window is the Status Bar; in the Samples page this will show 4 bits of information from left to right:

1. Help tips: meanings of certain menu items when you highlight one in a menu
2. Sample offset: based on the location of the cursor within the display, the values to use (in hex) for the Offset and High Offset commands (Oxx and SAx)
3. Sample point: based on the location of the cursor within the display, the actual sample point; the cursor detail depends on the Zoom Level
4. Playback time: if you preview-play the sample, this time will display the amount of time passed; to stop this counter, press a Stop Playback button (clicking on the Preview button a second time will stop playback but not this counter).

## Instruments

1. **New Instrument Slot:** Creates a new empty instrument slot at the end of the list, using the default attributes. Shift-click to duplicate the current instrument, which will create a slot with the exact same attributes as the current instrument.

- 2. Open Instrument:** Opens the Open File dialog so you can load an instrument file. (If there are samples that have not been assigned to instruments you will be prompted on whether or not you wish to assign them, but there is no option to assign individual ones.)
- 3. Save Instrument:** Opens the Save File dialog so you can save the current instrument (as an .iti file) in the location of your choosing, with the file name of your choosing.
- 4. Preview Instrument:** Plays the instrument (the sample with the instrument settings applied) at C5; clicking again passes a Note Off to the channel. If a preview is still playing when you go to another page, the preview is stopped.

**TIP:** You can stack instrument previews (preview one instrument, switch to another, then preview THAT instrument), which is very helpful in comparing pitches.

- 5. Current Instrument Slot:** Shows the ID of the current instrument slot.
- 6. Instrument Name:** An editable textbox which shows the name of the current instrument slot. This field is automatically entered when dragging an instrument into the Envelope Window, but you can change it to whatever you wish. This label is what's shown in the Instrument Lists in the Pattern Editor, as well as the Instrument Name in the Instrument side of the Comments page.
- 7. Source File:** An editable textbox which shows the name of the current instrument slot. This field is automatically entered when dragging an instrument into the Envelope Window, but you can change it to whatever you wish.
- 8. Instrument Volume:** Shows the instrument's global volume. This value, in 64ths, is multiplied against the Sample's Global volume to get the total Instrument volume. See the [Volume](#) section of the Audio Reference for more details on the factors that determine playback volume.
- 9. Fade Amount:** Shows the Fade value of the current instrument, which is applied only when a Note Fade is called from a channel in the Pattern Editor, or an NNA uses it as the action to execute when checking for a New Note event or Duplicate Note event. This value is the divisor in the equation, which means the higher the value, the QUICKER the fade. The maximum Fade amount is 8192 (virtually immediate).

**TIP:** Under certain circumstances, you can also use Fade the same way Ramping is used, but to eliminate clicks at the end of a sample. Just make sure that there is no Sample Loop applied, and that you apply Note Fades to stop the notes (if you're using NNAs, also set those to Note Fade). Alternatively you could use Release Notes.

- 10. Instrument Pan\*:** Enables and shows the pan of all samples called by the instrument, EXCEPT where a sample's Pan setting is active; that is, a Sample's Pan setting OVERRIDES that of the instrument using it. Checking this box activates the Pan, and the Pan value can be entered into the accompanying field, ranging from 0 (left) to 255 (right).
- 11. Pitch-Pan Separation:** Shows and sets the amount of stereo spread (or "swing") of the instrument's Pitch-Pan, which sets the pan position according to the note value. This value can range from -32 to +32, with more extreme numbers indicating a wider stereo spectrum (negative numbers reverse the stereo field, so that basser notes originate on the right stereo channel). Using Note effect pxx or Channel FX Xxx or S8x overrides this setting temporarily.
- 12. Pitch-Pan Center Note:** Shows the note that centers the Pitch-Pan stereo spectrum. Clicking in this field opens a popup menu where you can choose the center note.
- 13. Ramp Amount:** Shows and sets the Ramp value, which is the amount of "fade-in" attack applied to the samples in an effort to dampen the clicks that come with poorly assembled sample waveforms, or from offset commands that "break into" a loud spot in the sample. An instrument's Ramp value OVERRIDES the global setting. See the [Volume](#) section of the Audio Reference for more details.
- 14. Resampling Algorithm:** Shows this instrument's resampling algorithm. Each instrument can use its own resampling method that overrides MPT's global setting. Clicking on this field shows a popup menu where you can select a new algorithm. See [here](#) for more details on Resampling.

## Filtering

For more details on applying filtering to instruments, see the [Filtering](#) section in the Audio Reference.

- 15. Resonance Frequency\*:** Selects the "notch" along the instrument's frequency spectrum (relative to the Cutoff) that will be amplified. The Cutoff frequency must be active (not "Off") to apply resonance.
- 16. Cutoff Frequency\*:** Selects the frequency where the cutoff algorithm will be applied. When using a Low Pass Filter, this value is the maximum frequency. When using a High Pass Filter, this value is the minimum. The normal range is from 130 kHz to 5.1 kHz, but you can double this range by selecting the Extended Filter Range option in the [Song Properties](#).
- 17. Filtering Mode:** Selects the band pass that the cutoff will be applied. The default is a Low Pass filter, but you can select a High Pass filter, which will invert the cutoff range. If you select "Channel default," the filter mode of the last instrument that was played in the channel will be used.

## Random Variation

The next four sliders apply a random variation during playback. See [this section](#) for more info. You can click-and-drag the sliders, but for fine-tuning, click-and-hold the slider and press the left or right arrow keys.

- 18. Volume Variation:** Applies a random amount of variation to the instrument's default volume.
- 19. Pan Variation:** Applies a random amount of variation to the instrument's default pan position, if enabled.
- 20. Cutoff Variation:** Applies a random amount of variation to the instrument's cutoff frequency, if enabled.
- 21. Resonance Variation:** Applies a random amount of variation to the instrument's resonance, if both the Cutoff and Resonance is enabled.

## New Note Actions

New Note Actions (NNAs) occur when a new note in the same channel is encountered. During playback MPT checks if the next note in a channel (with a note that is still active) has a non-default NNA action assigned to it (the default is Note Cut, which means the instrument will simply cease to be processed audially). If so, a temporary "virtual" channel is set up to allow the previous note to be diminished, while the new note begins to be processed -- played -- as normal. (For this reason, the maximum number of audio channels that MPT allows is 128 out of the available 256.)

A subfunction of New Note Actions are Duplicate Note Actions (DNAs), which checks if the new note is of a particular type -- a new note with the same note, sample, instrument, or plugin. You can specify a separate action based on a DNA check.

See the section on [NNAs](#) for more details on applying these settings.

- 22. New Note Action\*:** Shows the instrument's NNA action when a new note is encountered in the same channel. Clicking on this field opens a popup menu where you can choose the action to undertake.
- 23. Duplicate Check Mode:** Shows the NNA check mechanism -- the default is to check for the same instrument. Clicking on the fields opens a popup menu where you can choose to check for a new note with the same instrument, sample, note, or plugin.
- 24. Duplicate Check Action:** Shows the instrument's action when a duplicate note is encountered in the same channel. Clicking on this field opens a popup menu where you can choose the action to undertake.

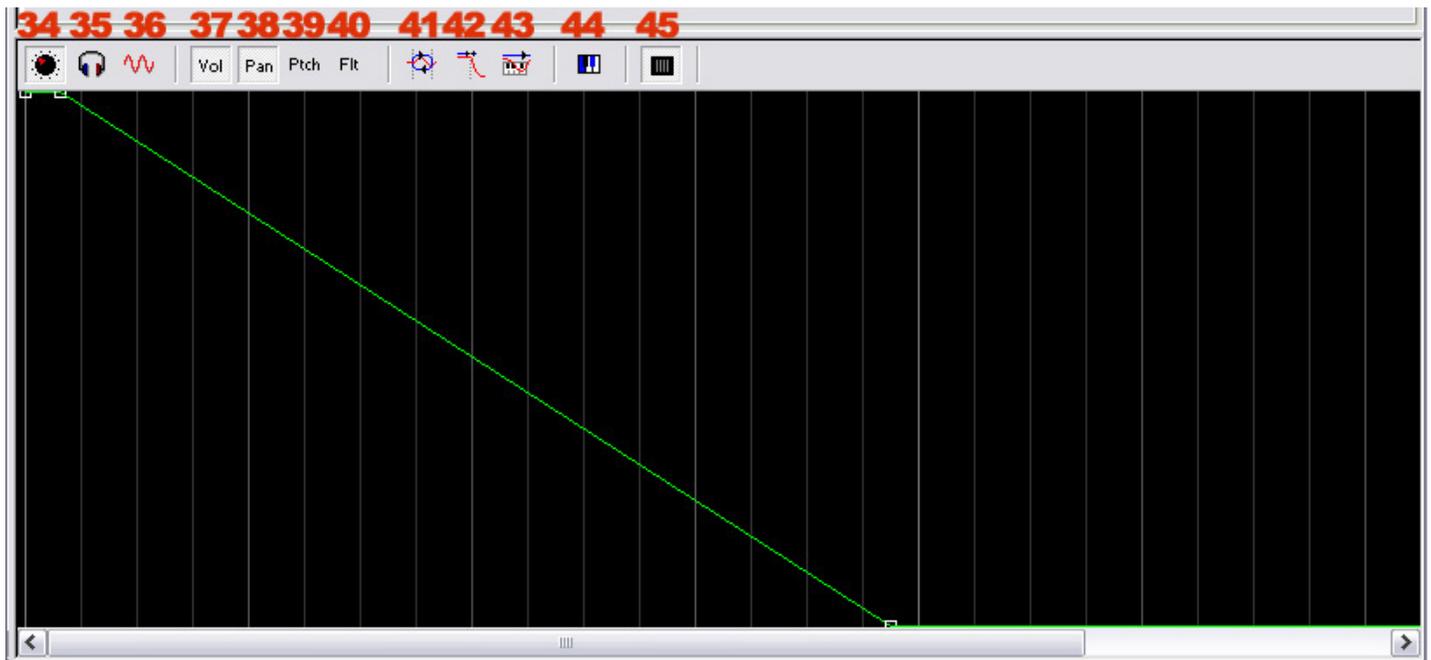
## Plugin/MIDI Settings

Here you can assign a plugin to the instrument, along with a sample assignment if you wish. Instrument plugins (which fall under the term VSTi's) are handled differently than VST FX to some degree, but they are handled the same in how they're controlled. When an instrument with a sample AND plugin FX is played, the sample is chained to the VST FX and then the FX audio is passed to the Master audio output. However, if a VSTi plays with a sample, their audio channels are combined and sent to the Master Audio. (If either of these scenarios uses a chained VST, the VST signal is passed to the next VST.)

**TIP:** You can assign a plugin to the instrument, and this can be on conjunction with one or more samples; that is, you can have one plugin and an array of samples assigned to one instrument, PLUS you can chain the plugins in the General page!

- 25. Plugin Assignment:** Shows the current plugin assignment. Clicking on this field will show a popup menu which lists the plugin slots, where you can choose a loaded plugin or an empty slot (in which you can load a plugin in the General page).
- 26. MIDI Channel:** Shows the current MIDI channel the VST will transmit. If the VST does not use more than one channel, this setting is ignored.
- 27. MIDI Program:** Shows the current program that will be called when playing this instrument.
- 28. MIDI Bank:** Shows the current bank that will be called when playing this instrument. Note that there is no way to load VST banks with MPT, but there is a workaround [here](#).
- 31. MIDI Velocity Mode:** Shows how a volume command (Note FX, third column) will be handled when processing vxx calls with an instrument-assigned note, such as C-5 01 v48 . . . . If you select "Use Note Volume" (the default setting), MPT passes the vxx value as a Key Velocity message to plugins and external MIDI devices. If you select "Process as Volume", MPT instead passes channel volume messages (CC 07) to the MIDI Channel, and key velocity will be an unchanging default value (the default value is defined by the VSTi or MIDI device).
- 32. Plugin Volume Mode:** Shows how a volume command (Note FX, third column) will be handled when processing vxx calls when no instrument is called, such as C-5 . . v48 . . . . If you select "Use Note Volume", MPT passes the vxx value as a Key Velocity message to plugins and external MIDI devices. If you select "Process as Volume", MPT instead passes channel volume messages (CC 07) to the MIDI Channel.
- 29. Tuning Options:** (This option is only enabled for MPTM-format tracks.) Shows the current instrument's tuning — by default this is 12-TET (12-tone Equal Temperament). Clicking on this field allows you to select another loaded tuning or to open the [Tuning Properties](#) dialog (when selecting "Control Tunings"). Read [here](#) for loading and using tunings.
- 30. Pitch-Tempo Lock:** (to be written later)
- 33. Sample Map:** Shows the sample assignments by note for this instrument. You can assign multiple samples by right-clicking and choosing "Edit Sample Map" from the contextual menu. See [here](#) for more details.

## Envelope Window



The Envelope Window shows the current instrument's envelope shape, but it can only show one envelope at a time, and is not superimposed on the sample waveform. For more info on how Envelopes and Loops work, see [here](#).

- 34. Display Volume Envelope:** Toggles the display for the 1st envelope, used for volume.
- 35. Display Pan Envelope:** Toggles the display for the 2nd envelope, used for panning.
- 36. Display Pitch/Filter Envelope:** Toggles the display for the 3rd envelope, which can be used for either pitch or filter attenuation, or both.
- 37. Apply Volume Envelope\*:** When enabled, applies the volume envelope to instrument playback.
- 38. Apply Pan Envelope\*:** When enabled, applies the pan envelope to instrument playback.
- 39. Apply Pitch Envelope\*:** When enabled, applies the 3rd envelope to the instrument's pitch.
- 40. Apply Filter Envelope\*:** When enabled, applies the 3rd envelope to the instrument's filter.
- 41. Apply Envelope Loop:** When enabled, applies the Envelope Loop. The Loop brackets will appear (solid vertical lines) and you can change the Envelope Loop endpoints by clicking-and-dragging them.
- 42. Apply Envelope Sustain:** When enabled, applies the Envelope Sustain. The Sustain brackets will appear (dashed vertical lines) and you can change the Envelope Sustain endpoints by clicking-and-dragging them.
- 43. Apply Envelope Carry:** (to be written later)
- 44. Open Sample Map:** Opens the [Sample Map dialog](#) so you can edit what note the sample can be applied to, which is very helpful for multi-sample instruments.
- 45. Display Grid:** Toggles the grid display. When enabled, each vertical line marks the beginning of a row. NOTE: Windows 98 does not properly draw the gridded display, so it will need to be toggled OFF to view the envelopes.

## Status Bar

(to be written later)

## Comments

OpenMPT 1.17.02.53 - [Once My Friend.it]

File Player Edit View Window Help

General Patterns Samples Instruments Comments

Song Message:

Background music for Unreal Tournament (Classic) that took on a life of its own. This song is now complete, and the only thing i still don't feel is PERFECT is the spoken line, but i already spent alot of time trying to make every syllable audible. It goes, "Yes, i knew you, but brotherhood is a function of Mortality, and that was..." and of course the title finishes the line (however, the title was born long before the line). So i took out part of the drum line to make the words clearer.

This song is intellectual property of Harbinger (and the vband Aeon), aka Nathaniel Kelley, copyright 2006. This song may be used only for private and personal use and may NOT accompany any commercial and /or pornographic recording, without WRITTEN AND DUPLICATE permission by the author of this music. Possession of this music is an agreement to these conditions.

Sample Name	Num	Size	Type	C-5 Freq	Instr	File Name
Synth Bass 1	01	7 KB	16 Bit	44492 Hz	1	SYBS148A
Bass01	02	3 KB	8 Bit	8363 Hz	2	
Snare100	03	13 KB	16 Bit	18774 Hz	3	Snare100.wav
bass47	04	2 KB	8 Bit	44100 Hz	4	bass47.wav
Fretless Bs.	05	10 KB	16 Bit	44212 Hz	4	FRTLS48A
Fretless Bs.	06	5 KB	16 Bit	21977 Hz	4	FRTLS60A
Fretless Bs.	07	9 KB	16 Bit	5519 Hz	4	JAZGT84A
Fretless Bs.	08				4	JAZGT93A
Fretless Bs.	09				4	JAZGTA1A
Strings	10	19 KB	16 Bit	26111 Hz	5	STRNG52B
Strings	11	22 KB	16 Bit	11631 Hz	5	STRNG71B
Strings	12				5	STRNG88B
Choir Aahs 2	13	24 KB	16 Bit	13732 Hz	6	CHOIR65A
	14	231 KB	16 Bit	22050 Hz	11	
	15	60 KB	16 Bit	22050 Hz	7	
rgan 3	16					EORG379
rgan 3	17					EORG391
@ Bass	18	188 KB	16 Bit	44653 Hz	8	gtrbassglass
	19	38 KB	16 Bit	8749 Hz	9	
explosion - hard	20	116 KB	16 Bit	16516 Hz	10	explosion -
robot (scream)2	21	770 KB	16 Bit	33032 Hz	12	robot (screa
mach39	22	169 KB	16 Bit	22050 Hz	13	mach39.wav
machine07	23	5 KB	8 Bit	22050 Hz	14	machine07
OMF line	24	285 KB	16 Bit	22050 Hz	15	OMF line.wav

Ready

The Comments page is available to all track formats except MODS. In the text box at the top, you can put in comments for the module. You can also change the font size in the General page of the Options dialog.

The bottom half of the page lists the samples or instruments (depending on the icon chosen) that are used in this track. You can edit the Name fields by clicking on the sample's/instrument's label, while double-clicking will open the sample/instrument to that slot on their respective pages.

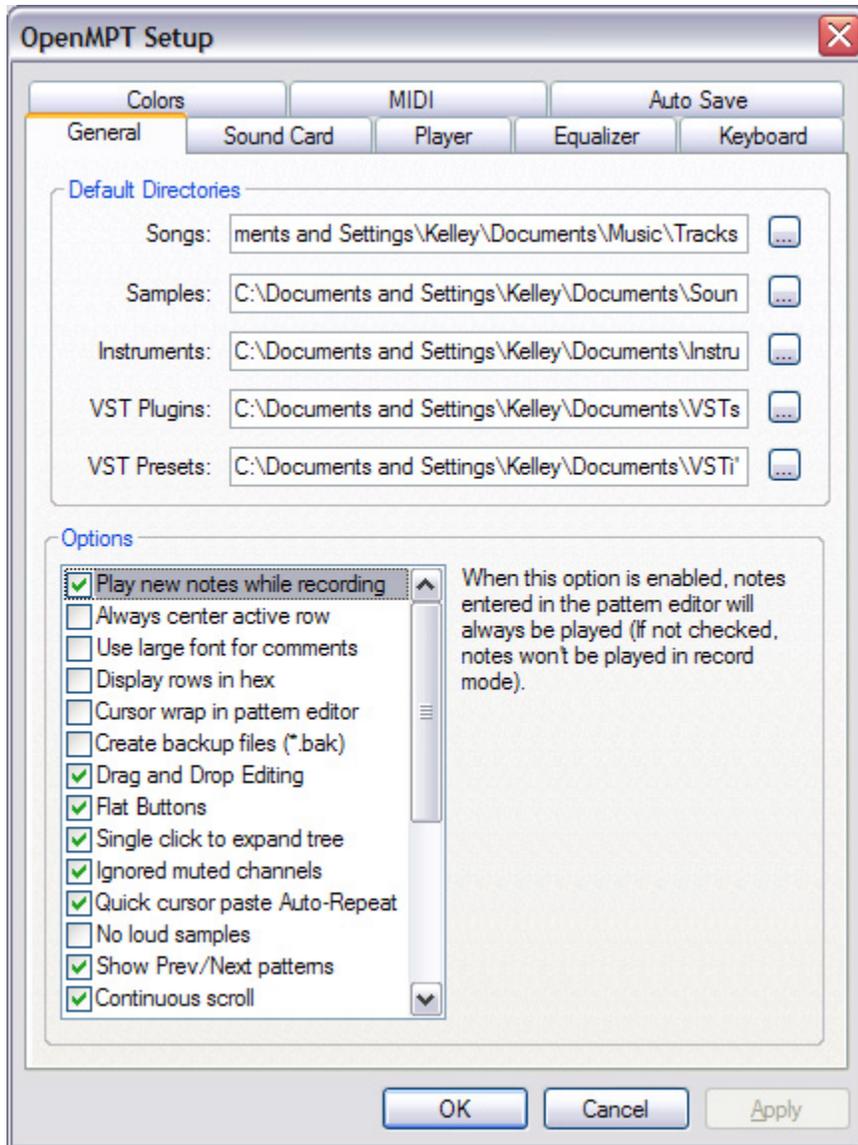
## 17. Reference: Dialogs

### MPT Setup Options

There are 8 pages of behavior and display preferences that can be accessed by clicking on the Setup Options icon on the Main Toolbar, or by selecting "Setup" from the View menu. (You can also set a keyboard shortcut in the Keyboard page of this dialog window.) To display any page, click on a tab of course. The next 8 sections describe the elements of each page in detail.

### General Options

The General Options page holds MPT's list of directories, as well as some general toggles for various displays or behaviors found throughout its operation.



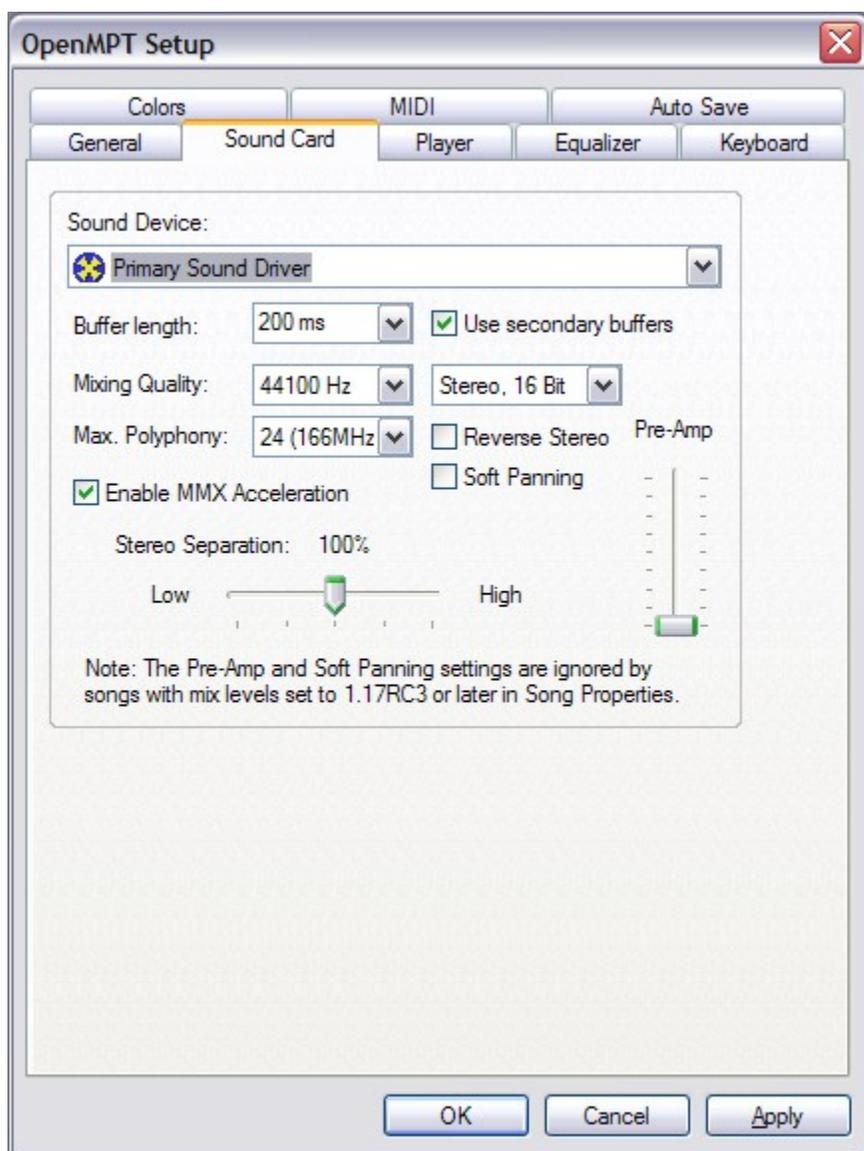
### Directories

ModPlug Tracker, when opening Open File or Save File dialogs, will default to the folders you enter into each of these fields (except for saving previously created files, which will default to their own directory). The folders are for tracks/modules/songs, samples, instruments, VST FX, and VSTi's. You can type the path manually, or you can click on the Browse button next to it to find the correct folder using Windows' standard browse technique. These folders can be anywhere, but if you set the path to a Briefcase, and it's open or in use by another program, MPT will not be able to save to that Briefcase.

### Miscellaneous Options

To enable any of these options, make sure the box is checked next to the text. To get info on what each toggle does, select the text itself, and Help tips will appear on the right side of the page.

## Soundcard Options



**Sound Device:** Shows the current audio driver that MPT is using. Clicking on this field will open a popup menu where you can choose a new driver (if you have more than Windows' default). You do not need to restart MPT when choosing a new driver.

**Buffer Length:** The amount of "latency" (in milliseconds) to apply to MPT's playback routine. Clicking on this field will open a popup menu where you can choose a different amount. If you're having trouble with stuttering playback, try increasing this amount. If you're using an ASIO driver, you can use very low latency settings for the same quality. Read [here](#) for more details on latency.

**Mixing Quality:** Shows the sample rate in the first field, and the bit rate in the second field. Clicking on either of these opens a popup menu where you can choose another setting amount. Read the section on [Sample Attributes](#) in the Audio Reference for more details.

**Maximum Polyphony:** The maximum number of audio channels that MPT will open for output. This applies to all computer-generated audio, including samples, VSTs, and MIDI instruments whose audio is routed back to the computer. If the audio of a MIDI device stays outside of the computer you're working on, it of course is not factored into the audio channel array. Reduce ModPlug's Polyphony if you're having trouble with playback skipping.

**MMX Acceleration:** Checking this box uses this obsolescent feature of Windows to

increase audio processing power. In most newer computers, this setting is irrelevant.

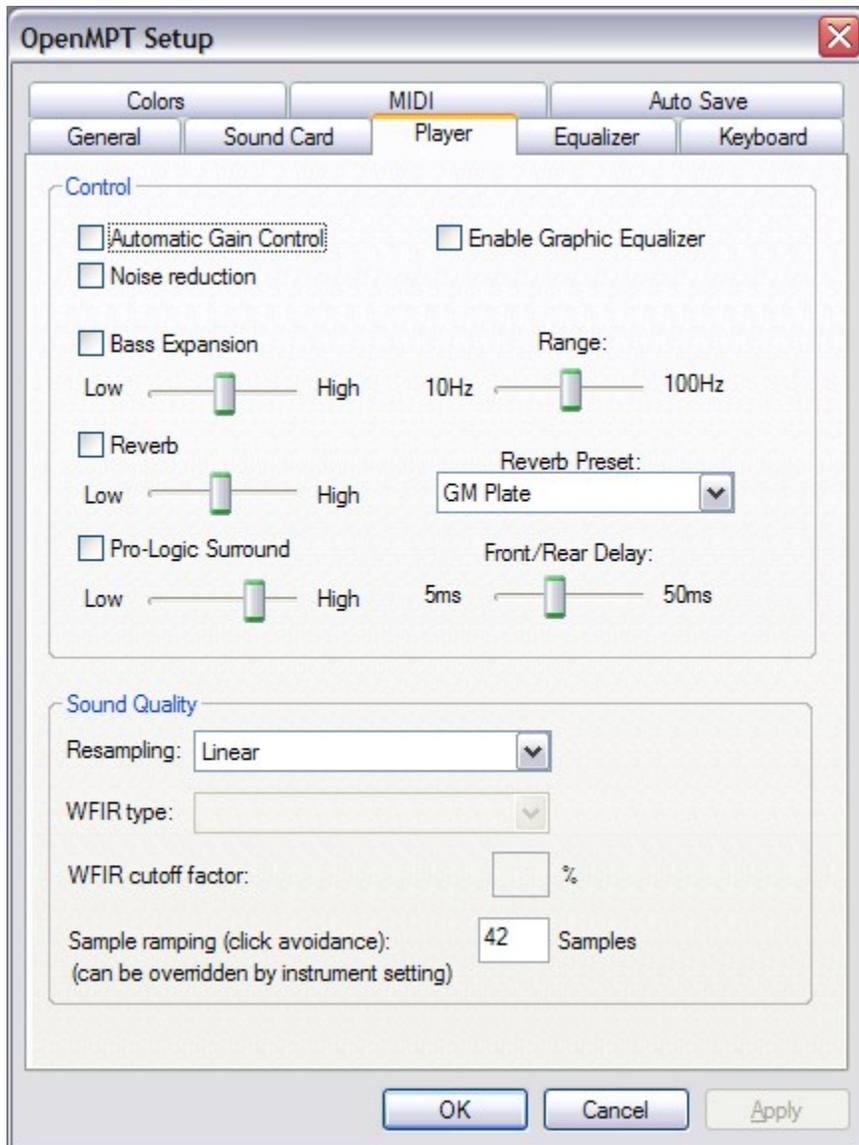
**Reverse Stereo:** Checking this box switches the left and right stereo channels of MPT's audio output.

**Soft Panning:** (to be written later)

**Pre-Amp Level:** An obsolete feature which boosts the sample volume. The newer version of this setting is the Sample Volume slider in the General page.

**Stereo Separation:** Allows for greater separation of the stereo channels; moving the slider modifies the amount of stereo separation. Most useful for close stereo speakers, but with headphones you would normally leave this at 100%.

## Player Options



**Automatic Gain Control:** Applies a compressor/limiter-type effect that monitors and keeps the volume within a more-or-less steady amplification. Softer sections will be made louder and loud sections will be softened in volume.

**Enable Graphic Equalizer:** Applies the Equalizer settings found in the next tab.

**Noise Reduction:** Uses a noise-reduction algorithm to eliminate as much background hiss as possible. Keep in mind this may reduce the volume or quality of high-frequency sounds, like cymbals and harmonic-rich timbres.

**Bass Expansion:** Applies a volume boost to the basser frequencies ON TOP of the equalizer settings plus spreads its frequencies around the stereo spectrum. Move the first slider to attenuate the stereo spread, and the second slider to increase the frequency range to affect. Best used without the equalizer.

**Reverb:** Applies a Reverb to all sound output. Move the slider to increase the reverb's volume, and choose a Reverb type from the popup menu next to it.

**Pro-Logic Surround:** Applies Surround Sound to the sound output. This will reduce the track's stereo and pan settings, as the signal will get diluted between the channels, in exchange for a "wider" sound. Move the slider to attenuate the amount of the Surround effect. If using a Quad Surround driver, you can move the second slider to send a delayed stereo signal to the Front/Rear output.

