

# Up and Running: A REAPER User Guide v 3.11

by  
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**Version 3.11**  
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This guide will be updated regularly as the software itself is further improved and developed.

Check for updates and other information at

<http://www.cockos.com/reaper/>

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## **Up and Running: A REAPER User Guide**

The essential and definitive guide to recording, editing and mixing with REAPER. Now fully updated for version 3.0. Includes sample project files and step by step examples to help you learn how to use the many features of REAPER

Includes special sections on key REAPER features such as routing and audio channel splitting, as well as numerous examples of how to use and apply many of the supplied FX plug-ins.

"*Up and Running* is not only a comprehensive guide to using REAPER, it's also full of an amazing amount of information on audio recording and engineering. I simply cannot recommend it enough!" - **Justin Frankel** (COCKOS Inc and REAPER Developer).

## **ReaMix: Breaking the Barriers with REAPER**

This book does much more than just teaching you how to use basic tools (such as volume, panning, EQ, gates, compressors, delay, reverb etc.) to get an OK mix. It also guides you thru the relationships – some simple, some complex – that exist between the dimensions of sound and the dimensions of space. It gives you the confidence to use this knowledge to transform your OK mixes into great mixes.

Although not light on theory, it has a definite practical emphasis, with links to archives containing some 40 or so project files, with step by step examples. These help you put your knowledge into practice.

"Wow! So much good stuff - from mindbending advanced techniques to solid sensible advice, this guide should have a positive effect on just about anybody interested in mixing (and especially those using REAPER)!" - **Justin Frankel**, Cockos Inc, developer of REAPER.

## **And from Amazon.com ...**

[http://www.amazon.com/REAPER-Power-Comprehensive-Geoffrey-Francis/dp/1598638793/ref=sr\\_1\\_11?ie=UTF8&s=books&qid=1248039991&sr=1-11](http://www.amazon.com/REAPER-Power-Comprehensive-Geoffrey-Francis/dp/1598638793/ref=sr_1_11?ie=UTF8&s=books&qid=1248039991&sr=1-11)

## **REAPER Power**

Takes you beyond the User Guide (which focuses mostly on how to do things) and places more of an emphasis on the when and the why. It's also designed to help you understand how REAPER's various components, tools, bits and pieces work together. The book is comprehensive and includes a CD with more than 100 project files which demonstrate the various features of REAPER in action. It also contains sample custom actions, FX chains, track templates, and much more.

If you're an experienced user of another product (perhaps Cubase, Sonar or Pro Tools) and are making the jump to REAPER then this book should give help fast-tracking you into REAPER's design philosophy and ways of working, which often are significantly different from what you're used to.

## Foreword and Acknowledgements

REAPER isn't just about software, and it isn't just about making music. It's about a whole lot more. REAPER is a whole community. It represents the way music should be, the way the internet should be, the way computers should be, the way program development and licensing should be .... in fact, the way the world should be.

It's about collaboration and co-operation, and it is truly awesome. If you've already laboured or suffered at the hands of some software companies, you'll know exactly what I'm talking about. If you haven't been there, then, believe me, you don't want to.

This User Guide could not have been produced without the help of many of the fine people in the REAPER community. If I try to mention everybody, I'll be sure to miss some out, so I'll just mention those whose assistance has been absolutely invaluable:

**Malcolm Jacobson** for his efforts in getting together the first REAPER manual. **Art Evans** for his technical advice and constructive input.

**Mario Bianchi** (aka **Mabian**) for his invaluable help with document formatting and layout.

**Bevan Fowke** (aka **Bevoss**) for his advice and assistance with custom actions and macros.

**Jason Brian Merrill** and others for their work on REAPER's WIKI.

**Craig Richardson** and **Simon Mullings** for their helpful suggestions and the patient hours spent on the tedious job of proof-reading.

**Pipeline Audio** for those great video tutorials. **White Tie** for awesome graphics. **Xenakios** and **SWS** for their extension sets.

And, of course ...

**Justin, Christophe** and **Schwa**, for bringing us REAPER

So welcome to REAPER! This User Guide is intended to get you up and running in REAPER, and to help you understand better how the program works, so that ultimately you will better be able to help yourself.

If you are new to the world of digital audio, you'll find that there is more than enough information in here to get you "up and running". You'll probably find that some sections contain information that you'll find difficult to understand and which you might not need at first. You can just skip over those sections and come back to them when you're ready. If, like me, you have come to REAPER with experience of other DAW software, you'll find that it pays to go over even the most basic sections, to help you understand how REAPER is designed, and how it slots together. You'll find yourself asking, "Why can't they all be like this?" You should also find plenty more to interest you.

It is not intended to be (and nor will it ever be) a 100% reference manual covering every single aspect and detail of REAPER. I've tried to approach the topics in what seems a fairly sensible order, introducing items pretty much on a "need to know" basis. In doing so, I've been as careful as I can be to ensure its contents are clear and accurate, but cannot accept any responsibility for any errors or problems you may encounter in applying it to your work.

In this version 3 update, I have flagged *major* new topics with the word **New!** in the section header and the Table of Contents. In the case of Chapters 12, 14 and 19, these are so different from earlier versions as to be able to be regarded as virtually new sections entirely. In addition to these changes, there are numerous other smaller changes and new features that are just too many to flag.

Finally, I'd like to make it clear that (apart from the extract from the COCKOS Web Site) any views or opinions expressed here or anywhere else are entirely my own, and have not been endorsed by COCKOS software or any other person or body associated with REAPER. I hope that you get as much from REAPER as I have, and that this User Guide is more than a little help to you along the way.

- Geoffrey Francis, September 2009

## REAPER Web Resources

The REAPER project is a live, dynamic and ongoing one. Be sure to check these web sites often and often:

<http://www.cockos.com/reaper/>

The REAPER Home Page

<http://www.cockos.com/reaper/download.php>

The REAPER Downloads Page

<http://www.cockos.com/reaper/about.php>

REAPER Features summary

<http://www.cockos.com/forum/forumdisplay.php?f=20>

The REAPER Forums

<http://www.cockos.com/wiki/>

The REAPER Wiki

## Sample Project Files

These are available for download from [http://www.cockos.com/wiki/index.php/REAPER\\_User\\_Guide](http://www.cockos.com/wiki/index.php/REAPER_User_Guide)

Note that the links are case sensitive. These files are in .MP3 format. Some of the examples outlined in this book require recording further tracks in MP3 format. In order to be able to do this, you will need to have the file **lame\_enc.dll** installed in your REAPER program directory.

This file can be downloaded from a number of locations, including

[http://www.free-codecs.com/download/Lame\\_Encoder.htm](http://www.free-codecs.com/download/Lame_Encoder.htm)

After downloading, simply copy this file into your REAPER program folder. Open the file and play it. If you hear no sound, you should check the **I/O** setting for your Master Track and make sure that output is correctly directed to your sound device.

## From the Original COCKOS Web Site ...

*Cockos Incorporated was founded in 2004 as a software development company with philanthropic goals.*

*The engineers who founded Cockos were tired by the frustration and oppression of working within large companies. Large public companies often find themselves slaves to their shareholders and while focusing on money, lose sight of what's really important.*

*The software development background of Cockos is extensive--our employees have developed end-user software, software distribution tools, peer-to-peer network and media streaming architectures that are used by many millions of people (examples include Winamp, NSIS, Gnutella, and SHOUTcast).*

*Some rules we try to follow:*

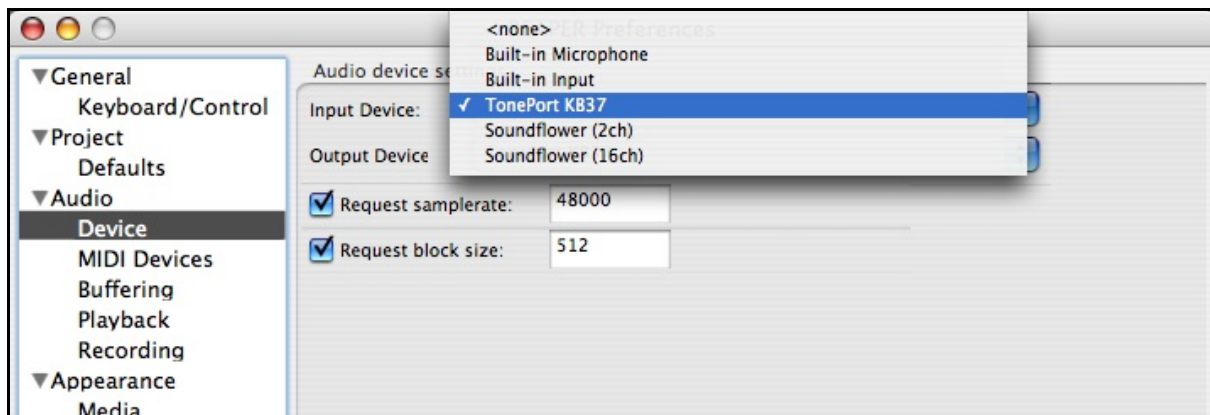
- *Give new features to customers quickly: the paradigm of batching updates and then selling them is both a terrible experience for the customer, and detrimental to the quality of the software.*
- *Avoid copy-protection and DRM schemes: these schemes are almost always ineffective, and usually result in a poorer experience for paying customers than for pirates.*
- *Price software reasonably, trust your customers*
- *Resources should be spent on product development whenever possible. To the consumer, this translates to more bang for the buck.*

<http://www.cockos.com/company.php>

## Introduction for Apple Mac Users

At the time of publishing this upgrade, an OS X version of REAPER is in the latter stages of beta testing. An OS X version of REAPER is expected to be released within the next few months. Even though this User Guide has been produced in conjunction with the PC version of REAPER, Apple Mac users should still find it helpful provided you are mindful of the following important differences.

### Audio Setup



Several of the Audio Setup procedures and settings for the OS X will be different from those outlined in Section 1 of this guide. It has not yet been possible to document these, but this will especially apply to the **Audio, Device** and **Audio, MIDI Devices** settings pages. You can obtain further information by visiting the Reaper OS X forum at <http://www.cockos.com/forum/index.php> and following the link.

### Booster Keys and Right Mouse Button

REAPER makes extensive use of both keyboard shortcuts and of clicking the right mouse button. For OS X users, instructions in this User Guide will need to be modified as shown below.

PC Booster Key	OS X Booster Key	Example / Comments
<b>Shift</b>	<b>Shift</b>	PC: <b>Shift E</b> to show FX Chain for selected item or take. OS X: <b>Shift E</b> to show FX Chain for selected item or take.
<b>Control</b>	<b>Command</b>	PC: <b>Control M</b> to toggle show/hide Mixer. OS X: <b>Command M</b> to toggle show/hide Mixer.
<b>Alt</b>	<b>Option</b>	PC: <b>Alt G</b> to toggle grid lines display on/off. OS X: <b>Option G</b> to toggle grid lines display on/off.
	<b>Control</b>	PC: Click right mouse button to display context menu. OS X: Click right mouse button to display context menu. <i>or with single button mouse</i> Hold Control key and click mouse button.



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### What's New In This Edition ....

This edition of the REAPER User Guide includes a number of fixes to minor typos and layout issues. In addition, the following changes have been incorporated:

Where ...	What ...
<b>Page 55, Sends and Busses</b>	Use Alt Click to toggle a track's Master/Parent send status on and off
<b>Page 93, Drag and Drop Sends</b>	Drag and drop from I/O button of any track to I/O button of another track to create a send
<b>Page 130, Snap/Grid Settings</b>	Snap Relative to Grid now supported
<b>Page 188. Using Smart Tools</b>	New feature, new section
<b>Page 189, Track Control Panel Help</b>	New feature, new section
<b>Page 277, Envelope Mouse Techniques</b>	Ctrl Drag to draw envelope in freehand mode
<b>Page 277, Envelope Mouse Techniques</b>	Ctrl Alt Drag to finely adjust envelope point
<b>Page 316, Plug-in Run Mode</b>	New feature, new section
<b>Page 354, Project Default Settings</b>	Set default track height for new projects.

#### Note:

With REAPER's rapid rate of development, you may find that this user guide may not be 100% up to date at the time you are reading it.

For a full list of new and recent features, choose the **Help, Changelog** command from the REAPER menu.

To check for the latest versions of both REAPER and this User Guide, go to

<http://www.cockos.com/reaper/download.php>



# The Main Stuff



## 1 Setting Up and Getting Started

### 1.1 Introducing REAPER

REAPER is a powerful Windows application for multitrack recording and editing of audio. REAPER provides a flexible but easy to use interface that is suitable for professionals and non-professionals alike.

For more information on REAPER's large range of easy to use features and in depth capabilities, check out the Features and Technical Specifications pages:

<http://www.cockos.com/reaper/features.php>

REAPER Features summary

To download REAPER, visit the download page:

<http://www.cockos.com/reaper/download.php>

The REAPER Downloads Page

REAPER is reasonably priced, sustainably developed, uncrippled unexpiring shareware. To purchase your REAPER licence, visit the Purchase Page:

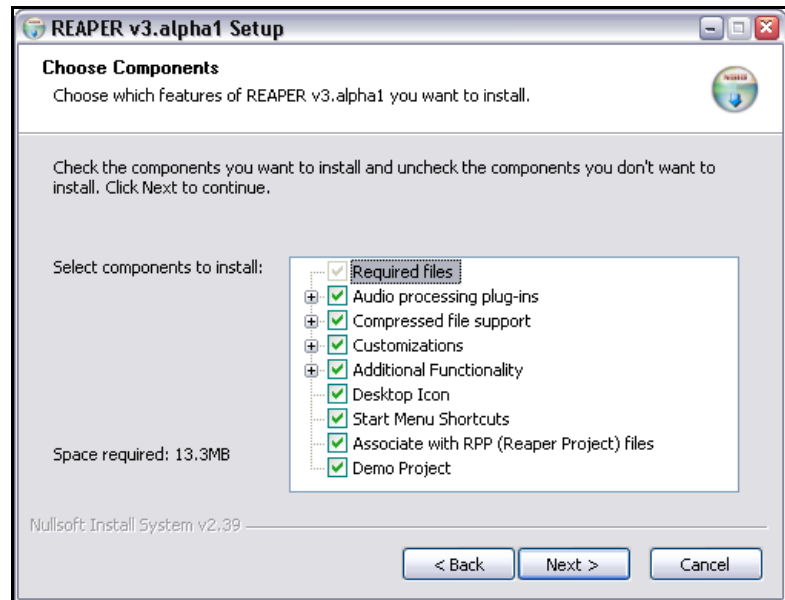
<http://www.cockos.com/reaper/purchase.php>

The REAPER Purchase Page

### 1.2 Installing REAPER

A full installation of REAPER requires approximately 13.3 MB of disk space. After downloading the REAPER install file, follow this sequence:

1. In Windows Explorer, find the folder to which the REAPER install file was downloaded. The file name includes the current version number, and will be something like **reaper 301-install.exe**.
2. Double click on this file name to run the install program.
3. If you agree with the Licence Conditions, click the **I Agree** button to continue.
4. Select which elements you wish to install (see picture right and comments below).
5. Accept the default folder offered to you – **C:\Program Files\REAPER** – and click Install.
6. Wait while the program installs.
7. When prompted, click on **Close** to Close the Install program, then **No** to indicate that you do not yet want to run REAPER.



**Tip:** If you choose not to install any REAPER program elements or options, you can later change your mind by simply running the install program again.

## Up and Running: A REAPER User Guide v 3.11

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### 1.3 The Install Options

The Install screen gives you the opportunity to decide which REAPER elements you choose to install and which ones you prefer not to install. Listed below is a summary of your main options.

Item	Explanation
<b>Audio Processing Plug-ins</b>	This is a collection of Audio and MIDI FX that is supplied with REAPER – such as a Compressor, a Noise Gate and a Synthesizer. Usually you should make sure this option is ticked.
<b>Compressed File Support</b>	This allows you to work with file formats such as MP3, OGG, APE (Monkey's Audio), FLAC and WavPack as well as Video files.  Note that to render (mix down to) MP3 files you will also need to download from the internet the file <b>lame_enc.dll</b> and then copy or move it into your REAPER program directory.
<b>Customizations</b>	This allows for the use of European keyboards and offers you the option to later choose any of a number of color schemes for REAPER.
<b>Additional Functionality</b>	This allows you to install elements such as the Media Explorer, CD Burning and Rewire. These aspects will be discussed later in this guide. If you are new to REAPER, you might wish not to install at this stage the ReaRoute ASIO driver, nor ReWire nor ReaMote. This makes for simpler options when audio routing. You can always add these later.
<b>Desktop Icon</b>	Leaving this option selected ensures that a REAPER shortcut icon will be placed on your Windows desktop.
<b>Start Menu Shortcuts</b>	Leave this option ticked to ensure that REAPER is added to your Windows Start Menu.
<b>Associate with RPP Files</b>	Ticking this option will enable you to open REAPER with any of your REAPER Project files direct from Windows Explorer or any desktop shortcut that you might create for your projects.
<b>Demo Project</b>	If you leave this option ticked, a sample project file will also be installed along with REAPER. This is not the same as any of the sample project files associated with this User Guide.

### 1.4 REAPER Software Updates

REAPER is updated frequently and regularly, with bug fixes, new features and other enhancements. At the time of writing, updates are being released at the rate of every two or three weeks.

You can check for updates at any time by visiting <http://www.reaper.fm/> Simply download and install. There is no need to first uninstall any previous version. Existing preferences and settings will automatically be carried over.

**Tip:** An option is available under **Preferences, General** to have REAPER automatically check for updates each time the program is started (provided of course you are on-line at the time). You will be shown how to select this option later.

## 1.5 Starting REAPER

To start REAPER, just double click on the REAPER desktop icon.

**Tip:** You can assign a desktop shortcut key within Windows, to make it even easier to start up the REAPER program. To do this:

1. Right click over the REAPER shortcut icon on your desktop.
2. Choose **Properties** from the menu, then click on the Shortcut tab.
3. Tab to or click on the Shortcut Field
4. Press your preferred shortcut, e.g. **Ctrl Alt R**.
5. Click on **Apply**.
6. Click on **OK**.

## 1.6 The REAPER Screen


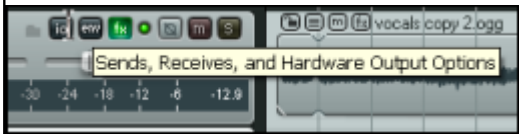
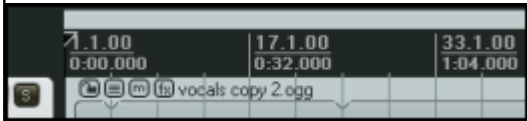


**Note:** REAPER allows you to select from a large number of different color themes and skins. The screen shots used in this book use the REAPER 3 default theme: if you are using any other theme, you might therefore notice some visual differences. If this causes you any difficulties, consider switching to the default theme.

## Up and Running: A REAPER User Guide v 3.11

When you start REAPER, it displays a screen similar (but not necessarily identical) to that shown above. The example shows a typical project file that has been opened.

Note the following. We'll examine the elements in more detail shortly.

Item	Explanation
<p><b>The Main Menu</b></p>	<p>This is displayed near the top as a row of commands – <b>File, Edit, View, Track</b> and so on. As in other Windows applications, the menu is used to give commands.</p>
<p><b>The Main Window Toolbar</b></p> 	<p>Just below the menu are two rows of seven buttons each. This is the REAPER Main Window Toolbar.</p> <p>Depending on the color theme in use, your buttons might not look the same as those shown. However, as with other Apps, you can hover your mouse over any Tool to obtain a tooltip (see example, left).</p> <p>Later in this User Guide you will be shown how you can customize this toolbar.</p>
<p><b>The Track control panels (TCP)</b></p> 	<p>These are the areas which are used to control the behavior of your audio and MIDI tracks – in this example there are 12 tracks, labelled from top to bottom Vocals, Lalala etc. Of course you can have as many tracks as you need, subject only to any limitations imposed on you by your hardware.</p> <p>Notice that each track has its own set of controls. We'll get to what these controls do and how they are used later, and again, tooltips are available for each of these.</p>
<p><b>The Main Window and Edit Area</b></p>	<p>This is to the right of the Track Panes. It displays the actual Media clips (or items) that make up your tracks. This can be any combination of Audio and MIDI items. Video items can also be included, but that is beyond the scope of this guide.</p>
<p><b>The Timeline</b></p> 	<p>The timeline runs across the top of the REAPER window, just to the right of the main toolbar.</p> <p>It measures the length of your project and helps you identify the position of the various media items. In the example on the left, the timeline is measured and displayed in both measures and beats (top) and minutes and seconds (below).</p>
<p><b>The Mixer</b></p>	<p>This is displayed (in this example) across the bottom of the screen. Notice that it includes a <b>MASTER</b> output track.</p>

Don't be surprised if your screen doesn't look quite the same as this, or even if it looks a lot different. The REAPER screen can be customised to suit your individual needs. We'll be covering this in Section 2.

### 1.7 REAPER Selections, Controls and Commands

Working in REAPER consists largely of making selections and giving commands. Sometimes you will want to do something to one item, perhaps just one audio clip. For example, you might have an item (or clip) that you no longer need, and which you wish to be deleted. In this case, you will select that item (usually using your mouse) and then give the appropriate command to tell REAPER to delete it.

# 1 - Setting Up and Getting Started

Other times, you will want to give a command that affects the whole of your project file. For example, you might wish to save all your work to date. In that case there would be no need to select anything – you would only need to give the commands.

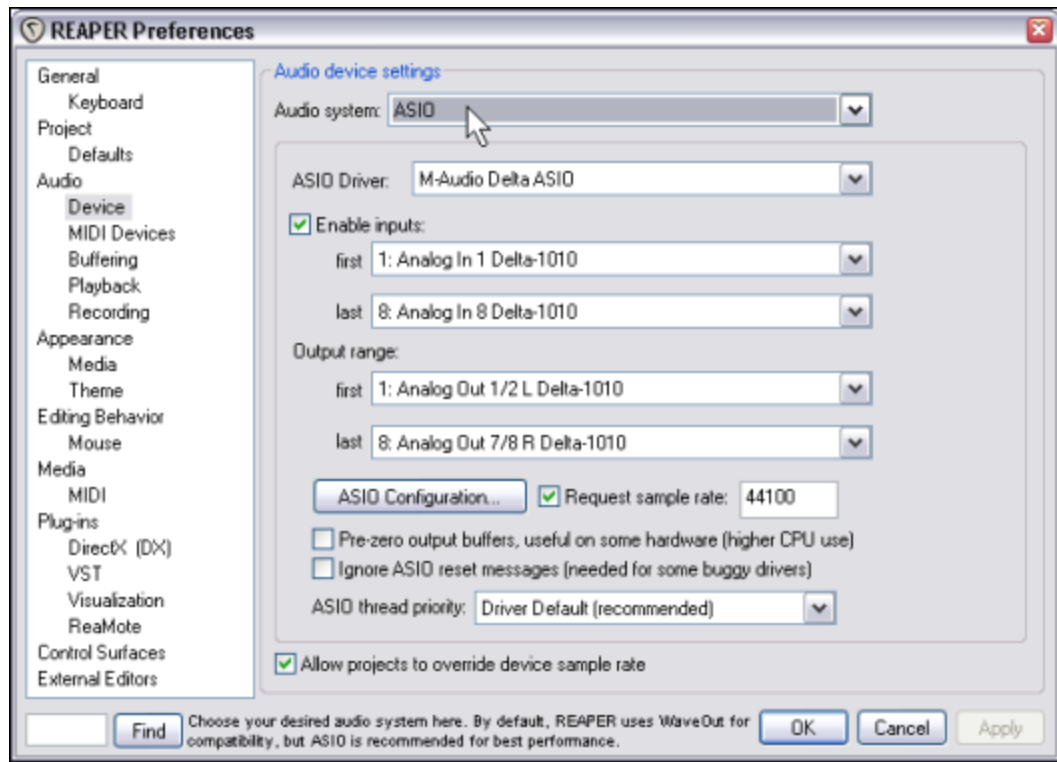
There are four methods commonly used to give commands in REAPER:

Method	Comment
<b>The Main Menu</b>	As with other Apps, this is accessed by the mouse or keyboard.
<b>Context Menus</b>	Clicking your right mouse button over an item or area of the screen will display a menu relevant to where you have clicked.
<b>Toolbars</b>	Clicking your mouse on any tool causes its command to be executed.
<b>Keyboard Shortcuts</b>	Keyboard shortcuts can be assigned to most controls and functions. This is an important and powerful aspect of REAPER. This topic is covered in depth in Section 13.

## 1.8 Setting Up For Audio

Before you can record or play anything, there are a few setup options that have to be specified. This section covers setting up audio. This is where you tell REAPER which audio device(s) you have, and how you wish to use them.

To set up your Audio Device, first choose the **Options, Preferences** command from the Main Menu, then select **Device** under **Audio** from the list of available topics:



From this screen, you should select:

## Up and Running: A REAPER User Guide v 3.11

Item	Comment
<b>Audio System</b>	The remaining items on this screen will vary according to which audio system you select here. You should Choose ASIO if ASIO drivers are available for your PCI sound card or Firewire or USB device.  The comments that follow assume that you have selected ASIO.
<b>ASIO Driver</b>	For best results, choose the ASIO driver(s) for your device.
<b>Enable Inputs</b>	This option needs to be turned on (ticked) if you wish to use REAPER for recording.
<b>Input Range</b>	If your device has multiple inputs, specify the first and last device that you want to be available. In the example above, eight inputs are available, This enables up to eight microphones or lines (in any combination) to be used simultaneously for recording.
<b>Output Range</b>	If your device has multiple outputs, specify the first and last that you wish to be available. Usually, your MASTER bus will direct output to a single pair of outputs, but you can use the others also if you wish.
<b>ASIO Configuration</b>	Clicking this button gives you access to the Control Software for your audio device settings.

### 1.9 Output Aliasing

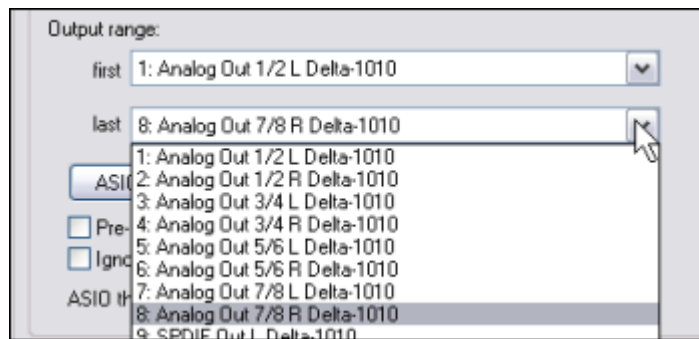
REAPER supports a feature known as **Output Aliasing**. This enables you to give names to your audio outputs, names that make sense to you.

This is especially useful if your soundcard or other audio device provides multiple outputs. For example, one pair of outputs might be connected to your control room monitors, another to studio monitors, and a third pair to a multi-output headphone monitor.

At the same time your sound card outputs will have names something like those shown here (right).

Clearly, these names are not very useful to you.

By assigning Aliases to these outputs, you can ensure that whenever you need to display a list of your outputs (for example, when determining the destination of the output from your Master) your own names will be displayed, instead of the hardware device names.

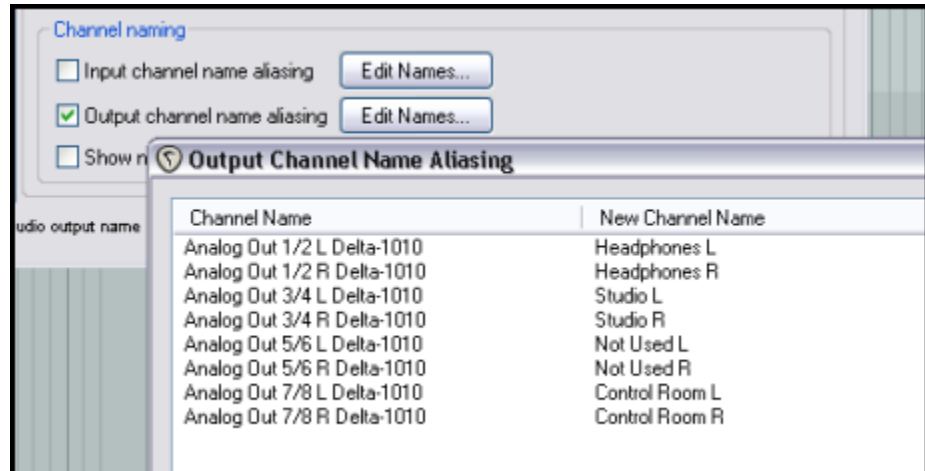


To create output aliases:

1. Choose the **Options, Preferences** command.
2. Display the **Audio** page and in the section labelled **Channel Naming** make sure you have ticked the option **Output Channel Name Aliasing** (this is almost the last item on this screen).
3. Click on the **Edit Names** button for this item.



- Double-click in the Channel Names column on each item shown (each in turn) to edit them. In each case, after typing your preferred alias, click on **OK** to return to the **Output Channel Name Aliasing** window (shown on the right).



- Click on **OK** to close this window and return to the **Preferences** dialog box.
- Click on **Apply** and **OK** to close the Preferences dialog box.

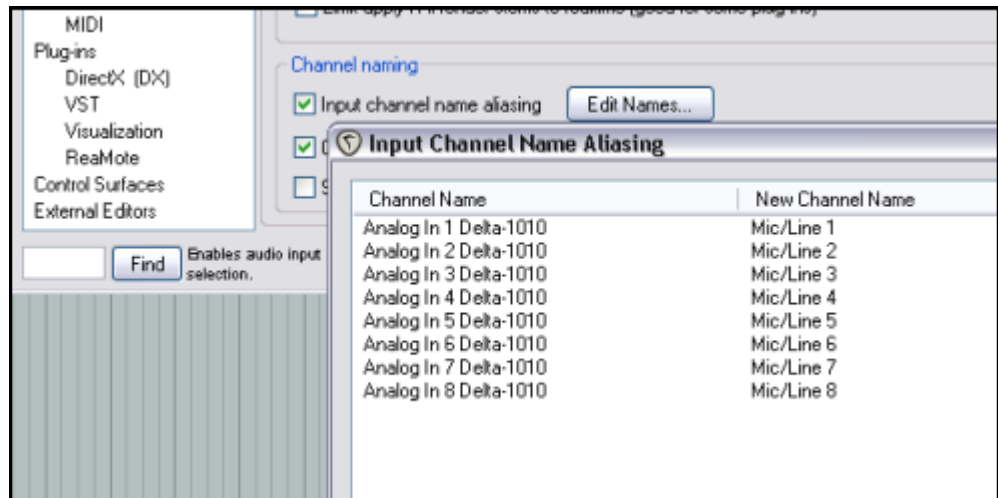
Your specified names should now automatically be used throughout REAPER. The topic of actually assigning outputs to tracks will be covered later, starting at Section 2.

## 1.10 Input Aliasing

REAPER also supports **Input Aliasing**.

Input aliasing is a term which refers to the ability to give your own names to your audio inputs.

This is often used simply to shorten the long names that the system will often give your audio inputs, especially when your device supports multiple inputs.



Input Aliasing is performed in much the same way as Output Aliasing, except that on the **Audio Preferences** screen you select **Input Channel Name Aliasing** instead of Output Channel Name Aliasing.

An example of the use of this feature might be to change names like **Analog In 1 Delta 1010 (1)**, **Analog In 2 Delta 1010 (1)** and so on to just **Mic/Line 1**, **Mic/Line 2**, etc.

## 1.11 Setting Up For MIDI

If you intend to use MIDI at all, you should enable your MIDI devices. Many PCI sound cards, Firewire and USB audio devices include a MIDI input and output port (for use, for example, with a MIDI Keyboard).

Choose **Options, Preferences** from the Main Menu, then display the **MIDI Devices** screen under **Audio**. You can select in turn each of the listed MIDI Input and Output devices, right-click over its name, then choose **Enabled**.

You can double-click on any input device name to display its **Configure**

**MIDI Input** settings (see right). This enables you to assign your own name (or alias) for the device, or to specify your advanced timestamp options (if required).

To assign your own name or to specify a time offset for any MIDI Output device, right click over the device name and choose **Configure Output** from the context menu (see below right).

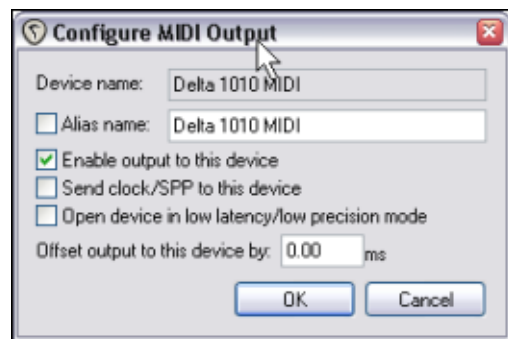
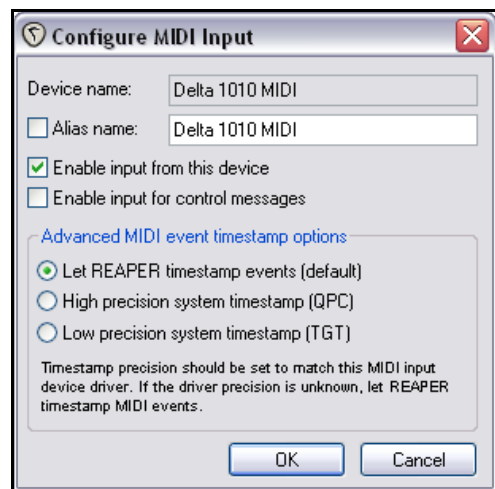
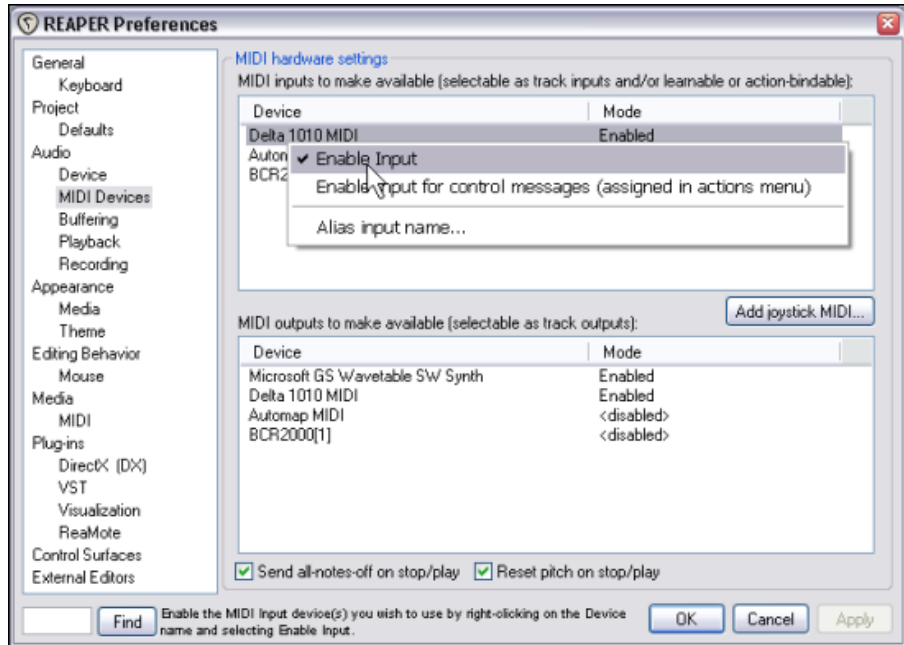
If you have a joystick that you wish to use with REAPER you should click on the **Add joystick MIDI** button then select the device name and processing mode. You can also specify whether you wish to use it for Virtual MIDI Keyboard input an/or as a MIDI control/learn device.