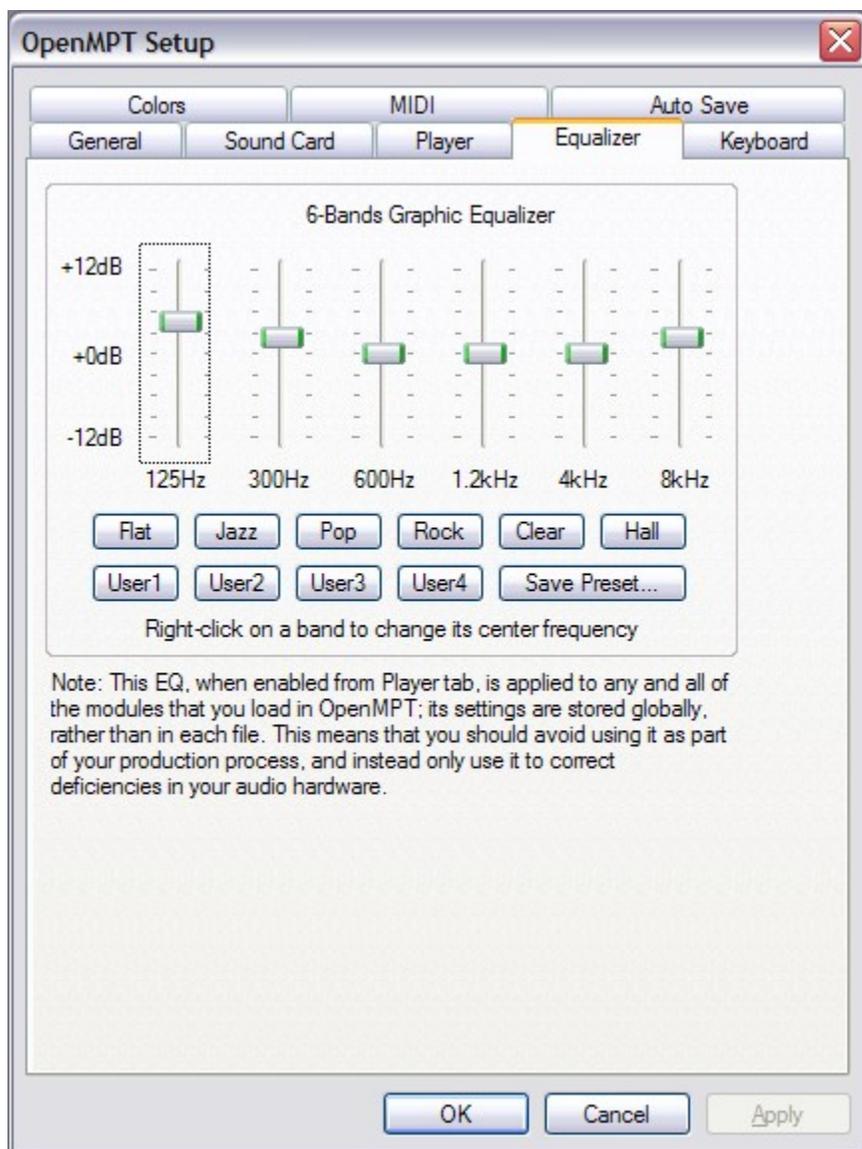
**Resampling Algorithm:** (to be written later)

**WFIR Type:** (to be written later)

**WFIR Cutoff Amount:** (to be written later)

**Ramp Amount:** Applies a GLOBAL ramping algorithm to ALL samples that are played in the track (except for those assigned to instruments, whose Ramp settings are active). The algorithm uses a "fade-in" attack to the samples in an effort to dampen the clicks that come with poorly assembled sample waveforms, or from offset commands that "break into" a loud spot in the sample. See the [Volume](#) section of the Audio Reference for more details.

## Equalizer Options



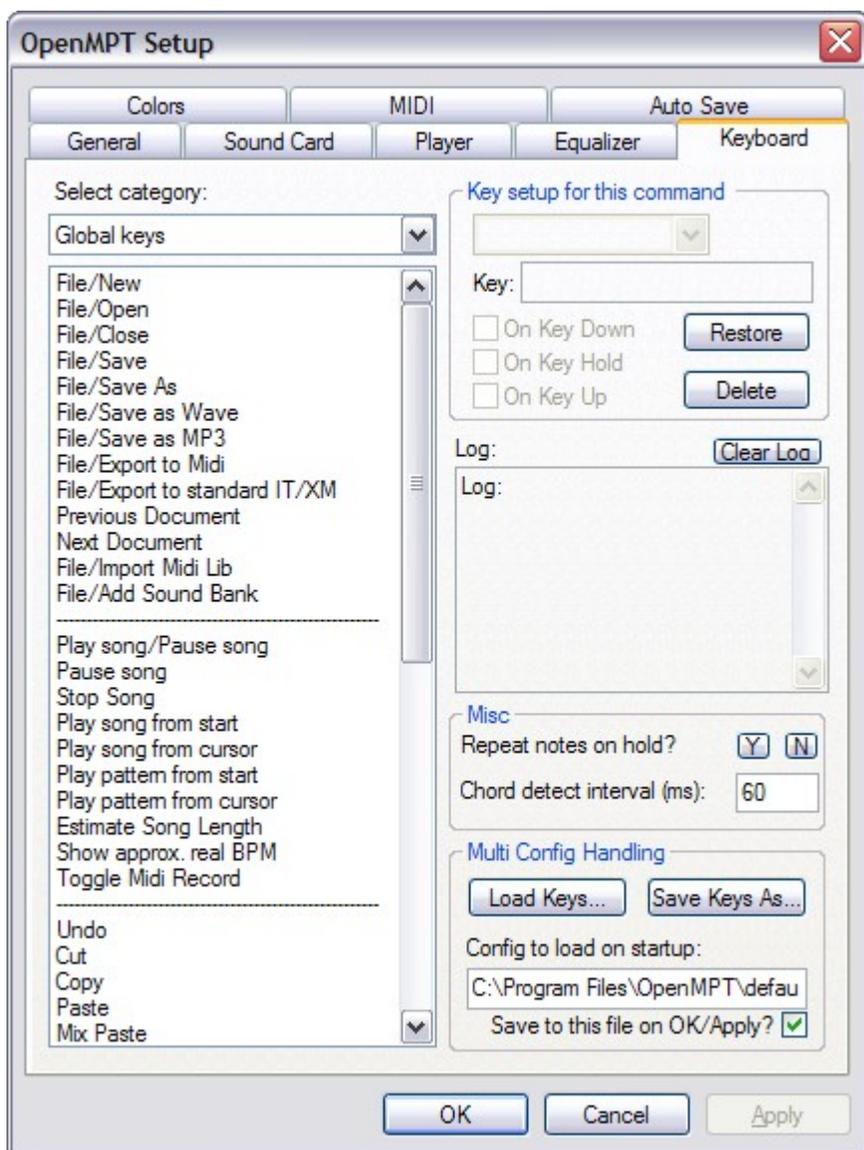
Playback audio is processed thru the Equalizer only if the "Enable Graphic Equalizer" checkbox is set (found in the Player Options page). The Equalizer settings are not saved with the song; they are a global setting applied to any output from or thru MPT.

**Equalizer Band Sliders:** Moving a slider higher to accentuate or bring out those frequencies, or lower to diminish the volume of those frequencies. Right-clicking on a slider and moving it left or right changes the frequency "notch". The Equalizer Bands are by default set at 0, which means no attenuation is applied to that band of frequencies.

**Presets:** Clicking one of the buttons below the sliders chooses a presets equalizer setting. You can also save your own preset by adjusting the equalizer to the desired settings, then clicking "Save Preset."

## Keyboard Options

In this page you can choose or edit keyboard shortcuts for many of the actions in ModPlug Tracker, which are always active unless the input focus is within a textbox. The following is a description of the various items on the page.



**Select Category:** Shows the current set of functions you can assign shortcuts to. Clicking this field opens a popup menu so you can choose which set of shortcuts you wish to edit or assign.

**Action List:** Clicking on one of the entries selects it for key assignment. See [Appendix D](#) for a description of the actions that can be assigned.

**Key setup ID:** Only enabled when there is an action highlighted, this field shows the choices of key assignments for this action. If there is no key assigned, it will display <new>; otherwise, the text will read "Choice x (of y)" where x is the number of the current shortcut and y is the total count of this action's possible key assignments. Clicking in this field will display other choices, where you can select the one to edit.

**Key:** Shows the key assignment for this key setup. Clicking in this field (after choosing an action in the Action List) will "listen" for the new key assignment or this choice. Any key presses will be entered into this field and assigned to the action as a keyboard shortcut, but in order to deactivate "listening" you must use the mouse and click outside of the field. The key setup ID is also changed to reflect the new assignment.

**On Key Down/Hold/Up:** When any of these are checked, the action will be activated at the corresponding event of the keypress, either when the key is pressed down, when it is held down, and/or when the keypress is released.

**Restore:** Clicking on this button resets the key assignments of this action to when the action was first selected. If there were conflicts generated, however (see Log below), the altered action is not restored.

**Delete:** Clicking on this button deletes this key assignment. If there were other keyboard shortcuts for this action, they remain; otherwise the key setup ID reverts to <new>.

**Log:** Shows conflicts between key assignments. Conflicts occur when one keypress or combination keypress is already assigned to an action within the same context. A conflict may also occur with the keyboard shortcuts of Windows. Sometimes a conflict can be tolerated, such as using the number keys to enter digits in any context. In most cases the OTHER action has its shortcut deleted as you assign the keypresses to this action. Other times there is simply a warning that keys may interfere and actually execute two actions. A problem may also occur when modifier keys (SHIFT, CTRL, or ALT, or the Application key) are expected but another key is assigned. In this case, MPT will not allow the non-modifier key to be assigned.

**Clear Log:** Clicking this button deletes all the text in the log window.

**Repeat notes on hold:** Checking this box allows for repetitious input when the key is held down (if the assignment's "On Key Hold" checkbox is enabled). Press Y to allow this feature, using the Key Repeat settings of your system (found

in the Keyboard Control Panel of Windows' Operating System). Press N to not use Key Repeat (any keyboard shortcut which uses "On Key Hold" will execute the action only once).

**Chord Detect Interval:** Shows the maximum number of milliseconds between note-assigned keypresses that MPT "listens" for, to consider those notes part of a chord.

**Load Keys:** Clicking on this button opens the Load File dialog so you can load another .mkb file of your choosing. This allows you or another user to use an alternate set of keyboard assignments.

**Save Keys As:** Clicking on this button opens the Save File dialog so you can save the current set of keyboard shortcuts within a folder and with a name of your choosing. This is helpful not only for multiple users of one computer, but also for testing different setups for ease of use.

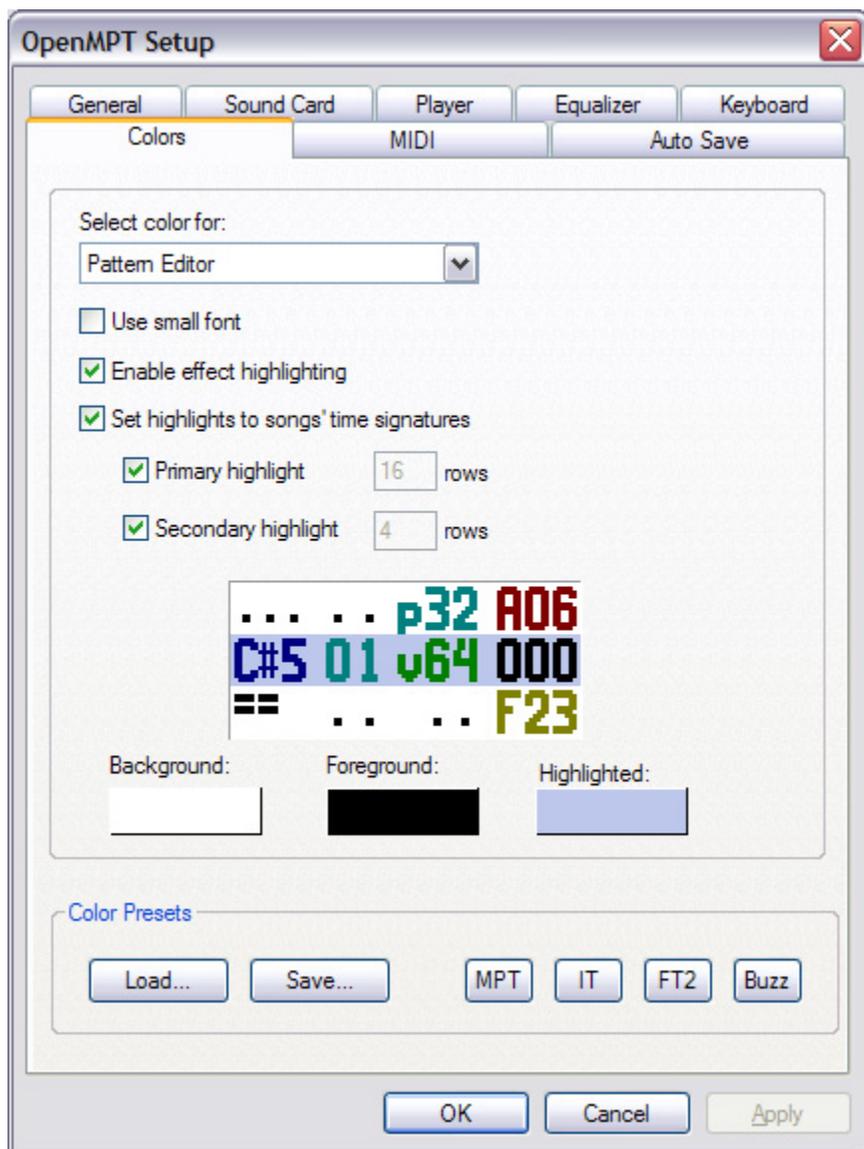
**Startup File:** Shows the editable path of the keyboard shortcut file (extension .mkb) which you want set as the default.

**Save on OK:** Checking this box will save any changes to the current slate of key assignments when you press OK or Apply, even if you move to other tabs in this window. Changes are not saved in any case when you press the Close Window box (the X at the upper right) or click on Cancel.

## Colors Options

Although MPT doesn't use skins or themes in its display scheme, you can set the colorization of some of the more important GUI elements from within the Colors page.

You can apply any of the four preset color schemes if you're used to using particular colors when tracking. Each of these are borrowed from other tracker applications so they may seem familiar. On the other hand you can devise your own color scheme, whether to help with the inspiration process or for better readability. There are four categories whose colors can be modified, which you can access by clicking on the Category Selection menu, shown below. The first 6 are for colors within the Pattern Editor.



- Pattern Editor
- Active Row
- Pattern Selection
- Play Cursor
- Note Highlight
- Effect Highlight
- Channel Separator
- Next/Prev Pattern
- Sample Editor
- Instrument Editor
- VU-Meters

As you select a different component to set colors for, various color boxes will appear below the Preview box at the bottom. Click on any of these to call up a standard Windows color selection dialog, where you can choose your color. As you change a color the Preview box allows you to see what it will look like in its context (except for the VU-Meters).

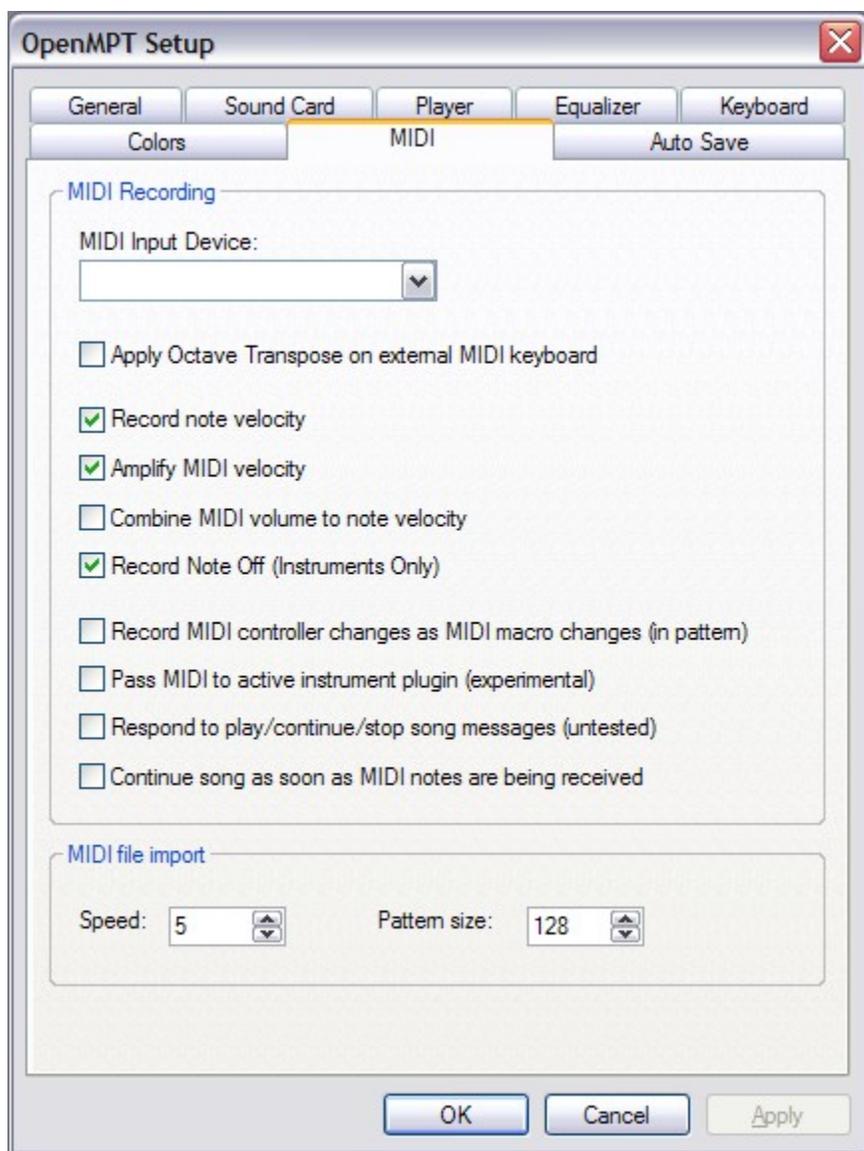
There are also some basic settings for the Pattern Editor display here.

**Use Small Font:** Checking this box uses a less readable font size in exchange for displaying more rows and channels in the Pattern Editor.

**Enable Effect Highlighting:** Checking this box enables color for the text in the Pattern Editor. If this is not checked, the text is black.

**Set Highlights to Time Signature:** Checking this box uses MPT's "time signature" to determine how the rows are highlighted. The time signature is set in the Song Properties dialog. If this box is not checked you can set a global highlighting for all songs. The Primary Highlight is the same color as the "Highlighted" box for the Pattern Editor component, and is equivalent to the Rows per Measure of MPT's time signature. The Secondary Highlight is a lighter version of the Primary Highlight, and equates to the Rows-per-Beat highlight of the time signature.

## MIDI Options



**MIDI Input Device:** Shows the current MIDI Device that will be received. Clicking on the field opens a popup menu where you can choose another device. If this field is empty, Windows is not recognizing any MIDI device — check the input or the driver.

**Apply Octave Transpose:** Checking this box converts the synth's octave to MPT's when inputting notes in the Pattern Editor and in playback. Middle C is C5 to MPT, but many synth keyboards apply middle C to C4.

**Record Note Velocity:** Checking this box records the note's key velocity into the pattern as a vxx Note Effect. This only applies to controllers that CAN pass key velocity messages through MIDI.

**Amplify MIDI velocity:** Applies a higher scaling to the key velocity values received by MIDI.

**Combine MIDI volume to Note Velocity:** Checking this box applies a vxx command when notes are entered from a MIDI device according to the MIDI instrument's volume setting, rather than each note's key velocity.

**Record Note Off:** Checking this box records Note Off commands (==) during realtime recording from the MIDI device.

**Record Controllers to Macros:** Checking this box forces MPT to save controller changes as Zxx Channel FX. Note that only macro values are entered; you will need to set up macro assignments in order for the proper controllers to be manipulated.

**Pass MIDI to Active Plugin:** Checking this box sends MIDI data that MPT receives from an external device to the active instrument plugin. Note that this is still in the testing phase.

**Respond to Song Messages:** Checking this box allows MPT to receive MIDI messages that cause sequenced songs to play, stop, or continue. Again this is still being tested against bugs.

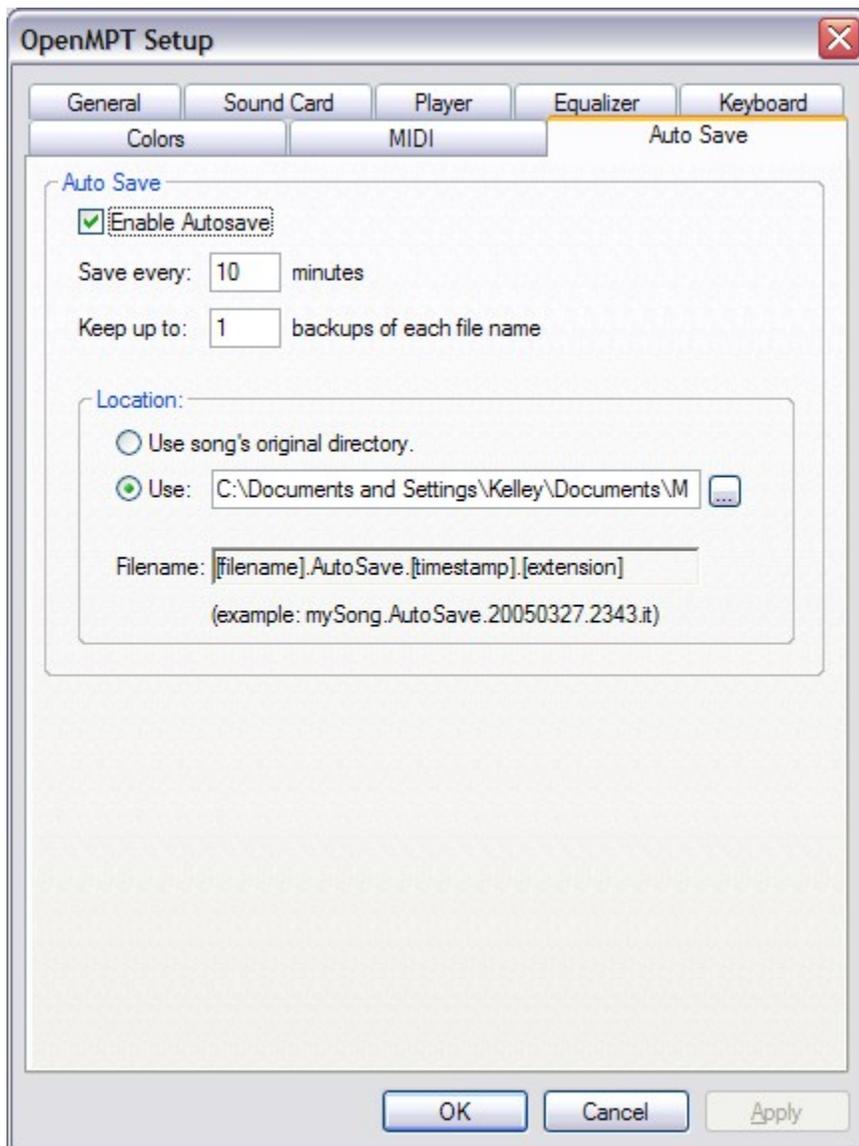
**Continue Song:** Checking this box allows for playback to resume (after being paused) when any key on the MIDI keyboard is pressed.

**MIDI Import Speed:** Shows the global MIDI import detail level. When importing MIDI files, this is the equivalent of the track's note detail (found in the "quantization" amount). MIDI tracks often define their song detail by the smallest note length required, such as eighth or thirty-second notes. Which setting should be used is still undetermined, but many users recommend an Import Speed of 2. Check [here](#) for more details on importing MIDI files.

**MIDI Import Pattern Length:** Shows the number of rows per pattern that MPT will force on the imported MIDI track.

## AutoSave Options

Autosaving is used for keeping backups for the current open track(s). A track is only saved automatically if changes were made since the last save or autosave.



**Enable AutoSave:** Checking this box enables the AutoSave features below.

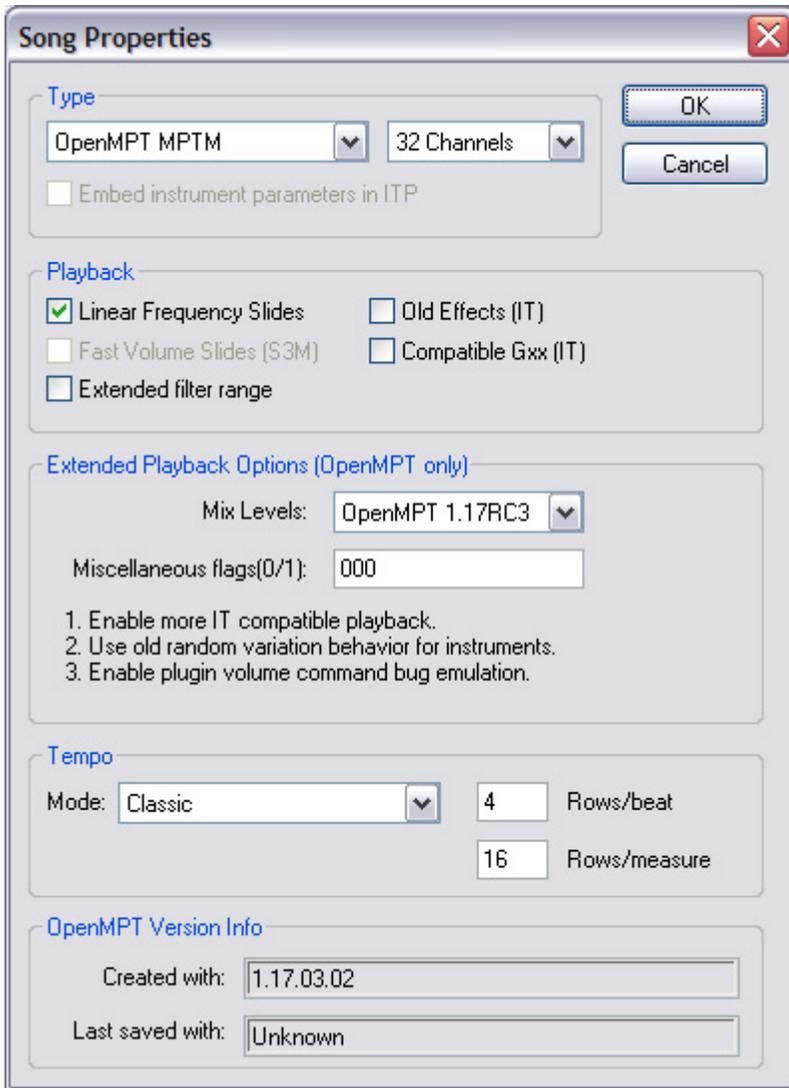
**Save Interval:** Shows the number of minutes between automatic saving.

**Backup Count:** Shows the number of saves that will be kept, in case you may want to use a version created before the last save.

**Backup Location:** Indicates where the autosave files will be stored. Clicking on the "original directory" button will store it in the same folder as the song. Clicking the other radio button allows you to choose another directory, either by entering the folder's path or clicking on the Browse button on the right to locate the folder.

**Filename Format:** This shows the way the AutoSave file will be named. It is not editable.

# Song Properties



**Track Type:** Shows the current track format. Clicking on this field will open a popup menu where you can choose to convert the track to another format. However, in doing so, you may lose features if you convert "down."

**Linear Frequency Slides:** (to be written later)

**Fast Volume Slides:** Applicable only for S3M tracks, checking this box will use the older version of volume-sliding, which earlier S3M tracks may have employed. ModPlug will check the version of the S3M module and will automatically enable this if necessary. Normally you would not need to change this setting unless you are updating an older S3m track.

**Extended Filter Range:** Normally the Cutoff frequency range is from 130 – 4978 Hz. Checking this box allows for the instrument filtering range to be doubled, to a range of 130 – 10307 Hz.

**IT Old Effects:** When enabled ModPlug exhibits some very subtle but important differences:

Tremolo: the depth of the oscillation volume is in 16ths of semitones rather than 32nds

Tremor (Ixy): 1 is added to the x and y values (for example, I35 is interpreted as I46)

**IT-Compatible Gxx:** Normally Portamento commands in IT tracks (Exx, Fxx, and Gxx) share their memory; that is, the last value used by one of them will be used by another if calling a 00 value. If you check this box, Gxx memory is NOT shared in IT tracks.

**Mix Level Format:** (to be written later)

**Miscellaneous Flags:** (to be written later)

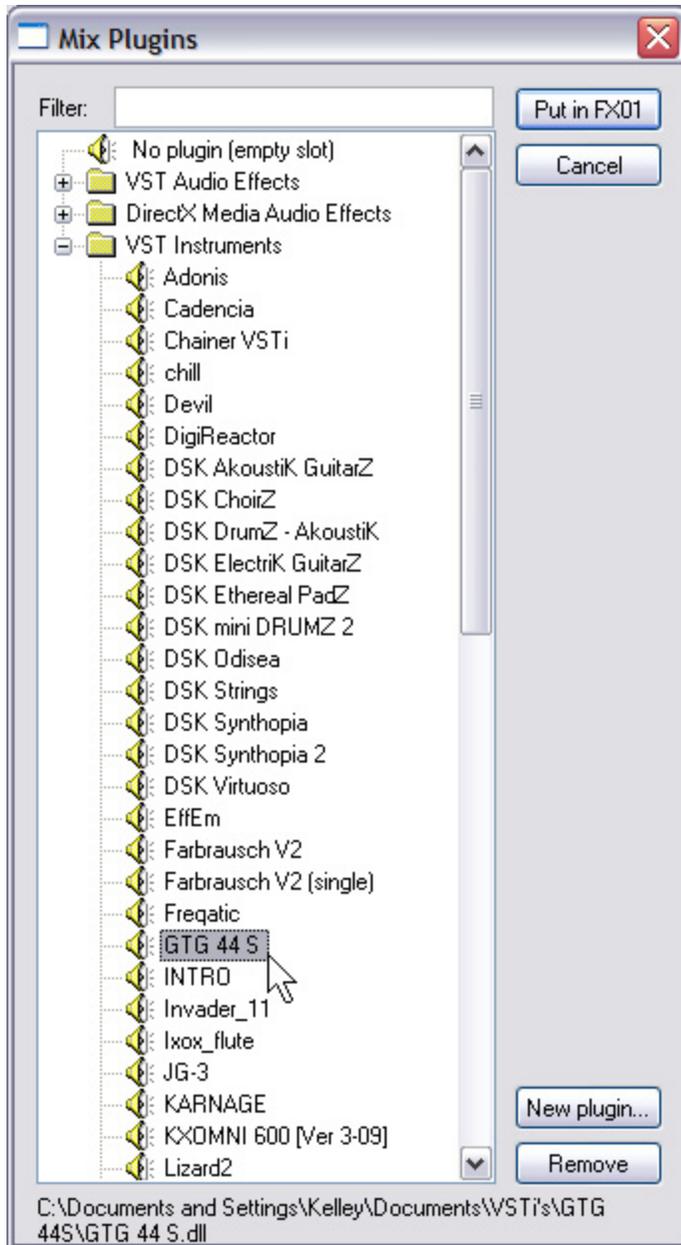
**Tempo Mode:** (to be written later)

**Version Info:** Shows the version of open MPT that the current track was created in and last modified in.

## Plugin Manager

The Plugin Manager dialog allows you to load/remove plugins into MPT or the current track. It lists all plugins in a Windows folder list style, where any folder can be opened and viewed by clicking on the + next to it. Actual plugins are shown with a speaker symbol next to it, and these can be loaded into a plugin slot.

Clicking on the Close box in the upper right of the dialog is the same as clicking on Cancel. The window is also resizable, and its size and location are remembered by MPT.



**Plugin Filter:** Input a few letters to filter which plugins are shown. Any plugin whose name does not contain that character sequence is hidden. Remember to erase the contents of this field to show all plugins.

**Plugin List:** Shows all plugins that have been loaded into MPT's cache (this list is kept within the file `plugin.cache`, which must remain at the root level of ModPlug's application). MPT currently can only recognize DirectX plugins and those that follow the Cubase plugin architecture, called Virtual Synthesis Technology. See [this section](#) for info on loading new plugins.

**Put in FX Slot:** Click on this button to load the selected plugin into the current plugin slot. This will actually create a reference for the track, and set up space for the plugin's parameters.

**Cancel:** Closes the window without assigning any plugins. If you loaded plugins into MPT's cache, however, those will remain.

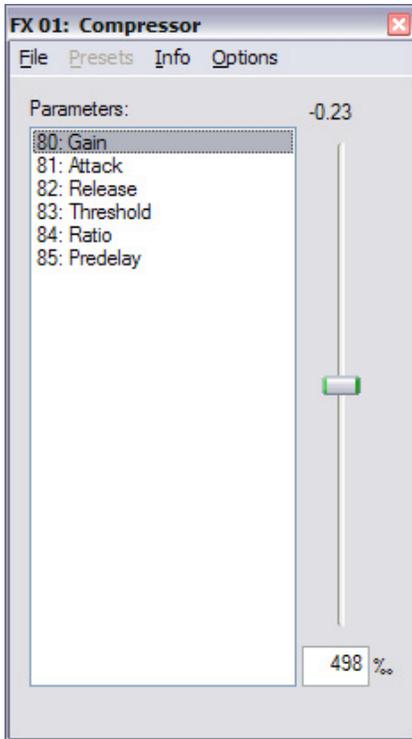
**New Plugin:** Opens Windows' standard Open File dialog so you can locate a plugin to load into MPT's cache. Acceptable plugins are only .dll files that match MPT's expected specifications. If MPT does not recognize the architecture, you will be notified and the plugin is not loaded. More info on loading plugins is found in [this section](#).

**Remove:** Removes the selected plugin from the Plugin List.

## Plugin Window

There are 2 types of Plugin windows: those with built-in GUIs and those without. Whether or not a plugin has a GUI, MPT puts all of them in its own window, so you can have access to ModPlug's features and functions. If the plugin does not have its own GUI (like DirectX plugins and mda VSTs), the window is very basic, showing a list of parameters you can set, and a slider to set their values, as shown on the left below.