If you have a Control Surface, such as a BCR2000, which you intend to use with REAPER, then you should set its input mode to **Control Only**. The use of Control Devices will be explained later in this guide.

### Other Audio Preferences

You can see that there are other Audio Preference screens that we have not yet examined, including **Buffering, Playback** and **Recording**. These will be dealt with later in this User Guide, in a more appropriate context. When getting started, you should be able to just leave these settings at their defaults, only returning to change them later if you find that you wish or you need to do so.

When finished, clicking on **OK** will, of course, close the **Preferences** box and cause your settings to be remembered.

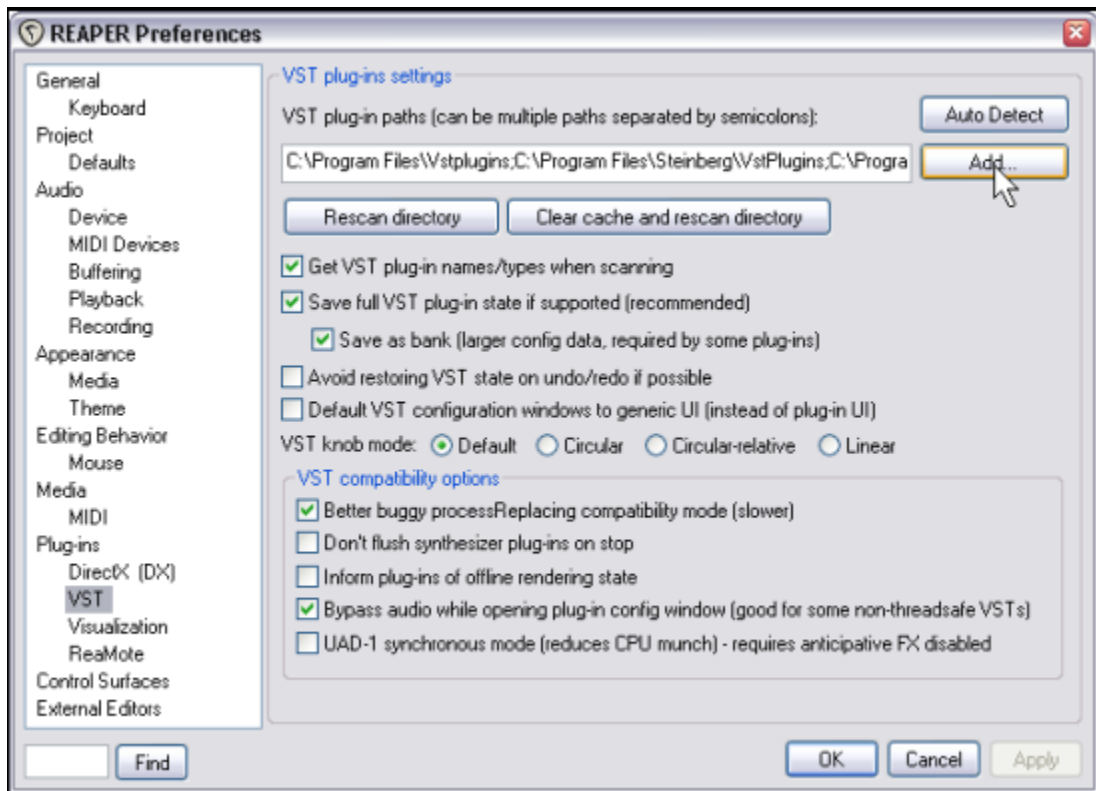


## 1.12 Enabling Plug-ins

There's one further Preferences screen you will probably want to visit before you get started – **VST Plug-ins**. As with Audio Preferences, REAPER has several pages of Plug-in Preference screens, but these can (at first at least) be left to their default settings.

However, if you already have a collection of VST and/or VSTi Plug-ins on your computer, you will need to tell REAPER where to find them.

To do this, choose the **Options, Preferences** command, then select **VST** under the **Plug-ins** section.



You can leave most settings as they are (at least for now), but you will need to click on the **Add** button to specify the location(s) of the folder(s) where your VST plug-ins are stored.

If your VST plug-ins are spread across more than one folder (this is not unusual), you will need to click on the **Add** button several times, each time selecting one of your folders. Remember to use the **Apply** button after doing so. When you specify a folder for your VST and VSTi plug-ins, REAPER will automatically also scan any subfolders below that folder. Of course, if you miss any, you can return to this screen at any time and add them to your selection later.

When you have finished specifying the location(s) of your VST Plug-ins, clicking on **OK** will close this screen and cause your settings to be remembered.

### 1.13 REAPER's Installed Folders and File Locations

If you are used to working with DAW software that leaves a trail of often unintelligible data scattered all across your hard disk and registry, in a seemingly random fashion that makes it impossible to figure out where all your valuable settings are stored, then you are going to love REAPER!

The exact number of installation and preference files you have will depend to some extent on your Install and Preference options, but in general, the story is this:

<b>REAPER's Installed Folders and File Locations</b>	
<b>The Registry</b>	REAPER does <i>not</i> store any install data, settings or preferences in your Windows Registry. Yes, that's right! Windows will set up an item for REAPER under HKEY_LOCAL_MACHINE, Software but it will not contain any data. The only other exception to this is that Windows keeps a record of your file movements in Registry areas such as its <b>MUICache</b> but none of these references will affect REAPER's ability to function in any way.
<b>The REAPER Install Directory</b>	By default, REAPER installs to <b>C:\Program Files\Reaper</b> This folder contains the REAPER program files. You should also ensure that <b>lame-enc.dll</b> is also installed to this folder if you intend to use the MP3 format. Many of the optional install items are held in sub-folders of <b>C:\Program Files\Reaper</b> For example, if you chose to install the FX Plug-ins, you will have a folder called <b>C:\Program Files\Reaper\Effects</b> If you chose to install the Color Themes, you will have a folder called <b>C:\Program Files\Reaper\Color Themes</b> .... and so on.
<b>The Application Data Directory</b>	Your preferences and other settings are all held in the REAPER Application Data directory. This is created for you when you install REAPER, using your Windows User Name. If you are using Windows XP, look in Windows Explorer for: <b>C:\Documents and Settings\<username>\Application Data\REAPER</username></b> If using Vista or Windows 7, look under: <b>C:\Users\<username>\AppData\Roaming\REAPER</username></b> In order to view the contents of this folder, you might need to turn on the option in Windows Explorer to <b>Show hidden files and folders</b> . The exact number of files held here will depend again on which options and preferences you have exercised. Expect at least the following:
<b>reaper.ini</b>	This is a text file that contains your various preferences, such as the Audio and MIDI Device preferences that we set up earlier. The Default Values for the various Preferences (under Options, Preferences) are stored here. These defaults are overwritten by your own settings when you change them. This file can be opened and edited using any text editor (such as Notepad) but it is inadvisable to do this unless you are sure that you know what you are doing.
<b>reaper-dxplug-ins.ini</b> <b>reaper-vstplug-ins.ini</b>	These files store data regarding installed plug-ins.
<b>reaper-reginfo.dat</b>	This file stores your product registration data

REAPER's Installed Folders and File Locations	
<b>Sub Directories</b>	<p>In addition, you might find that you have a number of sub-directories here, such as:</p> <ul style="list-style-type: none"><li><b>FXChains</b></li><li><b>ProjectTemplates</b></li><li><b>TrackTemplates</b></li></ul> <p>These are items that you can create yourself as an aid to managing your REAPER projects. If you do so, the appropriate settings are stored in these folders.</p> <p>The topics of FX Chains, Project Templates and Track Templates will all be covered in later sections of this User Guide</p>

There's one more thing that might interest you.

All of the settings, preference and custom files are text files. Any of them can be opened and modified using a text editor such as Notepad.

This even applies to REAPER's project files, with .RPP extension.

Of course, most probably you will never need to do this, and if you do, you should always take a copy first, just in case of any errors or accidents.

Note also that you should **never** try to use a text editing program to open, view or edit any file ending in **.exe** or **.dll**

**Tip:** You might wish to back up your **Application Data\REAPER** folder to CD. This will ensure that in the event of system damage you will be able to quickly and easily restore all your REAPER settings and preferences.

**Tip:** It's not difficult to install REAPER onto a USB key and take it with you wherever you go! An explanation of how to do this follows shortly in this User Guide.

## 1.14 Uninstalling REAPER

There is no need to uninstall your current version of REAPER before installing a new one. However, should you need to uninstall REAPER for any reason, you should follow this procedure:

1. Click on the Windows **Start** button, then **All Programs**, then **REAPER** then **Uninstall REAPER**.
2. When the REAPER Uninstall Wizard is displayed, click on **Uninstall**.
3. When the uninstall process is finished, click on **Close**.
4. When prompted, choose **Yes** if you wish to see which files have been left on your Hard Drive, otherwise choose **No**.

**Tip:** If you are likely to be reinstalling REAPER at some later date, do not remove these files. This will ensure that your previous settings and preferences will be recalled when re is reinstalled.

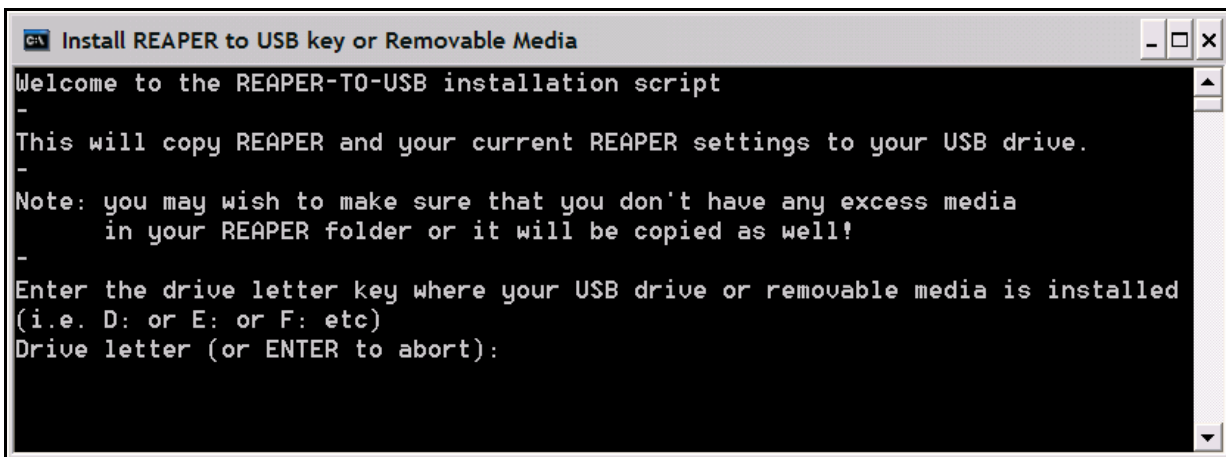
### 1.15 Running REAPER on a Flash Drive

You can install REAPER on a USB flash device, or other external drive. This ensures, for example, that if you are going to be away from home or your normal workplace, you can take your USB Stick (or whatever portable device you may have) with you, plug it in on any PC, and away you go.

Before you can install REAPER on a flash drive, it must first be installed on your hard drive. When you then install REAPER to an external device in this way, all your settings, preferences etc are also migrated.

#### Example

1. Insert your external device into an available USB port on your PC. If necessary use Windows Explorer to note its drive letter. This will depend of course on what hard drives, DVD burners, etc you have already installed.
2. Click on the Windows **Start** button, then **All Programs**, then **REAPER**, then **Install REAPER to USB Key or Removable Media**.
3. This causes the following window to be displayed:



```
Install REAPER to USB key or Removable Media
Welcome to the REAPER-TO-USB installation script
-
This will copy REAPER and your current REAPER settings to your USB drive.
-
Note: you may wish to make sure that you don't have any excess media
      in your REAPER folder or it will be copied as well!
-
Enter the drive letter key where your USB drive or removable media is installed
(i.e. D: or E: or F: etc)
Drive letter (or ENTER to abort):
```

4. Type the drive letter followed by a colon (for example, **E:**) and press **Enter**.
5. Wait while the various files are copied. There are a lot of files and this might take quite a few minutes (see tip below).
6. When the process is complete, you will see a message displayed "Press any key to continue...". Press the space bar (or any other key) and the process will be complete.

Note that this process will not copy your VST or DirectX plug-ins to the Flash Drive. You will need to manually copy and install any of these that you may require.

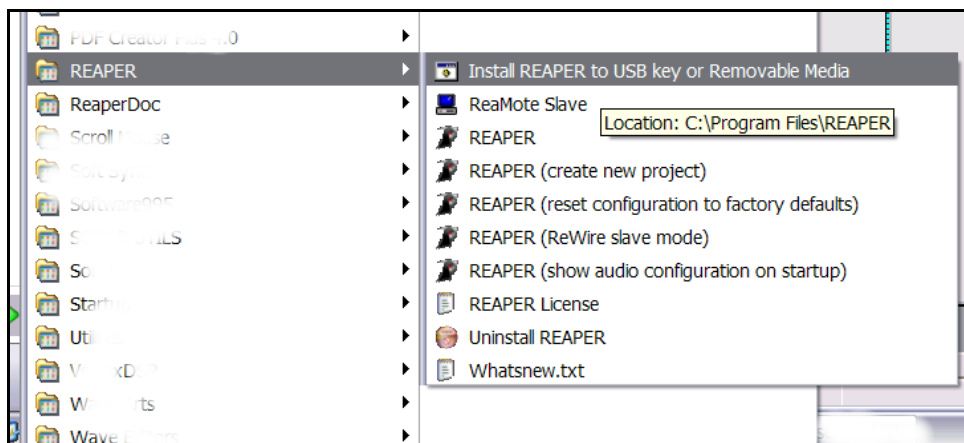
**Tip:** You can speed this process up considerably if before commencing this installation you first remove from your **C:\Program Files\REAPER\Color Themes** folder those color schemes that you do not use. You can always later reinstall REAPER to your hard drive to restore these.

#### To Run REAPER from the Flash Drive

1. Install the Flash drive in a USB 2.0 port on the computer.
2. Open Windows Explorer and display the REAPER folder of your Flash Drive.
3. Double click on **reaper.exe**

## 1.16 REAPER Start Menu Options

Most commonly you will probably wish to start REAPER by simply double-clicking on your Windows desktop shortcut. This will cause REAPER to be started in accordance with your existing preferences and settings. However, for times when you do not wish to do this, you should also



be aware of other options available from the Windows **Start** menu.

Click on the **Start** button, then **All Programs** then **REAPER** to be presented with a flyout menu of choices.

The main choices are summarized in the table below:

Menu Command	Explanation
<b>Install REAPER to USB key</b>	Use this to install REAPER to a Flash drive or similar device. This is discussed in detail earlier in this section.
<b>ReaMote Slave</b>	The use of <b>ReaMote</b> is beyond the scope of this User Guide. However, you can read an overview in Section 21.
<b>REAPER</b>	Starts REAPER normally according to your settings and preferences.
<b>REAPER (create new project)</b>	Starts REAPER with a new project file instead of opening the last used project file.
<b>REAPER (reset configuration to factory defaults)</b>	Starts REAPER and resets all settings, options and preferences to the factory defaults.
<b>REAPER (ReWire slave mode)</b>	Opens REAPER as a ReWire slave. This is beyond the scope of this User Guide, but is discussed in overview in Section 21.
<b>REAPER (Show audio configuration on startup)</b>	Starts REAPER and opens the Audio settings page of your Preferences settings.
<b>REAPER License</b>	Displays License information.
<b>Uninstall REAPER</b>	Uninstalls REAPER. If you need to uninstall REAPER for any reason, you should always use this method.
<b>Whatsnew.txt</b>	Opens the text file displaying a history of new features and changes introduced in each version of REAPER.

## Up and Running: A REAPER User Guide v 3.11

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### 1.17 REAPER Startup Tips

By default, REAPER opens with the last used project. As you will see later, you can permanently change this behavior if you wish. In addition, you can use hot keys when starting REAPER to override the default settings.

Hot Key(s)	Action
<b>Shift</b> (while starting REAPER)	Opens REAPER without loading last project.
<b>Ctrl Shift</b> (while starting REAPER)	Opens REAPER without loading any default project template.

### 1.18 REAPER File Types

Like any other software program, REAPER creates a series of files that it uses to store your work. The main file types and their purpose are described in the table below, along with other useful information.

File Type	Example	Explanation
<b>.RPP</b> REAPER Project File	<b>Brad Sucks.RPP</b>	This file is the core of your project. It holds all the information about your tracks and their settings.  .RPP files are stored in text format and can be opened and examined using any text editor. In general, however, this is not recommended practice, unless you are encountering a serious issue with the file and you need to examine this.
<b>.RPP-bak</b> Project Backup File	<b>Brad Sucks.RPP-bak</b>	Each time you resave your project file, the previous version is renamed and saved with the .RPP-bak extension. This ensures that if you get into difficulty, you can recover your project from its previous state by opening the project backup file.  To do this, simply double-click on the backup file name in Windows Explorer. This will cause REAPER to open with the backup file as a new file, which you can then save.
<b>.RPP-UNDO</b> Undo History File	<b>Brad Sucks.RPP-UNDO</b>	This optional file type will be created if you select the option to save your undo history with your project files. This option is included in the <b>Undo Settings</b> section of the <b>General</b> settings in your <b>Options, Preferences</b> window. This topic is explained more fully later in this guide.  As long as you do not delete this text file, you will be able to restore your project at will to any earlier state, even if that is a state that existed days, weeks or even months earlier.
<b>.reapeaks</b> REAPER Peaks File	<b>Guitar.wav.reapeaks</b>	Your reapeaks files contain the information necessary to enable REAPER to draw the waveforms etc. on your media items.
<b>.reapindex</b> REAPER Peaks File	<b>Guitar.wav.reapindex</b>	These files also contain information about your individual media items.



## 2 REAPER Project Basics

### 2.1 Opening an Existing Project

To open any existing REAPER Project File, use the **File, Open Project** command, or the keyboard shortcut **Ctrl O**. As with other Windows Apps, you will need to navigate to the appropriate folder to find your project.

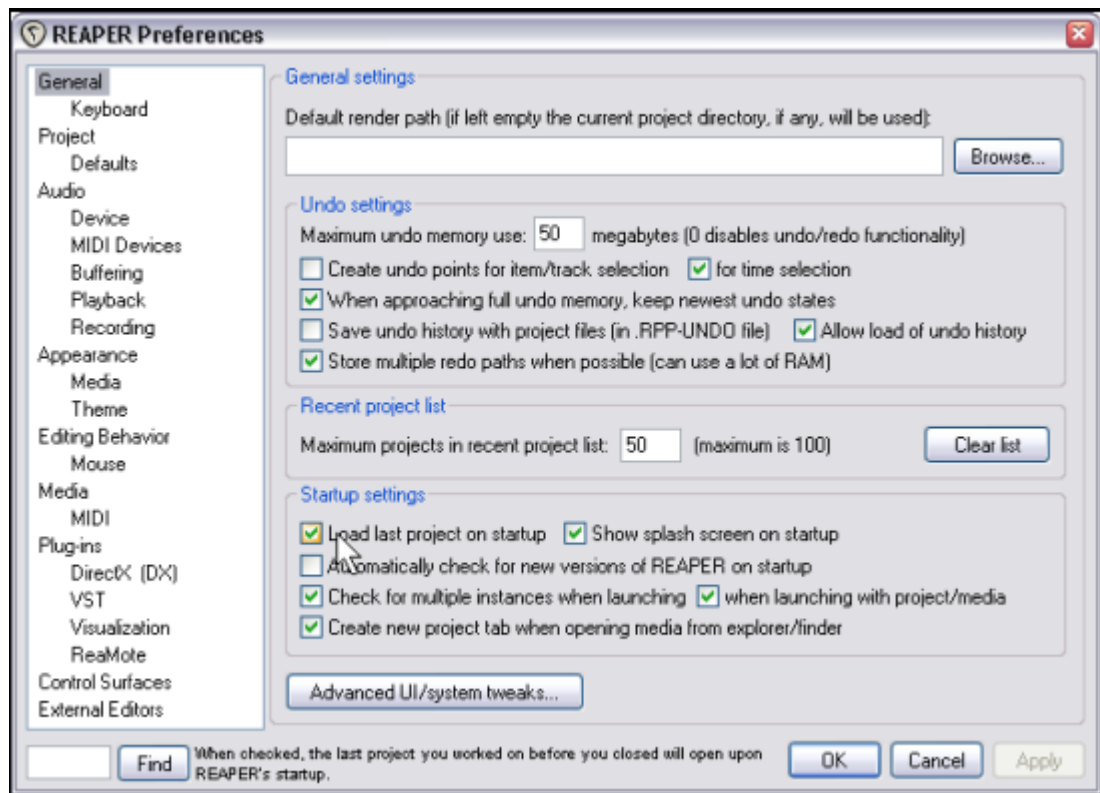
Projects that have been used recently can more easily be opened using the **File, Recent Projects** command.

This causes a list of up to the last 100 recently used project files to be displayed. You can then select any file from that list.

#### Tips:

1. You can determine the number of files displayed on the **Recent project list** by changing the setting under the **General** category on the **Options, Preferences** screen.
2. On the same screen, you can also specify whether or not you want the most recently used file automatically loaded when REAPER is started. Use the **Load Last Project** option for this.
3. On the same screen you can also specify whether you want to **Automatically check for new versions of REAPER** when REAPER is started.

These three items are shown on the screen below.



**Note:** To enhance print contrast, some of the illustrations used throughout this User Guide have been created using some minor modifications to the REAPER 3 default scheme. This has been done usually in order to help you understand the point of the illustration.

# Up and Running: A REAPER User Guide v 3.11

## 2.2 Project Settings

Every REAPER project has a number of settings that can be defined and changed to meet the requirements of each individual project.

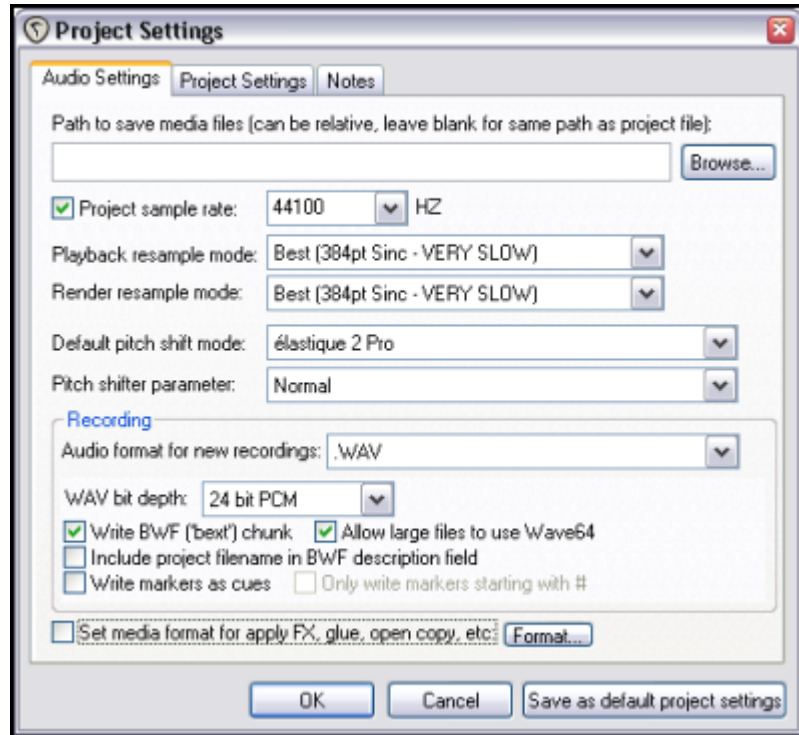
**Tip:** The examples shown in this section use the project file **All Through The Night.RPP** which is supplied with this User Guide. It might help you to keep that project open while you are using this documentation. Take a copy of this file and work with that. You will then be able to experiment freely without fear of damaging any of your own important projects.

The Project Settings dialog box is accessed by choosing the **File, Project Settings** command, or by using the keyboard shortcut **Alt Enter**. The dialog box has three pages of settings - **Audio Settings**, **Project Settings** and **Notes**.

### Audio Settings

These include:

- Path to store project files. If you leave this blank, REAPER will use the same folder as the project file.
- Project Sample Rate
- Recording format (typically WAV or MP3, but AIFF, FLAC, OGG Vorbis and WavPack and others are also available)
- Settings and specifications for chosen recording format – e.g. for WAV files this includes Bit Depth.
- Default method and parameter to be used for Pitch Shifting. We'll deal with this topic later.
- Preferred media format when media items are rendered, for example by applying FX or gluing. These are topics which we'll get to later. For now, just leave this option unselected.



### Project Settings

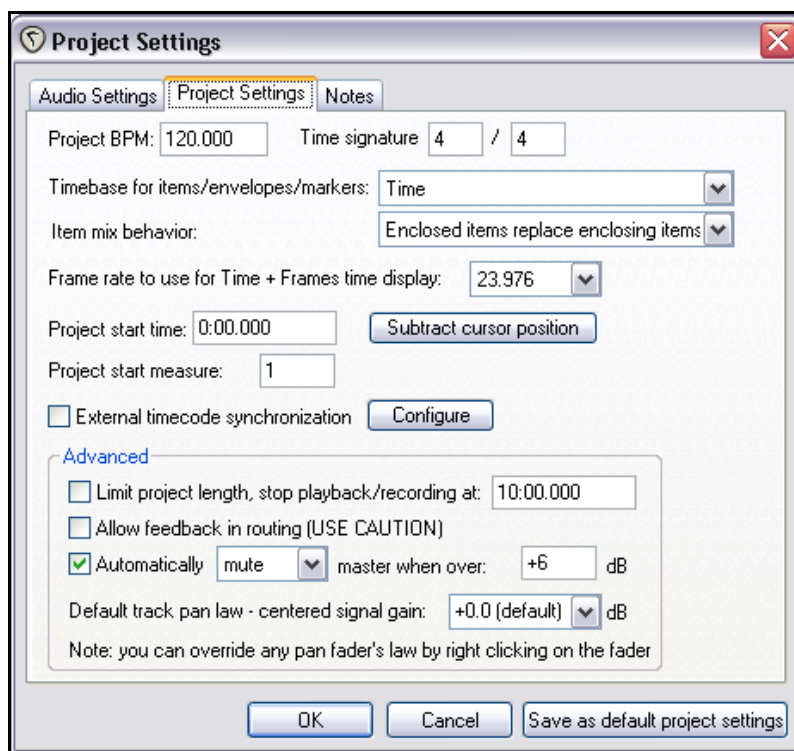
These include:

- Project beats per minute and time signature.
- Method for setting the project timebase - essentially you have a choice of Time, Beats (position, length rate) or Beats (position only).
- Item Mix Behavior. This determines how REAPER should behave when one media item is placed directly on top of another. The options are for Enclosed Items to Replace enclosing items, Items always to be mixed, or for the newer item to always replace the older item.
- Preferred Frame Rate.
- Project start time. Leave this at its default setting for now. Later you'll be shown why and how you may wish to change it.
- The option to synchronize the project with the timecode of an external device.
- The option to limit project length and recording time.

- The option to specify the project start time.
- The option to allow feedback in routing. Feedback routing can be useful for some advanced mixing activities, but it is not without its risks. *If you are in any doubt, do not select this option.*
- The option to automatically mute or clip the Master Output if volume exceeds a specified level.

Selecting this option can help prevent accidental damage to your audio device and/or speakers.

- Specifying a default pan law for your tracks. The pan law determines how the relative volume of a track behaves when that track is panned more or less to one side or the other.



If you are new to digital audio, you probably don't need to worry about pan laws too much. But if you'd care to know more, read on!

### Understanding Pan Laws

Panning laws have their origin in analog mixers. With these devices, any linear gain increase in one channel accompanied by a linear gain decrease in the other channel had the result that at the centre position the sum total of the two channels was greater than if the signal was panned full left or full right.

Various techniques were introduced to compensate for this. Pan laws are used to effectively mirror these techniques in the digital world. In short, a pan law of 0db will give you the gain described above. A pan law of -3db will compensate for that gain but will result in a centred mono or stereo file playing back 3dB quieter than its original level.

For further information about panning laws, go to [http://www.harmony-central.com/articles/tips/panning\\_laws/](http://www.harmony-central.com/articles/tips/panning_laws/)

### Notes

This is a very handy section that lets you record any notes, comments or information that you would like to be included with your project file.

You can specify that the notes should automatically be displayed each time the project is opened.

**Tip:** You can save all these settings as the defaults to be used for future new projects. Of course, for any individual projects you can over-write your defaults.

## 2.3 Directing Audio Output

This section introduces you to one of the most important core functions of REAPER – **Routing**. Routing is the means by which you ensure that your media (audio and/or MIDI) are directed to where you want them to go, so that your project can be heard exactly as you want it to be heard.

Routing can be very simple or extremely complex – and anything in between. This section introduces you to basic routing concepts. More complex routing options will be covered later in this Section, also in Sections 4 and 17, and elsewhere.

Each track includes an **I/O Button** in its panel toolbar. Shown here, it is the second left of the track control icons (buttons).

Clicking that button causes the routing for that track to be displayed.



To close the Track Routing window, either press the **Escape** key, or click on the little **X** in the top right corner of the window, or simply click anywhere outside the window.

## 2.4 The Track Routing Window

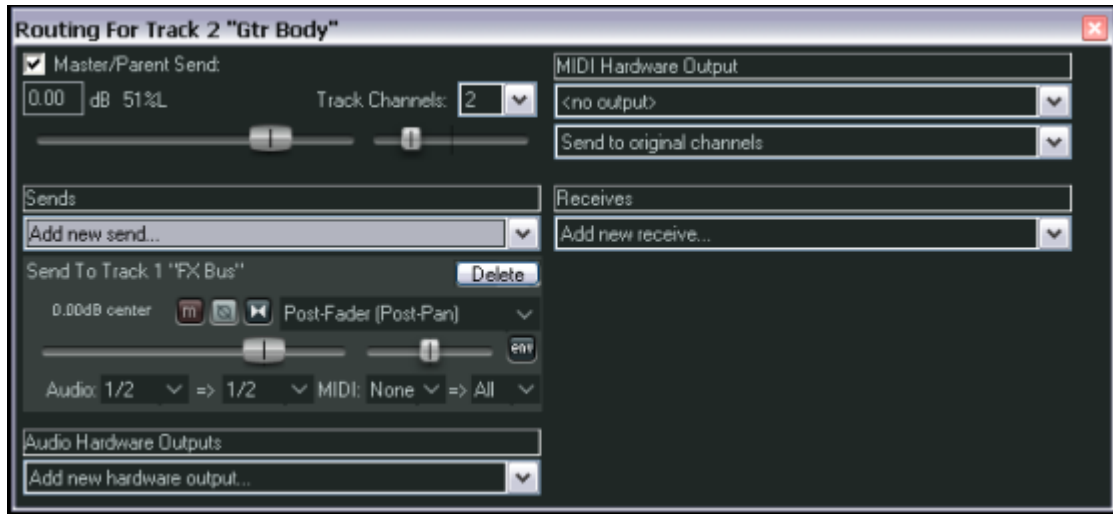
The exact contents of your Track Routing window will vary according to your project structure and your DAW hardware setup (e.g. sound card and audio devices, MIDI devices etc). Setting up these devices is covered in Section 1 of this User Guide.



Depending on the nature of your project, therefore, your display should be *similar* to that shown above, but not necessarily identical. Notice in particular:

- **Master / Parent Send** – Enabling this ensures that the track's output will be directed to the Master. In the sample files provided, you will want to direct the output of all tracks directly to the Master, as shown for Track 1 (below). If in doubt, leave this item enabled. later you will be shown some examples of routing where this should be disabled.
- **Sends** – for the time being, we are not using Sends: these will be introduced later. Notice, however, that output can be routed via a Send from any track to any others. This topic will be covered later.
- **Audio Hardware Outputs** – in addition to (or instead of) directing output to your Master Bus, you can also direct output of any track directly to Hardware Outputs on your audio device. If your audio device has multiple outputs, this can be useful, for example, for creating a separate headphone mix, or as series of separate headphone mixes.
- **MIDI Hardware Output** – Use this option to direct MIDI output to an external device or to the Microsoft GS Wavetable Synth.
- **Receives** – again, for the time being we will not be using these.

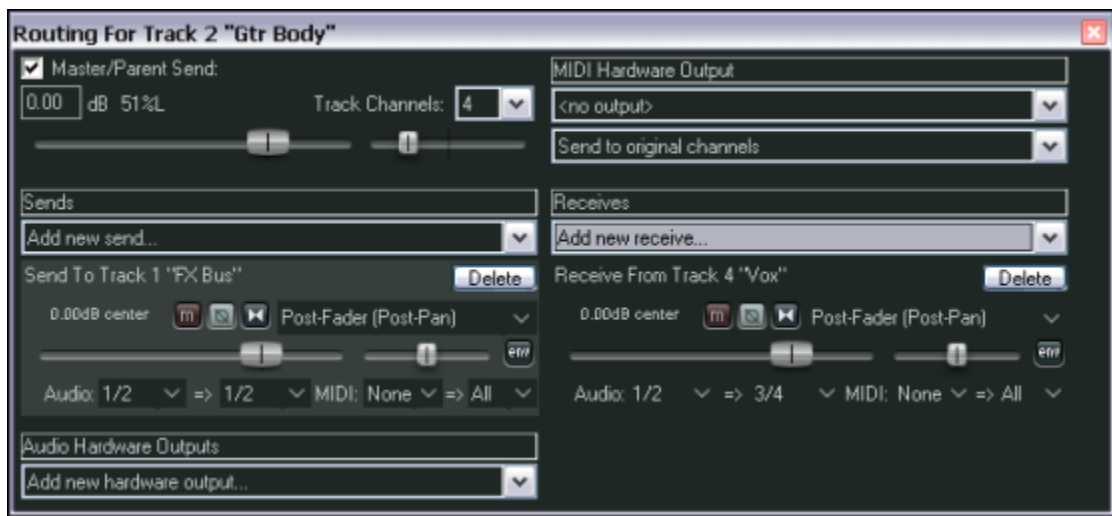
- Notice (picture below) that when you create a send, you are automatically presented with volume and pan faders which can be used to control this. You can also specify whether to send audio output, MIDI output, or both.