On the other hand, most VSTs have their own GUIs, complete with knobs, sliders, buttons, or other clickable elements. Below on the right is an example of the GUI for SpearGear's VSTi "Raspier".



Many other GUIs can be simpler, quite complex, or may even be divided into several pages of elements. No matter what you use, the window will contain MPT's plugin menus, all of which are described [here](#).

## Channel Manager

The Channel Manager allows you to set certain attributes to many channels at once. You can Mute/Unmute, enable/disable Record Select, enable/disable a channel's plugin assignments, or reorder or remove channels. Note that you cannot rename channels here, and once any function is applied and this window closed, you cannot use Undo to revert the channels to a previous state.

There are 2 states a channel in this window can be in — selected and/or enabled. Selecting a channel will turn its plate white, while de-selecting it will turn it back to gray. Enabling a channel will change the color of the status light (on the left side of each channel's plate), but the meaning of each color depends on the attribute you're changing. Note that channel selection is independent of channel enabling.

There are different ways to activate functions in each window, but here are the things that are common to all of them:

**Select All:** Selects all of the channels, regardless of their current selection state or enabled state.

**Invert Selection:** Selects all channels not currently selected, while de-selecting those that are. To select all but one channel, select the channel you don't want, then click on Invert Selection.

**Store:** Remembers the selection state and the enabled state of each channel in a temporary memory cache (not the clipboard), replacing the cache if it contained a previous setting. Each page has its own cache, so you can store the settings for each channel, for each page.

**Restore:** Reverts the channel settings to their previous states when they were last stored (except in the Reorder/Remove page, which enables all channels and returns them to their previous positions, since the last Apply).

Here is a description of each page in the Channel Manager.

## Solo/Mute Channels

In this page you can quickly mute and unmute many channels at once. You can also designate one or more channels as a Solo channel, which mutes all other channels. Any channel muted will not be processed during playback. **NOTE:** The toggles for Solo/Mute status do not operate properly, although the Solo/Mute status of each channel does function correctly.



**Left-click:** Toggles the clicked channel between Solo, which enables the Mute of all other channels, and Unmuted.

= Solo.  = Unmuted

**Right-click:** Toggles the Mute status of the clicked channel.  = Mute.  = Unmuted

**Control + Left-click:** Selects the channel.

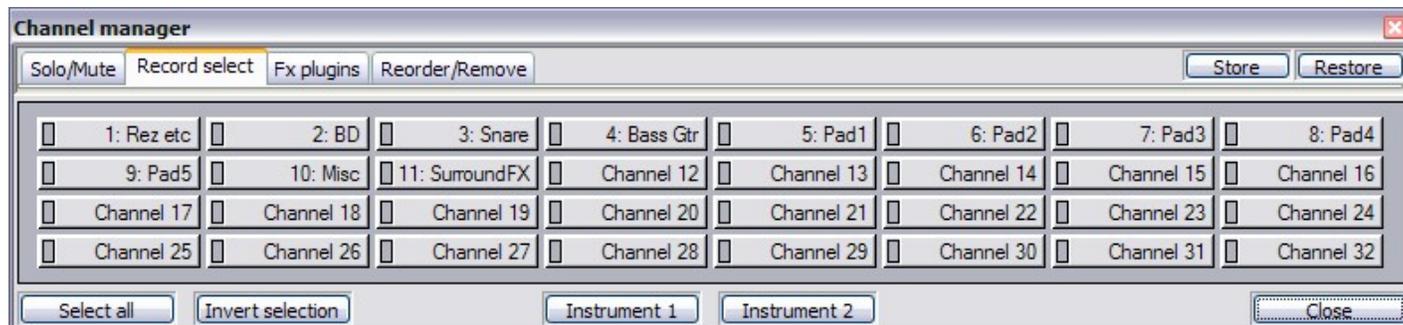
**Control + Right-click:** De-selects the channel.

**Solo:** Toggles the selected channels between Solo, which enables the Mute of all other channels, and Unmuted.

**Mute:** Toggles the Mute status of the selected channels.

## Record Select

In this page you can set which channels will be recorded by the main instrument (Instrument 1) or the alternate instrument (Instrument 2), each of which are set in the Pattern Editor's instrument section. See [this section](#) on using Record Select.



**Left-click:** Toggles the Enable Record Select using the main instrument.  = Enabled for 1.  = Disabled.

**Right-click:** Toggles the Enable Record Select using the alternate instrument.  = Enabled for 2.  = Disabled.

**Control + Left-click:** Selects the channel.

**Control + Right-click:** De-selects the channel.

**Instrument 1:** Enables Record Select (with the main instrument) for all selected channels, at the same time de-selecting them.

**Instrument 2:** Enables Record Select (with the alternate instrument) for all selected channels, at the same time de-selecting them.

## FX/Plugins

In this page you can enable or disable the audio processing of each channel's assigned plugin (if any).



**Left-click:** Enables the channel's plugin. ■ = Enabled.

**Right-click:** Disables the channel's plugin. ■ = Disabled.

**Control + Left-click:** Selects the channel.

**Control + Right-click:** De-selects the channel.

**Enable FX:** Enables all selected channels' plugins.

**Disable FX:** Disables all selected channels' plugins.

## Reorder/Remove

The effects of this page are inalterable, so use with care. Here you can alternate channel positions, moving them around by clicking and dragging, as described below. At the same time, you can also remove channels (but you cannot remove them all from this window). Read this section carefully before using these powerful functions.



**Left-click:** "Grabs" the selected channel's plate(s) so you can move it to a new location. Drag the plate to another channel, release the mouse button, and the selected plate will be placed BEFORE the chosen channel.

**Right-click:** Toggles the designation for the channel's removal. When a channel is enabled, it will remain after removal is applied. When it is disabled, it will be prepared for deletion. If you close the Channel Manager without applying, the channels' deletion order will be reset and nothing will be applied. ■ = Enabled; will not be deleted. ■ = Disabled; set for deletion.

**Control + Left-click:** Selects the channel.

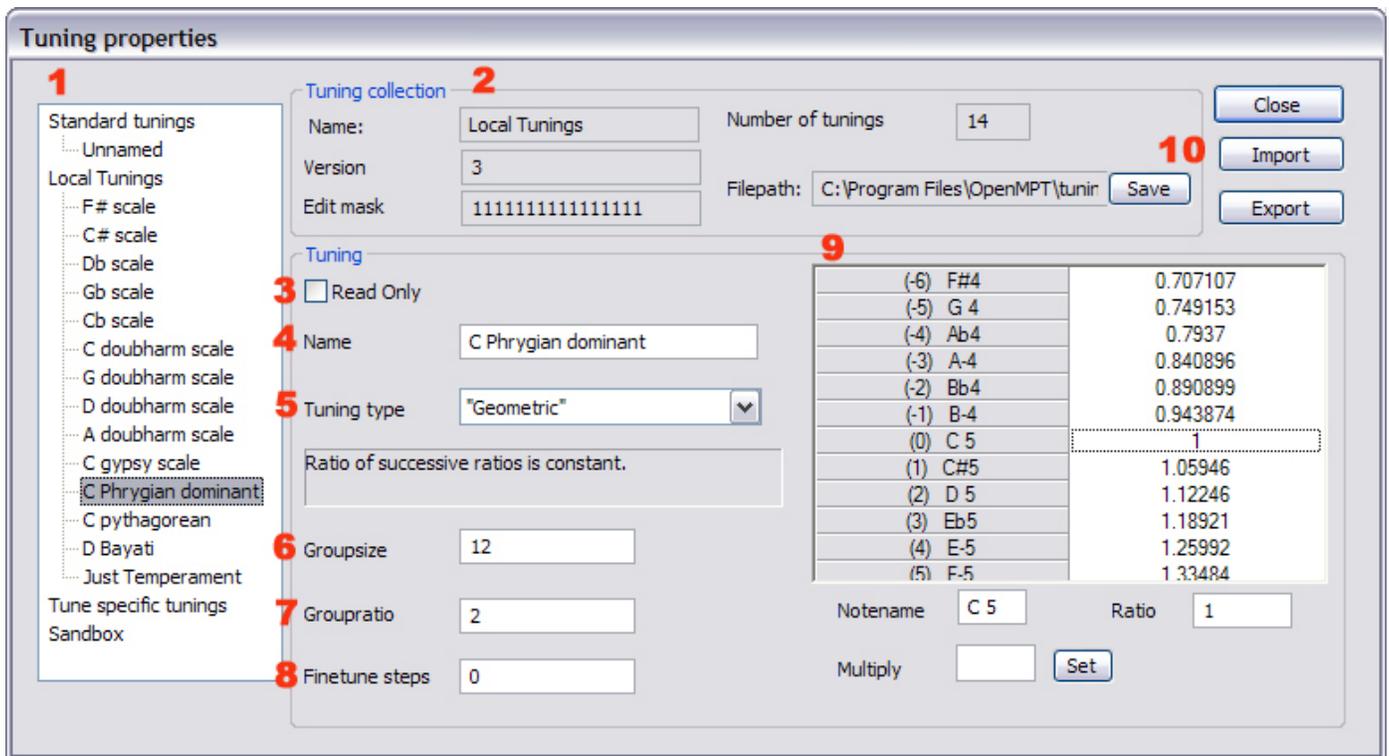
**Control + Right-click:** De-selects the channel.

**Remove:** Designates the selected channels for removal.

**Cancel All:** Restores the positions and removal state of all channels.

**Apply:** Reorders the positions of the channels in the track, and removes all disabled channels from the track and compacts the channels. THIS ACTION IS PERMANENT! You cannot restore the deleted channels. If you deleted channels by mistake, you will need to load the last saved (or autosaved) version of the track.

# Tunings Properties



**1. Tuning Collection:** This list box categorizes the tunings that are loaded into MPT's cache. You can select any tuning to make it the current tuning (whose attributes will be shown in the window). Right-clicking on a Tuning will allow you to delete the tuning from the list. Selecting and dragging a tuning between categories opens a context menu where you can choose to move or copy a tuning to a new category. Below is a description of each category.

**Built-in:** MPT's default tuning. Only MPT's hard-coded tuning can be listed in this heading, and it cannot be edited (though you can copy it to another category).

**Local:** tunings you have loaded previously. These are accessible from the Tunings popup in the Instrument tab, and are kept in the LocalTunings.tc file in the Tunings folder.

**Tune-Specific:** tunings saved with the song.

**Sandbox:** temporary tunings that are lost when the dialog box is closed. When importing a new tuning, it goes into this category.

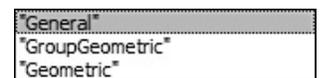
**2. Tuning Category Info:** Displays the various attributes of the tuning category. The last field shows the path that it was last saved in. Also see Tuning Import/Export (10).

**3. Read Only:** Checking this box prevents any further editing of the current tuning.

**4. Tuning Name:** An optional text field where you can name this tuning, which is not the same as the file name of the tuning. This is the label that will appear in the tuning collection list.

**5. Tuning Type:** The type of algorithm to use to calculate the pitch values, as described here:

**General:** Non-calculated. This is the "manual" tuning function, which allows you to set each pitch and note name manually. The disadvantage is that you must set them for EVERY note. This setting is especially useful for unpitched, strangely-pitched, or unusually-named notes, such as experimental tones or drum sets.



**Group Geometric:** (not functional)

**Geometric:** Calculates by number of pitches in an "octave" (called a group size), and the pitch change in the "octave". Using this method applies the equal temperament algorithm (based on  $\sqrt[12]{2}$ ), but there is a lot less flexibility in naming notes.

**6. Group Size:** Shows the number of notes in this tunings "octave" (which doesn't have to be an octave at all). You can enter a number in this field to define how many notes are in a note group (the Western European chromatic

octave has 12 notes, the diatonic has 7, and the whole note scale has 6). Each of these notes can be assigned their own keypress in the [Keyboard](#) page of the Options dialog.

- 7. Group Ratio:** Shows the frequency multiplier between the base note and the note one "octave" higher.
- 8. Finetune Steps:** Shows the number of divisions that are between notes, which has a direct influence on the amount that is bent in a portamento. In other words, the higher this setting, the higher the portamento value must be to bend the pitch by one note. If this value is 0, it will use MPT's default algorithm for determining portamento.
- 9. Note List:** Shows all notes that can be played (C-0 to B-9) and the pitch ratio at each note. Clicking on any note centers the selection in the window, and shows the note attributes below the window. See the chapter on [Tunings](#) for more detailed info.
- 10. Import/Export:** Clicking on the Save button opens the Save File dialog so you can save the tuning collection (extension .tc). Clicking on the Import button opens the Load File dialog so you can load a tuning file (.tun), which will put it into the Sandbox category. Clicking on the Export button will open the Save File dialog so you can save the selected tuning in its own file (.tun).

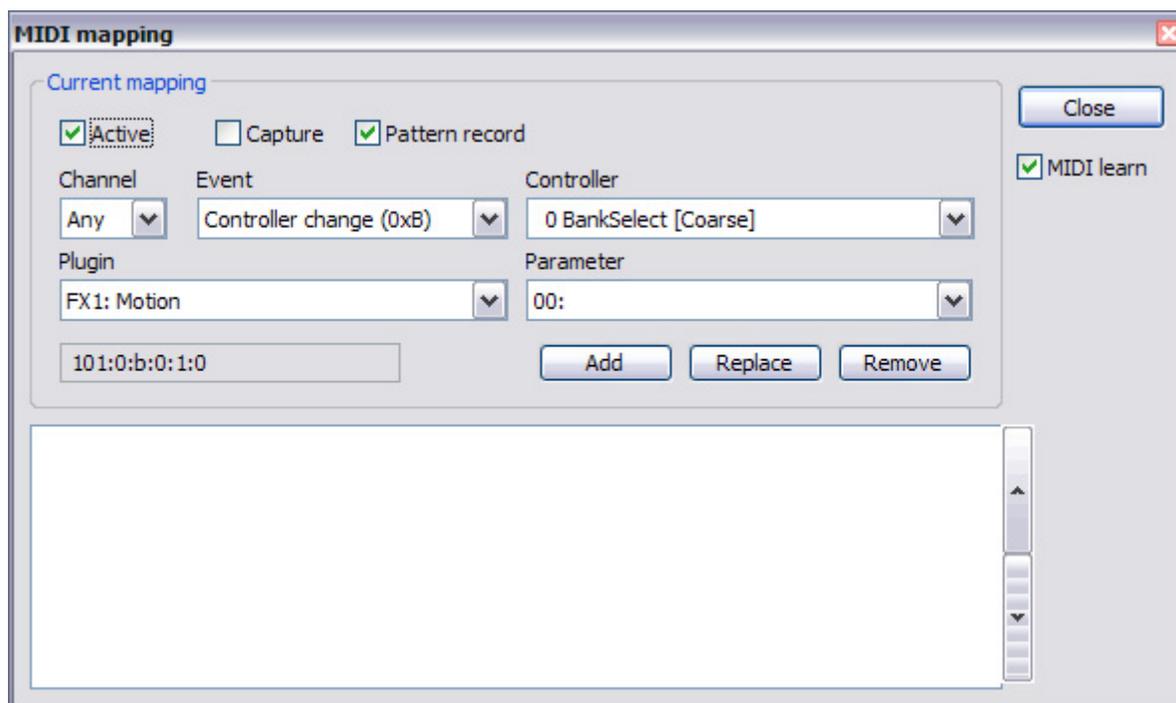
## Pattern Attributes



To change the number of rows in the pattern, either type the number into the text field, or click on the menu arrow to choose from a list. MOD and S3M files have an unchangeable number of rows (64), but with XM or IT (or IT-type) formats, you can choose from 1 to 1024 rows. To quickly halve or double the number of rows, click on the "/2" or "x2" buttons. If you are reducing the number of rows, and there is event data in the rows that are being deleted, you will be alerted that this data will be lost, and you can back out if necessary.

Below this field is a reminder of the pattern you're applying the attributes to, the current number of rows, and the amount of memory it reserves in the track file.

## MIDI Map



(to be written later)

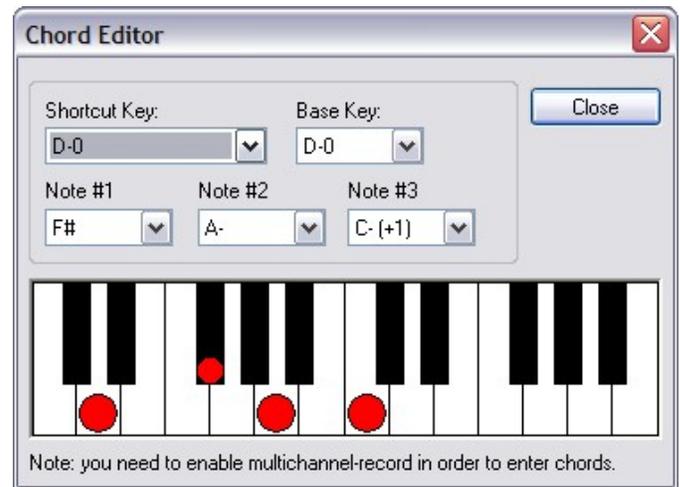
## Chord Editor

**Shortcut Key:** The note that, when input, will trigger the chord input. When using the computer keyboard for input, you should use a note outside of the range of notes you will be entering into the Pattern Editor; you can also provide a keyboard shortcut to trigger this note. When using a MIDI keyboard for input, just use notes at the far end of the keyboard controller; this makes it much easier to enter chords.

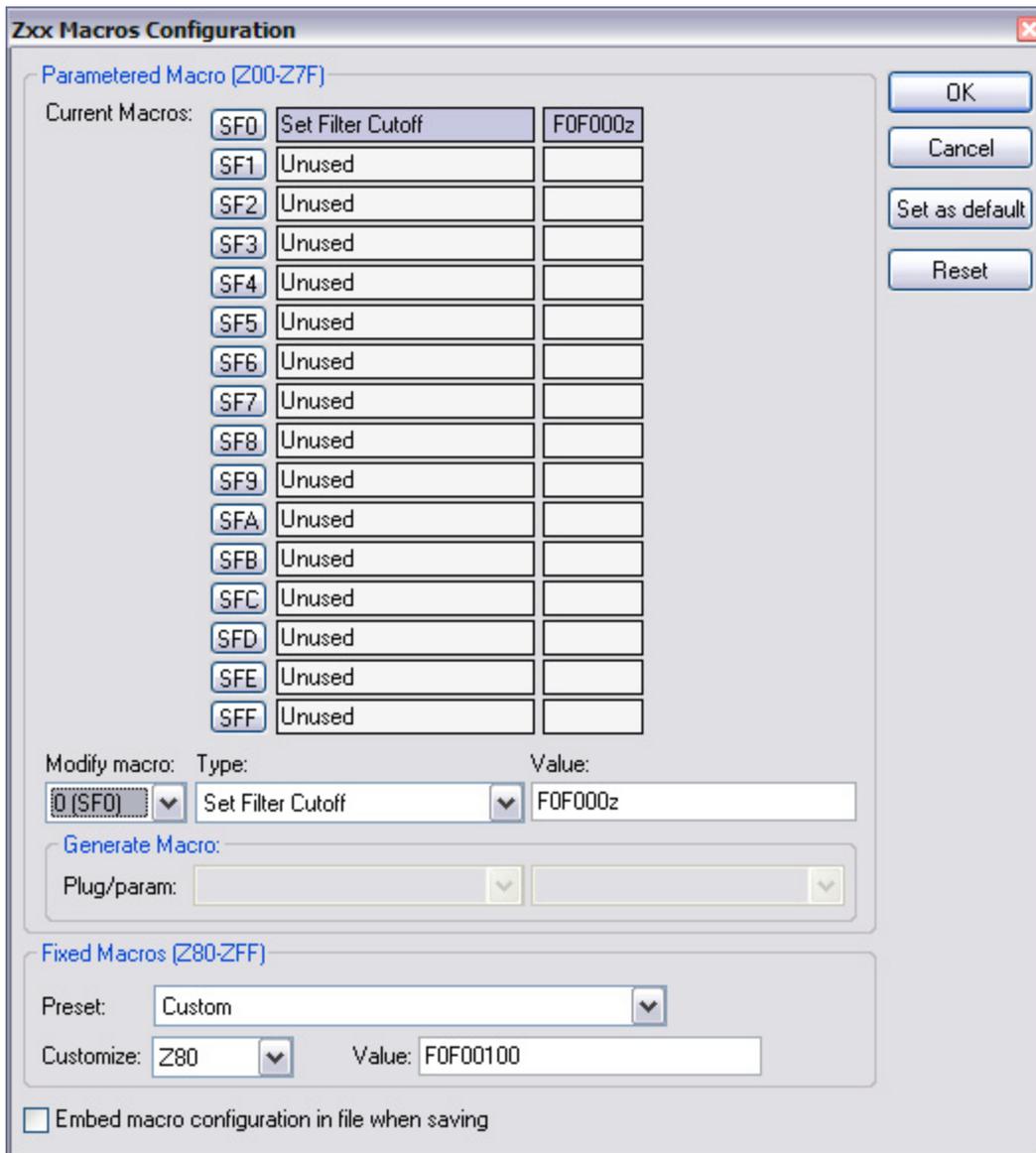
**Base Note:** The base note of the chord; however, it doesn't have to be the lowest note of the chord.

**Notes 1 – 3:** The alternate notes that will be input in the other channels being recorded into.

**Chord Diagram:** The piano keyboard representation of the chord, with red dots indicating which notes belong to the chord. You can click on any note in the diagram (up to 4 at a time) to set the note into the chord, but when using this method it's best to start out with no notes assigned except the base note. When clicking on a note, the chord is reconsidered and the notes are placed in the "Note #" fields according to the sequential order on the keyboard diagram. To remove a note assignment, click on the red dot so it is deleted.



## Macro Manager



**Current Macros:** Shows the list of the 16 available macro slots 0 – F. These are the SFX assignments that you can make for setting up the macro control. Click on one of the SFX buttons to select that assignment and show the attributes of the current slot at the bottom of the page. The text in the fields is not editable, but the current SFX assignment will be highlighted. These assignable macros use only the values 00 – 7F.

**Modify Macro:** Shows the current SFX slot. Clicking on this displays a popup menu where you can choose the slot you wish to modify (the same as clicking on one of the slot buttons).

**Type:** Shows the current Macro function. Clicking on this field displays a popup menu with the following options:

**Unused:** The current macro assignment will not call a function.

**Set Filter Cutoff:** Using macro commands will attenuate the played sample's **cutoff frequency**. Does not affect VSTs or MIDI instruments.

**Set Filter Resonance:** Using macro commands will attenuate the played sample's **resonance frequency**. Does not affect VSTs or MIDI instruments.

**Set Filter Mode:** Using macro commands will choose a **Filter Mode** for the channel. Does not affect VSTs or MIDI instruments.

**Plugin Wet/Dry Ratio:** Using macro commands will increase/decrease the ratio between the Wet signal and the Dry signal of a Plugin that is assigned to the instrument. If there is no plugin assigned, there will be no effect.

**Control Plugin Parameter:** Using macro commands will attenuate an assigned parameter of the instrument's plugin. Selecting this option will enable the Generate Macro field so you can assign a parameter (see below).



**MIDI Continuous Controller:** Using macro commands will send the assigned MIDI message to the assigned plugin. Selecting this option will enable the Generate Macro field so you can assign a MIDI parameter (see below). Sending MIDI messages to an external MIDI device requires a third-party plugin which can route MIDI messages to Windows. See [this section](#) for more info.

**Custom:** Using macro commands will send this data to the plugin. You cannot choose this option except by creating a new value in the Command Value field. Advanced and specialized use only.

**Command Value:** Shows the data that will be sent to the plugin. The field can be edited but should not be unless you are transmitting custom data.

**Generate Macro:** When selecting Control Plugin Parameter from the Macro Type menu, these 2 fields are enabled, showing the current plugin in the first field, and the plugin's current parameter that will be affected when using the macro. Clicking on the first field will show the list of loaded plugins, where you can choose the plugin to control. Clicking on the second field will display a popup of the entire list of parameters for the plugin (which will be different for each one), where you can select the parameter for this SFX assignment.

If the Macro Type is MIDI CC, only the first field will be enabled. This shows the MIDI message that will be sent when calling the macro (only Zxx commands will work), and clicking on it will open a popup menu where you can choose the MIDI message to send. The value of the MIDI CC message (for example, CC07, the Channel Volume) is the value in the Zxx command. See the section on using [MIDI](#) if you need more details.

**Fixed Macro Presets:** Shows the current function when a macro uses a value higher than 7F. Clicking on this field opens a menu where you can choose other functions, but keep in mind these functions will only be called when the Zxx or \xx value is between 80 and FF.

**Customize:** (to be written later)

**Custom Value:** (to be written later)

**Embed Macros:** Saves the macro assignments on this page into the file. If you instead want to simply save this setup as MPT's default, click on the "Save as Default" button at the top. When you close the track these assignments will be lost.

## WAV Export

**Audio Quality:** Shows the Sample Rate and the Bit Rate of the resulting audio file. Clicking in either field will open a popup menu for each, where you can change these sound qualities.

**Change Player Options:** Clicking on this button opens the Options Page so you can change the options or to disable these settings. When exporting to audio, ALL of the Player settings including MPT's Equalizer will be applied.

**Channel Mode:** Checking this box will export each channel separately, which makes it easy to export an effected sample or VST note or chord to its own .wav sample.

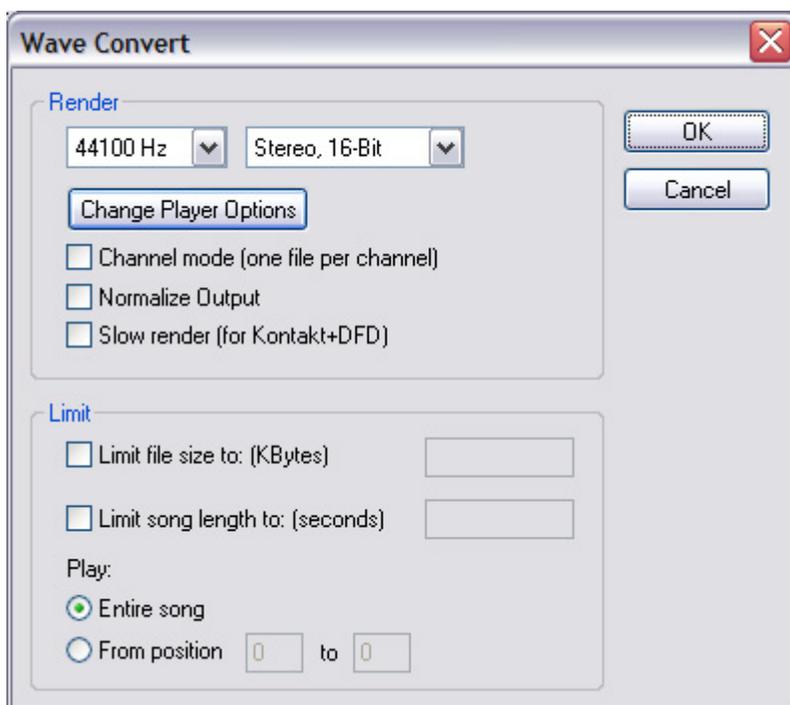
**Normalize Output:** Checking this box allows MPT to increase the audio data so that the highest volume equals the highest possible volume. The effect this has is that low-volume audio waves are made louder, while audio that already has loud sections will not be changed. See the section on [Normalization](#) for a better explanation.

**Slow Render:** Checking this box causes MPT to use a different algorithm when exporting to WAV, for plugins that render audio differently than most plugins.

**Limit File Size:** Checking this box limits the export based on the maximum file size in kilobytes. Rendering will stop when the file size equals this value.

**Limit Song Length:** Checking this box limits the export based on the file size in seconds.

**Play:** Choosing one of the radio buttons determines what part of the track will be saved. If you choose "Entire Song",



the "official" sequence of patterns will be saved to the file (those between the first pattern in the Order List and the last pattern before a null pattern). Choosing "From Position" allows you to select the start and end patterns (inclusive) that Modplug will save to the file.

## MP3 Export

When exporting the track to an .mp3 file, you will first be prompted for the location where you wish to save it, THEN you will be given the Export options.

**Driver:** Shows the current MP3 codec MPT will use to generate an mp3s from the audio output. Clicking on the field opens a popup menu where you can choose the driver.

**Format:** Shows the choices of sample rate, bit rate, and number of channels you can export to. Clicking on this field opens a menu where you choose the MP3 attributes.

**Limit File Size:** Checking this box limits the export based on the maximum file size in kilobytes. Fill in the text field with a whole number to set a KB limit.

**Limit Song Length:** Checking this box limits the export based on the file size in seconds, which you can enter in the text field.

**Song Information:** Checking the box allows you to fill in the metadata for the mp3. Keep in mind some fields have character limits. The Genre choices are defined by the MP3 codec you've selected.



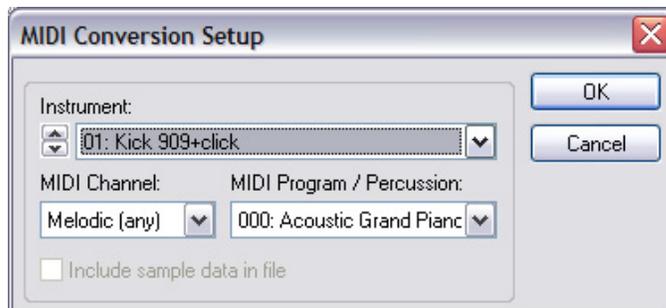
## MIDI Export

**Instrument:** Shows the current instrument to apply the MIDI conversion to. Clicking on the field opens a popup menu listing all of the instruments in the track ("instruments" in this case actually refer to sample slots within the source track; if the sample slot does not contain sample data, it will not be exported).

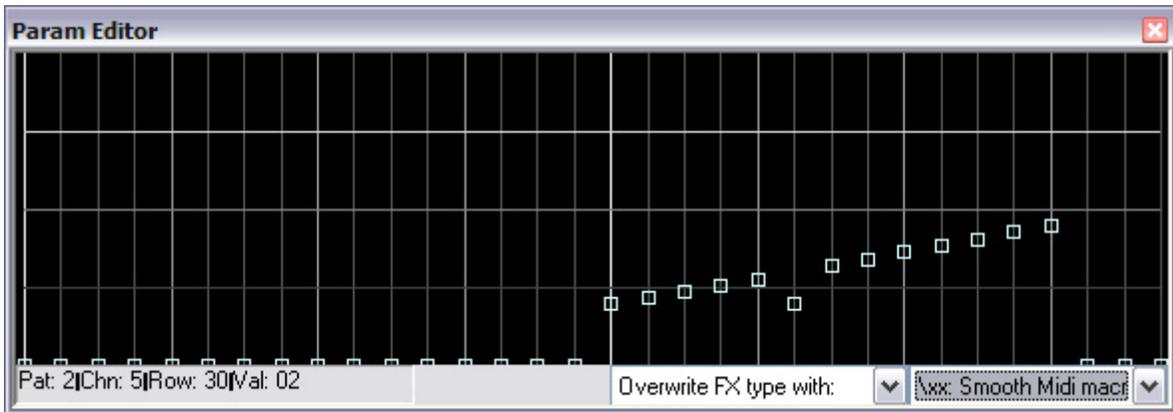
**MIDI Channel:** The channel to transfer the instrument to. In .mid files, each instrument is reserved for one channel (except when using Program Change MIDI commands, but these are not used in MPT's conversion). In General MIDI specifications, channel 10 is reserved for drums. Every place in the source track where the current instrument is called (no matter what it's found), it will be transferred to this channel. If there are more than 16 instruments, you will have to decide which will share channels.

**MIDI Program:** The MIDI program (instrument) that the track instrument will be transferred to.

**Include Sample Data:** (not functional)



## Parameter Editor



The Parameter Editor window is the most graphical display of information in MPT besides the sample and envelope displays. The window not only shows the effect values for one channel (the first channel within the selection) for the selected rows, but you can also modify the data with a few actions.

Each vertical line represents one row in the pattern; effect values are implied up and down these vertical rods, with higher values at the top of the grid. The squares are handles that indicate the relative value, and these can be dragged up or down their axis to change the effect value. Left-clicking allows you to “paint” values across several axes, while right-clicking allows to drag only the one selected. It should be noted, however, that the effect command is not considered; so if you have a channel with different channel effect commands, all of their values will be displayed here.