- Whenever you select any listed track, audio hardware output or MIDI device to be used for a track's routing, controls such as Level and Pan are automatically added to this interface.

When you create a new project, by default the output of each new track is routed to the Master track and from there to the output of your sound card. If that is all you need, you do not need to study the routing options right now. However, understanding REAPER's routing capabilities will almost certainly enable you at some stage to get more benefits from the program, including a more efficient use of your DAW's hardware resources (such as CPU).

The illustration below shows an example of the Track Routing Window for a track for which both **sends** and **receives** have been created. You will be shown how to do this later in this section and elsewhere in this User Guide.



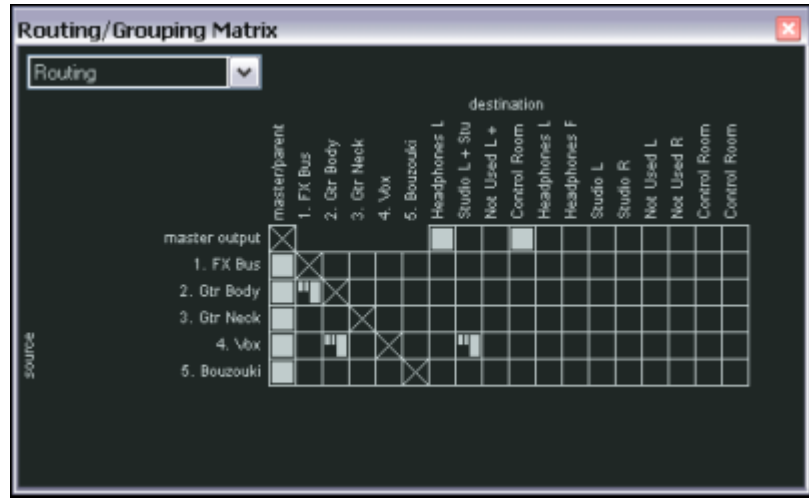
Approach track routing gently at first: it is a very powerful feature of REAPER. The main body of this User Guide will take you thru the basics of track routing.

After you have mastered these, you will find some slightly more complex examples later in this User Guide.

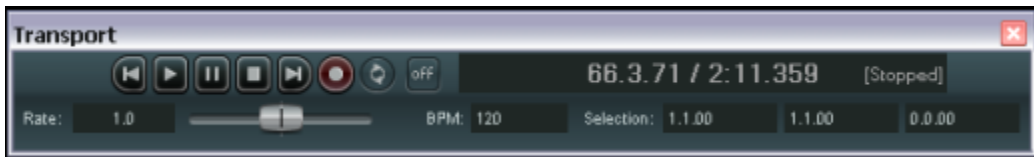
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**Tip:** You can use the **View, Show Routing Matrix** command (Alt R) to display a summary table of your Project's Track Routing. More about this later!

Get to know the routing matrix!  
 You will find it to be one of the most useful features of REAPER.



## 2.5 The Transport Bar



If the Transport Bar is not visible in your REAPER window, use the **View, Show Transport** command to display it, or use the keyboard shortcut **Ctrl Alt T** to do this. The Transport Bar might appear as a floating window inside REAPER, or it might be docked just below your track control panels. At this stage, this does not matter. The main Transport Controls (from left to right) are as follows:

Function	Default Keyboard Shortcut
<b>Rewind to start of project</b>	<b>W</b>
<b>Play</b>	<b>Space</b>
<b>Stop at current position and move edit cursor</b>	<b>Ctrl Space</b>
<b>Stop and rewind to where play last started (edit cursor)</b>	<b>Space **</b>
<b>Go to end of project</b>	<b>End</b>
<b>Record</b>	<b>Ctrl R</b>
<b>Toggle Repeat (when a loop has been defined)</b>	<b>R</b>
<b>Time (current position of the Edit Cursor)</b>	

Below the control buttons is displayed a **Rate Control Fader** which can be used to speed up or slow down playback. To the right of that are shown the Project Beats per Minute setting and the start and end positions of any current time selection. Time and loop selection will be covered later in this User Guide. There are a few more items on the transport bar which we'll get to later.

Other useful Transport Control keys are listed in the table that follows.

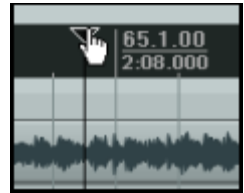
Function	Default Keyboard Shortcut
Go back a little	Ctrl Left
Go forward a little	Ctrl Right
Play (with loop selection skipping)	Alt Space

Right clicking over the Transport Bar displays a context menu. This may seem slightly intimidating at first. We'll get to the more advanced stuff later, but for now just notice that there are menu options available to:

- Select your preferred time display format.
- Dock or Undock the transport from the Main Window.

### Scrubbing

The top of the edit cursor is marked by an upside down triangle. While your project is playing, you can grab this with your mouse and drag to move the edit cursor without affecting playback. Depending on your preferences settings, you may need to hold down the **Shift** key while you do this.

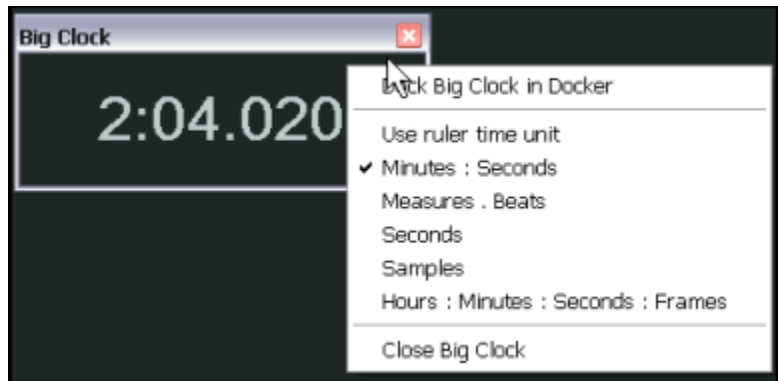


If you do this when the project is not playing, it will have the effect of "scrubbing" your audio. Scrubbing will be explained in a later section.

### 2.6 The Big Clock

Use the **View, Show Big Clock** command (or press **Alt C**) to toggle on and off the display of the Big Clock, which clearly displays the current position of the Edit Cursor.

This window can be sized and moved at will, or docked in the docker. Right clicking over the Big Clock gives you a context menu of options, including changing the display format.



### 2.7 Track Controls

If you play the project file **All Through The Night.RPP** you will notice that exactly the same sound is coming out of both speakers and that the different instruments and vocals are all competing with each other for the same acoustic space.

That's because no adjustments have been made to the Volume or Pan controls for these tracks.

The larger fader (to the left) is used to adjust a track's volume, the smaller one (to its right) adjusts the panning, sending the signal more to the left speaker or the right speaker as preferred.



To adjust these (or any other faders in REAPER), use any of the following methods:

- Click and hold down the left mouse button over the fader, then drag in the direction required, releasing the mouse when finished.
- Hover your mouse over the fader, and use the Scroll Wheel to adjust the level down/up.
- Click on the fader, then use **Ctrl Down** and **Ctrl Up** to adjust the level down/up.

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**Tip:** To audition possible changes, hold down the **Alt** key while dragging the fader with the mouse. When you release the mouse it will then return to its original position. This can be useful if you need to raise the volume momentarily, perhaps to listen out for a glitch or a phrase.

**Tip:** To perform the same operation on more than one track, hold down the **Ctrl** key while you click on the Track control panel or track number for each track. Then release the **Ctrl** key. Any fader or other movement will be applied to all selected tracks.

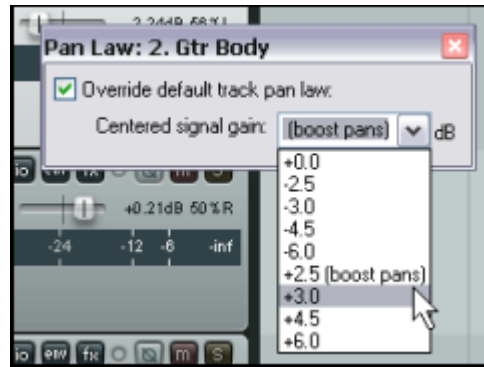
The three rightmost buttons on each track's control area have these functions:

<b>Phase Control</b>	Toggles Phase status (normal/inverted) for track or all selected tracks.
<b>Mute</b>	Toggles Mute on/off for selected track (or all currently selected tracks)
<b>Solo</b>	Toggles Solo on/off selected track (or all currently selected tracks)

Notice that by default, track **Solo** causes not only the track itself to be played, but also the output of any sends originating from that track. If you wish to hear only the track without these sends, hold the **Alt** key while you solo the track.

You can also change the **pan law** for any individual track. Right-clicking over the track's pan control fader opens a window where you can select from the list or type in your own required pan law for that track.

Note that a setting higher than zero will cause the signal's audio strength to be boosted as it is panned.

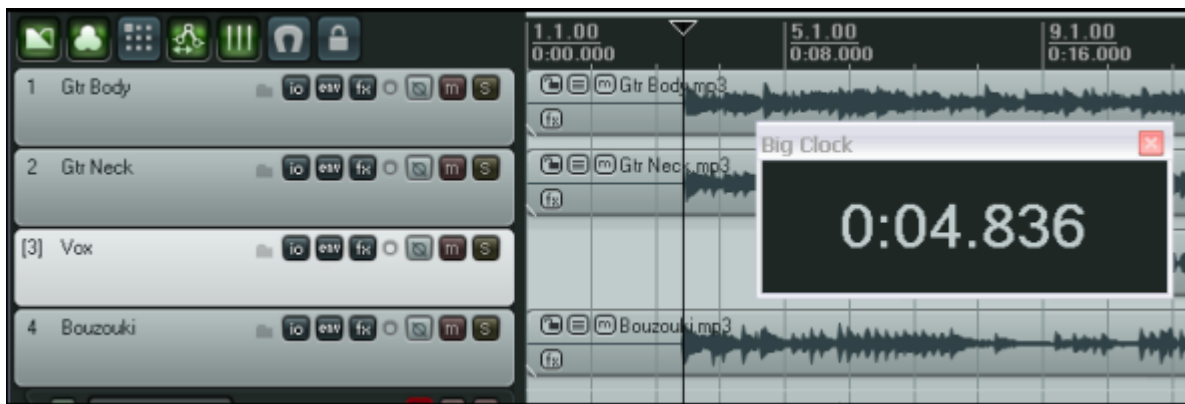


## 2.8 Setting the Project Start Time

With many projects you will find that you have a few seconds of recorded silence before the program material (instruments and vocals) actually start. This can create two annoying problems:

- It means that times shown along the timeline and on the big clock do not accurately represent the time within the song.
- When you go to the start of the project, there are always a few seconds of silence to be played before you reach the start of the song.

In the example shown below the actual start of the song is at 0:04.836. We want to reset this point to Zero.

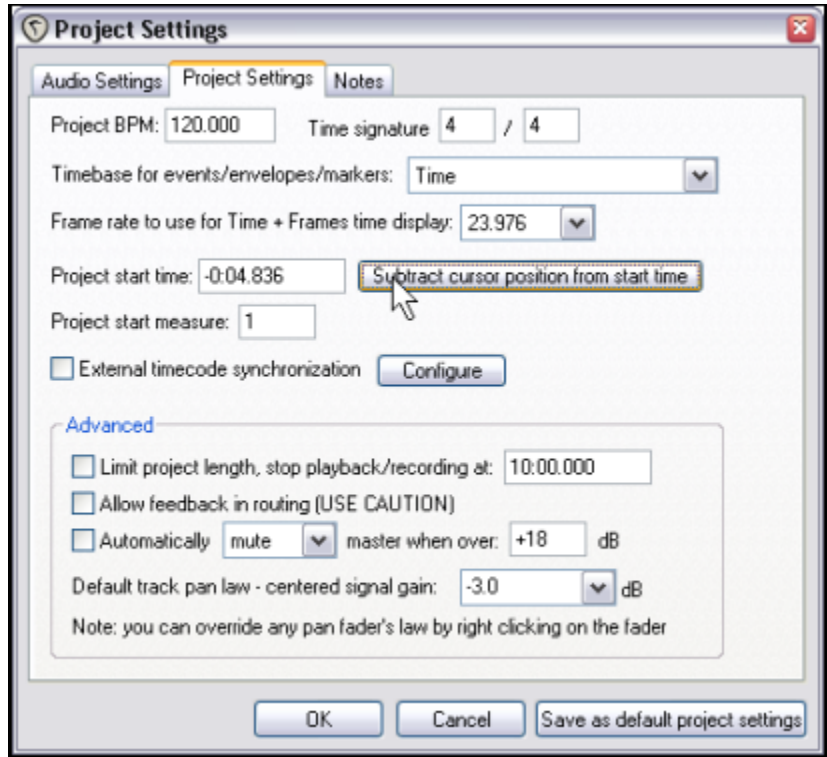




## 2 - REAPER Project Basics

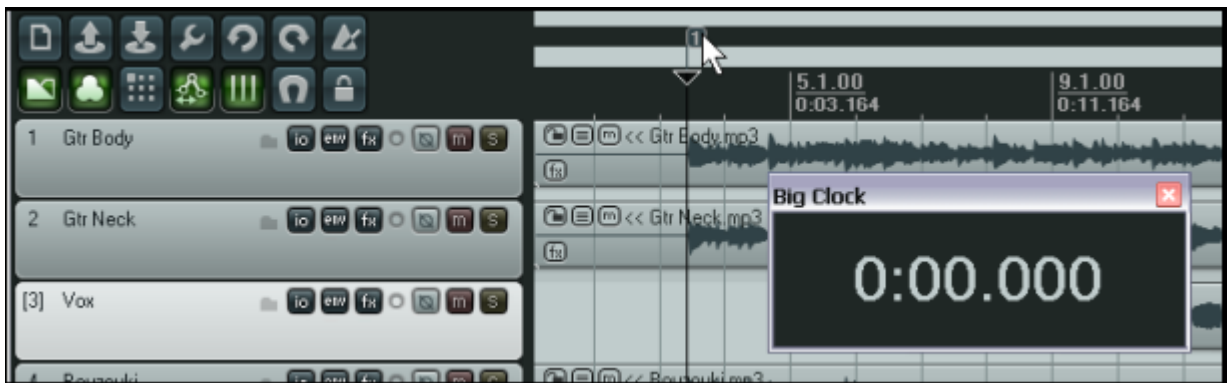
This is how it is done:

- Place the cursor at the point that you wish to mark as the start of the song - in this example this will be 04.836 into the project.
- Press **Alt Enter** to display the **Project Settings** window.
- Select the tab labelled **Project Settings**.
- Click the button labelled **Subtract cursor position from start time** (see right). Reaper will automatically enter the correct position into the **Project start time** box for you.
- Click on **OK** to close the Project Settings interface.
- To mark this point, press the letter **M** on your keyboard. This creates a marker on your timeline labelled **1**.



We'll have a lot more to say about markers in some of the later chapters of this User Guide.

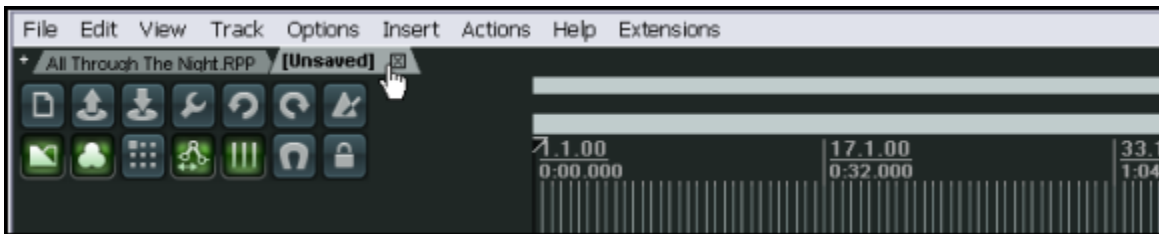
- The position of the marker is now set to **0:00.000** and you can jump straight to this point at any time by pressing **1** on your keyboard (see below).



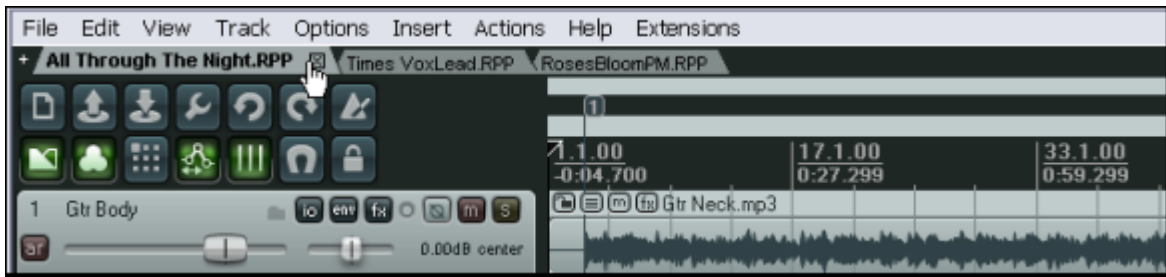
## 2.9 NEW! Multiple Project Tabs

REAPER lets you keep more than one project open at the same time, using multiple project tabs. This makes it easy for you to jump between different projects if you are working on more than one song, or to move or copy media items (audio and/or MIDI) from one project to another.

To create a new project tab when you already have one file open, simply use the **File, New Project Tab** command (or press **Ctrl Alt N**). A new tab will be opened (labelled **Unsaved**), but the previous project will also remain open on a different tab. You can jump between projects simply clicking on the tab (see below).



To open a file in an existing project tab, simply select that tab, then use the **File, Open Project** command in the usual way. To open it in a new project tab, simply select this option from the dialog box when opening the project. You may have as many projects open as you wish (see below).



You can right click over any project tab to show the project tab menu. The commands are:

**New Project Tab**, This inserts another new tab.

**Close Current Project**. Closes the project currently open in that tab, and the tab with it. You can also do this by simply clicking on the **X** at the right hand end of the project tab.

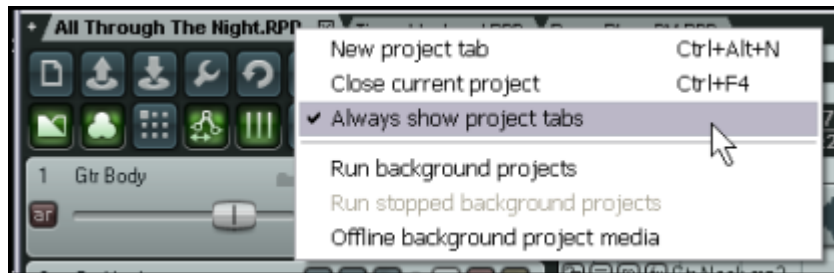
**Always Show Project Tabs**.

This command can be toggled on and off. When on, project tabs will always be shown, even if only one project is currently open.

**Run Background Projects**. This allows you to play the project in one tab while working on another.

**Run Stopped Background Projects**. This will commence playback of projects in tabs other than the currently selected one.

**Offline Background Project Media**. This sets to offline the status of media items in all tabs other than whichever is currently active.



**Tip:** When using multiple project tabs, you can use the **File, Close All Projects** command to close all open projects.

### 2.10 Navigation and Zooming

A REAPER Project can be navigated using the mouse and/or the keyboard.

#### Navigating within the Track Control Panel

The following keyboard shortcuts can be used to navigate within the Track Control Panel:

Keystroke	Default Function
<b>Ctrl Alt Down</b>	Go to next track.
<b>Ctrl Alt Up</b>	Go to previous track.

#### Adjusting Panel Width

To adjust the width of the track panel area, place your mouse over the vertical border that separates the track control panel area from the main workspace area, until the mouse indicator changes to a horizontal black double headed arrow. Click and hold down the left mouse button while dragging the mouse left or right. Release the mouse button when the desired track control panel width is reached.

#### Adjusting Track Height

Action	Function
<b>Click and drag mouse up/down on lower track boundary</b>	Adjust height of single track.
<b>Hold Alt, click and drag mouse up/down on lower track boundary</b>	Adjust height of all selected tracks.
<b>Hold Ctrl, click and drag mouse up/down on lower track boundary</b>	Adjust height of all tracks.

#### Toggling Track Height

The following mouse and keyboard shortcuts can be used to adjust the track height for all tracks in a project:

Keystroke	Default Function
<b>`</b> (this is the key immediately to the left of <b>1</b> , usually directly above the <b>Tab</b> key).	Toggle between normal track height and minimised track height, all tracks
<b>~</b> (on most keyboards, this is the <b>Shift</b> key in combination with the <b>`</b> key).	Toggle between normal height and maximising currently selected track.
<b>!</b> (on most keyboards, this is the <b>Shift</b> key in combination with the <b>1</b> key)	Expand height of selected tracks, minimise all others. Press again to restore all tracks to same height.
<b>@</b> (on most keyboards, this is the <b>Shift</b> key in combination with the <b>2</b> key)	Minimise all tracks.
<b>Double click on vertical scroll bar</b>	Toggles height of all tracks between minimised, normal and maximised.

**Tip:** You can change any of the shortcut key assignments if you wish, and also create additional keyboard shortcuts of your own. This is done using the **Action List Editor**. You will be shown how to do this in a later section of this User Guide.

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### Zooming In and Out with the Keyboard

The following keyboard shortcuts can be used for zooming within a project:

Keystroke	Default Function
Page Down	Zoom Out vertically
Page Up	Zoom In vertically
Ctrl Num Pad +	Zoom to current selection
Ctrl Page Down	Zoom Out to entire project length
- (the minus sign)	Zoom Out horizontal
+ (the plus sign)	Zoom In horizontal
Shift Up	Zoom In media peaks
Shift Down	Zoom Out media peaks

### Scrolling In and Out with the Keyboard

The following keyboard shortcuts can be used for scrolling within a project:

Keystroke	Default Function
Alt Down	Scroll View down
Alt Up	Scroll View up
Alt Left	Scroll View left
Alt Right	Scroll View right

**Tip:** Pressing the **F1** key will cause a complete list of current keyboard shortcut assignments to be displayed, including any shortcuts you have defined yourself.

**Tip:** To view and print a list of shortcut keys, use the **Help, Keyboard Shortcuts** command.

### Zooming and Scrolling with the Mousewheel

The mousewheel can also be used for zooming in and out when you are navigating a project file. The table below summarises how the mouse wheel behaves.

Modifier Key	Behavior
	Horizontal Zoom
Ctrl	Vertical Zoom
Alt	Horizontal Scroll
Ctrl Alt	Vertical Scroll

If you wish to change these mousewheel assignments, you can do so using the **Action List Editor**. This topic will be covered in a later section of this User Guide.

### 2.11 NEW! Hiding Tracks

Any selected tracks can be hidden from either the track view or the mixer view (but not both at the same time). Simply do this:

1. In either the track control panel or the mixer panel, click on the track number for the first track in the selection, then use control click on the other track numbers to build the selection.
2. Right click over any track number in the selection to display the context menu.
3. Deselect either **Show Selected Tracks in Track List** or **Show Selected Tracks in Mixer**.

Any hidden tracks can be restored to the view where it is hidden simply by selecting that track in the other view and on that menu changing whichever **Show Selected Tracks** option is currently disabled (that is, not ticked).

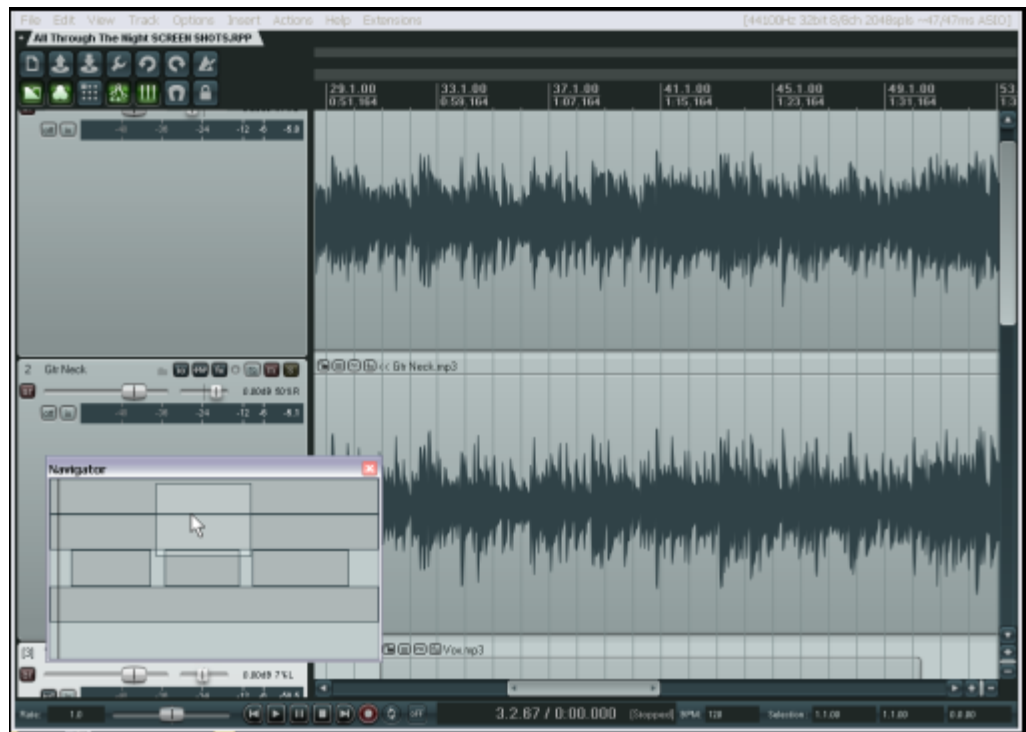
### 2.12 Using the Navigator

The REAPER Navigator shows you an overview of your project. It can be useful to display this when you have zoomed in closely on an area of your project.

To display the Navigator, choose the **View, Show Navigator** command. The keys **Ctrl Alt V** can be used to toggle the Navigator display on and off.

You can also use the Navigator window to scroll thru your project.

Simply position the mouse over the box within the navigator window that represents the on-screen area of your project. Then hold down the left mouse button, and click and drag to scroll the display. Release the mouse button when finished. Other ways of using the **Navigator** are:



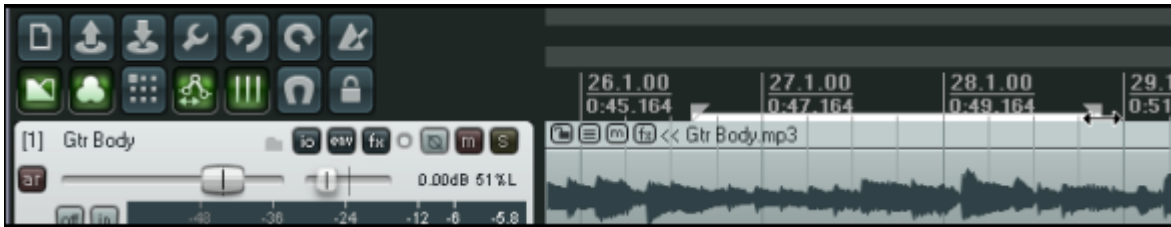
Method	Result
<b>Hold down right mouse button, click, drag and release</b>	Define new area to be displayed in REAPER workspace.
<b>Left click mouse</b>	Reposition rectangle and workspace display area.
<b>Ctrl Left Click</b>	Reposition and relocate play cursor.
<b>Mousewheel</b>	Use as in workspace to scroll and/or zoom.

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## 2.13 Selections and Loops

Often you will want to work with just a part of your project for a while. In order to do this, first check the **Options** menu to see if **Loop Points Linked to Time Selection** is enabled. If it is enabled (ticked) then making a time selection and defining a loop are the same thing. If it is disabled (not ticked) then making a time selection and defining a loop become two different things. Whichever is the case, you can define your loop area by clicking and dragging along the timeline.

- Stop the playback at or near the point where you want your loop to begin (or click your mouse in the background area to move the Edit Cursor there).



- Place your mouse over the **Timeline** (just above the first track), then click and drag along the timeline, releasing the mouse to define the exact area that you want to loop. The effect of this is illustrated above. Notice that the start and end of the loop are marked by two small triangles. *If when you attempt this, the selection snaps outwards to define a larger area than you want, then REAPER has snapping enabled.* Snapping will be discussed in detail in a later section, but for now you can use the shortcut keys **Alt S** to toggle this feature on and off.

**Tip:** To set the loop selection to match a media item, hold **Ctrl Shift** while you double click on that item.

Now when you play the project, provided that the loop (toggle repeat) icon on the transport bar has been engaged, it will replay over again the area selected for your Loop. This is known as the Repeat Function. If loop points are linked to times election, the start time, finish time and duration of the selection are also shown on the **Transport Bar**. In any event, pressing the **R** key toggles this Repeat Function on and off. There is also the option (under **Options, Preferences** on the **Playback** page) to stop playback at the end of a loop when the Repeat Function is disabled.

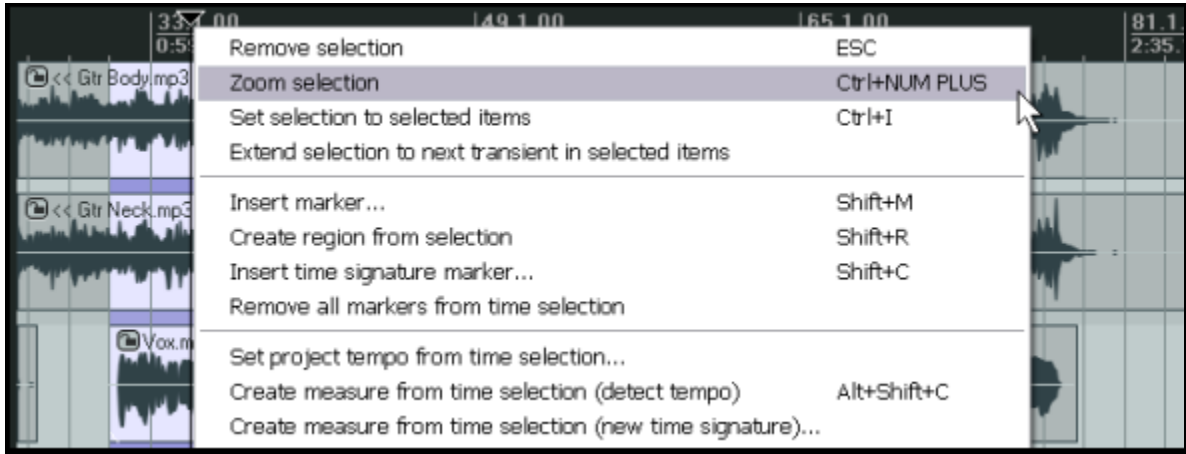
To change the region defined as your loop, simply repeat the original procedure. To clear the loop altogether, without defining a new one, just press the **Escape** key.

If loop points are not linked to the time selection, then you can define a time selection by clicking and dragging in the space underneath or between the media items, in the track background area. An example of this is shown below.



Right clicking on the Timeline gives you a menu of commands which you can apply to a time selection, including **Zoom Selection**. You can also use this menu to change the units used on the timeline – for example, Minutes, Measures, Seconds and Samples.

Fewer than half of these commands are shown in the illustration below - enough to help you to understand how important working with time selections is in REAPER. The other commands on this menu will be discussed elsewhere in this User Guide, as the need arises. These are features that you are likely to find useful when editing your files.

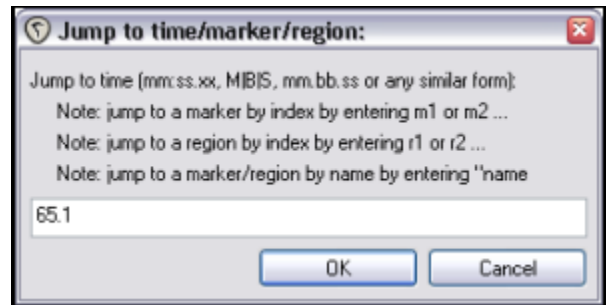


**Tip:** Notice that where a keyboard shortcut is available for any command, that shortcut is displayed on the context menu. You will find that learning the keyboard shortcuts for those features of REAPER that you use most will save you a lot of time.

Incidentally, to zoom out of a time selection and restore a whole project length to view, press **Ctrl PgDown**.

### Navigating by Jumping

You can jump to any point along the timeline using the **View, Jump To** command, or by pressing the keyboard shortcut for this command, **Ctrl J**. In specifying the location to jump to, you should use the same format as is used on the timeline.



In the example used here, the timeline displays Measures and below it Minutes and Seconds. You could therefore use either format, e.g. **65.1** or **2:03**.

### 2.14 Item Names, Buttons and Icons

Depending on various preference settings, you may (or may not) see your item names together with a number of icons (or buttons) displayed either above the media item or even on the media item itself.



An example of this is shown here. Don't worry for now about what they are, or if on your system they aren't yet visible. We'll get to these when we look at editing media items.

### 2.15 Managing Time and Loop Selections

In the last section you learnt how to use your mouse to click and drag within an empty area of the track view to define a time selection. This may or may not also change the loop selection, depending on your **Options, Looped points linked to time selection** setting. As you progress thru this User Guide, you will come to see that time selection plays an important role in REAPER, for example when it comes to editing your media items.

You'll probably find at first that it's too easy to make a mistake with the mouse. You can find yourself perhaps selecting too large an area, or else missing part of the area that you intended to select.

**To modify a loop selection** using the mouse, hover the mouse over the edge at the start or finish of the loop selection on the time line, then click and drag left or right. Dragging left from the start of the selected area extends the selection left, dragging right shortens it. Dragging right from the finish of the selected area extends it to the right, dragging left shortens it.

**To move a loop selection**, hold the mouse over the selected area on the time line, then hold down **Shift** while clicking and dragging the mouse left or right.

There are also several keyboard shortcuts you can use for managing **Time Selections**, summarised below. If looped points are linked to the time selection, then the loop area will also be modified.

Keystroke	Default Function
, (comma)	Nudge Entire Time Selection left a little.
. (period or full stop)	Nudge Entire Time Selection right a little.
Ctrl ,	Extend Time Selection to left by nudging left edge left a little.
Ctrl .	Extend Time Selection to right by nudging right edge right a little.
Ctrl Alt ,	Shrink Time Selection from right by nudging right edge left a little.
Ctrl Alt .	Shrink Time Selection from left by nudging left edge right a little.
Shift ,	Move Time Selection left by time selection length.
Shift .	Move Time Selection right by time selection length.
Ctrl Shift C	Copy portions of selected media items in Time Selection.
Esc	Remove Time Selection.

In addition, if you wish you can use the keyboard rather than the mouse to define your time selection in the first place. First you need to position the cursor at either the start or the end of the loop, then use one of these:

Keystroke	Default Function
Shift Left Arrow	Drag cursor to the left and create time selection.
Shift Right Arrow	Drag cursor to the right and create time selection.