In the bottom left corner is some non-editable but helpful info on exactly what is being indicated. From left to right, you'll see the pattern ID, the channel ID, the row number, and the effect value when the cursor is located within the window.

In the bottom right corner are two fields indicating first, the action to execute when clicking in the window, then second, the effect command to apply. Clicking on the field will open a popup menu where you can make your selections. To use the window, slide a square along a vertical axis, or click at an axis and drag the mouse to shape how you want the values to interpolate. Doing so will apply values according to the following actions:

**Overwrite FX type:** When clicking or dragging in the window, the value will be placed properly in each row and will apply the effect command you have selected in the second field, overwriting any existing channel FX.

**Fill blanks:** When clicking or dragging in the window, the value will be placed properly in each row and will apply the effect command you have selected in the second field only in rows where there are no existing channel FX.

**Keep FX type:** When clicking or dragging in the window, the value will be placed properly in each row but applying no new effect commands. This means only those rows that have channel FX inserted will be modified.

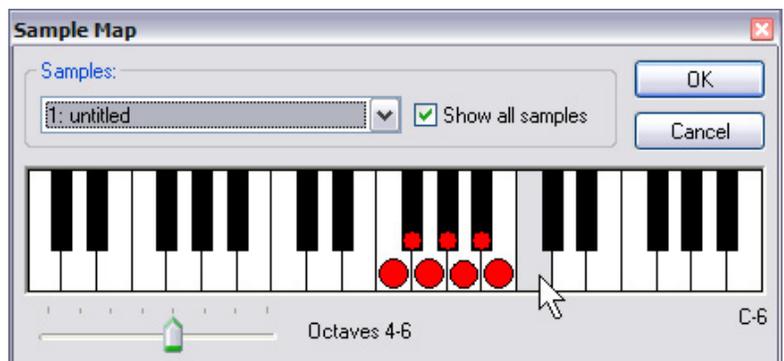
NOTE: While the FX command list is filtered by track format, no check is made of previously entered FX, which may not be allowed if you convert the file between edits to a more basic format (such as IT to S3M).

Keep in mind that, while the values you modify are updated immediately in the channel (and vice versa), modifications only occur in the channel in which the Parameter Editor was opened. To edit values in another channel you have to choose Visualize Effect again from the context menu in another channel (or type its keyboard shortcut).

## Sample Map

**Current Sample:** Shows the current sample assigned to the shown keys. Clicking on the field opens a popup menu listing all of the loaded samples (if the “Show All Samples” box is checked), where you can choose the sample to map.

**Sample Notes:** Displays a keyboard where you can assign the current sample to a note by clicking on it (the note where the mouse is located is shown on the bottom-right corner of the dialog). A red dot



shows the assignment. If you click on a note that was already assigned, your new assignment overwrites the previous sample. The only way to delete a sample assignment is to choose "No sample" from the Sample list and click on that note.

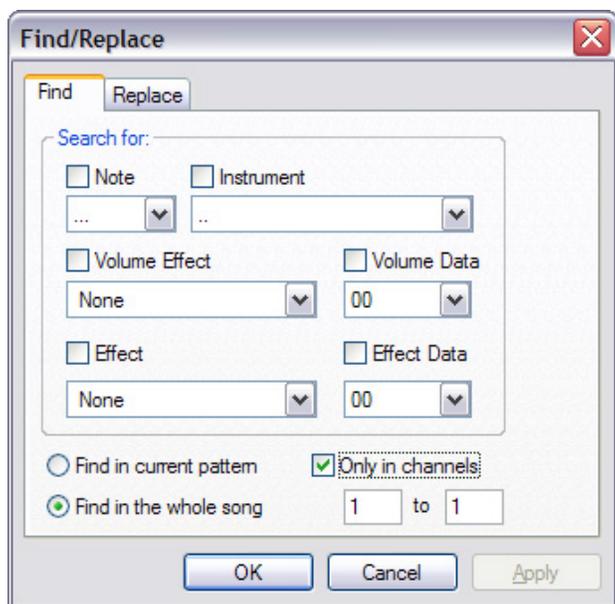
**Octave Range:** Moving the slider shifts the octave range the keyboard display represents.

## Find & Replace

### The Find Page

You can search for the data that meets the criteria you enumerate below, starting where the cursor is in the Pattern Editor. After you enable at least one of the search criteria and fill in the required target data, press OK and MPT begins searching in the location you specify in the Search Range limits at the bottom of the page. The search starts in the first row and checks each channel, then proceeds to the next row after all channels in the range have been searched. If MPT finds an instance that meets the criteria, the cursor is positioned there and the field is highlighted.

You can continue searching using the Find Next command (in the Edit Menu or its keyboard shortcut) even if you edit the highlighted data.



**Search for Note:** Checking the box will use the note criteria as part of the search query. Clicking on the field below it shows a popup menu where you can choose any note, a particular note, or a note message (like Note Cut) to search for. MPTM Parameter Control Events are considered note messages and can be queried here.

**Search for Instrument:** Checking this box will include the instrument criteria in the search query. Clicking on the field below it shows a popup menu where you can choose a particular instrument to search for.

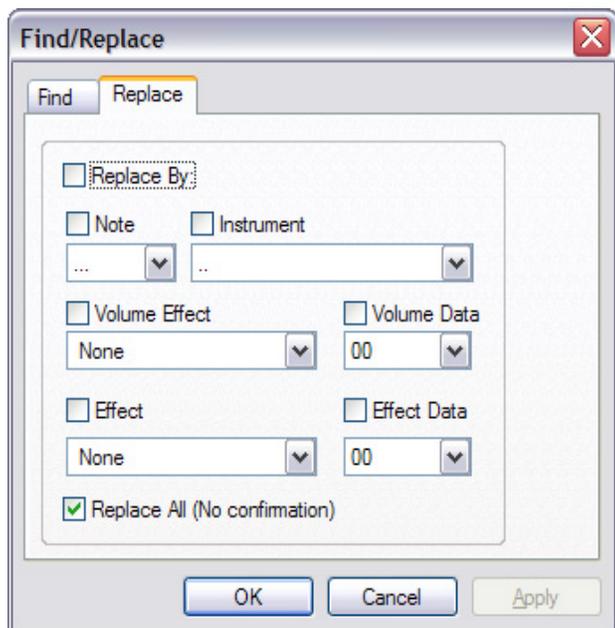
**Search for Note (Volume) Effect:** Checking this box will include the Note FX criteria in the search query. Clicking on the field below it shows a popup menu where you can choose a particular note FX command to search for. The available commands depends on the track type.

**Search for Note FX (Volume) Data:** Checking this box will include the Note FX value criteria in the search query. Clicking on the field below it shows a popup menu where you can choose a value between 0 and 64 to search for.

**Search for Channel Effect:** Checking this box will include the Channel FX criteria in the search query. Clicking on the field below it shows a popup menu where you can choose the command to search for. The available commands depends on the track type.

**Search for Channel FX Data:** Checking this box will include the instrument criteria in the search query. Clicking on the field below it shows a popup menu where you can choose a value between 00 and FF to search for.

**Search Range:** The last two items define the range where you can execute the search. Click on a radio button to conduct a search either only in the current pattern or in all patterns. If you want to narrow the search to only one or more contiguous channels, check the box and fill in the range of channels. (If the second field is lower than the first, the search will take place only in the channel listed in the first field.)



## The Replace Page

As ModPlug does a search based on the Find criteria, you can also choose to have certain data replaced along the way, which saves time instead of entering the data yourself. To do a Find & Replace, enter the Find criteria on the first page, then check the "Replace By" box in this page. Then fill in the items you want replaced when MPT locates the target data (be sure to check the box for the data type), but remember that the data does not have to be the same type as that which was queried. For example you could do a search for all Note Fades, and in each instance where one is found, you could use Replace to enter a volume effect without deleting the Note Fade.

To use Replace, enable the checkbox for each data item type and choose the correct data to be entered. Before clicking OK, make sure the Replace All box is checked for a complete search-and-replace; if the check box is not activated, you'll be prompted each time the Find routine locates the target data, and you can choose to replace it one-by-one. ("Find in Whole Song" and "Replace All" are on by default every time the dialog is opened.)

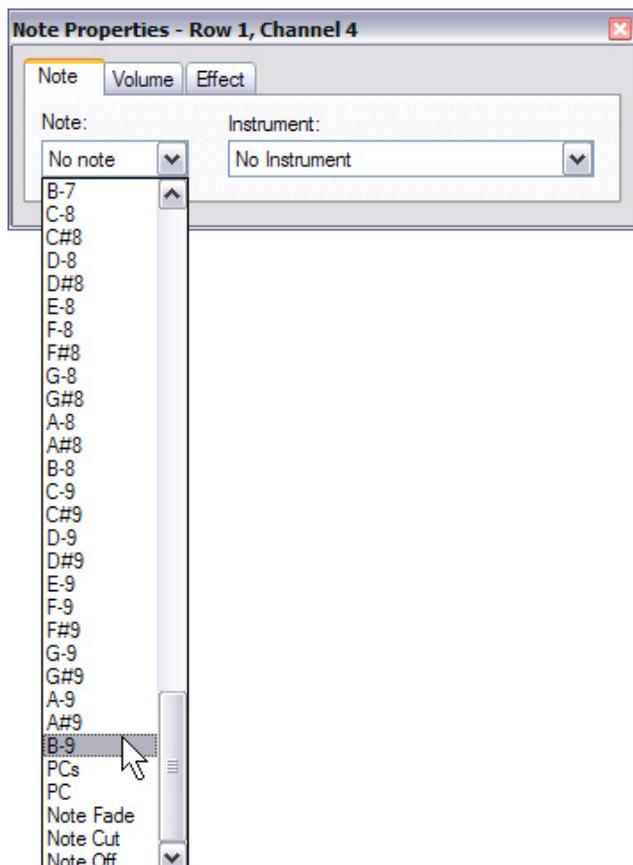
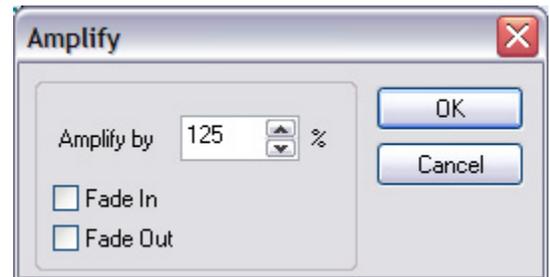
### Limitations

Currently you cannot search based on position in a pattern (every x row or beat) nor in discontinuous channels (such as only channels 5, 8, or 10). You can only apply simple one-event criteria to replacing; for example, you cannot place a drum note into every row after a kick was made in the previous row. Nor can you replace values by addition/subtraction or percent.

## Amplify

**Amplify Amount:** The percentage to amplify the selected data. When using this dialog from the Sample Display, you can enter negative amounts, which will both invert the sample phase of the selection as well as perform the amplification. (Negative numbers are not allowed when Amplifying from the Pattern Editor.)

**Fade Type:** Check one or both of the Fade Type boxes to have a ramped amplification enabled. When doing a Fade In, the amplification data is interpolated from 0 to the amplified amount within the selection; Fade Out goes the opposite way. If both are checked, the Fade In is applied for half the selection, while the other half is applied a Fade Out.



## Note Properties

You can specify all the parameters of one event with this dialog. To open it, double click on a field in the Pattern Editor, which will locate the cursor there, ready for input from this dialog. When you edit any parameter, the cursor is set to that field, and the value you choose from the dialog is immediately entered into the Pattern Editor.

### Note Tab

Shows the current note and the instrument assigned to it. Clicking on the note field opens a popup menu where you can choose the note or note message.

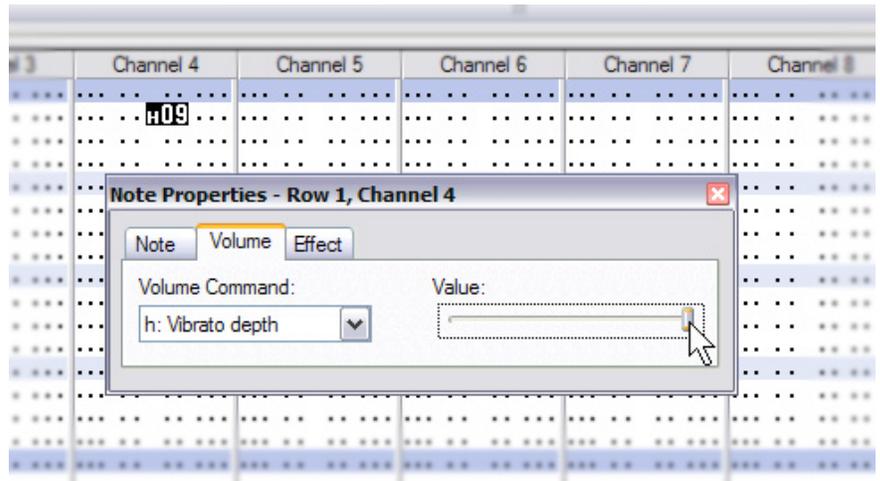
With MOD tracks you can choose "No Note" or a given note. With S3M tracks you'll also have the Note Cut option, and with XM tracks you only get the additional Note Off option. With IT and its variants, you can choose "No Note", a given note, "Note Off", "Note Cut", and "Note Fade". With MPTM tracks, you can also choose a Parameter Control Event.

See [here](#) for more info on the Note messages.

Clicking on the instrument field shows a popup list of all the loaded samples/instruments from which you can select.

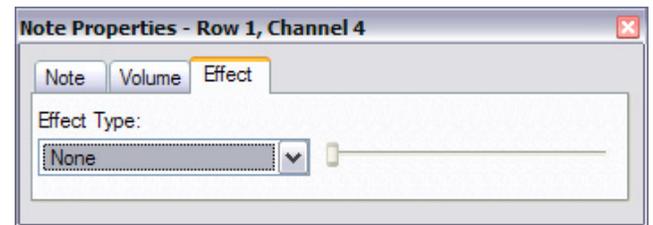
## Volume Tab

Shows the current Note FX command (not available in MOD tracks). Clicking on the field shows a popup list of all available commands that you can choose from, but the list depends on the track format. You can set the value of the Note FX parameter by moving the slider. If the cursor is in the third column of a row, this value will be inserted automatically. See the section on **Note FX** for more info.



## Effect Tab

Shows the current Channel FX command. Clicking on the field opens a popup list where you can choose the FX command, but this list is dependent on the track type. Moving the slider sets the value of the Channel Effect. If the cursor is in the fourth column of a row, this value will be inserted automatically. A description of Channel FX is in **Appendix A**.



## Cleanup Manager

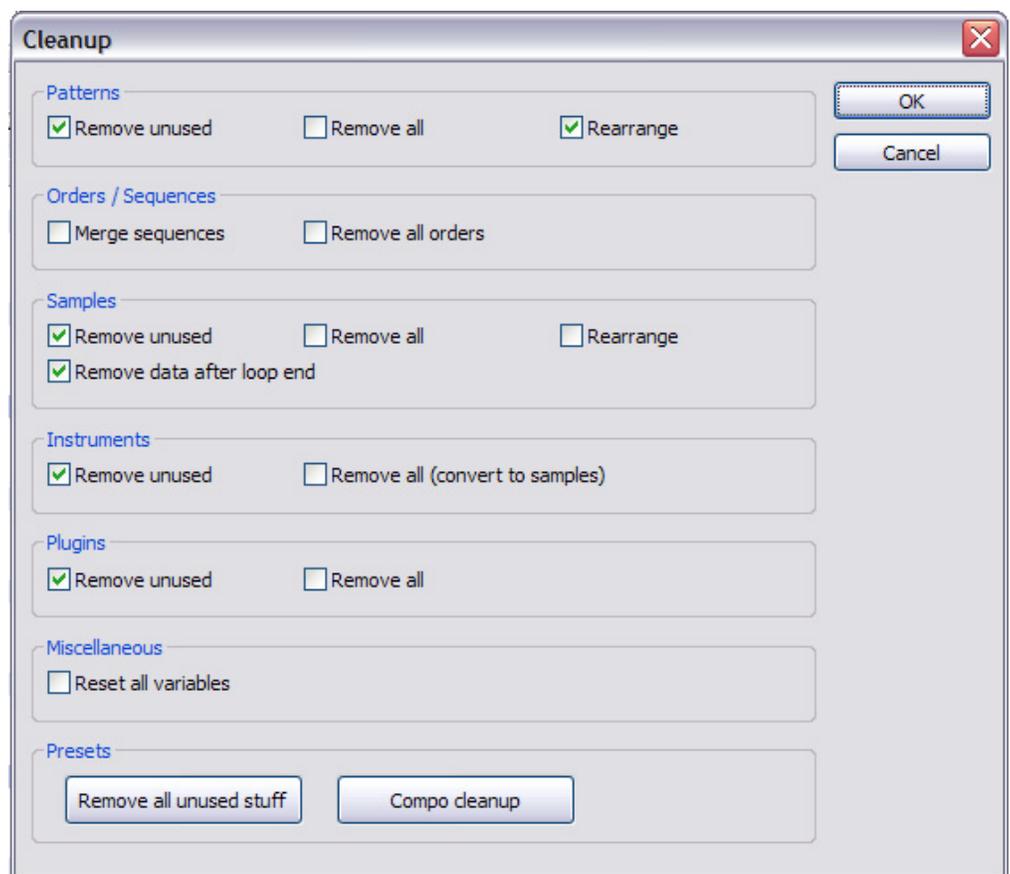
The Cleanup Manager allows you to strip away or rearrange various aspects of your track. The interface is self-explanatory, and when you move your mouse cursor over a checkbox, HelpTips describe what each one does. No cleanup is done until the OK button is clicked.

**Clean Up Patterns:** There are options to remove all patterns, only the unused patterns, or rearrange them in sequential order (according to when they appear in the Order List).

**Clean Up Orders/Sequences:** There are options to clear the Order List, or to merge all Sequences into one Sequence. This helps when exporting or converting from one track format to another, especially from MPTM.

**Clean Up Samples:** There are options to remove all sample slots, remove only those that are not called from within any pattern, or rearrange them sequentially. There is also an option to trim all samples so that data after their sample loops — if any use one — is deleted (audio after sample loops is never reached during playback, in all circumstances).

**Clean Up Instruments:** There are options to convert all instrument slots to sample slots (and delete the instrument slots), or to remove all instrument slots that are not called in any pattern. If you wish to also remove those samples



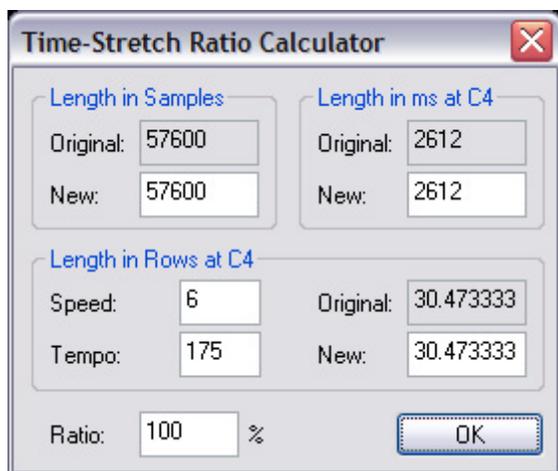
mapped to these instruments, also check the "Remove Unused" in the Samples section above.

**Clean Up Plugins:** There are options to remove all plugins (clearing all of their slots), or to remove only those that are not called in any pattern.

**Miscellaneous:** This option converts the track to IT format and resets all settings to the IT default. This is useful for updating older modules for editing.

**Presets:** Clicking on any preset button sets the checkboxes in a default way. For example, clicking Compo Cleanup will set the checkboxes for removing all patterns, orders, and instruments, while keeping all the samples (but rearranging them in sequence). You can with any preset enable or disable any of the default checkboxes.

## Time Stretch



**Sample Length:** Shows the original length of the sample in sample data points, and the new length which you can enter in its field.

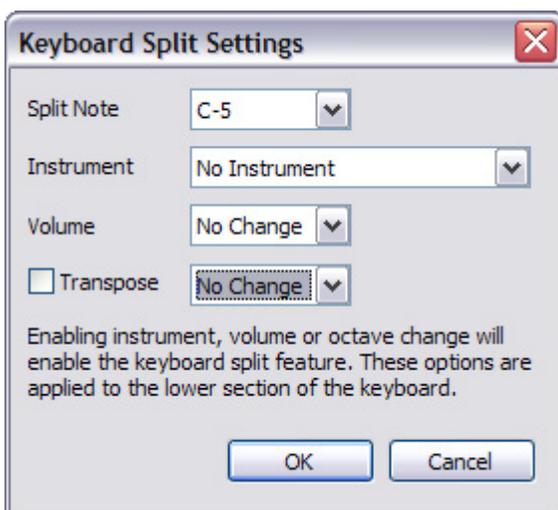
**Time Length:** Shows the original length of the sample in milliseconds (when played at middle C), and the new length which you can enter in its field.

**Speed:** You can fit the sample to play within a certain number of rows, but here you must set the ticks per row (speed) for its calculation.

**Tempo:** You can set the running tempo of playback, but keep in mind the actual BPM is determined by the song's **Tempo Mode**.

**Playback Length:** Shows the original length of the sample in rows (based on the Speed and Tempo settings), and the new length which you can enter in its field.

**Ratio:** Shows the amount of lengthening in percent that will occur based on the given data above. This is updated when you change any of the previous settings, or you can enter a general percentage.



## Keyboard Split

You can apply a different instrument based on which note is entered into the Pattern Editor, by "splitting the keyboard." To activate the split, set any of the parameters in this dialog to non-default settings, and the altered settings are applied based on their value. All notes BELOW the split point will apply the Main instrument (listed in the Pattern attributes section); all notes at this note and above will apply the alternate instrument and its alternate settings. Keep in mind this will enter two instruments into the same channel together (unless you navigate to another channel), and may affect playback from the notes running into each other.

**Split Point:** If you input a note below this note, the alternate instrument will be entered instead of the current "main" instrument, at the given input volume. Clicking on the note field opens a list of notes to choose from.

**Alternate Instrument List:** Same as the Main Instrument List but shows the current "alternate" instrument. Clicking on the field opens a popup menu showing all loaded instruments, where you can choose a new alternate instrument.

**Volume:** If entering the alternate instrument, this volume will also be entered into the Note FX column. Click on the field opens a popup menu where you can choose the volume level.

**TIP:** You can also automatically apply a volume to all instrument assignments into the Pattern Editor (but you have to use the alternate instrument to do so) by setting the Split Point to the highest value (B-9). This will actually apply the ALTERNATE instrument (with its volume setting), so when you need to change instruments, but still apply the volume command, change the alternate instrument, not the main instrument.

**Transpose:** This box must be checked to apply the Octave Shift, below.

**Octave Shift:** Transposes the entered note to a different octave based on the setting in this field. Clicking this field opens a popup menu where you can choose how much of a transposition. If the transposition takes the note outside of the note value limits (C-0 to B-9), the note will be capped at those limits. This function is good for keeping the notes in the same range while applying different instruments, the same way a church organ stacks its keyboards. For example, if the Split Point is C-5, set the Octave Shift of the alternate instrument to "Octave +2". Then when you press the keys for notes C-3 thru B-4, it will enter them as C-5 to B-6, the same range as the lowest octaves of the main instrument. (will insert graphic later)

## 18. Reference: Menus

In all menus, the keyboard shortcuts are shown but may be different than your own. You can set these in the [Keyboard page](#) of the Setup dialog.

### File

**New:** Creates a blank track and opens it in its own window. You can select the track type from the submenu. When using the shortcut, MPT defaults to an IT track.

**Open:** Allows you to use Windows' standard Open File dialog to locate the track you wish to open. The name of the file is also added to the Recent Files list. MPT can open the following file formats, converting if necessary to their closest type:

IT/ITP/MPTM Impulse Tracker modules or their MPT variants

XM Fast Tracker modules

S3M/STM Scream Tracker modules

MOD/NST ProTracker modules

MID/RMI MIDI sequence modules (converted to MOD)

Modplug Tracker can also open miscellaneous file types and even WAV files, as well as compressed modules, but in some cases you may need to attain the library for the file format.

**Close:** Closes the file (and its windows) of the current track. If changes were made (shown by an asterisk in MPT's title bar), you will be prompted if you wish to save the changes. If so, the Save command is executed.

**Save:** Saves the file in its current directory with its current name. If the file is new and was never saved, this command is the same as the "Save As" menu item.

**Save As:** Open the standard Windows Save File dialog, where you can choose the location where you wish to store the file, and the name of the file.

**Save as WAV**<sup>†</sup>: Exports the track to a .wav audio file. See [this section](#) on WAV export. The track is not saved nor closed.

**Save as MP3:** Exports the track to an .mp3 audio file. See [this section](#) on MP3 export. The track is not saved nor closed.

**Export as MIDI:** Exports the track to a .mid sequencer file. See [this section](#) on MIDI export. The track is not saved nor closed.

**Compatibility Export:** Exports the track to a "pure" version of the track format. See [this section](#) on Compatibility Export. The track itself is not saved nor closed in its current state.

**Import MIDI Library:** (to be written later)

**Add Sound Bank:** (to be written later)

**Recent Files List:** Lists the last 9 files that were opened in MPT. The shortcut keys are the digits 1 to 9 (pressed with the Alt-Key).

**Exit:** Executes the Close command on all files (see above), saves its own caches (the plugin list and the recent files list, for example), and quits ModPlug Tracker, closing all of its open dialogs and sound channels as well.



<sup>†</sup> There is a bug in ModPlug which does not reset the audio buffers when playback is stopped or paused when using VSTs, in which case if you attempt to export audio after stopping playback, the "leftover" audio will be output to the file at the beginning of the audio file, until the buffer is cleared. To remedy this, empty the buffer by clicking on a sample or instrument preview button, or by playing an empty pattern.

## Player

NOTE: There is currently a bug in which the audio buffers are not reset when stopping or pausing playback when using VSTs. This means that if you resume or begin playback, whatever's in the audio buffer will be played as well.

**Pause/Resume:** Pauses the song by stopping audio processing, setting the volume of all audio channels to 0, but NOT resetting the playback pointer. When resuming playback from Pause, volume is brought to most recent levels for each channel and the Master Audio output, audio processing is restarted from the playback pointer; this also means that audio from previous notes are lost.

**Play from Start:** Resets the playback pointer to the first tick of the first row of the first pattern in the Order List, and begins playback.

**Stop:** Stops all audio processing and sets the volume to 0 temporarily.

**Pause:** Pauses the song by stopping audio processing, temporarily setting the volume of all audio channels to 0, but NOT resetting the playback pointer.

**MIDI Record:** Allows MIDI messages to be received and placed in the current pattern at the active row according to the message received. See the section on [MIDI Setup](#), [MIDI Mapping](#), or [MIDI in ModPlug](#) for more details.

**Estimate Song Length:** Displays a window which shows an estimate of the song Length based on tempo and speed, the Tempo Mode, and the number of rows in the "official" patterns of the song.

**Approximate Real BPM:** Displays a window which shows an estimate of the actual tempo in terms of Beats per Minute (BPM), based on Tempo Mode, the tempo value, and the ticks-per-row value (speed).

Player	
Pause/Resume	Space
Play from start	Ctrl+Space
Stop	.
Pause	
Midi Record	Shift+Ctrl+R
Estimate Song Length	
Approx. real BPM	

## Edit

**Undo:** Repeals the last action taken. This only occurs in text fields (done by the Windows OS) and the Pattern Editor (ModPlug un-does an action by placing a previous copy of the pattern at its proper location). There seems to be an unlimited number of Undo's but it is based on available RAM. NOTE: Navigation and selection cannot be un-done.

**Cut:** Executes a Copy action, then erases all data from the selected area. The cursor is not relocated.

**Copy:** Copies the selection to the clipboard, leaving the data and cursor location intact.

**Paste:** Transfers a copy of the clipboard contents where the cursor is located, if the format is acceptable to the paste location, overwriting any data within the bounds of the pasted data. For text, this paste will begin at the next character after the cursor. For pattern data, this will begin in the same event as the cursor location, even if the cursor is not in the first column of the event. [For sample data, pasting simply trims off the data around the copied selection \(you cannot paste INTO sample data\).](#)

**Paste Special:** Opens a submenu where you can choose alternate forms of pasting data into patterns, as described here:

Edit	
Undo	Ctrl+Z
Cut	Ctrl+X
Copy	Ctrl+C
Paste	Ctrl+V
Paste Special	
Select All	Ctrl+A
Cleanup...	
Find	Ctrl+F
Find Next	Ctrl+Alt+F
Goto	Ctrl+J
Split Keyboard Settings	

Mix Paste	Ctrl+Alt+V
Paste Flood	Alt+Win+V
Push Forward Paste	

**Mix Paste:** Transfers a copy of the clipboard contents where the cursor is located (works only for the Pattern Editor), overwriting any fields within the bounds of the pasted data ONLY IF there is no data in the correlating fields. For example, in the graphic below, the first channel (13) is the source data on which we'll be mix-pasting the clipboard data, which is shown in the second channel. When executing the mix-paste, it results in the last channel.



## View

**General Tab:** Displays the [General Page](#), setting the input focus to the selected text of the first channel's label.

**Patterns Tab:** Displays the [Patterns Page](#), and setting the input focus to the most recent cursor position in the Pattern Editor.

**Samples Tab:** Displays the [Samples Page](#).

**Instruments Tab:** Displays the [Instruments Page](#).

**Comments Tab:** Displays the [Comments Page](#).

**Main Toolbar:** Toggles the display of the Main Toolbar, remembering its position.

**Folder Tree:** Toggles the handle for the Folder Tree, remembering its position. If the Folder Tree is open when the handle is hidden, then the Tree is hidden, and the page display is shifted to show more. If the handle is not enabled, the Folder Tree cannot be opened.

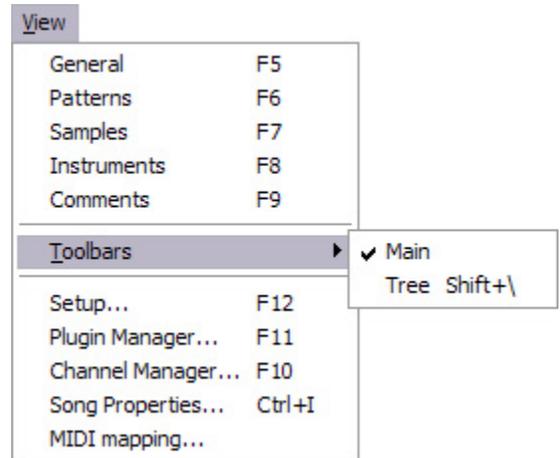
**Setup Options:** Shows the [Setup Options](#) dialog at the last open page.

**Plugin Manager:** Shows the [Plugin Manager](#) dialog.

**Channel Manager:** Shows the [Channel Manager](#) dialog.

**Song Properties:** Shows the [Song Properties](#) dialog.

**MIDI Mapping Options:** Shows the [MIDI Map](#) dialog.



## Window

**New Window:** Opens an alternate window of the current track using the same page display.

**Cascade Windows:** Resizes and "cascades" all open windows (by superimposing one over the other diagonally) so that any window can be brought to the front with a mouseclick on that window.

**Tile Windows Horizontal:** Resizes all open windows so that horizontally they equal the width of MPT's window (from the Folder Tree handle to the right side), and vertically they share an equal amount of space between the Menu Bar and the Status Bar.

**Tile Windows Vertical:** Resizes all open windows so that vertically they equal the height between the Menu Bar and the Status Bar, and horizontally they share an equal amount of space between the Folder Tree handle and the right side of MPT's window.

**Arrange Icons:** (not functional)

**Split:** Obsolete function which allowed a page to be split horizontally. Selecting this menu item centers the mouse cursor in the screen and "grabs" the divider so you can reposition it.

**Current Open Files List:** Shows all open tracks in the order they were loaded. The one with the check mark is the "current" track to which all the relevant menu items will be applied.

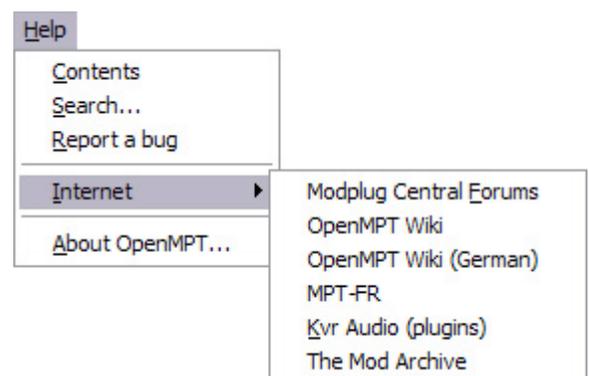


## Help

**Contents:** Opens the Contents page of the Help Manual, which by default should be located in the root directory of the application. If MPT cannot locate it, the Open File dialog will open so you can browse for it yourself.

**Search Help Manual:** Opens the Search page of the Help Manual, which by default should be located in the root directory of the application. If MPT cannot locate it, the Open File dialog will open so you can browse for it yourself.

**Report a Bug:** Opens your default Internet browser, to the index



page of the MPT forums, where you can report a bug. (Obviously this only works if your computer is online.)

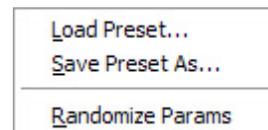
**Internet Links:** Opens your default Internet browser to the selected page. (Obviously this only works if your computer is online.)

**About OpenMPT:** Shows the Recent Changes window, then MPT's About window that displays the credits for MPT, and links to its open-source site.

## Plugin Window

### File

**Load Preset:** Opens the Load File dialog so you can browse for a preset to load, which must be an .fxp file. The plugin's current program is not switched, but instead all of the new preset's parameters are entered. If the loaded preset does not belong to the plugin, you will be notified, and it will not be loaded. It's advisable to keep your programs in the same file as the plugin, perhaps in their own folder.



**Save Preset As:** Opens the Save File dialog so you can save the program in a location of your choosing. MPT saves the parameter settings in an .fxp file.

**Randomize Params:** Assigns random values to the plugin's parameters. Helpful for when you feel experimental or want a new sound, but is best used for very basic plugins so modification is simple.

### Preset

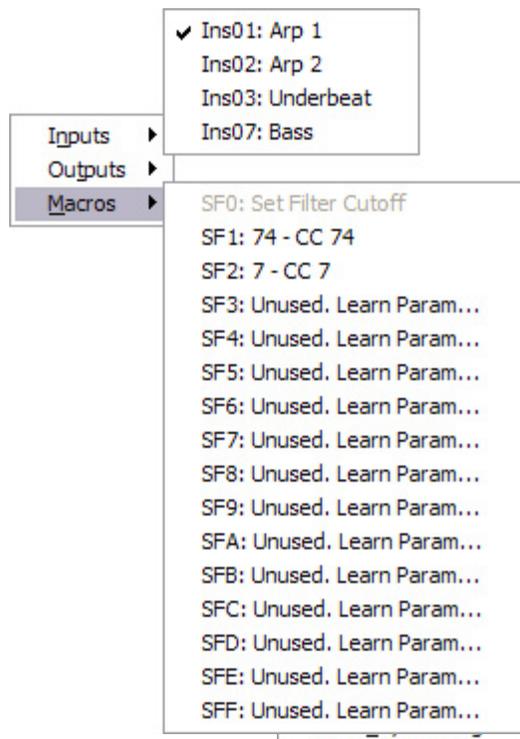
This menu lists all of the plugin's programs. If there are more than 100, they are divided into submenus. NOTE: When choosing a preset from MPT's plugin window, some plugins do not recognize the program change. This means for those plugins, selecting a program from this menu will instead set new values for the preset's parameters.

### Info

**Inputs:** Lists the MPT instruments that call this plugin, allowing you to select the program they are currently using. In the example on the right, there are 4 instruments that are assigned this one plugin instance.

**Outputs:** Lists this plugin's audio output route; if another plugin is listed, you can select it here to open that plugin's GUI. Modplug only allows one output for any one plugin. (This means side-chaining is not possible without help from a routing plugin, such as Xlutop's Chainer.)

**Macros:** Lists the 16 parameter assignments that this plugin uses (each plugin will have different parameters assigned to each SFx setting). Any SFx assignment that the plugin can't use will be grayed out. Selecting an unused SFx slot will allow MPT to "learn" what parameter to set the SFx control to, by next manipulating a GUI element with the mouse. For more details on how to use this menu, check the chapter on [Macros](#).



### Options

**Bypass:** Prevents audio processing from this plugin. If there is audio input, it will be sent to the output without being affected by this plugin. (You can also set this with the Bypass checkbox in the Plugin section of the General page.)

**Record Params:** Sends parameter value changes to the Pattern Editor when you manipulate a GUI element in this window. When you move a slider or other controller in the plugin window, its value will be recorded in the channel FX column of the row where the cursor is located, using the Macro slide command (`\xx`), or a [PCE](#) for MPTM tracks. NOTE: When Record Params is enabled, all plugins will send these values to the Pattern Editor whenever you move a GUI element, even if you close their windows and re-open them; therefore, you must select this menu option again to turn off these value messages. See [this section](#) for info on using this feature.

**Pass Keys to Plugin:** Allows keypresses to be sent to the plugin, bypassing MPT's shortcut functions. This is helpful for plugins that allow you to name programs, or for registration that must occur from within the plugin. Like the others, this menu option is not disabled when you close the plugin window; it must be selected again to allow the keyboard shortcuts to work (such as for playing notes from the computer keyboard).

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## 19.Reference: Contextual Menus

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### Sample Display

**Set Loop Start:** Uses the selected sample point as the start of the Sample Loop.

**Set Loop End:** Uses the selected sample point as the end of the Sample Loop.

**Set Sustain Start:** Uses the selected sample point as the start of the Sustain Loop.

**Set Sustain End:** Uses the selected sample point as the end of the Sustain Loop.

**Convert to 8-bit:** If the sample is 16-bit, this will convert the sample to 8-bit, slightly reducing its sound quality in exchange for a smaller sample size. Neither the pitch nor the playback frequency is altered.

**Trim:** Deletes all sample outside of the selected region. If no selection is given, then the selection outside of the Sample Loop points will be deleted. You cannot trim audio channels separately with ModPlug.

**Cut:** Performs a Copy command, then removes the selected data points, shifting the remaining sample data together.

**Copy:** Stores the start and end points of the selection, overwriting the clipboard. Unfortunately you cannot do anything with this data except Paste it into (over) this or another sample. It cannot be pasted into a third-party audio editor.

**Paste:** Replaces the entire sample with the sample data in the clipboard. You cannot paste INTO the sample waveform.

Set Loop Start to:	
Set Loop End to:	
Set Sustain Start to:	
Set Sustain End to:	
Convert to 8-bit	
Trim around loop points	
Cut	Ctrl+X
Copy	Ctrl+C
Paste	Ctrl+V

### Envelope Window

**Loop:** Toggles the [Instrument Loop](#).

**Sustain:** Toggles the [Sustain Envelope](#).

**Carry:** Toggles the [Envelope Carry](#).

**Insert Point:** Adds a new point to the envelope at the location of the mouseclick.

**Remove Point:** Removes the selected point from the envelope. You cannot remove the first or last point.

**Toggle Release Node:** Toggles the point as a [Release Node](#).

**Copy Envelope:** Places the data of the envelope into the Clipboard.

**Paste Envelope:** Transfers the envelope data in the clipboard to the selected envelope, replacing it if it exists already.

**Scale Points:** Shows a dialog which allows you to shift all envelope points by a given factor. For example, scaling by a factor of 2 will double the time it takes to get to each envelope point.

<u>L</u> oop
<u>S</u> ustain
<u>C</u> arry envelope
<u>I</u> nsert Point
<u>R</u> emove Point
<u>T</u> oggle Release Node
<u>C</u> opy envelope
<u>P</u> aste envelope
Scale points...

### Pattern Editor

**Mute Channel:** Disables all audio output from the selected channel.

**Solo Channel:** Disables all audio output, except from the current channel.

**Transition Actions:** Will carry out one of these actions the next time the playback pointer is at the beginning row of the next-played pattern. The actions are Mute (disable audio from the selected channel), Unmute All (enable audio from every channel), or Solo (disable audio from all EXCEPT the selected channel).

**Select Column:** Select all data within the selected channel.

**Select Pattern:** Select all data within the current pattern.

**Cut:** Executes a Copy action on the selected region, then erases all data from it. The cursor is not relocated.

**Copy:** Copies the selection to the clipboard, leaving the data and cursor location intact.

**Paste:** Transfers a copy of the clipboard contents (if it is pattern data) where the cursor is located, overwriting any data within the bounds of the pasted data. This will begin in the same event as the cursor location, even if the cursor is not in

the first column of the event.

**Mix Paste:** Transfers a copy of the clipboard contents where the cursor is located, overwriting any fields within the bounds of the pasted data ONLY IF there is no data in the correlating fields. See the [Edit menu](#) version of this command for an example.

**Undo:** Repeats the last action taken. In the Pattern Editor, ModPlug un-does an action by placing a previous copy of the pattern at its proper location. Navigation cannot be un-done.

**Clear:** Erases all data in the selected region without affecting the clipboard contents.

**Interpolate:** Fills in data that transitions between the uppermost, or "origin", data of the selected column and the lowermost, or "destination", data in the same column. Interpolation can only be called when the first row and the last row of any same column in the selection has data that can be transitioned; in other words, there must be specific data to transition between, and they must be of the same type. If the data in the original row is the same as the destination row, the same data will simply be repeated, filling in any blank fields in the affected columns. The transition will occur within all channels in the selection for those that meet the criteria, using the following rules:

⊙ Interpolating notes

- ✧ The notes will be transitioned using the notes according to the note names of the tuning which they use; if no tuning is applied, it will use MPT's default notes of the "B chromatic scale" — C, C#, D, D#, E, F, F#, G, G#, A, A#, and B.
- ✧ Any row in the interpolated selection which already contains a note will be skipped, and the existing note will remain.
- ✧ If the origin note is also assigned an instrument, the instrument will accompany any note entered into the transition (skipping already existing notes), even if the destination note does not call an instrument.

⊙ Interpolating note FX (volume column)

- ✧ Any row in the interpolated selection which already contains a note effect will be skipped and will remain intact, UNLESS it is the same effect command as the interpolated data.

⊙ Interpolating channel FX (effect)

- ✧ Any row in the interpolated selection which already contains a channel effect will be skipped and will remain intact, UNLESS it is the same effect command as the interpolated data.
- ✧ If only one side of the channel FX column is selected (the prefix or the value), the transition will still occur using the same rules.

**Transpose:** Changes the pitch of all notes within the selection, up or down an octave, or up or down one note.

**Change Instrument:** Assigns the current instrument (shown in the Main Instrument field) to ALL notes within the selection (even if the selection does not include the instrument column). This will override the alternate instrument applied from a keyboard split. (There is no way to apply the alternate instrument based on the note using a keyboard shortcut or contextual menu.) When using "old-style" contextual menus (a preference set in the General Options page), this menu does not appear.

**Amplify:** Assigns a volume command to all notes in any event included in the selection. It is applicable only if the note FX column is included in the selection, but

Mute Channel		
Solo Channel	Alt+A	
On transition: Mute		
On transition: Unmute all		
On transition: Solo		
Select Column	Shift+Ctrl+A	
Select Pattern	Ctrl+A	
Cut	Ctrl+X	
Copy	Ctrl+C	
Paste	Ctrl+V	
Mix Paste	Ctrl+Alt+V	
Undo	Ctrl+Z	
Clear selection		
Interpolate Effect	Alt+4	
Interpolate Vol Col	Alt+3	
Interpolate Note	Alt+1	
Transpose +1	=	
Transpose -1	-	
Transpose +12	Shift+=	
Transpose -12	Shift+-	
Change Instrument	Alt+2	01: Arp 1 (Chainer VST)
Amplify	Shift+Alt+3	02: Arp 2 (Chainer VST)
Visualize Effect	Alt+V	03: Underbeat (Chainer VST)
Grow selection		04: Pad 1 (WAVESTATION)
Shrink selection		05: Pad 2 (Motion)
Show row play time	Ctrl+T	06: Drums (WAVESTATION)
Insert Rows		07: Bass (Chainer VST)
Delete Rows		Remove instrument
		Set to current instrument



the note column does NOT need to be included. When choosing this command, you will be presented with the Amplify dialog which allows you to enter a percent decrease/increase of each notes current volume. (If the note does not have a volume command, the volume value is assumed to be 64; the sample's/instrument's volume settings are not considered). Then each note in an event that is part of the selection will be assigned a volume command with the calculated value. NOTE: Amplify does not work in MOD formats.

**Visualize:** Opens the [Parameter Editor](#) window, using only the channel FX data from the first channel within the selection.

**Grow Selection:** Doubles the number of rows the selection occupies by inserting a blank row after every row in the selection. This will overwrite any rows in those channels below the selection, then re-select the area overwritten. The cursor is not relocated.

**Shrink Selection:** Halves the number of rows the selection occupies by deleting every second row in the selection. The new area is re-selected, but the cursor is not relocated.

**Show Row Play Time** †: Displays an estimate of the time length from the song start to the selected row.

**Insert Rows:** Inserts one row at the top row of the selection in every selected channel, shifting (the rows below it) down by one row, which deletes the last row in the channel.

**Delete Rows:** Deletes the selected rows in the selected channels, shifting (the rows below it) up by the same number deleted and inserting empty rows at the bottom to keep the same number of rows in the channel.

† Only shows when "Old-style context menus" is enabled (in the General page of the Setup Options)

## Order List

**Insert Pattern:** Copies the same selected pattern(s), placing the same Pattern IDs at that point in the Order List.

**Remove Pattern:** Removes the selected pattern(s) from the Order List.

**Create New Pattern:** Places a new blank pattern in the Order List where you clicked, or after the last "official" pattern, whichever is closest to the front. If the selected pattern is a null pattern, the new blank pattern will have the default number of rows (64); otherwise it will contain the same number of rows.

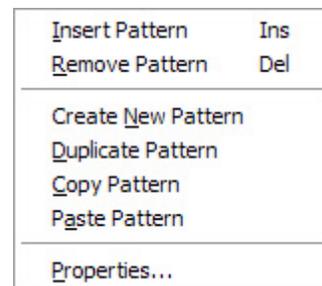
**Duplicate Pattern:** Copies the pattern into a new pattern ID, placing it in the Order List where you clicked, or after the last "official" pattern, whichever is closest to the front.

**Copy Pattern:** Copies the pattern data into the clipboard. You can only copy data from one pattern at a time.

**Paste Pattern:** Places the pattern data in the clipboard into the selected pattern. You can only paste into single, filled patterns.

**Properties:** Opens the [Pattern Properties](#) dialog.

**Render to WAV:** Exports the selected pattern(s) to a .wav file. See the section on [WAV Export](#) for more info.



## Sample Map

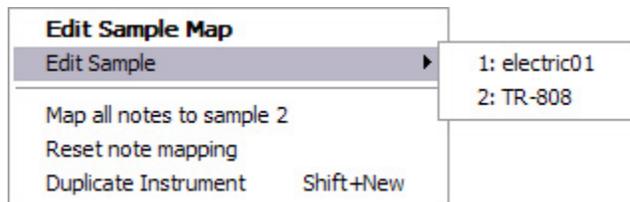
**Edit Sample Map:** Opens the [Sample Map](#) dialog, where you can assign samples to certain notes for input and playback.

**Edit Sample:** Allows you to select a sample whose attributes you wish to modify; once selected, the Samples tab is opened and the sample slot is shown.

**Map All Notes:** Assigns all notes to the given sample.

**Reset Note Mapping:** (not functional)

**Duplicate Instrument:** Creates a new instrument slot and sets all of its attributes to those of the current instrument.



## Channel Header

**Mute Channel:** Disables all audio output from this channel.

**Solo Channel:** Mutes all channels except this one.

**Unmute All:** Enables audio output from all channels.

**Transition Actions:** Will carry out one of these actions the next time the playback pointer is at the beginning row of the next-played pattern. The actions are Mute (disable audio from the selected channel), Unmute All (enable audio from every channel), or Solo (disable audio from all EXCEPT the selected channel).

**Reset Channel:**

**Record Select:** Designates the channel for [Channel Recording](#), assigning the current "Main" instrument to each note.

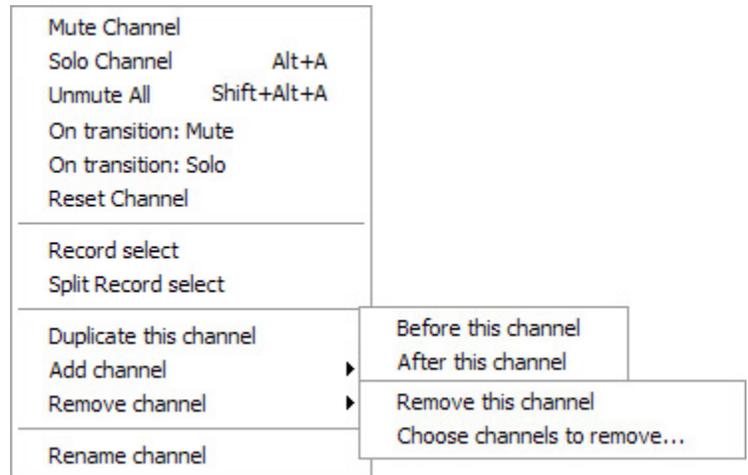
**Split Record Select:** Designates the channel for [Channel Recording](#), assigning the alternate instrument to each note if it falls at or above the split point.

**Duplicate Channel :** Inserts an exact copy of the current channel after it, doing it for EVERY PATTERN. You must choose to insert the new channel before or after the current channel.

**Add Channel :** Inserts a blank channel before or after the current channel IN EVERY PATTERN. Use Remove Channel on the new pattern to undo this action.

**Remove Channel :** Removes the current channel, or opens the Remove Channels dialog so you can select which channels to delete. You will be alerted that this works on EVERY PATTERN and cannot be un-done.

**Rename Channel:** Opens a dialog where you can enter a new label for the channel.



## Other Contextual Menus

Folder Tree

(to be written later)

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## 20. Reference: Sound, Audio, and Digital Control

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(this section is incomplete)

### Audio 101

#### Sound

In the natural world, when matter moves thru air, the gas envelope around it is shifted. If the movement oscillates, and in small enough amounts, it creates a rippling effect around the vibrating matter, the same way a thrown pebble creates ripples in a pond, except the ripple is spherical, around the source. The atmospheric ripple consists of minute changes of air pressure that are often measurable and quantifiable. We call this sound.

Since sound is temporal, in order to quantify the changes in air pressure, we can measure it from a fixed point in space from within the rippling sphere. We can measure how much the air pressure compresses and decompresses slightly from normal pressure, how fast these changes in air pressure occur, and what pattern the pressure changes occur. These form the three natural components of sound, and the terms we use for them are "loudness" (volume), "pitch," and "timbre." All of these can be expressed in waveforms.

## Waveforms

**On the right** is an example of a theoretical waveform. Time is represented universally in waveforms on the X axis, so that moving from left to right indicates the passage of time within the fixed point in space where we are measuring the spherical ripple of sound. Likewise, air pressure is represented on the Y axis, so that 0 on the Y axis (shown as the center horizontal line) represents normal air pressure. It's tempting to think that the waveform is a cross-section of the actual shape of the soundwave; not so — it is only a mathematical representation of the change in air pressure over time.

As a soundwave moves thru time (from left to right) the air pressure will fluctuate (up or down). When the pressure increases above normal, the y value will rise above the horizontal line. But as in most waves, an increase in air pressure means that it was "borrowed" from other space, so behind the increased pressure is a wave of decreased air pressure, often below normal. Here the Y value will dip below the center line over a micron of time. How extreme the fluctuations in air pressure occur dictate the **loudness** of the sound.

The pressure fluctuations come at a certain rate of speed, called a frequency. To visualize the frequency, look only at the instants when the air pressure becomes zero (normal air pressure). As a pattern can be distinguished, this gives a pretty good idea of the frequency of the sound wave. To the human ear, this frequency can be sensorily translated as **pitch**.

However, the fluctuations in air pressure do not have to oscillate in a symmetrical or ordered way. The changes in air pressure can be shown in waves, but often these waves overrun and attenuate each other, and often change the entire wave in such a way that fluctuations in air pressure can occur on the fluctuations themselves ("even his muscles have muscles!"). This seeming randomness within a waveform creates subfrequencies, which are perceived as harmonics. The amount and depth of these harmonics form a sonic impression to our aural senses — **timbre**.

## Digital Representation

Sound can be stored on a physical medium or as digital data. All sound stored on physical material is referred to as **analog** recording, such as vinyl records, magnetic tape like 8-track or cassette, or other means. The waveforms that reproduce the sound are generated when playing back the medium, and must usually be amplified electronically to hear it. The advantage of analog recording is that even if the medium becomes damaged, the sound can still be transmitted and heard, even with glitches in the audio output.

Sound can also be stored as data in a **digital** recording, but in order for this to occur, the sound input must be converted from a natural sound to an analog signal, then further to an electronic representation of the waveform. When this happens, the air pressure acts upon the input medium (microphone) and an analog-to-digital conversion circuit transfers the physical fluctuations of air pressure into a stream of amplitude values, with higher pressures given values above 0 and lower pressures less than 0. In this way, these values can be stored in a linear table and shown graphically as a waveform.

Sound can also be generated by digital means by creating values for the waveform, which are often done algebraically or algorithmically. Whether created or recorded, in order for digitally generated sound to be heard, it's sent thru circuitry to a digital-to-analog convertor (DAC), and then to a speaker, which allows electric pulses to resonate over a surface and cause the vibrating surface to re-create the waveform physically.

There are 3 main attributes of digital waveforms when they are received, transmitted, or stored — Channel output, Sample Rate, and Bit Depth (or Bit Resolution). A digital sound output or input can be sent thru and stored in one or more audio routes, called channels. This channel output allows for panning, stereo, and surround sound effects.

When an ADC circuit receives electric pulses from the sound waves, it converts the waveform data in intervals (called "samples") at a given rate — the **sample rate** — which is measured in hertz (samples per second). The sample rate of a waveform, therefore, represents the number of data values within one second of the sound, measuring the detail level of the waveform. The higher the sample rate, the more detail can be applied. This is important for higher frequencies which require higher detail for more accurate reproduction.

The Y values (amplification data) that can be represented in a waveform depend on the range of numbers that limit these values. For example, if the allowable range is from 0 - 255 ( $2^8$ ), you can assign values -127 to 128 to indicate the lowest and highest amplitude peaks in the waveform. This range is directly dictated by a waveform's **bit depth**; the higher the bit resolution, the louder the waveform can be. (Often bit depth is erroneously called "bit rate", but in audio engineering the terms mean different things.) So a bit depth of  $2^{16}$  can allow for loudness values between -255 to 256. This is called 16-bit resolution and is used in most sound data files, like samples.

## Volume

Amplification

Clipping

Normalization

## Pitch

Portamento

Vibrato

## Stereo Position (Pan)

# MIDI Reference

## Overview

Before the early '80s there was no common language or electronic message system that was shared between synthesizers. Then in 1982 a protocol was outlined to allow commands or other electronic messages to be used to control or read synthesizer data in more-or-less a universal format. It was dubbed the Musical Instrument Digital Interface or MIDI for short (mid'-dee). MIDI transmissions are only electronic event messages rather than audio signals, and are designed to allow each synthesizer to produce and process audio in its own way, but be controlled using somewhat universal commands.

For example, you can play notes, bend their pitches, control panning positions, or sync timers between synthesizers of different makes and models, using a single set of commands understood by both devices. Because the electronic stream is data rather than audio waveforms, the files that contain these event messages are quite small, compared to other means of creating electronic music.

In the 1980s, MIDI allowed for digital composition to be done on computers or specialized electronic devices called "sequencers." Sequencing used the MIDI language to make it easy to record and edit events that would control MIDI synthesizers, and even trigger it to play back the audio, which could be recorded to an audio medium. While file sizes are small and the commands can be understood by any MIDI-compatible device, the disadvantage is that the song will probably sound different on different synths, because each have their own means of producing sounds, especially among synthesizer companies.

This problem was somewhat addressed by the advent of General MIDI, or GM, which is simply one or more banks of preset instrument programs, that any sequencer file can call to produce a universal playback sound, no matter what synth is used. The GM standard not only assigned specific instruments to particular program numbers, it also mapped many MIDI controllers to important synthesis effects, set minimums for polyphony and number of channels, and assigned internal samples to instruments. GM is still in use today, and even has been expanded into different formats like Roland's GS and Yamaha's XG, as well as the more recent GM2 specifications present in many newer synthesizers.

Many of the synthesizer parameters that can be manipulated are done so using MIDI messages that work in each channel, of which there are only 16. While the channels are limited to 16, one can send Program Change messages to call up different instruments. But this means that one synth can only play a maximum of 16 instruments at once (alho each instrument can have more than one multisample assignments). But this instrument limitation is not the same as polyphony, which limits the number of notes or voices.

These MIDI channel messages are only a few bytes in length, which make for excellent translation speed between the event and the parameter control. In a normal playing of a note on a keyboard, here is an example of the messages that are and can be sent:

- When the user presses a note key, the Note On message is sent, which is a data package that contains the note (within a range of 0 to 127, the range of notes of the MIDI keyboard) and the "key velocity," the strength that the note was struck. Some synthesizers may interpret this as "note volume" and some programs may control different parameters of the instrument based on velocity amount.
- If the user continues applying pressure to the synth keys while holding them (this is called "aftertouch"), the synth will send either aftertouch messages (also called "Poly Pressure") from each key, or "channel pressure" messages, which applies the aftertouch to the whole keyboard.
- When the user releases the keys, a Note Off message is sent, which also contains the "release velocity" of each note,

which is the strength of each key being released.

Not all synthesizers pass or understand all of these parameters; the only ones that are truly universal are the note values for Note On and Note Off messages. Furthermore, many synthesizers offer ways of affecting the instrument settings as they're being processed, such as Pitch Bend and Modulation wheels, joysticks, data sliders, knobs and buttons, foot controllers and pedals, breath controllers, and ribbon controllers. All of these send their own messages using their own controller numbers, which can sometimes be assigned by the user, depending on the synth model.

## MIDI Messages

The data blocks commonly referred to as MIDI Messages are sent serially in one-way paths from one MIDI device's "MIDI Out" connector to the other device's "MIDI In" connector ("MIDI Thru" echoes the MIDI-In signal). The messages are simple but specific, often taking the form of commands that not only control various synth settings like pitch, volume, key pressure, and filters, but also change programs or banks or toggle arpeggiations or on-board effects. Many of these messages have a universal scope of application, but not all do; each company can set its own use for the MIDI controller messages, and even different devices from the same company will use the same controller assignments to manipulate different parameters. [Appendix C](#) has a standard table for MIDI message usage.

There are basically 8 types of MIDI messages:

- **Notes:** MIDI has 127 notes represented, from C -1 to G 9 (the equivalent of C 0 to G 10 in MPT's octave range), or 0 - 127. Using Western tuning this is the range from 8.176 Hz to 12,544 Hz. Sending a note value with velocity greater than 0 is considered a Note On message.
- **Key pressure:** An aftertouch message is sent when notes that are on are being pressed with non-static pressure. Most low-end synthesizers use Channel Pressure messages that apply aftertouch to the entire keyboard, while the more expensive synths often send Poly Pressure messages from each pressed key (which require more sensors in the assembly). These two types of aftertouch are often not found together in the same keyboard.
- **Pitch Bend:** In MPT, this is called portamento, but it increases or decreases the pitch of the note smoothly in 8192nds of a semitone (or by single semitones if a glissando setting is enabled). These messages bend the synthesizer notes by up to 2 semitones up or down in one event. However, the synthesizer or an instrument parameter defines how far one note can be bent relative to the original pitch.
- **Continuous Controller:** For all other instrument parameters that can be manipulated, CC messages are assigned by the manufacturer to control certain settings. While there is a standardized set of controls, there is a certain amount of flexibility by each synth maker, so don't assume that a standard CC command will control a listed parameter. For clarity, you must check each synthesizer's MIDI implementation table.
- **Program Change:** These special messages call up another program (or patch) from the synthesizer. There is also a type of channel message that changes banks.
- **System:** These are specialized messages such as MIDI clock ticks that stay in sync with the clocks of other MIDI devices, and Active Sense messages that keep the connection between inactive MIDI devices. System messages are like the heartbeat or digestive movements; they are internal and automatic.
- **System Exclusive (SysEx):** These messages are usually non-MIDI data dumps or device settings that each manufacturer defines for its devices. This type of message is rarely used by non-programmers except for backup purposes.
- **Real-time System Exclusive:** These are the newer type of MIDI messages that control the interaction and communication of MIDI-compatible equipment that activate light or other entertainment devices. These devices are designed mainly for stage shows and concerts.

## MPT Setup

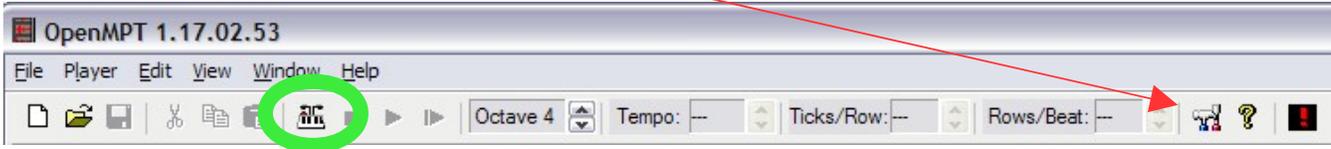
In order for Modplug to make use of MIDI communication, it has to be able to receive and understand incoming MIDI data as well as send MIDI messages in the proper syntax. MPT's MIDI implementation is not complete but should suffice; however, in order to use external MIDI devices you need to have a proper setup. Also see the Addendum for other specific MIDI issues that have been found. See the next section for MPT's MIDI implementation chart.

Originally MPT was not designed for MIDI input or output but several features and workarounds have been added to allow you to use an external MIDI device both for entering notes and for playback. This makes it easy to input notes if you're used to composing from a musical keyboard. But it also increases the functionality of MPT by being able to send notes to via MIDI and play back the synthesizer or device like a sequencer.

Below is the procedure for using your MIDI device with MPT. If you're not using a MIDI device, you can skip this section. For other options or troubleshooting MIDI problems, see the chapter on the [MIDI Setup Page](#).

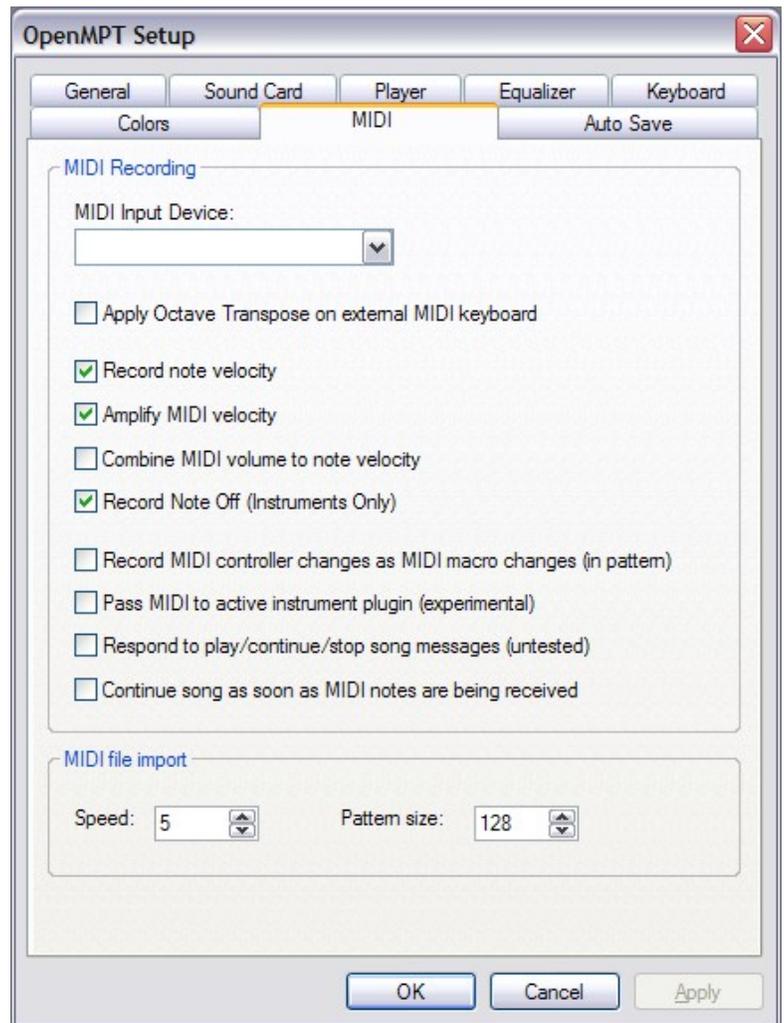
## Enabling MIDI Input

1. Plug your MIDI device into your computer. Unless the device has a PC-specific port (serial or USB), or your computer has a MIDI-specific input, you will probably need a special converter plug to transfer MIDI messages between the two. Check your device's manual to make sure you have the correct connection. Many newer computer models no longer use serial ports, but some older MIDI synths provided them. If you're planning to purchase a MIDI device for use with MPT, it's advisable to get one with USB connections, since they are generally the most universal and they have a higher data exchange speed and reliability.
2. Click on the Preferences icon in the Main toolbar



(or alternatively, load or create a track and in the View menu, select the Setup submenu). The Setup dialog will open.