The following keystrokes can be used to zoom when you are working with a time selection:

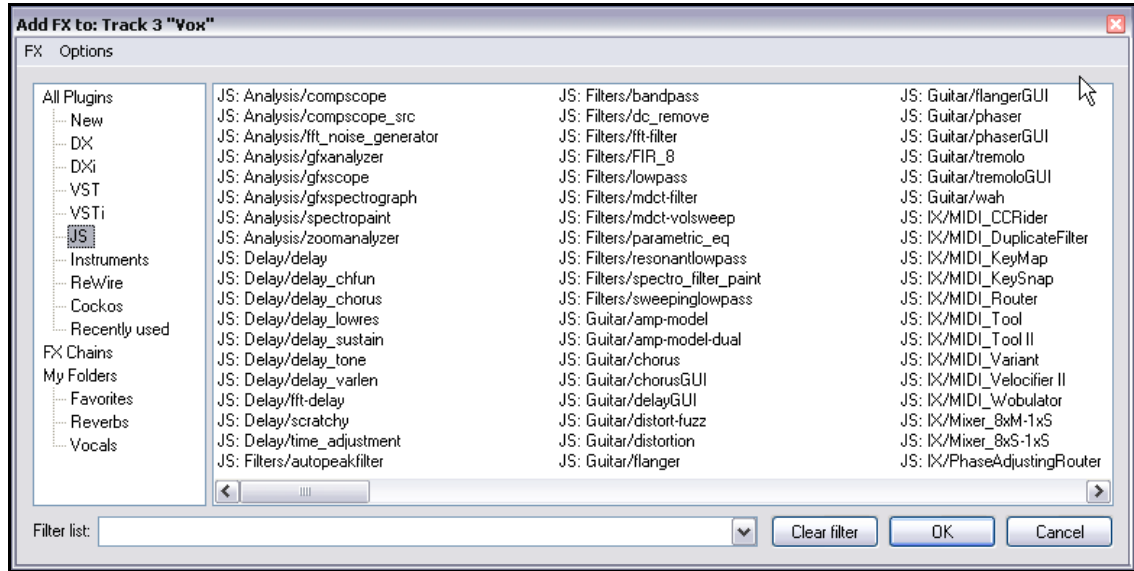
Keystroke	Default Function
Ctrl PageUp	Zoom to Time Selection.
Ctrl PageDown	Zoom back to Project.

**Tip:** If you are unable to position your cursor exactly where you wish when creating a loop selection, it may be that you have snapping enabled. **Alt S** will toggle snapping status on and off.

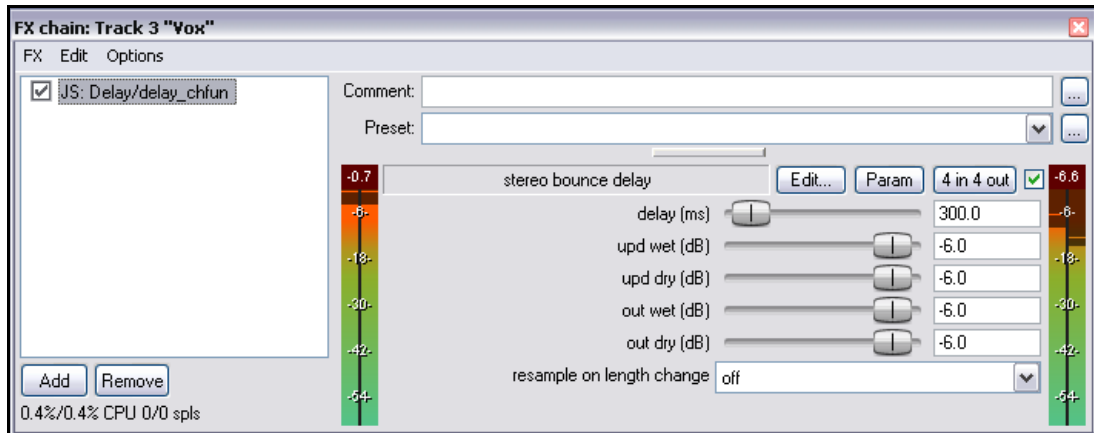


### 2.16 Track FX Basics

Track FX (VST and Direct X as well as VSTi and DXi) can be added to any track by directly inserting the FX into the FX Window for the required track. In some programs, these are known as *track inserts*. A good selection of FX plug-ins is supplied with REAPER, including Jesusonic and Cockos effects. We'll be taking a closer look at many of these individually later in this User Guide. For now, let's just focus on some general aspects of how FX fit in to the REAPER scheme of things. To use any of these FX, simply follow this procedure:



1. Click on the FX Button in the Track Control Panel of the track to which you want to add the FX. This causes the Add FX window for that track to be displayed.
2. Select a category, e.g. All Plug-ins, DX, VST, JS, Cockos. All available FX in that category will be listed.
3. Double click on the name of the required FX. An example is shown below.
4. To add more FX, click on the **Add** button within the Track FX window, then repeat steps 2 and 3 above.

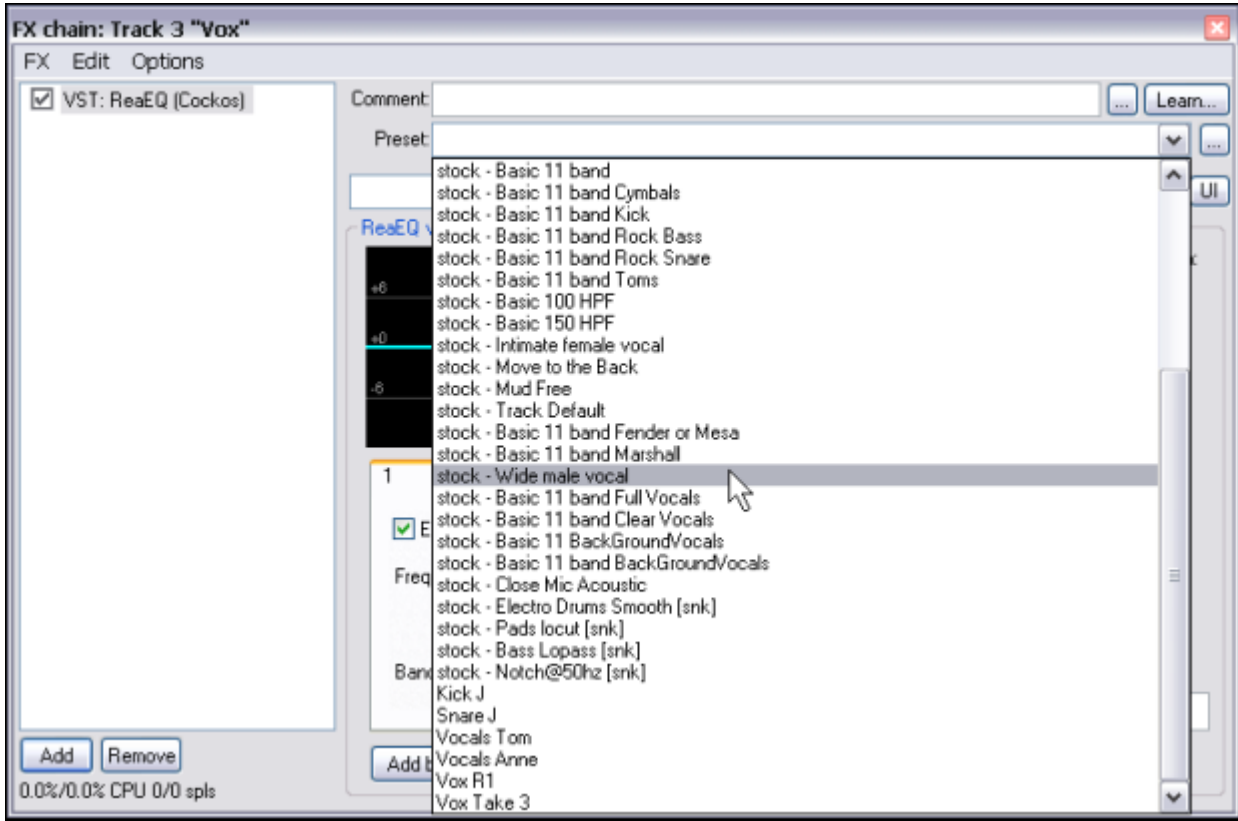


**Note:** When you add any plug-in to any track's FX chain, that plug-in will then be displayed in the FX Browser's **Recently Used** FX folder.

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### 2.17 Using the Supplied FX Presets

Very often you will wish to use some of the excellent FX that are shipped with REAPER to improve the sound of your tracks. The use of these FX is a huge topic. You will find many examples in Chapters 16 and 17 of this User Guide. For more detailed information and more advanced examples, you should consider obtaining a copy of **ReaMix: Breaking the Barriers with Reaper** which is available from the Reaper Bookstore at <http://stores.lulu.com/store.php?fAcctID=1374784>



However, as a means of getting started you might wish to explore some of the presets that come with these plug-ins. For example, **Cockos ReaEQ** includes presets which as a starting point you can try on your Kick, Toms, etc. Simply display the drop down list and select the item that you want.

Most of the Cockos Rea series of plug-ins include a number of presets. You can explore these for yourself to discover what is available. Of course, you can also make any adjustments and changes to these that you like, in order to customise them more precisely to your own needs.

As well as the presets supplied with REAPER, you can download further sets by visiting <http://stash.reaper.fm/> and following the link to **FX Preset Libraries**.

To import downloaded presets into REAPER, follow this sequence:

1. Insert an instance of the plug-in into any track.
2. Click on the ... button (just below the **Learn** button in the FX Chain window).
3. Choose **Import Preset Library**.
4. Navigate to and select the required file then click on **Open**.


### 2.18 Controlling Track FX

REAPER provides you with a number of tools to help you manage your Track FX. For example, you can:

- Change the order in which they are applied.
- Copy or move any FX from one track to another.
- Save (and retrieve) any sequence of FX as a chain that can be easily inserted into other tracks.
- Bypass individual FX or an entire FX chain.
- Specify a default set of FX to be automatically inserted into new tracks for your project.

Task	Method
<b>Dock the FX Chain</b>	Choose the <b>FX, Dock FX Window in Docker</b> command.
<b>Adjust the values for Track FX parameters</b>	Drag with the mouse, or scroll the mouse wheel over, the fader that controls the value of the parameter that you wish to change.
<b>Change Track FX Order for a track</b>	Drag and drop the FX Name up or down within the Track FX window.
<b>Float the FX window</b>	Double-click on the FX name in the FX Chain window.
<b>Copy an FX from one track to another.</b>	Hold down <b>Ctrl</b> , drag the FX from the source track FX window and drop on the FX button for any other track.
<b>Move an FX from one track to another.</b>	Hold down <b>Alt Shift</b> , drag the FX from the source track FX window and drop on the FX button for any other track.
<b>Rename an FX Instance</b>	Select the FX name in the FX Chain and press F2.
<b>Bypass an FX</b>	Untick either the check box to the left of the FX name within the Track FX window or the check box in the top right corner of the floated FX.
<b>Remove an FX from a track</b>	Select the FX name within the Track FX window then click on the <b>Remove</b> button.
<b>Remove all FX from a track</b>	Hold <b>Alt</b> while clicking on the track's FX button in the Track Control Panel.
<b>Save the current sequence of Track FX as a chain</b>	In the Track FX window, choose the <b>FX, Save FX Chain</b> command. Current FX parameter settings are saved with the chain.
<b>Save selected Track FX as a chain</b>	Select the names of the FX to be included in the chain (use Ctrl key while clicking the mouse), then choose <b>FX, Save Selected FX as Chain</b>
<b>Make the current Track FX the default for new tracks</b>	Within the Track FX window, choose <b>FX, Save Chain as default for new tracks.</b>

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Task	Method
<b>Retrieve an existing previously saved FX Chain</b>	Within the Track FX window, choose <b>FX, Add FX Chain</b> command, or within the TCP right-click over the FX button and select <b>Add FX Chain</b> from the menu.
<b>Load your default FX Chain</b>	Within the Track FX window, choose <b>FX, Load Default Track Chain</b> from the menu.
<b>Access the FX Preferences settings</b>	Within the Track FX window, choose the <b>Options, FX Plug-in Settings</b> command.
<b>Bypass all FX for a track</b>	In the Track Control Pane, click on the <b>FX Enable/Disable</b> toggle button. Click again to reverse this. 

### 2.19 NEW! Adjusting FX Wet/Dry Balance

One clever little feature of the REAPER FX interface is a small rotary fader that allows you to adjust the wet/dry balance of audio signal that is produced after the track or item is passed thru the plug-in.

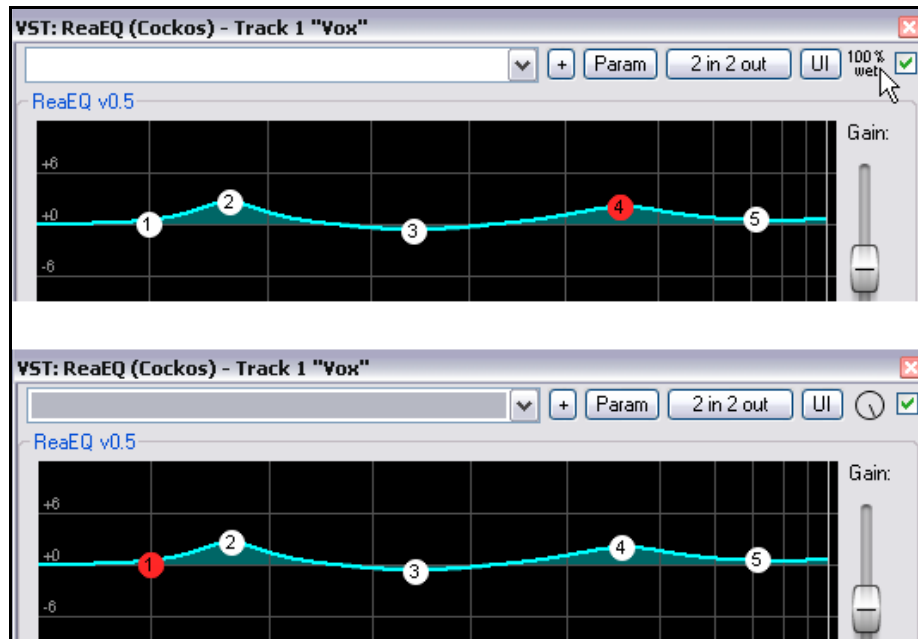
Some types of plug-in - notably reverb and delay plug-ins - usually include wet/dry faders to allow you to adjust this balance. When these are present, you can of course still use them if you prefer, but REAPER's native wet/dry rotary fader can be applied to *any* plug-in.

The presence of this fader is not obvious at first. It is located next to the UI button, near the top right corner where the current wet/dry mix ratio is displayed.. In the illustration top right this reads 100% wet and its position is indicated by the mouse cursor.

Click and hold on this to reveal the rotary fader (bottom right picture). Moved all the way to the

right (as shown here), the plug-in is applied in the way that you would normally expect it to be, that is, 100% wet. Moved all the way to the left, the signal will be set to 0% wet (that is, 100% dry), effectively bypassing the plug-in altogether.

You can of course set its position anywhere you like between these two extremes. For example, moving the fader to the 12 o'clock position would give you a mix of 50% wet and 50% dry.



### 2.20 Creating a Default FX Chain

If you have used other DAW software such as Sonar, you might be used to having an EQ Plug-In automatically inserted for you in every track. REAPER allows you to do this by creating a default FX chain which is then automatically applied to every new track that you create. Of course, this default chain can contain any FX that you wish. To do this, you simply follow this procedure:

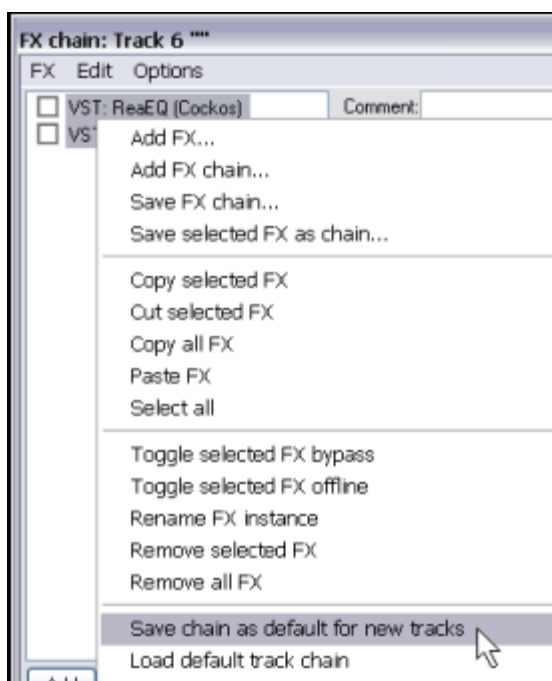
- Open the FX Window for any track.
- Add the FX required.
- With the FX selected, right click and choose **Save chain as default for all new tracks** from the menu.

**Tip:** If you switch the FX to bypass mode before saving your FX chain, then the FX chain will be saved in bypass mode. This means that the FX in your new tracks will not require any CPU usage until such time as you open the FX window and enable them.

#### Example

In this example, we will create a default FX chain that consists of ReaEQ and ReaComp, both set to bypass mode.

1. Open any project file and add a new track at the end. We will use this track to create our FX chain.
2. Click on the **FX** button for this track to open the FX Window.
3. Use the **Add** button to add, in turn, first **ReaEQ (Cockos)** and then **ReaComp (Cockos)**.
4. Make sure that both these FX are unticked – this sets them to bypass.
5. Select both these two FX.
6. Right click over the selection and from the context menu choose **Save chain as default for new tracks** (see right).
7. Close the FX window
8. You can now exit REAPER if you wish. There is no need to save the changes to the project file.
9. Re-open REAPER and open any project file.
10. Insert a new track anywhere you wish in this project file.
11. Open the FX window for your new tracks. You should see that the two plug-ins, ReaEQ and ReaComp have already been inserted into this FX bin, in bypass mode.