3. Click on the MIDI tab to see the MIDI setup page, shown on the right.
4. In the MIDI Input Device popup menu, make sure the correct input for your MIDI device is selected.
5. In the Main Toolbar, select the MIDI Record button, circled in green above.
6. Now while editing in the Pattern Editor, notes played on your MIDI keyboard will input the corresponding notes in the pattern.
7. To assign a MIDI controller to a macro, so that you can manipulate MIDI parameters during playback, see the section on [Zxx Macros](#), specifically the section on MIDI instruments.



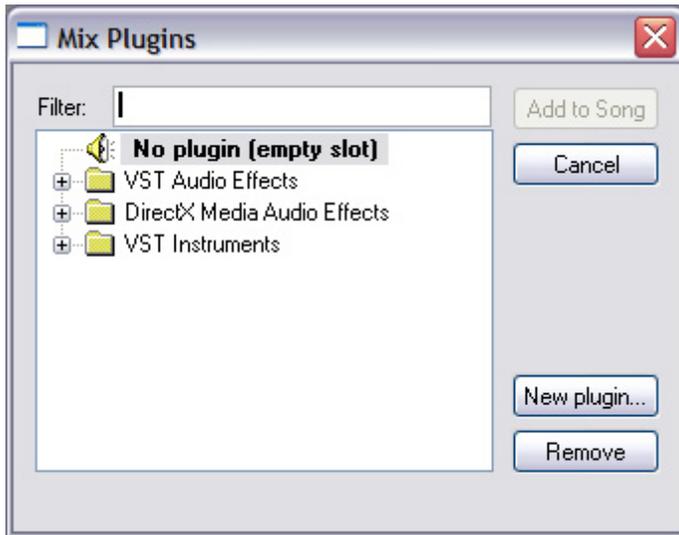
## Enabling MIDI Output

MPT cannot access MIDI keyboards from the application itself, but there are VSTs which enable MIDI routing outside of MPT to Windows to the MIDI port. These can be found at [kvraudio.com](http://kvraudio.com) or other sites that allow downloads of VSTs. One such free VST is called VST2MID, and we'll use this to provide MIDI output access. Here is the method for accessing the MIDI keyboard from MPT:

1. Open or create a track (any format will work except MODs). Also make sure you have the VST2MID in your plugin folder. If you don't know what this means, review the section on [Plugin Setup](#).
2. In the General page, in the Plugin section at the bottom half of the page, make sure the current plugin is empty, and click on the "Select" button next to it.



The Plugin Manager window will open.



3. Find the VST2MID plugin (it should be in the VST Audio Effects directory). If it is not listed you must load into MPT's plugin cache. (Click on the "New Plugin" button, find the VST .dll file, and open it.) Once it's in the Plugin List, click on it, and click on the top button ("Put in FX01" or whatever slot you're putting it into).
4. If it's loaded properly, you can click on the Edit button to see its interface, shown below. Click on the selection text under "MIDI Out Port" to choose the MIDI synth to route MIDI data to.



5. Now you must assign an instrument to the VST. Normally you can just create an instrument and assign FX01 as the plugin (more detailed instructions are [here](#)); this will send all note data to the VST2MID router, which in turn will send it to the port where your MIDI instrument receives its data. This should play the MIDI instrument.

## MPT Implementation

This is a list of current MIDI messages that are available, and how MPT if at all handles MIDI messages, both received and transmitted. Testing was done with a MIDI keyboard whose MIDI implementation was limited, which means this chart may be incomplete. YES means that testing showed MIDI was received or transmitted as expected.

(to be written later)

## Appendix A: FX commands

This reference is designed for quick reading and comprehension of the commands that are used as Channel Effects (those entered into the fourth column in a channel). It was determined early on, therefore, to divide the commands by module format, even though most of them are alike. This is because track composers will normally stick to one format they either like, or are used to, or in some cases are limited to. This way they don't have to "read over" information that doesn't apply to their work.

It should be noted that the MOD and XM formats share most of their similar commands, while S3M and IT (and IT-compatible) formats share a different set, even though they duplicate many of the MOD/XM functions and features.

Also, most Channel FX do not affect VSTs. Those that can be used to affect VST playback are indicated with an underscore. Keep in mind that many of these can affect the channel but not the VST, such as Set Channel Volume (Mxx), while other can disrupt VST processing, such as Position Jumps (Bxx), which may desync arpeggiation or gating.

The syntax for the command parameters is this: a command consists of one character (the "prefix") followed by the value that will be applied, which is a hexadecimal number (for notation purposes, a hex value, if you don't know, is preceded by a dollar sign \$). If the notation is given as **xx**, this means the value is expecting a number between \$00 and \$FF, which is a decimal value of 0 – 255. If the notation is **xy**, each digit is independent of the other, and each will be using a value between \$0 and \$F (0 – 15). For example, for the Oxx command, xx will be a value between \$00 and \$FF; so for a value of 98, convert the decimal value to hex (\$62) and enter it in the fourth column (in the row it should apply) as O62. As another example, the Hxy command uses two values, x and y; so if x is 4 (vibrato speed) and y is 12 (vibrato depth), you enter the command as H4C. Note that some values are limited by the command, such as the XM command Cxx, which limits the value to \$40 (64).

### MOD Effect Commands

[0xy](#): Arpeggio  
[1xx](#): Portamento Up  
[2xx](#): Portamento Down  
[3xx](#): Tone-Portamento  
[4xy](#): Vibrato  
[5xx](#): Tone-Portamento + Volume Slide  
[6xx](#): Vibrato + Volume Slide  
[7xy](#): Tremolo  
[8xx](#): Set Panning  
[9xx](#): Set Sample Offset  
[Axy](#): Volume Slide  
[Bxx](#): Position Jump  
[Cxx](#): Set Volume  
[Dxx](#): Pattern Break  
[Fxx](#): Set Speed/Tempo

#### Exy: Extended MOD Commands

[E1x](#): Fine Portamento Up  
[E2x](#): Fine Portamento Down  
[E3x](#): Glissando Control  
[E4x](#): Vibrato Control  
[E5x](#): Set Finetune  
[E6x](#): Pattern Loop  
[E7x](#): Tremolo Control  
[E9x](#): Retrigger  
[EAx](#): Fine Volume Slide Up  
[EBx](#): Fine Volume Slide Down  
[ECx](#): Quick Note  
[EDx](#): Note Delay  
[EEx](#): Pattern Delay  
[EFx](#): Invert Loop

### Waveforms

For any effect commands which change the waveform of internal oscillators (such as vibrato), the following table shows the possible values of x for that command.

x	waveform	x	waveform
0	sine (default) — retrigger	4	sine — continue
1	saw — retrigger	5	saw — continue
2	square — retrigger	6	square — continue
3	random — retrigger	7	random — continue

If the waveform is selected with retrigger, then new notes will be restart the waveform.

## MOD Pitch Effects

For most pitch alterations, the rate of change is directly influenced by the ticks-per-step value (Speed). The higher this rate, the quicker the bend. The pitch will be bent the same amount per tick, so more ticks will mean more of a bend per step. Furthermore, what is being changed is the frequency on a linear basis (called a period) according to internal tables. So, not only does pitch bending sound different depending on the source note, but it also makes it difficult to quantify the amount of pitch change per tick.

Note in any pitch set or slide, you cannot access pitches outside of the range of C1 to B5.

<b>0xy</b> Arpeggio	Plays an arpeggiation of 3 notes in one row, cycling between note, note + x halftones, note + y halftones. Example: C-4 01 . . 037 Plays C4, D#4 (C-4 + 3 semitones), and G4 (C4 + 7 semitones).
<b>E30</b> Disable Glissando <b>E31</b> Enable Glissando	When glissando is active, tone-portamento effects will slide by semitones (like a guitar).
<b>E5x</b> Set Finetune	Sets the finetune value of the current sample's pitch to the signed nibble x, whose legal values are 0 - F, corresponding to signed nibbles 0 to 7, -8 to -1.

### Portamento (Pitch Bend)

<b>1xx</b> Portamento Up <b>2xx</b> Portamento Down	Slides up/down the pitch of the current note being played, increasing/decreasing the playback period by xx every tick. Thus, the Speed setting affects the amount of pitch change.
<b>E1x</b> Fine Portamento Up <b>E2x</b> Fine Portamento Down	Increases/decreases the pitch of the current sample by x, but unlike regular portamento, the slide takes place only at the first tick.
<b>3xx</b> Tone-Portamento	Pitch-bends the previous note towards the current note at rate xx for the duration of the current row. The rate is xx every tick, and is thus affected by the Speed. If xx is 00, the bend will continue at the last rate given. Example: C-4 01 . . . . F-4 . . . . 305 (bends the note up by 5 towards F4) . . . . . 300 (continues to slide up during this step, until F4 is reached) If the glissando command has been activated ( <b>E31</b> ), the pitches will be rounded to the nearest halftone.

### Vibrato (Pitch Oscillation)

<b>4xy</b> Vibrato	Vibrato with rate x and depth y, where x/64 is the number of ticks per row, and y/16 is the number of semitones to oscillate. This command will oscillate the frequency of the current note with a sine wave (you can change the vibrato waveform by using the <b>E4x</b> command).
<b>E4x</b> Vibrato Control	Sets the waveform of succeeding Vibrato effects to x. (See the paragraph on Waveforms at the beginning of this list.)

## MOD Volume Effects

Under all circumstances, volume in Channel FX affects the CHANNEL volume, and this value cannot exceed 64 (\$40). For more info on the total output volume, see the Reference section on [Volume](#).

<b>A0x</b> Volume Slide Down <b>Ax0</b> Volume Slide Up	Increases/decreases the channel's current volume by x × (Speed – 1). Thus, the Speed setting affects the amount of pitch change. If x is not 0, the second digit is ignored.
<b>EAx</b> Fine Volume Slide Up <b>EBx</b> Fine Volume Slide Down	Increments/decrements the volume of the current sample by x, at the beginning of the step, instead of gradually sliding.
<b>50x</b> Vol. Slide Down + Tone-Portamento <b>5x0</b> Vol. Slide Up + Tone-Portamento	Equivalent to Volume Slide ( <b>Axy</b> ) plus Tone-Portamento Continue ( <b>300</b> ). The note given will be the portamento target while x or y is the amount of volume change in that step (see the command <b>Axy</b> for clarification). The portamento rate is the last one used by a portamento command ( <b>1xx</b> , <b>2xx</b> , or <b>3xx</b> ). Use <b>500</b> to continue towards the pitch at the last volume slide called with this command.
<b>60x</b> Vol. Slide Down + Vibrato <b>6x0</b> Vol. Slide Up + Vibrato	Equivalent to Volume Slide ( <b>Axy</b> ) plus Vibrato Continue ( <b>400</b> ), this command increases/decreases the channel volume by x × (Speed – 1) while continuing the previous vibrato, using the vibrato rate and depth given in the last vibrato command. The Speed setting affects the amount of pitch change AND volume slide.
<b>Cxx</b> Set Channel Volume	Sets the current volume to xx. For MOD tracks, avoid using the volume column for volume effects, since the volume column isn't saved in the file. NOTE: ModPlug Tracker will replace volume column effects with the equivalent Channel Effect commands when saving as a MOD file, stripping away the effects column data.

## Tremolo (Volume Oscillation)

<b>7xy</b> Tremolo	Tremolo with speed x and depth y, where x is the number of ticks per row, in 64ths, and y is the amount of volume to oscillate, in 16ths. This command will oscillate the volume of the current note with a sine wave, but you can change the waveform with the <b>E7x</b> command.
<b>E7x</b> Tremolo Control	Sets the waveform of succeeding Tremolo effects to x. (See the paragraph on Waveforms at the beginning of this list.)

## MOD Panning Effects

<b>8xx</b> Set Panning	Sets the pan position of the current channel. The value ranges from 00 (left) to FF (right).
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## MOD Pattern Effects

<b>Bxx</b> Position Jump <sup>‡</sup>	Causes the playback to jump to the pattern position xx, where xx is a number between 0 and 127 (MOD tracks have a maximum number of 128 patterns). As an example, <b>B00</b> will restart the song from the beginning. If used together with a pattern break ( <b>Dxx</b> ), you can also specify the starting row (by default, it will play from the start of the pattern).
<b>Dxx</b> Pattern Break	Jumps to row xx (which, remember, is in hex) of the NEXT pattern in the Order List. (For MODs, xx can only be a value from 00 - 40.) If the current pattern is the last pattern in the Order List, this command will go to the row xx of the same pattern. NOTE: When doing a Pattern Playback (as opposed to a SONG Playback) and "Loop Pattern" is enabled, <b>Dxx</b> will only apply to the current Pattern.
<b>E6x</b> Pattern Loop	Sets up this pattern's loop. The start of a pattern loop defaults to the first step in the pattern, but if x = 0, the start of a loop is reset to the current step. If x is any other value, after this step, the loop is replayed another x times before continuing THE SONG. Hence this Effect cannot be performed across multiple patterns. Note that pattern loops do not support nesting.
<b>EEx</b> Pattern Delay	Delays the playback of the current row by x rows. Any sounds still playing will continue to process, but the reading of the next row will not continue until this delay is complete.
<b>Fxx</b> Set Speed/Tempo	Sets the ticks per row (if xx is smaller than F20) or the SONG TEMPO (if xx is greater than F20). Avoid using exactly F20 as a parameter, since it can cause problems between players. If xx = 0, it is treated as Speed = 1.

## MOD Sample Effects

<b>9xx</b> Set Sample Offset	Starts playing the instrument's sample at the position xx × 256 (instead of position 0). If xx is 00, the previously used <b>9xx</b> value will be used.
<b>E9x</b> Retrigger Note	Plays the instrument (at the same note and only for the duration of the row) every x ticks. If x is greater than the number of ticks, the retrigger is never activated (because the next step will have begun).
<b>ECx</b> Quick Note	Cuts the current note after x ticks by setting the note volume to 0. This means you must call the sample again in another note before any sound is heard (the volume must be reset to its default or a volume you specify).
<b>EDx</b> Note Delay	Delays playing the specified note for x ticks.
<b>EFx</b> Invert Loop	Not functional in MPT.

<sup>‡</sup> NOTE FOR MODPLUG PLAYER: Although MPT allows backward jumping, most players (including Modplug Player) disable backward jumps in the song if looping mode isn't enabled, so that it is not possible to loop a song forever (pretty annoying in a playlist). This means if you wish to jump BACKWARDS from a point in the track, you must enable the Loop Song toggle in the module player software, which in turn means the song where a backward position jump occurs will loop forever until manually unlooped.

## XM Effect Commands

Channel Effect commands in XM are the same as all the MOD commands, with a few additions. XM has the added ability to apply envelopes and use VSTs, as well as setting many initial parameters.

0xy: Arpeggio  
1xx: Portamento Up  
2xx: Portamento Down  
3xx: Tone-Portamento  
4xy: Vibrato  
5xy: Volume Slide + Tone-Portamento  
6xy: Volume Slide + Vibrato  
7xy: Tremolo  
8xx: Set Panning  
9xx: Set Sample Offset  
Axy: Volume Slide  
Bxx: Position Jump  
Cxx: Set Volume  
Dxx: Pattern Break

E9x: Retrigger  
EAx: Fine Volume Slide Up  
EBx: Fine Volume Slide Down  
ECx: Quick Note  
EDx: Note Delay  
EEx: Pattern Loop  
EFx: Invert Loop  
Fxx: Set Speed/Tempo  
Gxx: Set Global Volume  
Hxy: Global Volume Slide  
Kxx: Key Off  
Lxx: Set Envelope Position  
Pxx: Panning Slide  
Rxy: Retrigger  
Txy: Tremor

### Exy: Extended MOD Commands

E1x: Fine Portamento Up  
E2x: Fine Portamento Down  
E3x: Glissando Control  
E4x: Vibrato Control  
E5x: Set Finetune  
E6x: Pattern Delay  
E7x: Tremolo Control

### Xxy: Extended XM effects

X1x: Extra Fine Portamento Up  
X2x: Extra Fine Portamento Down  
X9x: Extended Channel Settings  
Yxy: Panbrello

## Waveforms

For any effect commands which change the waveform of internal oscillators (such as vibrato), the following table shows the possible values of x for that command.

x	waveform	x	waveform
0	sine (default) — retrigger	4	sine — continue
1	saw — retrigger	5	saw — continue
2	square — retrigger	6	square — continue
3	random — retrigger	7	random — continue

If the waveform is selected with retrigger, then new notes will be restart the waveform.

## XM Pitch Effects

For most pitch alterations, the rate of change is directly influenced by the ticks-per-step value (Speed). The higher this rate, the quicker the bend. The pitch will be bent the same amount per tick, so more ticks will mean more of a bend per step. Furthermore, what is being changed is the frequency on a linear basis (called a period) according to internal tables. So, not only does pitch bending sound different depending on the source note, but it also makes it difficult to quantify the amount of pitch change per tick.

Note in any pitch set or slide, you cannot access pitches outside of the range of C1 to B5.

<b>0xy</b> Arpeggio	Plays an arpeggiation of 3 notes in one row, cycling between note, note + x halftones, note + y halftones. Example: C-4 01 . . 037 Plays C4, D#4 (C-4 + 3 semitones), and G4 (C4 + 7 semitones).
<b>E30</b> Disable Glissando <b>E31</b> Enable Glissando	When glissando is active, tone-portamento effects will slide by semitones (like a guitar).
<b>E5x</b> Set Finetune	Sets the finetune value of the current sample's pitch to the signed nibble x, whose legal values are 0 - F, corresponding to signed nibbles 0 to 7, -8 to -1.

## Portamento (Pitch Bend)

<b>1xx</b> Portamento Up <b>2xx</b> Portamento Down	Slides up/down the pitch of the current note being played, increasing/decreasing the playback period by xx every tick. Thus, the Speed setting affects the amount of pitch change per row.
<b>E1x</b> Fine Portamento Up <b>E2x</b> Fine Portamento Down	Increases/decreases the pitch of the current sample by x, but unlike regular portamento, the slide takes place only at the first tick.
<b>X1x</b> Extra fine portamento up <b>X2x</b> Extra fine portamento down	Increases/decreases the pitch of the current sample by x, but unlike regular portamento, the slide takes place only at the first tick and only by a fourth of the normal period.
<b>3xx</b> Tone-Portamento	Pitch-bends the previous note towards the current note at rate xx for the duration of the current row. The rate is xx every tick, and is thus affected by the Speed. If xx is 00, the bend will continue at the last rate given. Example: C-4 01 .. ... F-4 .. .. 305 (bends the note up by 5 towards F4) ... .. 300 (continues to slide up during this step, until F4 is reached) If the glissando command has been activated ( <b>E31</b> ), the pitches will be rounded to the nearest halfnote.

## Vibrato (Pitch Oscillation)

<b>4xy</b> Vibrato	Vibrato with rate x and depth y, where x is the number of ticks per row, in 64ths, and y is the number of semitones to oscillate, in 16ths. This command will oscillate the frequency of the current note with a sine wave (you can change the waveform with the <b>E4x</b> command).
<b>E4x</b> Vibrato Control	Sets the waveform of succeeding Vibrato effects to x. (See the paragraph on Waveforms at the beginning of this list.)

## XM Volume Effects

Except for **Gxx** and **Hxy**, volume in Channel FX affects the CHANNEL volume, and this value cannot exceed 64 (\$40). For more info on the total output volume, see the Reference section on [Volume](#).

<b>A0x</b> Volume Slide Down <b>Ax0</b> Volume Slide Up	Increases/decreases the channel's current volume by $x \times (\text{Speed} - 1)$ . Thus, the Speed setting affects the amount of pitch change. If x is not 0, the second digit is ignored.
<b>EAx</b> Fine Volume Slide Up <b>EBx</b> Fine Volume Slide Down	Increments/decrements the volume of the current sample by x only at the first tick.
<b>5xx</b> Volume Slide + Tone-Portamento	Equivalent to Tone-Portamento ( <b>300</b> ) plus Volume Slide ( <b>Axy</b> ). The note given will be the portamento target while x or y is the amount of volume change in that step (see the command <b>Axy</b> for clarification). The portamento rate is the last one used by a portamento command ( <b>1xx</b> , <b>2xx</b> , or <b>3xx</b> ). Use <b>500</b> to continue towards the pitch at the last volume slide called with this command.
<b>60x</b> Vol. Slide Down + Vibrato <b>6x0</b> Vol. Slide Up + Vibrato	Equivalent to Volume Slide ( <b>Axy</b> ) plus Vibrato Continue ( <b>400</b> ), this command increases/decreases the channel volume by $x \times (\text{Speed} - 1)$ while continuing the previous vibrato, using the vibrato rate and depth given in the last vibrato command. The Speed setting affects the amount of pitch change AND volume slide per row.
<b>Cxx</b> Set Channel Volume	Sets the current volume to xx.
<b>Gxx</b> Global Volume	Sets the GLOBAL song volume to xx.
<b>Hxx</b> Global Volume Slide <b>HFx</b> Fine Global Vol. Slide Down <b>HxF</b> Fine Global Vol. Slide Up	Slides up or down the SONG'S current volume by $x \times (\text{Speed} - 1)$ , except for fine volume slides, which is done by x amount only in the first tick of the row.

## Tremolo (Volume Oscillation)

<b>7xy</b> Tremolo	Tremolo with speed x and depth y, where x is the number of ticks per row, in 64ths, and y is the amount of volume to oscillate, in 16ths. This command will oscillate the volume of the current note with a sine wave (you can change the waveform with the <b>E7x</b> command).
<b>E7x</b> Tremolo Control	Sets the waveform of succeeding Tremolo effects to x. (See the paragraph on Waveforms at the beginning of this list.)

<b>Txy</b> Tremor	Turns on and off the current channel every tick, where x = on time and y = off time; the volume will be set at the current note volume for x ticks, and then muted (volume set to 0) for y ticks. This effect is different from the Tremolo effect ( <b>7xy</b> ) in that it does not manipulate the instrument's sound, but rather the CHANNEL'S output, which may be affected by VST or other Effects.
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### XM Panning Effects

<b>8xx</b> Set Panning	Sets the pan position of the current channel. The value ranges from 00 (left) to FF (right).
<b>Pxx</b> Panning Slide	Slides the panning of the current channel by xx points. The panning points are from 00 (left) to FF (right).
<b>Yxy</b> Panbrello (pan oscillation)	Panbrello with speed x and depth y. This command will oscillate the pan of the current note with a sine wave. You cannot change the panbrello waveform in XM tracks.

### XM Pattern Effects

<b>Bxx</b> Position Jump <sup>†</sup>	Causes the playback to jump to the pattern position xx. As an example, <b>B00</b> will restart the song from the beginning. If used together with a pattern break ( <b>Dxx</b> ), you can also specify the starting row (by default, it will play from the start of the pattern).
<b>Dxx</b> Pattern Break	Jumps to row xx (which, remember, is in hex) of the NEXT pattern in the Order List. If the current pattern is the last pattern in the Order List, this command will go to the row xx of the same pattern. NOTE: When doing a Pattern Playback (as opposed to a SONG Playback) and "Loop Pattern" is enabled, <b>Dxx</b> will only apply to the current Pattern.
<b>E6x</b> Pattern Loop	Sets up this pattern's loop. The start of a pattern loop defaults to the first step in the pattern, but if x = 0, the start of a loop is reset to the current step. If x is any other value, after this step, the loop is replayed another x times before continuing THE SONG. Hence this Effect cannot be performed across multiple patterns. Note that pattern loops do not support nesting.
<b>EEx</b> Pattern Delay	Delays the playback of the current row by x rows. Any sounds still playing will continue to process, but the reading of the next row will not continue until this delay is complete.
<b>Fxx</b> Set Speed/Tempo	Sets the ticks per row (if xx is smaller than \$20) or the SONG TEMPO (if xx is greater than \$20). Avoid using exactly \$20 as a parameter, since it can cause problems between players.

### XM Instrument Effects

<b>9xx</b> Set Sample Offset	Starts playing the instrument's sample at the position xx x 256 (instead of position 0). If xx is 00, the previously used <b>9xx</b> value will be used.																																				
<b>E9x</b> Retrigger Note	Plays the instrument (at the same note and only for the duration of the row) every x ticks. Example: <pre> ... .. F06 (Sets tick speed to 6) C-3 42 .. E93 (Retrig at tick 3 out of 6) </pre> If x is greater than the number of ticks, the retrigger is never activated (because the next step will have begun).																																				
<b>Rxy</b> Retrigger Note with Volume	Plays the instrument (at the same note within the step) every y ticks, with x volume change. On the right is the volume retrigger value table based on x. When a note is retriggered, the source note is cut (a Note Cut is not sent, but the channel is reset and its sound ceases) whether the note was internal or from a VSTi before being played again. In VSTi's, volume is not applied to retrigger. If xx is greater than the number of ticks the retrigger is never activated (because the next step will have begun). Example: <pre> ... .. A06 (Sets tick speed to 6) C-3 02 v32 Q73 (Play Instrument 2 at C3 with volume 32, then retrigger at tick 3 out of 6 with volume 16) </pre> <table border="1"> <thead> <tr> <th>x</th> <th>volume</th> <th>x</th> <th>volume</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>no change</td> <td>8</td> <td>no change</td> </tr> <tr> <td>1</td> <td>-1</td> <td>9</td> <td>+1</td> </tr> <tr> <td>2</td> <td>-2</td> <td>A</td> <td>+2</td> </tr> <tr> <td>3</td> <td>-4</td> <td>B</td> <td>+4</td> </tr> <tr> <td>4</td> <td>-8</td> <td>C</td> <td>+8</td> </tr> <tr> <td>5</td> <td>-16</td> <td>D</td> <td>+16</td> </tr> <tr> <td>6</td> <td>x 2/3</td> <td>E</td> <td>x 1.5</td> </tr> <tr> <td>7</td> <td>x 1/2</td> <td>F</td> <td>x 2</td> </tr> </tbody> </table>	x	volume	x	volume	0	no change	8	no change	1	-1	9	+1	2	-2	A	+2	3	-4	B	+4	4	-8	C	+8	5	-16	D	+16	6	x 2/3	E	x 1.5	7	x 1/2	F	x 2
x	volume	x	volume																																		
0	no change	8	no change																																		
1	-1	9	+1																																		
2	-2	A	+2																																		
3	-4	B	+4																																		
4	-8	C	+8																																		
5	-16	D	+16																																		
6	x 2/3	E	x 1.5																																		
7	x 1/2	F	x 2																																		

<b>ECx</b> Quick Note	Cuts the current note after x ticks by setting the note volume to 0. This means you must call an instrument again before any sound is heard (the volume must be reset to its default or a volume you specify).
<b>EDx</b> Note Delay	Delays playing the specified note for x ticks.
<b>EFx</b> Invert Loop	Not functional in MPT.
<b>Kxx</b> Key Off	Sends a Note Off command to the given instrument (or the last one called if an instrument is not given).
<b>Lxx</b> Set Envelope Position	Sets the envelope position to tick xx. (This value can be checked in the Status Bar under the Envelope Window.)
<b>X9C</b> Global Filter Mode (IT compatibility).	Selects global filter mode. When resonant filters are enabled with a <b>Zxx</b> effect, they will stay active until explicitly disabled -- by setting the cutoff frequency to the maximum ( <b>Z7F</b> ), and the resonance to the minimum ( <b>Z80</b> ).
<b>X9D</b> Local Filter Mode (MPT compatibility)	Selects local filter mode. When this mode is selected, the resonant filter will only affect the current note and will revert when a new note is played.
<b>X9E</b> Play Forward	Temporarily forces the direction of a bidirectional loop to go forward.
<b>X9F</b> Play Backward	Plays the current instrument backwards, or temporarily sets the direction of a sample loop to go backward.

### XM Audio Effects

<b>X90</b> Disable Channel Surround <b>X91</b> Enable Channel Surround	Disables/enables Surround for the current channel. (Note that a panning effect will automatically disable Surround, unless the Quad Surround mode has been activated with the <b>X9B</b> effect.)
<b>X98</b> Disable Reverb <b>X99</b> Enable Reverb	Disables/forces reverb for this channel.
<b>X9A</b> Select Mono Quad Surround <b>X9B</b> Select True Quad Surround	Selects mono surround mode (center channel) -- the default setting — or selects Quad Surround mode: this allows you to pan in the rear channels, especially useful for 4-speakers playback. Note that these two commands do not activate Surround only for the current channel; it is a global setting that will affect the behavior of Surround for all channels. You can enable or disable the surround for individual channels by using the <b>X90</b> and <b>X91</b> effects. Even in Quad Surround mode, the channel Surround will stay active until explicitly disabled by an <b>X90</b> command.

‡ NOTE FOR MODPLUG PLAYER: Although MPT allows backward jumping, most players (including Modplug Player) disable backward jumps in the song if looping mode isn't enabled, so that it is not possible to loop a song forever (pretty annoying in a playlist). This means if you wish to jump BACKWARDS from a point in the track, you must enable the Loop Song toggle in the module player software, which in turn means the song where a backward position jump occurs will loop forever until manually unlooped.

# S3M Effect Commands

[Axx](#): Set Speed  
[Bxx](#): Position Jump  
[Cxx](#): Pattern Break  
[Dxy](#): Volume Slide  
[Exy](#): Portamento Down  
[Fxy](#): Portamento Up  
[Gxx](#): Tone-Portamento  
[Hxy](#): Vibrato  
[Ixy](#): Tremor  
[Jxy](#): Arpeggio  
[Kxy](#): Volume Slide + Vibrato  
[Lxy](#): Volume Slide + Tone-Portamento  
[Mxx](#): Set Channel Volume  
[Nxy](#): Channel Volume Slide

[Oxx](#): Set Sample Offset  
[Pxy](#): Panning Slide  
[Qxy](#): Retrigger  
[Rxy](#): Tremolo

## Extended S3M Commands

[S1x](#): Glissando Control  
[S2x](#): Set Finetune  
[S3x](#): Set Vibrato Waveform  
[S4x](#): Set Tremolo Waveform  
[S5x](#): Set Panbrello Waveform  
[S6x](#): Pattern Delay (Fine)  
[S7x](#): NNA & Envelope Control  
[S8x](#): Coarse Panning  
[S9x](#): Extended Channel Control

[SAx](#): Set High Offset  
[SBx](#): Pattern Loop  
[SCx](#): Quick Note  
[SDx](#): Note Delay  
[SEx](#): Pattern Delay (Coarse)  
[SFx](#): Select Active Macro

[Txx](#): Set Tempo  
[Uxy](#): Fine Vibrato  
[Vxx](#): Set Global Volume  
[Wxy](#): Global Volume Slide  
[Xxx](#): Set Panning  
[Yxy](#): Panbrello  
[Zxx](#): Filter Effect

## Waveforms

For any effect commands which change the waveform of internal oscillators (such as vibrato), the following table shows the possible values of x for that command.

x	waveform	x	waveform
0	sine (default) — retrigger	4	sine — continue
1	saw — retrigger	5	saw — continue
2	square — retrigger	6	square — continue
3	random — retrigger	7	random — continue

If the waveform is selected with retrigger, then new notes will restart the waveform.

## S3M Pitch Effects

For pitch alterations, the rate of change is directly influenced by the ticks-per-step value (Speed). The higher this rate, the quicker the bend. The pitch will be bent the same amount per tick, so more ticks will mean more of a bend per step. Furthermore, what is being changed is the frequency on a linear basis (called a period) according to internal tables. However, if Linear Frequency is set in the Song Properties, the pitch change will be predictable, sliding by the same pitch interval.

<b>Jxy</b> Arpeggio	Plays an arpeggiation of 3 notes in one row, cycling between note, note + x halftones, note + y halftones. Example: C-4 01 . . 037 Plays C4, D#4 (C4 + 3 semitones), and G4 (C4 + 7 semitones). If you call <b>Jxy</b> without a note, the arpeggio values are stored.
<b>S10</b> Disable Glissando <b>S11</b> Enable Glissando	When glissando is active, tone-portamento effects will slide by semitones (like a guitar).
<b>S2x</b> Set Finetune (MOD compatibility)	Sets the finetune value of the current sample's pitch to the signed nibble x, whose legal values are 0 - F, corresponding to signed nibbles 0 to 7, -8 to -1.

## Portamento (Pitch Bend)

<b>Exx</b> Portamento Down <b>EFx</b> Fine Portamento Down <b>EEx</b> Extra fine portamento down	Slides down the pitch of the current note being played, decreasing the playback period by xx every tick (the Speed setting thus affects the amount of pitch change per row), except for Fine Portamento, in which the slide takes place only at the first tick. Extra-fine portamento slides the pitch only at the first tick and only by a fourth of the normal period.
<b>Fxx</b> Portamento Up <b>FFx</b> Fine Portamento Up <b>FEx</b> Extra fine portamento up	Slides up the pitch of the current note being played, increasing the playback period by xx every tick (the Speed setting thus affects the amount of pitch change per row), except for Fine Portamento, in which the slide takes place only at the first tick. Extra-fine portamento slides the pitch only at the first tick and only by a fourth of the normal period.

<b>Gxx</b> Tone-Portamento	Pitch-bends the previous note towards the current note at rate xx for the duration of the current row. The rate is xx every tick, and is thus affected by the Speed. If xx is 00, the bend will continue at the last rate given. Example: C-4 01 . . . . . F-4 . . . . 305 (bends the note up by 5 towards F4) . . . . . 300 (continues to slide up during this step, until F4 is reached) If the glissando command has been activated ( <b>S11</b> ), the pitches will be rounded to the nearest halfnote.
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### Vibrato (Pitch Oscillation)

<b>Hxy</b> Vibrato <b>Uxy</b> Fine Vibrato	Vibrato with rate x and depth y, where x is the number of ticks per row in 64ths, and y is the number of semitones to oscillate for <b>Hxy</b> , in 16ths, or the number of sixty-fourth semitones for <b>Uxy</b> . This command will oscillate the frequency of the current note with a sine wave (you can change the vibrato waveform by using the <b>S3x</b> command).
<b>S3x</b> Vibrato Control	Sets the waveform of succeeding Vibrato effects to x. (See the paragraph on Waveforms at the beginning of this list.)

### S3M Volume Effects

<b>Mxx</b> Set Channel Volume	Sets the current volume to xx (values higher than <b>M40</b> are ignored during playback).
<b>N0x</b> Channel Vol. Slide Down <b>NFx</b> Fine Channel Vol. Slide Down <b>Nx0</b> Channel Vol. Slide Up <b>NxF</b> Fine Channel Vol. Slide Up	Increases/decreases the <u>channel's</u> current volume by $x \times (\text{Speed} - 1)$ . Thus, the Speed setting affects the amount of pitch change per row, except for Fine volume slides, which slides the volume only at the first tick.
<b>Vxx</b> Global Volume	Sets the GLOBAL song volume to xx.
<b>Wxx</b> Global Volume Slide <b>Wfx</b> Fine Global Vol. Slide Down <b>WxF</b> Fine Global Vol. Slide Up	Slides up or down the SONG'S current volume by $x \times (\text{Speed} - 1)$ , except for fine volume slides, which is done by x amount only in the first tick of the row.
<b>D0x</b> Volume Slide Down <b>DFx</b> Fine Volume Slide Down <b>Dx0</b> Volume Slide Up <b>DxF</b> Fine Volume Slide Up	Increases/decreases the <u>note's</u> current volume by $x \times (\text{Speed} - 1)$ . Thus, the Speed setting affects the amount of pitch change per row, except for Fine volume slides, which slides the volume only at the first tick. For example, if you set Speed to 6, and your event is called like this: C5 01 . . . D02, this is the process of this event: Tick 1: Play Instrument 01 at pitch C5. Tick 2 - 6: Reduce volume of note by 2 for a total volume of reduction of 10 by the end of the row. If you called the event C5 01 . . . DF2, the volume would only have only been decreased by 2 with the note.
<b>Kxy</b> Vol. Slide Down + Vibrato Vol. Slide Up + Vibrato	Equivalent to Volume Slide ( <b>Dxy</b> ) plus Vibrato Continue ( <b>H00/U00</b> ), this command increases/decreases the channel volume by $x \times (\text{Speed} - 1)$ while continuing the previous vibrato, using the vibrato rate and depth given in the last vibrato command. The Speed setting affects the amount of pitch change AND volume slide per row.
<b>Lxy</b> Volume Slide + Tone-Portamento	Equivalent to Volume Slide ( <b>Dxy</b> ) plus Tone-Portamento ( <b>G00</b> ). The note given will be the portamento target while xy is the amount of volume change in that step (see the command <b>Dxy</b> for clarification). The portamento rate is the last one used by a portamento command ( <b>Exx</b> , <b>Fxx</b> , or <b>Gxx</b> ). Use <b>L00</b> to continue towards the pitch at the last volume slide called with this command.

### Tremolo (Volume Oscillation)

<b>Rxy</b> Tremolo	Tremolo with speed x and depth y, where $x/64$ is the number of ticks per row, and y is the amount of volume to oscillate, in 16ths. This command will oscillate the volume of the current note with a sine wave, but you can change the waveform with the <b>S4x</b> command.
<b>S4x</b> Tremolo Control	Sets the waveform of succeeding Tremolo effects to x. (See the paragraph on Waveforms at the beginning of this list.)
<b>Ixy</b> Tremor	Turns on and off the current channel every tick, where x = on time and y = off time; the volume will be set at the current note volume for x ticks, and then muted (volume set to 0) for y ticks. This effect is different from the Tremolo effect ( <b>Rxy</b> ) in that it does not manipulate the instrument's sound, but rather the CHANNEL'S output, which may be affected by VST or other Effects.

### S3M Panning Effects

<b>S8x</b> Set Panning (Coarse)	Sets the pan position of the current channel. The value ranges from 0 (left) to F (right).
<b>Xxx</b> Set Panning (Fine)	Sets the pan position of the current channel. The value ranges from 00 (left) to FF (right).
<b>P0x</b> Pan Slide Left <b>PFx</b> Fine Pan Slide Left <b>Px0</b> Pan Slide Right <b>PxF</b> Fine Pan Slide Right	Slides the panning of the current channel by $x \times (\text{Speed} - 1)$ , except for Fine Pan Slides, which alter the pan setting by $x$ points only on the first tick. The panning points are from 00 (left) to FF (right), and the Speed setting affects the amount of pitch change per row.

#### Panbrello (Pan Oscillation)

<b>Yxy</b> Panbrello (pan oscillation)	Panbrello with speed $x$ and depth $y$ . This command will oscillate the pan of the current note with a sine wave. This command will oscillate the stereo pan of the current note with a sine wave, but you can change the waveform with the <b>S5x</b> command.
<b>S5x</b> Set panbrello waveform	Sets the waveform of succeeding Panbrello effects to $x$ . (See the paragraph on Waveforms at the beginning of this list.)

### S3M Pattern Effects

<b>Bxx</b> Position Jump <sup>†</sup>	Causes the playback to jump to the pattern position $xx$ . As an example, <b>B00</b> will restart the song from the beginning. If used together with a pattern break ( <b>Cxx</b> ), you can also specify the starting row (by default, it will play from the start of the pattern).
<b>Cxx</b> Pattern Break	Jumps to row $xx$ (which, remember, is in hex) of the NEXT pattern in the Order List. If the current pattern is the last pattern in the Order List, this command will go to the row $xx$ of the same pattern. NOTE: When doing a Pattern Playback (as opposed to a SONG Playback) and "Loop Pattern" is enabled, <b>Cxx</b> will only apply to the current Pattern.
<b>SBx</b> Pattern Loop	Sets up this pattern's loop. The start of a pattern loop defaults to the first row in the pattern, but if $x = 0$ , the start of a loop is reset to the current row. If $x$ is any other value, after this row, the loop is replayed another $x$ times before continuing THE SONG. Hence this Effect cannot be performed across multiple patterns. Note that pattern loops do not support nesting.
<b>SEx</b> Pattern Delay (Coarse)	Delays the playback of the current row by $x$ rows. Any sounds still playing will continue to process, but the reading of the next row will not continue until this delay is complete.
<b>S6x</b> Pattern Delay (Fine)	Delays the playback of the current row by $x$ TICKS.
<b>Axx</b> Set Speed	Sets the current ticks-per-row. NOTE: If converting to MOD or XM format, either avoid using values bigger than 20, or recalculate after converting.
<b>Txx</b> Set Tempo <b>T0x</b> Slide Tempo Down <b>T1x</b> Slide Tempo Up	Sets the tempo of the song, or, for Tempo Slides, increases/decreases the tempo by $x$ . All Tempo commands occur once and only at the first tick of the row. The minimum value for the Tempo value is <b>T20</b> , and the maximum possible value is <b>TFF</b> . The default tempo is 125 ( <b>T7D</b> ), which is equivalent to one tick every 20ms (50Hz) in Classic Mode. The meaning of the "tempo" value depends on the <a href="#">Tempo Mode</a> .

### S3M Sample Effects

<b>Oxx</b> Set Sample Offset	Starts playing the instrument's sample at the position $xx \times 256$ (instead of position 0) for 8-bit samples, or $xx \times 512$ for 16-bit samples. If $xx$ is 00, the previous O value will be used. If $xx$ is greater than the size of the sample, the command (and its note) are ignored.
<b>SAx</b> Set High Offset (for 8-bit samples larger than 64K, or 16-bit samples larger than 128K).	Sets the high byte of the offset. The value $x \times 64K$ (or $x \times 128K$ for 16-bit) will be added to the next offset effect. As an example, these two commands in tandem will start an 8-bit sample playback at sample 3884 (\$0F2C): <pre> ... .. SAF (Starts offset from sample \$0F00) C-3 42 .. 02C (Plays the note beginning at sample 2C) </pre> NOTE: <b>SAx</b> values are remembered for all <b>Oxx</b> commands that are called in that channel.

<b>Qxy</b> Retrigger Note with Volume	Plays the instrument (at the same note within the step) every y ticks, with x volume change. On the right is the volume retrigger value table based on x. When a note is retriggered, the source note is cut (a Note Cut is not sent, but the channel is reset and its sound ceases) whether the note was internal or from a VSTi before being played again. If xx is greater than the number of ticks the retrigger is never activated (because the next step will have begun).  Example:  ... .. A06 (Sets tick speed to 6) C-3 02 v32 Q73 (Play Instrument 2 at C3 with volume 32, then retrigger at tick 3 out of 6 with volume 16)	<b>x</b>	<b>volume</b>	<b>x</b>	<b>volume</b>
		0	no change	8	no change
		1	-1	9	+1
		2	-2	A	+2
		3	-4	B	+4
		4	-8	C	+8
		5	-16	D	+16
		6	$x \frac{2}{3}$	E	$x 1.5$
7	$x \frac{1}{2}$	F	$x 2$		
<b>SCx</b> Quick Note	Cuts the current note after x ticks by setting the note volume to 0. This means you must call the sample again before any sound is heard (the volume must be reset to its default or a volume you specify). <b>SC0</b> is ignored.				
<b>SDx</b> Note Delay	Delays playing the specified note for x ticks. <b>SD0</b> is ignored.				
<b>X9C</b> Global Filter Mode (IT compatibility).	Selects global filter mode. When resonant filters are enabled with a <b>Zxx</b> effect, they will stay active until explicitly disabled -- by setting the cutoff frequency to the maximum ( <b>Z7F</b> ), and the resonance to the minimum ( <b>Z80</b> ).				
<b>X9D</b> Local Filter Mode (MPT compatibility)	Selects local filter mode. When this mode is selected, the resonant filter will only affect the current note and will revert when a new note is played.				
<b>X9E</b> Play Forward	Temporarily forces the direction of a bidirectional loop to go forward.				
<b>X9F</b> Play Backward	Plays the current instrument backwards, or temporarily sets the direction of a sample loop to go backward.				

### S3M Miscellaneous Effects

<b>X98</b> Disable Reverb	Disables/forces reverb for this channel.
<b>X99</b> Enable Reverb	
<b>Zxx</b> Set Resonance/Cutoff Amount	If xx is less than \$80, xx is applied to the sample's resonance. Above \$80, xx is applied to the cutoff frequency. Note that since S3M tracks cannot use instruments, macros are only applied to filter resonance/cutoff. However, when an S3M track is loaded which contains <b>Zxx</b> effects, you will be asked how you wish to process them.

‡ NOTE FOR MODPLUG PLAYER: Although MPT allows backward jumping, most players (including Modplug Player) disable backward jumps in the song if looping mode isn't enabled, so that it is not possible to loop a song forever (pretty annoying in a playlist). This means if you wish to jump BACKWARDS from a point in the track, you must enable the Loop Song toggle in the module player software, which in turn means the song where a backward position jump occurs will loop forever until manually unlooped.

# IT Effect Commands

Axx: Set Speed  
Bxx: Position Jump  
Cxx: Pattern Break  
Dxy: Volume Slide  
Exy: Portamento Down  
Fxy: Portamento Up  
Gxx: Tone-Portamento  
Hxy: Vibrato  
Ixy: Tremor  
Jxy: Arpeggio  
Kxy: Vibrato + Volume Slide  
Lxy: Tone-Portamento + Volume Slide  
Mxx: Set Channel Volume  
Nxy: Channel Volume Slide  
Oxx: Set Sample Offset

Pxy: Panning Slide  
Qxy: Retrigger  
Rxy: Tremolo  
**Extended S3M Commands**  
S1x: Glissando Control  
S2x: Set Finetune  
S3x: Set Vibrato Waveform  
S4x: Set Tremolo Waveform  
S5x: Set Panbrello Waveform  
S6x: Pattern Delay (Fine)  
S7x: NNA & Envelope Control  
S8x: Coarse Panning  
S9x: Extended Channel Control  
SAx: Set High Offset

SBx: Pattern Loop  
SCx: Quick Note  
SDx: Note Delay  
SEx: Pattern Delay (Coarse)  
SFx: Select Active Macro  
Txx: Set Tempo  
Uxy: Fine Vibrato  
Vxx: Set Global Volume  
Wxy: Global Volume Slide  
Xxx: Set Panning  
Yxy: Panbrello  
Zxx: Set Macro Parameter  
/xx: Slide Macro Parameter  
#xx: Byte Shift (Parameter Extension)

## Effect Memory in IT tracks

Certain IT commands store parameter values, all of which can be called by passing 00 as the value in the Effect command. For example,

	.....	...	.....	G12	is the same as:	.....	...	.....	G12
	.....	...	.....	G00		.....	...	.....	G12
	.....	...	.....	G00		.....	...	.....	G12

In other words, using 00 as the command value uses the last given value, if the command stores the value.

The following effect commands store their previous values (those effect commands in parentheses share a single parameter memory):

**(Dxy/Kxy/Lxy)**    **Ixy**    **Nxx**    **Sxy**  
**(Exx/Fxx/Gxx)**    **Jxy**    **Oxx**    **Txx**  
**(Hxy/Uxy)**    **Wxx**

This means, for example,

.....	...	.....	E12	can be written as:	.....	...	.....	E12		.....	...	.....	H81	is the same as:	.....	...	.....	H81
.....	...	.....	F12		.....	...	.....	F00		.....	...	.....	U00		.....	...	.....	H81
.....	...	.....	E12		.....	...	.....	E00		.....	...	.....	U83		.....	...	.....	U83
.....	...	.....	F12		.....	...	.....	F00		.....	...	.....	U00		.....	...	.....	U83
C-4	01	.....	G12		C-4	01	.....	G00		.....	...	.....	H00		.....	...	.....	U83

Commands H and U are linked even more closely. If you use H00 or U00, then the previous vibrato, whether it was set with Hxx or Uxx, will be used. So:

When using Wxx commands, each channel has its own volume slide memory.

## Waveforms

For any effect commands which change the waveform of internal oscillators (such as vibrato), the following table shows the possible values of x for that command.

x	waveform	x	waveform
0	sine (default) — retrigger	4	sine — continue
1	saw — retrigger	5	saw — continue
2	square — retrigger	6	square — continue
3	random — retrigger	7	random — continue

If the waveform is selected with retrigger, then new notes will be restart the waveform.

## IT Pitch Effects

For pitch alterations, the rate of change is directly influenced by the ticks-per-step value (Speed). The higher this rate, the quicker the bend. The pitch will be bent the same amount per tick, so more ticks will mean more of a bend per step. Furthermore, what is being changed is the frequency on a linear basis (called a period) according to internal tables. However, if Linear Frequency is set in the Song Properties, the pitch change will be predictable, sliding by the same pitch interval.

<b>Jxy</b> Arpeggio	Plays an arpeggiation of 3 notes in one row, cycling between note, note + x halftones, note + y halftones. Example: C-4 01 . . 037      Plays C4, D#4 (C-4 + 3 semitones), and G4 (C4 + 7 semitones). If you call <b>Jxy</b> without a note, the arpeggio values are stored. If you call <b>J00</b> , it uses the previous arpeggio values from the same channel (which means you can use this between multiple instruments).
<b>S10</b> Disable Glissando <b>S11</b> Enable Glissando	When glissando is active, tone-portamento effects will slide by semitones (like a guitar).
<b>S2x</b> Set Finetune (MOD compatibility)	Sets the finetune value of the current sample's pitch to the signed nibble x, whose legal values are 0 - F, corresponding to signed nibbles 0 to 7, -8 to -1.

### Portamento (Pitch Bend)

Portamento commands **Exx** and **Fxx** are sent as MIDI Pitch Bend messages to VSTi's and MIDI instruments at their exact value. The amount of Pitch Bend that actually occurs, however, depends on the Pitch Bend range of the VSTi's program. **Gxx** commands are not sent to VSTi's or MIDI instruments.

<b>Exx</b> Portamento Down <b>EFx</b> Fine Portamento Down <b>EEx</b> Extra fine portamento down	Slides down the pitch of the current note being played, decreasing the playback period by xx every tick (the Speed setting thus affects the amount of pitch change per row), except for Fine Portamento, in which the slide takes place only at the first tick. Extra-fine portamento slides the pitch only at the first tick and only by a fourth of the normal period.
<b>Fxx</b> Portamento Up <b>FFx</b> Fine Portamento Up <b>FEx</b> Extra fine portamento up	Slides up the pitch of the current note being played, increasing the playback period by xx every tick (the Speed setting thus affects the amount of pitch change per row), except for Fine Portamento, in which the slide takes place only at the first tick. Extra-fine portamento slides the pitch only at the first tick and only by a fourth of the normal period.
<b>Gxx</b> Tone-Portamento	Pitch-bends the previous note towards the current note at rate xx for the duration of the current row. The rate is xx every tick, and is thus affected by the Speed. If xx is 00, the bend will continue at the last rate given. Example: C-4 01 . . . . . F-4 . . . . 305    (bends the note up by 5 towards F4) . . . . . 300    (continues to slide up during this step, until F4 is reached) If the glissando command has been activated ( <b>S11</b> ), the pitches will be rounded to the nearest halfnote.

### Vibrato (Pitch Oscillation)

<b>Hxy</b> Vibrato <b>Uxy</b> Fine Vibrato	Vibrato with rate x and depth y, where x is the number of oscillations per row, in 64ths, and y is the number of semitones to oscillate for <b>Hxy</b> (in 32nds), or the number of sixty-fourth semitones for <b>Uxy</b> . If either x or y equals 0, the previous Vibrato value will be used. These commands will oscillate the frequency of the current note with a sine wave (you can change the vibrato waveform by using the <b>S3x</b> command). If IT Old Effects is enabled (in the Song Properties window), the vibrato applies x/64 of the oscillation every tick, and the vibrato depth y is in 16th semitones (as in MOD vibratos).
<b>S3x</b> Vibrato Control	Sets the waveform of succeeding Vibrato effects to x. (See the paragraph on Waveforms at the beginning of this list.)

## IT Volume Effects

<b>Mxx</b> Set Channel Volume	Sets the current volume to xx (values higher than <b>M40</b> are ignored during playback).
<b>N0x</b> Channel Vol. Slide Down <b>NFx</b> Fine Channel Vol. Slide Down <b>Nx0</b> Channel Vol. Slide Up <b>NxF</b> Fine Channel Vol. Slide Up	Increases/decreases the <u>channel's</u> current volume by x x (Speed - 1). Thus, the Speed setting affects the amount of pitch change, except for Fine volume slides, which slides the volume only at the first tick.
<b>Vxx</b> Global Volume	Sets the GLOBAL song volume to xx (values higher than <b>V80</b> are ignored at playback).

<b>Wxx</b> Global Volume Slide <b>Wfx</b> Fine Global Vol. Slide Down <b>Wxf</b> Fine Global Vol. Slide Up	Slides up or down the SONG'S current volume by $x \times (\text{Speed} - 1)$ , except for fine volume slides, which is done by $x$ amount only in the first tick of the row.
<b>D0x</b> Volume Slide Down <b>DFx</b> Fine Volume Slide Down <b>Dx0</b> Volume Slide Up <b>DxF</b> Fine Volume Slide Up	Increases/decreases the <u>note's</u> current volume by $x \times (\text{Speed} - 1)$ . Thus, the Speed setting affects the amount of pitch change per row, except for Fine volume slides, which slides the volume only at the first tick. For example, if you set Speed to 6, and your event is called like this: C5 01 . . D02, this is the process of this event: Tick 1: Play Instrument 01 at pitch C5. Tick 2 - 6: Reduce volume of note by 2 for a total volume of reduction of 10 by the end of the row. If you called the event C5 01 . . DF2, the volume would only have only been decreased by 2 with the note.
<b>Kxy</b> Vol. Slide Down + Vibrato Vol. Slide Up + Vibrato	Equivalent to Volume Slide ( <b>Dxy</b> ) plus Vibrato Continue ( <b>H00/U00</b> ), this command increases/decreases the channel volume by $x \times (\text{Speed} - 1)$ while continuing the previous vibrato, using the vibrato rate and depth given in the last vibrato command. The Speed setting affects the amount of pitch change AND volume slide per row.
<b>Lxy</b> Volume Slide + Tone-Portamento	Equivalent to Volume Slide ( <b>Dxy</b> ) plus Tone-Portamento ( <b>G00</b> ). The note given will be the portamento target while $xy$ is the amount of volume change in that step (see the command <b>Dxy</b> for clarification). The portamento rate is the last one used by a portamento command ( <b>Exx</b> , <b>Fxx</b> , or <b>Gxx</b> ). Use <b>L00</b> to continue towards the pitch at the last volume slide called with this command. For example: C-4 01 . . V00 (Start from this note with the volume all the way down) F-4 . . . . L05 (Slide towards F — and increase volume — at a speed of 5) . . . . . L00 (Keep sliding pitch and volume unless F4 is reached)

### Tremolo (Volume Oscillation)

<b>Rxy</b> Tremolo	Tremolo with speed $x$ and depth $y$ , where $x$ is the number of oscillations per row, in 64ths, and $y$ is the amount of volume to oscillate, in 32nds. (If $x$ OR $y = 0$ , the previous <b>Rxy</b> values are used.) This command will oscillate the volume of the current note with a sine wave, but you can change the waveform with the <b>S4x</b> command. In Modplug, the Tremolo effect keeps its own tick count, meaning that it is not reset when a new note is played or note volume is 0. If IT Old Effects is enabled (in the Song Properties window), the tremolo applies $x/64$ of the oscillation every tick, and the volume depth is $y/16$ semitones (as in MOD vibratos).
<b>S4x</b> Tremolo Control	Sets the waveform of succeeding Tremolo effects to $x$ . (See the paragraph on Waveforms at the beginning of this list.)
<b>Ixy</b> Tremor	Turns on and off the current channel every tick, where $x$ = on time and $y$ = off time; the volume will be set at the current note volume for $x$ ticks, and then muted (volume set to 0) for $y$ ticks. If either $x$ or $y$ equals 0, it is treated as equalling 1. This effect is different from the Tremolo effect ( <b>Rxy</b> ) in that it does not manipulate the instrument's sound, but rather the CHANNEL'S output, which may be affected by VST or other Effects. If IT Old Effects is enabled (in the Song Properties window), 1 is added to $x$ and $y$ values.

### IT Panning Effects

<b>S8x</b> Set Panning (Coarse)	Sets the pan position of the current channel. The value ranges from 0 (left) to F (right).
<b>Xxx</b> Set Panning (Fine)	Sets the pan position of the current channel. The value ranges from 00 (left) to FF (right).
<b>P0x</b> Pan Slide Left <b>Pfx</b> Fine Pan Slide Left <b>Px0</b> Pan Slide Right <b>PxF</b> Fine Pan Slide Right	Slides the panning of the current channel by $x \times (\text{Speed} - 1)$ , except for Fine Pan Slides, which alter the pan setting by $x$ points only on the first tick. The panning points are from 00 (left) to FF (right), and the Speed setting affects the amount of pitch change per row.

## Panbrello (Pan Oscillation)

<b>Yxy</b> Panbrello (pan oscillation)	Panbrello with speed x and depth y, where x is the number of oscillations per row, in 64ths, and y is the amount of volume to oscillate, in 32nds. (If either x or y = 0, the previous Yxy value is used.) This command will oscillate the stereo pan of the current note with a sine wave, but you can change the waveform with the <b>S5x</b> command. NOTE: When the waveform is set to Random ( <b>S53</b> or <b>S57</b> ), y is actually interpreted as a DELAY (rather than oscillation speed). Randomizing the waveform will actually cause a random choice (between sine, triangle, and square waveforms), and the delay will be the number of ticks before choosing one of the waveforms. So if you want to achieve a "Noise" waveform, set the waveform to Random, using a high tick speed ( <b>A08</b> or greater), and set the Panbrello speed to a LOW value (x = 1).
<b>S5x</b> Set panbrello waveform	Sets the waveform of succeeding Panbrello effects to x. (See the paragraph on Waveforms at the beginning of this list.)

## IT Pattern Effects

<b>Axx</b> Set Speed	Sets the current TICK speed of the song, corresponding to the value in the Ticks per Row field in the General page. This will actually have a different effect on playback speed and many other effects based on the song's <a href="#">Tempo Mode</a> . NOTE: If converting to MOD or XM format, either avoid using values bigger than 20, or recalculate after converting.
<b>Txx</b> Set Tempo <b>T0x</b> Slide Tempo Down <b>T1x</b> Slide Tempo Up	Sets the tempo of the song, or, for Tempo Slides, increases/decreases the tempo by x. All Tempo commands occur once and only at the first tick of the row. The minimum value for the Tempo value is <b>T20</b> , and the maximum possible value is <b>TFF</b> . The default tempo is 125 ( <b>T7D</b> ), which is equivalent to one tick every 20ms (50Hz) in Classic Mode. The meaning of the "tempo" value depends on the <a href="#">Tempo Mode</a> .
<b>Bxx</b> Position Jump <sup>†</sup>	Causes the playback to jump to the pattern position xx. As an example, <b>B00</b> will restart the song from the beginning. If used together with a pattern break ( <b>Cxx</b> ), you can also specify the starting row (by default, it will play from the start of the pattern).
<b>Cxx</b> Pattern Break	Jumps to row xx (which, remember, is in hex) of the NEXT pattern in the Order List. If the current pattern is the last pattern in the Order List, this command will go to the row xx of the same pattern. NOTE: When doing a Pattern Playback (as opposed to a SONG Playback) and "Loop Pattern" is enabled, <b>Cxx</b> will only apply to the current Pattern.
<b>SBx</b> Pattern Loop	Sets up this pattern's loop. The start of a pattern loop defaults to the first row in the pattern, but if x = 0, the start of a loop is reset to the current row. If x is any other value, after this row, the loop is replayed another x times before continuing THE SONG. Hence this Effect cannot be performed across multiple patterns. Note that pattern loops do not support nesting.
<b>SEX</b> Pattern Delay (Coarse)	Delays the playback of the current row by x rows. Any sounds still playing will continue to process, but the reading of the next row will not continue until this delay is complete.
<b>S6x</b> Pattern Delay (Fine)	Delays the playback of the current row by x TICKS.

## IT Instrument Effects

<b>Oxx</b> Set Sample Offset	Starts playing the instrument's sample at the position xx x 256 for 8-bit samples, or xx x 512 for 16-bit samples. If xx is 00, the previous O value will be used. If xx is greater than the size of the sample, the command (and its note) are ignored, UNLESS the Old Effects box is checked in Song Properties, in which case the sample is played from the END of the sample.
<b>SAx</b> Set High Offset (for 8-bit samples larger than 64K, or 16-bit samples larger than 128K).	Sets the high byte of the offset. The value x x 64K (or x x 128K for 16-bit) will be added to the next offset effect. As an example, these two commands in tandem will start an 8-bit sample playback at sample 3884 (\$0F2C): <pre> ... .. . SAF (Starts offset from sample \$0F00) C-3 42 .. 02C (Plays the note beginning at sample 2C) </pre> NOTE: <b>SAx</b> values are remembered for all <b>Oxx</b> commands that are called in that channel.

<b>SCx</b> Retrigger Note with Volume	Plays the instrument (at the same note within the step) every y ticks, with x volume change (volume change is not applied to VSTi's). On the right is the volume retrigger value table based on x. When a note is retriggered, the source note is cut (a Note Cut is not sent, but the channel is reset and its sound ceases), whether the note was internal or from a VSTi, before being played again. If xx is greater than the number of ticks the retrigger is never activated (because the next step will have begun). Example:  ... .. A06 (Sets tick speed to 6) C-3 02 v32 Q73 (Play Instrument 2 at C3 with volume 32, then retrigger at tick 3 out of 6 with volume 16)	<b>x</b>	<b>volume</b>	<b>x</b>	<b>volume</b>
		0	no change	8	no change
		1	-1	9	+1
		2	-2	A	+2
		3	-4	B	+4
		4	-8	C	+8
		5	-16	D	+16
		6	$\times \frac{2}{3}$	E	$\times 1.5$
7	$\times \frac{1}{2}$	F	$\times 2$		
<b>SCx</b> Quick Note	Cuts the current note after x ticks by setting the note volume to 0. This means you must call the sample again before any sound is heard (the volume must be reset to its default or a volume you specify). <b>SC0</b> is interpreted as <b>SC1</b> .				
<b>SDx</b> Note Delay	Delays playing the specified note for x ticks. <b>SD0</b> is interpreted as <b>SD1</b> .				
<b>S9C</b> Global Filter Mode (IT compatibility).	Selects global filter mode. When resonant filters are enabled with a <b>Zxx</b> effect, they will stay active until explicitly disabled -- by setting the cutoff frequency to the maximum ( <b>Z7F</b> ), and the resonance to the minimum ( <b>Z80</b> ).				
<b>S9D</b> Local Filter Mode (MPT compatibility)	Selects local filter mode. When this mode is selected, the resonant filter will only affect the current note and will revert when a new note is played.				
<b>S9E</b> Play Forward	Temporarily forces the direction of a bidirectional loop to go forward.				
<b>S9F</b> Play Backward	Plays the current instrument backwards, or temporarily sets the direction of a sample loop to go backward.				

## IT Channel Effects

<b>S90</b> Disable Channel Surround	Disables/enables Surround for the current channel. (Note that a panning effect such as <b>Xxx</b> or <b>S8x</b> will automatically disable Surround, unless the Quad Surround mode has been activated with the <b>X9B</b> effect.)
<b>S91</b> Enable Channel Surround	
<b>S98</b> Disable Reverb	Disables/forces reverb for this channel.
<b>S99</b> Enable Reverb	
<b>S9A</b> Select Mono Quad Surround	Selects mono surround mode (center channel) -- the default setting -- or selects Quad Surround mode: this allows you to pan in the rear channels, especially useful for 4-speakers playback. Note that these two commands do not activate Surround only for the current channel; it is a global setting that will affect the behavior of Surround for all channels. You can enable or disable the surround for individual channels by using the <b>X90</b> and <b>X91</b> effects. Even in Quad Surround mode, the channel Surround will stay active until explicitly disabled by an <b>X90</b> command.
<b>S9B</b> Select true Quad Surround	
<b>S70</b> Continued Note Cut	Stop playback of "continued" notes, which are notes that are still playing due to NNAs. When a Stop Note command is used, it will affect ALL (but only) notes leftover from NNA envelopes. Note Fade uses the instrument's Fade value.
<b>S71</b> Continued Note Off	
<b>S72</b> Continued Note Fade	
<b>S73</b> Sets NNA to Note Cut	TEMPORARILY sets the NNA envelope of the given note, but only for its duration. The next note of that instrument will use its default NNA as long as one of these commands is not present. More details of New Note Actions can be found <a href="#">here</a> .
<b>S74</b> Sets NNA to Continue	
<b>S75</b> Sets NNA to Note Off	
<b>S76</b> Sets NNA to Note Fade	
<b>S77</b> Disables volume envelope	TEMPORARILY toggles the respective envelopes for the given note, but only for its duration. The next note of that instrument will use its default envelope as long as one of these commands is not present.
<b>S78</b> Enables volume envelope	
<b>S79</b> Disables panning envelope	
<b>S7A</b> Enables panning envelope	
<b>S7B</b> Disables pitch/filter env.	
<b>S7C</b> Enables pitch/filter env.	

<b>SFx</b> Select active macro	Selects the active macro <b>SFx</b> , causing the next <b>Zxx</b> command to use the new macro. Check <a href="#">here</a> on using macros.
<b>Zxx</b> Set macro value <b>\xx</b> Slide macro value	Sets the value of the active macro that was last set ( <b>SF0</b> by default). Using Backslash ( \ ) instead of Z will slide the value smoothly, using the Speed as the amount of detail in the slide. Note that when sending MIDI Channel Control messages, you can only use <b>Zxx</b> commands. There is an entire section to using macros and <b>Zxx</b> commands <a href="#">here</a> .
<b>#xx</b> Byte Shift (Parameter Extension)	Multiplies the previous value by $256^y$ , and adds the current value $xx$ ( $y$ is the number of times the Byte Shift has been currently called). Basically this command creates a byte sequence for the previous command by moving previous values “upbyte.” For example, C-5 01 .. 014 Normally this would play C-5 starting at sample point \$14 (=20). ... .. #E2 Now the previous byte is shifted up one place, C-5 will instead play at offset \$14E2 ( $20 \times 256, + 226 = 5346$ ) ... .. #33 Now all the bytes are shifted up, so C-5 will instead play at offset \$14E233 ( $20 \times 65536, + 226 \times 256, + 51 = 1368627$ ) The Byte Shift only works for Offset ( <b>Oxx</b> ), Tempo ( <b>Txx</b> ), and Pattern Break ( <b>Cxx</b> ) effects.

† NOTE FOR MODPLUG PLAYER: Although MPT allows backward jumping, most players (including Modplug Player) disable backward jumps in the song if looping mode isn't enabled, so that it is not possible to loop a song forever (pretty annoying in a playlist). This means if you wish to jump BACKWARDS from a point in the track, you must enable the Loop Song toggle in the module player software, which in turn means the song where a backward position jump occurs will loop forever until manually unlooped.

## MPTM Effect Commands

As of this edition, MPTM files use all IT commands, with no changes or additions, except for Parameter Control events, described here.

### MPTM Parameter Control Events

Instead of note events (which include notes, instrument designations, Note FX, and Channel FX), a Parameter Control event (PCE for short) is a shortcut way for an MPTM track to control the setting of a plugin parameter without having to assign controllers to SFx assignments and then use Zxx or /xx commands (macros) to tweak the values. Since the PCE takes up all columns in an event, this means you can't assign note events in the same channel with the PCE, but it's so easy that you can set up a side channel to handle these special events.

Here is the syntax for using a PCE, which enter in one row of a channel in the Pattern Editor:

```
Note Instr NFX CFX
PC 02 012 312
PC xx yyy zzz
```

The note column will contain one of two messages — “PC ” to signify an absolute setting, or “PCS” to indicate a smooth setting. The smooth setting will apply the value in gradations from one value to the next based on the current speed. These two messages are the equivalent to the Zxx and /xx effect commands respectively. If you delete the note column in a PCE, the entire event is erased.

The instrument column (xx) is a decimal number indicating the plugin ID (according to the FX slot it occupies), not the plugin's instrument. (To quickly find the correct Plugin slot, open the Folder Tree panel and the Plugins folder of the song you're working on.) The plugin does not have to be assigned to an instrument (which makes it easier to control if it is a channel-assigned plugin or a Master Effect). However, if a PCE is called without a plugin assignment, the message is not sent to a plugin, and no parameter modification takes place; in other words, instruments are not remembered for PCEs in a channel. Plugin designations go from 01-00, with 00 being plugin 100.

In the Note FX column, yyy is the parameter ID (the GUI knob you wish to turn), in decimal. This can be found by searching the parameter list in the General page, searching the parameter list in the Macro Manager dialog, or by using the “learn” technique for plugins. You can use any plugin controller up to ID 999, which makes it easier to control complex VSTi's, which may have parameter controllers higher than MPT's macro limit of 398.

In the Channel FX column, zzz is the value (from 000 – 999 decimal) to apply to that parameter, RELATIVE to its maximum amount. In other words, unlike the Macro commands, which set it to the hex value you give it, this value in the PCE (in decimal) is based on the percentage of the maximum value the controller can be. For example, if the real maximum value for a VSTi's slider is 127, and you want to set it to the Zxx value of 64 (50%), a PCE equivalent value would be 499 — 50% of 999. This makes for far greater levels of detail in setting values and means you don't have to know the parameter's range.

You can use the Interpolate Effect command on a selection of Parameter Control events (any column). This will interpolate ALL values in each column between the first and last event, replacing previous data, filling in any blanks, and writ-

ing over note events. However, if the first or last row in the selection does not have a PCE call, the entire selection will be COMPLETELY overwritten (including note events) using the same plugin and parameter, but using the value 000.

You can delete the PCE by entering a note event, or by pressing the delete shortcut key(s) while the selection occupies the 1st column. Deleting a selection over the 2nd column erases the plugin assignments, while deleting the parameter or value columns sets the digits to 000.

When Mix-Pasting PCEs, the standard paste is applied UNLESS a row contains any data; that is, only empty rows are pasted over with PCE data.

After creating PCEs in a track, re-ordering plugins in the list will automatically update the events pointers. There is no need to go back and fix previously placed Parameter Control events.

## Appendix B: Note Effect Commands

Here is the list and details of the current MPT Note FX; each effect call has the format `sxx`, where `s` is the FX symbol, and `xx` is the two-digit decimal value. Following each effect name is either `XM` or `IT`, signifying that this track format (and its variants) uses that Note Effect. If the name is underscored, the effect also works on VSTs.

The volume slide commands (`axx`, `bxx`, `cxx`, and `dx`) memorize and share their values, as do the pitch slide commands (`exx` and `fx`).

Name	F	S	Description
<u>Volume</u> <sup>1</sup>	IT XM	v	Sets the instrument's immediate volume (00 - 64). Playing a note WITHOUT designating an instrument will play it at this volume. If an instrument IS designated, but not a volume effect, the instrument's Default Volume will be used.
Pan	IT XM	p	Sets the instrument's pan position (00 - 64). This pan position will remain with this instrument until expressly re-set.
Fine Volume Slide Up	IT XM	a	Smoothly increase the immediate volume by <code>xx</code> (01 - 09) by percent. If you call <code>a00</code> the last <code>a</code> value is used.
Fine Volume Slide Down	IT XM	b	Smoothly decrease the immediate volume by <code>xx</code> (01 - 09) by percent. If you call <code>b00</code> the last <code>b</code> value is used.
Volume Slide Up	IT XM	c	Smoothly increase the immediate volume by <code>xx</code> (01 - 09), in tens of percent. If you call <code>c00</code> the last <code>c</code> value is used.
Volume Slide Down	IT XM	d	Smoothly decrease the immediate volume by <code>xx</code> (01 - 09), in tens of percent. If you call <code>d00</code> the last <code>d</code> value is used.
Vibrato Speed	IT XM	u	Set current vibrato to speed <code>xx</code> (01 - 09), using the vibrato set by a channel effect (not the sample autovibrato) or the note vibrato (called by effect <code>h</code> ). The vibrato is activated only when a vibrato effect ( <code>u</code> or <code>h</code> ) is called.
Vibrato Depth	XM	h	Set current vibrato to depth <code>xx</code> (01 - 15), using the vibrato set by a channel effect (not the sample autovibrato) or the note vibrato (called by effect <code>h</code> ). The vibrato is activated only when a vibrato effect ( <code>u</code> or <code>h</code> ) is called.
Tone Portamento	IT XM	g	Bends the previous note toward the current note by <code>xx</code> percent (00 - 09). The amount of bend depends on the tick speed.
<u>Portamento Down</u> <sup>2</sup>	IT	e	Bends the note down by <code>xx</code> semitones per tick (00 - 09). However, the bend depends on the tick speed.
<u>Portamento Up</u> <sup>2</sup>	IT	f	Bends the note up by <code>xx</code> semitones per tick (00 - 09). However, the bend depends on the tick speed.
<u>Velocity</u> <sup>3</sup>	IT	:	Plays the note with velocity <code>xx</code> (00 - 09), times 10. For internal sounds, this works the same as the volume command. But for MIDI sound generators, including VSTs, it sends a Key Velocity value, in case the synth can process notes with key velocity settings.
Offset	IT	o	Plays the sample starting at byte <code>xx</code> times 2048.
Pan Left	XM	l	Moves the current pan position <code>xx</code> places (00 - 15) towards the left channel, to a minimum of 0.
Pan Right	XM	r	Moves the current pan position <code>xx</code> places (00 - 15) towards the right channel, to a maximum of 15.

<sup>1</sup> For plugins, volume attenuation is defined according to the Volume Handling setting in the Instrument page (the plugin must be assigned to an instrument for it to have an effect). For more info, look in the [Volume](#) section in the Reference chapters.

<sup>2</sup> For VSTi's, portamento (pitch bend) is altered according to the VSTi's internal Pitch Bend Range setting.

<sup>3</sup> Key Velocity can be handled differently based on the Velocity Handling setting in the Instruments page.

## Appendix C: MIDI commands

CC#	Range	Description
0	0 - 7F	Bank Select
1	0 - 7F	Modulation
2	0 - 7F	Breath Controller
3	0 - 7F	Aftertouch (old style)
4	0 - 7F	Foot Controller
5	0 - 7F	Portamento Time
6	0 - 7F	Data Slider
7	0 - 7F	Main Volume
8	0 - 7F	Balance
9	0 - 7F	— unused —
10	0 - 7F	Pan
11	0 - 7F	Expression
12 - 15	0 - 7F	— unused —
16	0 - 7F	General Purpose #1
17	0 - 7F	General Purpose #2
18	0 - 7F	General Purpose #3
19	0 - 7F	General Purpose #4
20 - 31	0 - 7F	— unused —
32 - 63	0 - 7F	Least significant bits for CC #0 - 31
64	0 or 7F	Sustain Pedal (Hold 1)
65	0 or 7F	Portamento Switch
66	0 or 7F	Sostenato Pedal
67	0 or 7F	Damper Pedal
68	0 or 7F	— unused —
69	0 or 7F	Alternate Pedal (Hold 2)
70	0 - 7F	Sound Variation
71	0 - 7F	Timbre
72	0 - 7F	Release Time
73	0 - 7F	Attack Time
74	0 - 7F	Brightness
75	0 - 7F	Control 1
76	0 - 7F	Control 2
77	0 - 7F	Control 3
78	0 - 7F	Control 4

<b>CC#</b>	<b>Range</b>	<b>Description</b>
79	0 - 7F	Control 5
80	0 or 7F	General Purpose #5
81	0 or 7F	General Purpose #6
82	0 or 7F	General Purpose #7
83	0 or 7F	General Purpose #8
84 - 90	0 or 7F	— unused —
91	0 - 7F	Effects Level
92	0 - 7F	Tremolo Depth
93	0 - 7F	Chorus Depth
94	0 - 7F	Celeste Depth
95	0 - 7F	Phase Depth
96	0 or 7F	Data Increment
97	0 or 7F	Data Decrement
98	0 - 7F	Non-Registered Parameter Most Significant Byte
99	0 - 7F	Non-Registered Parameter Least Significant Byte
100	0 - 7F	Registered Parameter Most Significant Byte
101	0 - 7F	Registered Parameter Least Significant Byte
102 - 120	0 - 7F	— unused —
121	0	Controller Reset
122	0 or 7F	Local Controller Switch
123	0	Note Reset (Panic)
124	0	Omni Off
125	0	Omni On
126	0 - 16	Channel Mono On (0 = also Omni Off)
127	0	Poly Off

---

## Appendix D: Keyboard Setup commands

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### Global keys

These keyboard shortcuts will work on all parts of ModPlugTracker, as long as it's the frontmost application.

File/New	Creates a new blank track. If one is already open, it is neither closed nor saved.
File/Open	Shows the dialog to open an existing readable tracking format. If one is already open, it is neither closed nor saved.
File/Close	Closes the current song. If it has not been saved, you are given the opportunity before the file is closed.
File/Save	Saves the file in its current name and format.
File/Save As	Allows you to save the file with a new name or in another folder.
File/Save as Wave	Exports the current track .wav file in the folder you choose. The current track is neither closed nor saved.
File/Save as MP3	Exports the current track .mp3 file in the folder you choose. The current track is neither closed nor saved.
File/Export to Midi	Exports the current track into the .mid format. See the section on <a href="#">MIDI files</a> for a detailed explanation of how this file is exported. The current track is neither closed nor saved.
File/Export to IT/XM	Exports the current track to "pure" .it format, without MPT's .it alterations.
Previous Document	Goes to the previous tracking file that is open (these are visible in the Windows Menu).
Next Document	Goes to the next tracking file that is open (these are visible in the Windows Menu).
File/Import Midi Lib	Imports the MIDI Instrument Library of your choosing. If the file is valid, it will appear in the Folder Tree in its own heading.
File/Add Sound Bank	Imports a sound bank of your choosing. If the file is valid, it will appear in the Folder Tree in its own heading.
Play song/Pause song	Toggles the playback of the current track. The playback pointer is not reset when using this toggle; that is, it plays from where the pointer left off when it was last pressed.
Pause song	Only stops the playback of the current track but does not reset the playback pointer.
Stop Song	Stops the playback of the current track AND resets the pointer to the start of the song.
Play song from start	Resets the playback pointer to the very first row and begins playback from there.
Play song from cursor	Resets the pointer to the row where the editing cursor is set (even if the selected row is not in the currently displayed pattern), and begins playback from there. Playback will continue until the end of the track.
Play pattern from start	Resets the pointer to the first row of the current pattern (even if you are in a different section of MPT), and begins playback from there. It will stop at the end of the pattern (or loop within the pattern if Loop Pattern is enabled).
Play pattern from cursor	Resets the pointer to the row where the editing cursor is set in the current pattern (even if you are in a different section of MPT), and begins playback from there. It will stop at the end of the pattern (or loop within the pattern if Loop Pattern is enabled).
Estimate Song Length	Estimates the playback length of the entire track.
Show approx. real BPM	Estimates the beats per minute of the song, based on the Initial tempo and the number of ticks per row, plus the Tempo Mode in the Song Properties dialog.
Toggle Midi Record	Toggles the MIDI Record option.
Undo	Rescinds the last edit. Applies to all text and pattern data. However, while there are multiple Undo's for pattern edits, there is only one Undo for text edits (pressing Undo a second time re-applies the edited text).

Cut	Copies the selected data into the clipboard, then removes it from the field it occupies. Applies to text, pattern, and sample data.
Copy	Copies the selected data into the clipboard. Applies to text, pattern, and sample data.
Paste	Pastes the selected data at the location of the cursor, but Paste acts differently on the type of data. With text, clipboard contents are inserted at the point of the cursor, or, if text is already highlighted, replace the selected text. With pattern data, clipboard contents are pasted in the same row at the same column of the current (visible) Pattern where the cursor is located, overwriting any pattern data that falls within the paste area. With sample data, clipboard contents are pasted OVER THE ENTIRE SAMPLE, in essence replacing all of that sample's data with whatever sample data is stored in the clipboard.
Mix Paste	Clipboard contents are pasted in the same row at the same column of the current (visible) pattern where the cursor is located, EXCEPT where there is already any data in any corresponding field of the paste area.
Mix Paste (old IT Style)	Clipboard contents are pasted in the same row at the same column of the current (visible) pattern where the cursor is located, EXCEPT where there is already any pattern data that falls within the paste area. However, the note data is assumed to include the note name, the designated instrument, and the note FX (volume data field), so if any of these contain non-blank data, none of the note data in that row of that channel of the clipboard will be pasted over it. (But channel FX data is tested separately, and will be only pasted if the last column in that channel is blank.)
SelectAll	Selects all text data, pattern data, or sample data, depending on the location of the cursor or current selection.
Find	Opens the Find/Replace dialog, which allows you to search for and/or replace given pattern data. Find starts from the cursor location.
Find Next	Applies the current Find settings and searches for the next data that matches it, selecting the given data; however it does not set the cursor in that row. For Find to be used again, the cursor must be set in the current pattern, then Find Next searches the entire row (in each channel) before going to the next row.
View General	Opens the General Tab.
View Pattern	Opens the Pattern Tab.
View Samples	Opens the Samples Tab.
View Instruments	Opens the Instruments Tab.
View Comments	Opens the Comments Tab.
<del>View Graph</del>	<del>Currently not functional.</del>
Toggle Main View	Shows/hides Main toolbar.
Toggle Tree View	Shows/hides Folder Tree panel.
View Options	Opens the OpenMPT Setup dialog.
View Channel Manager	Opens the Channel Manager table.
View Plugin Manager	Opens the Plugin dialog.
Show Song Properties	Opens the Song Properties dialog.
View MIDI Mapping	Opens the MIDI mapping dialog.
Help (to do)	Opens the Offline Help Manual (currently not functional)
Previous instrument	Changes the current instrument to the previous one in order.
Next instrument	Changes the current instrument to the next one in order.
Previous octave	Changes the current octave to the next lower octave.
Next octave	Changes the current octave to the next higher octave.

Previous order	Changes the current pattern to the previous one in the pattern order. If the pattern ID is the same the display will not change.
Next order	Changes the current pattern to the next one in the pattern order. If the pattern ID is the same the display will not change.

## Pattern - Orderlist

These keyboard shortcuts operate while the cursor focus is in the Order List (a pattern ID will be highlighted).

Delete Order	Erases the pattern from that location in the Order List (the pattern ID is still available, however).
Insert Order	Creates a new blank spot in the Order List.
Edit Pattern	Resets the Pattern Editor to show the highlighted pattern.
Switch to Pattern Editor	Moves the cursor focus to the Pattern Editor.
Previous Order	Selects the previous pattern in the Order List.
Next Order	Selects the following pattern in the Order List.
First Order	Selects the first pattern in the Order List.
Last Order	Selects the final pattern in the Order List.
Pattern Index Digit 0-9	Enters the respective numeral into the pattern ID box.
Increase Pattern Index	Adds one to the pattern ID, up to the highest indexed pattern.
Decrease Pattern Index	Subtracts one from the pattern ID, to a minimum of index 0.

## Pattern - General Context

These keyboard shortcuts will only work if the cursor focus is within one of the columns of the Pattern Editor, except where noted.

NOTE: When navigating (moving the cursor) to before the first row or after the last row in the pattern, the cursor "wraps" to the other side of the same pattern, if the "Cursor Wrap" option is enabled (in the Options section of the General tab of the MPT Setup dialog). If navigating beyond the first or last row when the "Continuous Scroll" option is enabled, the cursor will instead move to the previous/next pattern in the order list.

Navigate down by 1 row	Moves the cursor to the next row in the same column.
Navigate up by 1 row	Moves the cursor to the previous row in the same column.
Navigate down by spacing	Moves the cursor down (in the same column) by the value in the Row Spacing field.
Navigate up by spacing	Moves the cursor up (in the same column) by the value in the Row Spacing field.
Navigate left	Moves the cursor to the previous column in the same row, going to the previous channel's last column if moving from the first column of the current channel.
Navigate right	Moves the cursor to the next column in the same row, going to the next channel's first column if moving from the last column of the current channel.
Navigate to next channel	Moves the cursor to the same column in the same row in the next channel.
Navigate to previous channel	Moves the cursor to the same column in the same row in the previous channel.
Jump down by measure	Moves the cursor down (in the same column) by the number in the Rows/measure field (of the Song Properties dialog).
Jump up by measure	Moves the cursor up (in the same column) by the number in the Rows/measure field (of the Song Properties dialog).
Jump down by beat	Moves the cursor down (in the same column) by the number in the Rows/beat field (of the Song Properties dialog).

Jump up by beat	Moves the cursor up (in the same column) by the number in the Rows/measure field (of the Song Properties dialog).
Snap down to measure	Moves the cursor down (in the same column) to the first row of the next measure, as determined by the number in the Rows/measure field (of the Song Properties dialog).
Snap up to measure	Moves the cursor up (in the same column) to the first row of the previous measure, as determined by the number in the Rows/measure field (of the Song Properties dialog).
Snap down to beat	Moves the cursor down (in the same column) to the first row of the next beat, as determined by the number in the Rows/beat field (of the Song Properties dialog).
Snap up to beat	Moves the cursor up (in the same column) to the first row of the previous beat, as determined by the number in the Rows/beat field (of the Song Properties dialog).
Go to first channel	Moves the cursor to the first column of the first channel in the same row.
Go to first row	Moves the cursor to the first row of the same channel in the same column.
Go to first row of first channel	Moves the cursor to the first column of the first channel in the first row.
Go to last channel	Moves the cursor to the last column of the last channel in the same row.
Go to last row	Moves the cursor to the last row of the same channel in the same column.
Go to last row of last channel	Moves the cursor to the last column of the last channel in the last row.
Previous pattern	Displays the previous pattern in the order list, moving the cursor to its equivalent position in it.
Next pattern	Displays the next pattern in the order list, moving the cursor to its equivalent position in it.
Selection key	The modifier key to be used to extend the selection when navigating with keyboard shortcuts.
Copy select key	The modifier key to be used to copy the selection when dragging with the mouse.
Select channel / Select all	Toggles the "select all" method, either all events in the current pattern of the current channel where the cursor is located, or all events in the pattern.
Copy and lose selection	Copies the selected events (replacing whatever was in the clipboard) and deleting the selected events from the pattern. The cursor is not relocated.
Clear row	Deletes all event data in the same row in the current channel.
Clear field	Deletes only the data in the same row of the same column in the current channel.
Clear field (IT Style)	Deletes the note and instrument when the cursor is in the note column; note FX and channel FX remain.
Clear row and step	Deletes all event data in the same row in the current channel and moves the cursor by the number of rows in the Row Spacing field.
Clear field and step	Deletes only the event data in the same row of the same column in the current channel and moves the cursor by the number of rows in the Row Spacing field.
Clear field and step (IT Style)	Deletes the note and instrument when the cursor is in the note column (note FX and channel FX remain) and moves the cursor by the number of rows in the Row Spacing field.
Delete rows	Deletes the same number of rows as the selection, affecting the same number of channels where the selection extends; the data is moved up to replace the cleared data, and extra rows are added in the affected channels so that the row number remains the same.
Delete all rows	Deletes all event data in the selected channels
Insert Row	Moves event data in the current and following rows in the selected channel down one row. Event data in the last row of those channels is deleted.

Insert All Rows	Moves event data in the current and following rows in all channels down one row. Event data in the last row of all channels is deleted.
Mute current channel	Toggles the sound output (mute) for the channel where the cursor is located.
Solo current channel	Toggles the sound output (mute) for all channels except the one where the cursor is located.
Unmute all channels	Activates the sound output for all channels, regardless of Mute status.
(Un)mute chan on pat transition	Toggles the sound output (mute) for the channel where the cursor is located, but the change takes place when the current pattern is finished playing.
Unmute all channels on pattern transition	Activates the sound output for all channels, regardless of Mute status, but the change takes place when the current pattern is finished playing.
Solo channel on pattern transition	Toggles the sound output (mute) for all channels except the one where the cursor is located, but the change takes place when the current pattern is finished playing.
Reset Channel	
Transpose +1	Raises by one the note number of the currently selected notes. Only selected note data (first column) is affected.
Transpose -1	Lowers by one the note number of the currently selected notes. Only selected note data (first column) is affected.
Transpose +12	Raises by one the octave number of the currently selected notes. Only selected note data (first column) is affected.
Transpose -12	Lowers by one the octave number of the currently selected notes. Only selected note data (first column) is affected.
Amplify selection	Opens a dialog to change the volume commands (note FX not channel FX) of the selected volume data. Only selected volume data (third column vxx) is affected.
Interpolate note	Transitions smoothly (using all available notes) between notes in the selection, filling in (and replacing if necessary) all rows with new note data. The first and last rows of the selection must contain note data.
Interpolate volume	Transitions smoothly between data amounts in the selection, filling in (and replacing if necessary) all rows with new note FX data. The first and last rows of the selection must contain note FX data, and they must be of the same type (volume, panning, etc). Note FX of different types are not replaced.
Interpolate effect	Transitions smoothly between data amounts in the selection, filling in (and replacing if necessary) all rows with new channel FX data. The first and last rows of the selection must contain channel FX data, and they must be for the same effect (Ixx, Zxx, etc.). Channel FX of different types are not replaced.
Open effect visualizer	Opens the Params Editor dialog.
Open pattern randomizer	Opens the Pattern Randomizer dialog. (not functional)
Go to row/channel/...	Opens the Go To dialog.
Apply current instrument	Applies the current instrument to all rows in the selection that contains note data.
Grow selection	"Expands" the selection by doubling the number of the selected rows, and evenly spacing out the event data within it. The expansion will replace event data below it in the same channels as the selection.
Shrink selection	"Shrinks" the selection by deleting every other row of the selection. However, if only part of any row is selected, the data corresponding to the deleted selected data is also deleted.
Toggle follow song	Toggles the "Follow Song" function.
Quick copy	Copies only one chunk of data (where the cursor is located) to MPT's "Quick" clipboard; the standard clipboard is not erased. Each column pair has its own Quick clipboard. See the section on <a href="#">Using the Clipboard</a> for more details.

Quick paste	Pastes the data in MPT's "Quick" clipboard to the location of the cursor. The data last saved in that column's clipboard will be pasted in the cursor's corresponding column.
Enable recording	Toggles the Event Record feature. When enabled, patterns may be edited.
Play row	Process and play only the events in the current row where the cursor is located.
Set row jump on note entry	The modifier key(s) that, when pressed with digits 0-8, will allow you to change the Row Spacing amount without using the mouse or moving the cursor focus out of the editor.
Switch to order list	Toggles the cursor focus between the pattern editor and the current pattern in the Pattern Order list.
Insert new pattern	Inserts a new blank pattern after the current pattern, displays it, and moves the cursor to the same position in it. Also functions when cursor focus is in the Order list.
Duplicate Pattern	Inserts a new pattern ID with this pattern's contents.
Toggle channel's plugin editor	Opens the Plugin Manager dialog.
Show note properties	Opens the Note Properties dialog, where you can assign any event data to the current row of the current channel.
Show pattern properties window	Opens the Pattern Properties dialog.
Show macro configuration	Opens the Macro Setup dialog.
Split Keyboard Settings dialog	Opens the dialog where a Split Keyboard can be set up.
Toggle loop pattern	Toggles the Loop Pattern feature.
Show context (right-click) menu	Opens the context menu at the cursor location without using the mouse.
Show playback time at current row	Shows the estimated time within the track at the start of the current row.

## Pattern – Note Column

These shortcuts will be recognized as note entries when the pattern editor has focus and the cursor is in the note column (the first column).

Base octave [note]	Enters a note in the octave indicated in the Octave field
Base octave +1 [note]	Enters a note in the next higher octave indicated in the Octave field
Base octave +2 [note]	Enters a note two octaves higher than the one indicated in the Octave field
Set octave [0 – 9]	Sets the selected note's octave.
Chord Modifier	The modifier key(s) that calls a chord rather than a note. The chords are set and assigned in the <a href="#">Chord Editor</a> .
Note Cut	Enters a Note Cut command (^ ^) and applies the current instrument (replacing it if necessary)
Note Off	Enters a Note Off command (= =) and applies the current instrument (replacing it if necessary)
Note Fade (IT only)	Enters a Note Fade command (~ ~) and applies the current instrument (replacing it if necessary)
Note Cut (no instrument)	Enters a note cut command (^ ^), leaving the instrument field blank
Note Off (no instrument)	Enters a note off command (= =), leaving the instrument field blank
Note Fade (no instrument) (IT only)	Enters a Note Fade command (~ ~), leaving the instrument field blank
ParamControl (MPTM only)	Enters a <a href="#">Parameter Control event</a> (PCE), using an absolute setting
ParamControl Smooth (MPTM only)	Enters a <a href="#">Parameter Control event</a> (PCE), using a sliding setting

## Pattern Editor – Instrument Column

These shortcut keys will be activated only when the pattern editor has focus and the cursor is in the instrument column (the second column). Some users may wish to assign certain number keys to other functions (e.g. '8' to 'Play Row'), so making the numbers fully customizable helps manage this case. Note that MPT distinguishes between standard number keys and "numpad" keys.

Set instrument digit [0 -9]	Enters the digit into the rightmost place in the instrument field, moving the existing digit to the leftmost place.
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## Pattern Editor – Channel Effect Column

These work when the pattern editor has focus and the cursor is in the Channel FX column (the prefix of the fourth column). MPT distinguishes between standard number keys and "numpad" keys. Currently only some of the newer effects introduced in MPT are customizable.

FX MIDI macro slide	Enters the symbol for Macro slide between parameters (see the section on <a href="#">Macros</a> for details)
FX pseudo-velocity (experimental)	(to be written later)
FX parameter extension command	Enters the symbol for Byte Shift, or parameter extension. See <a href="#">here</a> for details.

## Pattern Editor – Effect Param

These work when the pattern editor has focus and the cursor is in the Channel FX parameter column (the last 2 places of the last column in the channel). MPT distinguishes between standard number keys and "numpad" keys. Remember that unlike the other numeric columns, the Channel FX column is in hexadecimal, where counting is done from 0 to 15, with the letters A – F representing the numbers 10 – 15.

FX Param digit [0 -9]	Enters the digit into the rightmost place in the parameter field, moving the existing digit to the leftmost place.
FX Param digit [A – F]	Enters the letter into the rightmost place in the instrument field, moving the existing digit to the leftmost place.

## Sample Editor:

These shortcuts are recognized when the Samples Tab is visible.

Trim sample around loop points	If loop points are specified, all sample data outside of these start/end times are deleted
Silence sample selection	All of the sample data within the selected area is set to zero, effectively placing silence in that span.
Normalise Sample	Applies Normalization to the sample.
Amplify Sample	Opens the <a href="#">Amplify dialog</a> , allowing you to alter the volume of the sample and apply Fade In or Fade Out (from silence).
Reverse sample	Puts the selected sample data in reverse order, causing it to sound like it's being played backwards.
Delete sample selection	Deletes the sample data within the selection, moving the remaining data together.
Zoom Out	Decreases the data-to-display ratio, effectively zooming out to show less graphic detail of the sample data. The values "wrap" so when you Zoom Out to the lowest ratio, using the command again goes to the highest ratio.
Zoom In	Increases the data-to-display ratio, effectively zooming in to show more graphic detail of the sample data. The values "wrap" so when you Zoom In to the highest ratio, using the command again goes to the lowest ratio.

Invert Sample Phase	(to be written later)
Signed/unsigned Conversion	(to be written later)
Remove DC Offset	(to be written later)
Load a Sample	Opens the Open File dialog to allow you to import a .wav file into the sample slot. (This command also works in the Instrument Tab, importing an instrument to the next Instrument slot.)
Save Sample	Opens the Save File dialog to allow you to save the .wav file into a folder of your choice. (This command also works in the Instrument Tab, saving the Instrument and its accompanying samples as an .iti file.)
New Sample	Creates a blank sample in the next unused slot. (This command also works in the Instrument Tab.)

### **Plugin Editor:**

These shortcuts are recognized when a VST GUI is the active window. Remember when navigating most VSTs, changes made to one preset will be retained when going to another until MPT is exited or the VST is removed from the track.

Previous plugin preset	Selects the plugin previous to the current plugin in the preset list.
Next plugin preset	Selects the plugin following the current plugin in the preset list.
Plugin Preset Backward Jump	Selects the 10th plugin previous to the current plugin in the preset list.
Plugin Preset Forward Jump	Selects the 10th plugin following the current plugin in the preset list.
Randomize plugin parameters	Give random values to all recognizable parameters in the VST. There is a limit to the number of settings in a VST that MPT will recognize (and thus randomize), which is 398 in XM/IT tracks (using macros), or 1000 in MPTM tracks (using PCEs).