**Tip:** If you wish to make changes to the contents of your default FX chain, simply repeat the process described above, this time with the changed set of plug-ins.

**Tip:** If you hold down the **Ctrl Shift** keys when opening a project file then the file will be opened with all FX set off line. This can be useful if you need to conserve CPU, or if there is a plug-in which might be causing problems.

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## 2.21 Using an FX Bus

If you have used other DAW software, or an analog (tape) recording and mixing desk, you are probably already familiar with the concept of a **Bus**. The exact meaning of the term can have several variations, but most commonly (and in this example), a Bus is used to enable a number of tracks to share the same resource (such as perhaps Reverb or Chorus FX).

This saves on valuable computer resources such as CPU. For example, instead of requiring multiple instances of the same FX in perhaps three or four tracks or more, by using a Bus you can ensure that only one instance of the FX is required.

Note that when you use a Bus in this way:

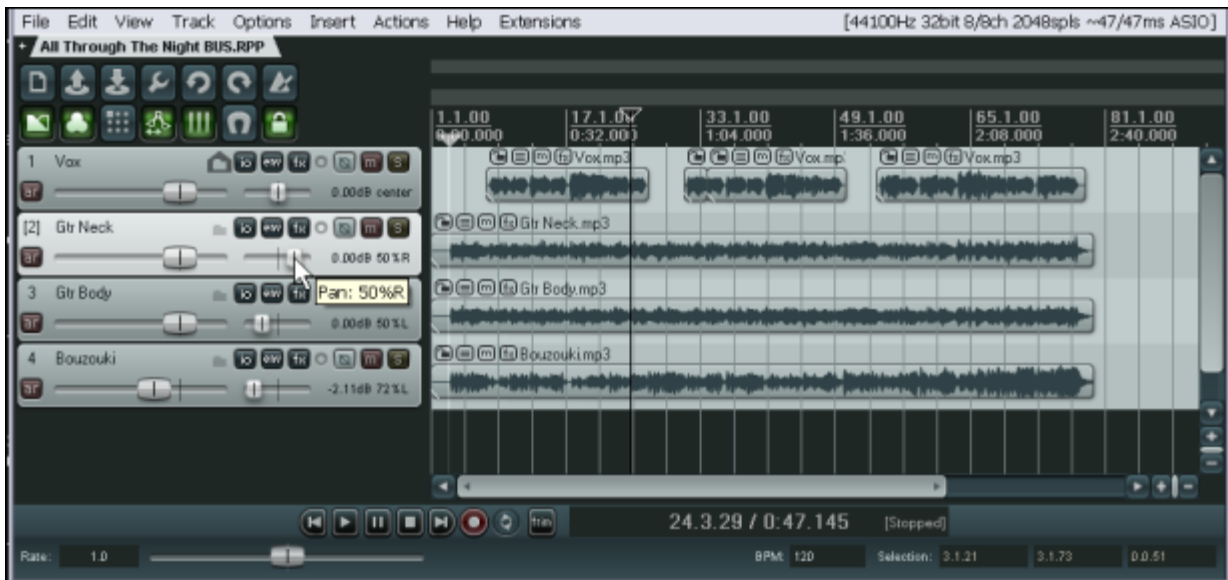
- The output of each track is still directed to the Master, as in the earlier example that we examined in Section 1.
- In addition, a portion of the signal from each track is directed to the FX Bus.
- At some stage, the output of the FX Bus is then mixed back in with the original signal. Typically (and in the example shown here) this is achieved by directing the output of the FX Bus to the Master, although other more complex routing arrangements are also possible.

The Bus can be inserted anywhere in the project that you like. In this example, we will be inserting it just after the last track.

This example uses the sample project file **All Through The Night.RPP**. You might wish to open this file, then save a copy to a new name such as **All Through The Night with Bus.RPP** before embarking on this example.

In this example, we are going to create an FX Bus and insert into that bus a Chorus effect. We will then ensure that both of our guitar tracks use the chorus. You will see that REAPER is different from other audio software in that it makes no inherent distinction between a Bus and a Track. The difference is determined solely by how you use it.

Notice that the illustration below shows that for a more pleasing sound, the guitar tracks have been panned somewhat to the left and right respectively.

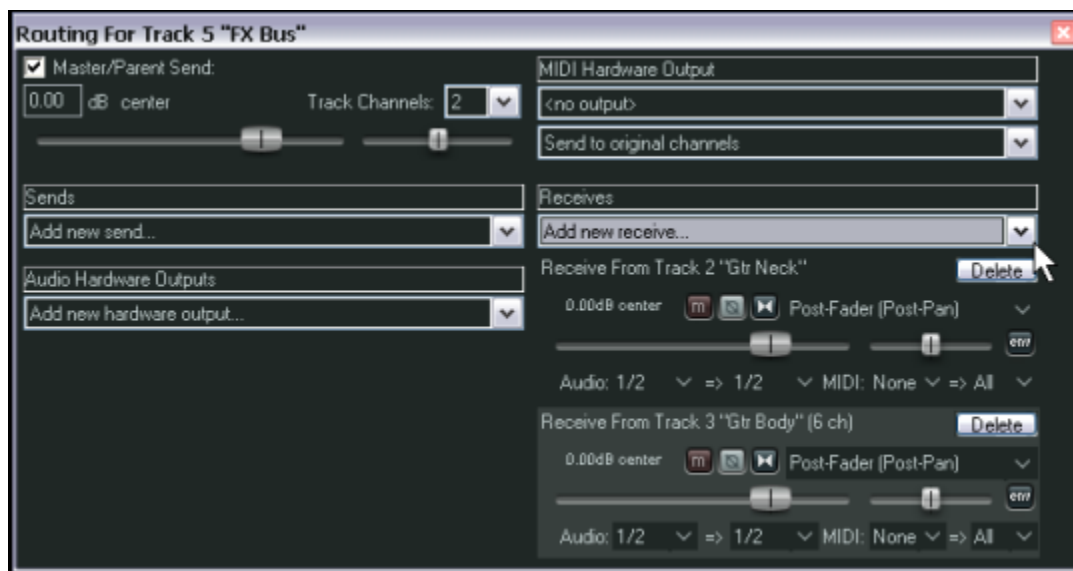


### To Create the Bus and add the FX to it:

1. Select track 4 (in the Track Control Panel).
2. To insert a new track either choose the **Track, Add New Track** command, or press **Ctrl T** or double click in the vacant track control panel area beneath the last rack.
3. To name this new track, click in the area where the name is to go, type **FX Bus** then press **Enter**.
4. To insert the Chorus FX into this bus, click on the bus's **FX** button. From the list of plug-in types, select Jesusonic, then in the list of plug-ins double click on **JS: Guitar/Chorus**. Close the Bus FX window.

### To Create Sends from the Tracks to the Bus:

5. Select Track 5, FX Bus.
6. Display the Inputs and Outputs for this track. To do this, click on the **I/O** button.
7. Click on the **Add New Receive** drop down arrow to display a track list, then click on **2: Gtr Neck**.
8. Click again on the **Add New Receive** drop down arrow to display a track list, then click on **3: Gtr Body**. You should now have two receives as illustrated below, each with its own Volume and Pan faders.



Note that for every receive there is an equivalent send, and vice versa. For example, If you now open the I/O window for Track 2 or Track 3 you will see there is a send to track 5 in both of these.

### Making Adjustments

When you now play the song, you'll probably find that there's more chorus on the guitar tracks than you would like. There are four ways to adjust this. You will need to experiment until you find what gives you the results you want:

1. Adjust the FX parameters in the FX window for the bus. In this case, you could lower the amount of Wet signal in the mix.
2. Adjust the Receive levels for each of the two guitar tracks.
3. Display the Routing Settings for either guitar track and adjust the Send levels for that track only.
4. Adjust output volume fader for the track called **FX Bus**.

**Tip:** If you wish to disable the direct send of any track to its Master/Parent (thereby directing its output only via any sends that you have created for this track), a quick method is to hold **Alt** while clicking on the track's **IO** button. **Alt Click** will also toggle the Master/Parent send back on.

## 2.22 Sending Multiple Tracks to an FX Bus

In the previous example, we created our FX bus by opening the I/O window for the bus track and adding receives.

As an alternative we could have used this method:

1. In the track control panel, select all of the tracks from which you wish to create a send.
2. Right click over the I/O button of any one track in the selection.
3. From the menu, choose **Sends** then select the track which you wish to receive the output from the sends.

## 2.23 Monitoring FX Performance

The various plug-ins that you have at your disposal can, if used wisely, help to bring your mixes to life. The only downside is that they can impose quite a heavy overload on your computer's CPU. To help you overcome this problem, you can use the **Performance Meter** to closely monitor your FX in the following ways:

- You can check how much CPU is being used by the FX in your various tracks and in the master.
- You can disable and enable FX chains for individual tracks, quickly, easily and conveniently all together in one place.
- You can toggle on and off the mute status for your tracks, again all in one convenient place.

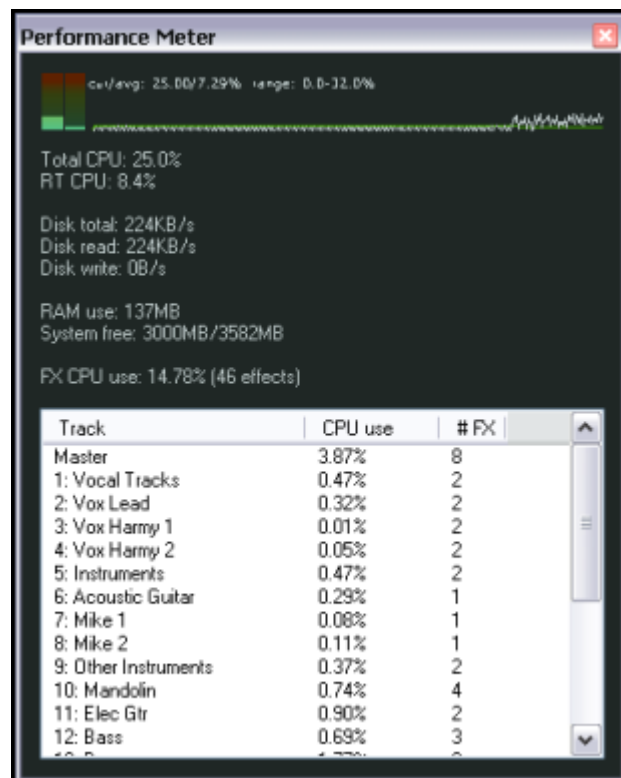
To display the Performance Meter, press **Ctrl Alt P**, or use the **View, Show Performance Meter** command.

### Example

In the example shown (right), you can see that our project FX are using about 14.78% CPU overall, and that the Master track with 8 plug-ins is using over 3.8%. You might wish to examine this track more carefully, especially if your project was running closer to CPU capacity.

The first thing you could do is to examine the FX for this track, to enable you to identify exactly what the FX on this track are doing.

To do this, just double click on the Track name or number in the Performance Meter window. This will open the FX chain for that track.





## 2 - REAPER Project Basics

This feature is especially useful if you have a large number of tracks in your project. You can use the Performance Meter window to browse thru your project file, checking it track by track, without having to scroll or navigate thru Track View. You can of course also toggle FX Bypass for any track, selection of tracks, or all tracks in the **Track View** or **Mixer View**. The table below summarises these options.

In Mixer or Track View, do this ...	In order to do this ...
Click the FX Bypass button for any track.	Toggle FX Bypass On/Off for that track.
Select a number of tracks (Ctrl Click) then click the FX Bypass button for any track in the selection.	Toggle FX Bypass On/Off for all tracks in the selection.
Hold Ctrl key while clicking FX Bypass button for any track.	Toggle FX Bypass On/Off for all tracks.

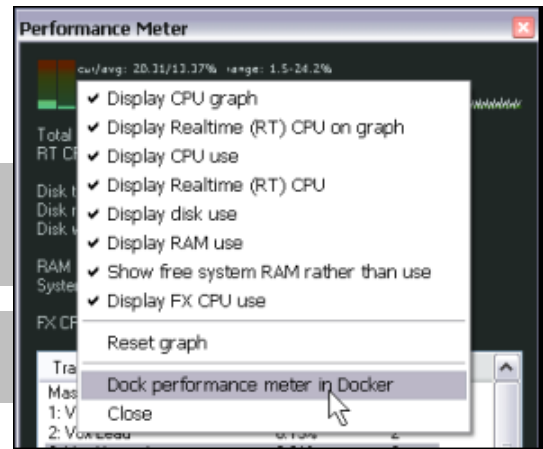
In addition, the Performance Meter has two right click menus, each with a number of options. The first is accessed by right clicking in the track list area.

In the Performance Meter window do this ...	In order to do this ...
Right click over any track and choose Show FX Dialog	Open FX Window for that track.
Right click over any track and choose Toggle FX Bypass	Toggle FX Bypass On/Off for all tracks in the selection.
Right click over any track and choose Toggle Track Mute	Toggle track mute for that track

The other menu is used mostly to select what information you want displayed in the window. Right click anywhere in the main Performance Meter area to display this. You can also use this menu to move the window to the docker.

**Tip:** You can select several tracks – using **Ctrl Click** – then right click over any of the selected track numbers in the Performance Meter window to Toggle FX bypass and/or Track Mute status for all tracks in the selection.

**Note:** You can find more information about the REAPER Performance Meter in Section 16 of this guide, Further Customising REAPER.



### 2.24 NEW! Adding Parameter Controls to the TCP

You can also add to the track control panel of any track rotary controls which can be used directly to adjust the values and settings for any FX parameters in that track. The method for doing this is explained in Chapter 9. Note that any such parameter controls that you create will be included in your saved FX chains and track templates.

## 2.25 REAPER Views and Windows

You have already been introduced to working with a number of Windows open in REAPER – for example, the Mixer, the Big Clock, the FX Browser, the Navigator and the Transport.

One glance at the **View** menu will show you that there are several other windows that you may use when working with REAPER.

In this section, we will be looking at:

- The Performance Meter: this indicates how much of your PC's resources (such as CPU and RAM) is currently available.
- The Routing Matrix: this presents you with a handy overview of which tracks are routed to where, including any sends that you may have created.

To toggle the display of the Performance Meter, use **Ctrl Alt P**

To toggle the display of the Routing Matrix, use **Alt R**

### 2.25.1 The Performance Meter

Press **Ctrl Alt P** to view the performance meter (see previous page).

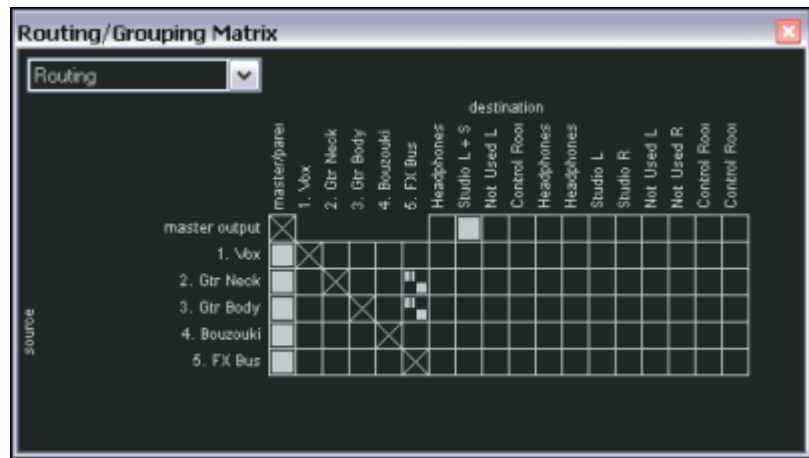
Play the project, and observe the behavior of this Performance meter. Right clicking over this window displays its settings menu.

### 2.25.2 The Routing Matrix

The more accomplished you become at using REAPER's routing capabilities, the more useful you will find the Routing Matrix.

Press **Alt R** to display the routing matrix. For the project file **All Through The Night with Bus** it should resemble that shown right, although of course your hardware outputs will not be the same.

This matrix isn't just for show. You can use it to make changes to your faders, for example, send levels and panning. This can be an especially convenient way of working if a project file has many tracks.



For example, observe the cell in the matrix where the **Gtr Body** row intersects with the **FX Bus** column. This cell contains two small blobs.

By right clicking over this cell, you can cause the controls to be displayed which determine how the signal from the Gtr Neck track is sent to the FX Bus (see illustration left).

### Simplifying the Routing Matrix Display

If your sound card has multiple outputs, then by default, REAPER's Routing Matrix will display multiple permutations of paired outputs, including several that you may feel that you do not need.

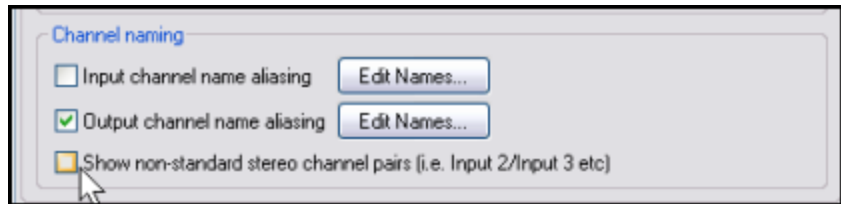
Consider the example on the right, which uses output channel name aliasing.

This matrix shows a setup which uses a sound card with outputs. Outputs 1 and 2 are directed to Headphones, outputs 3 and 4 to Studio, 5 and 6 are currently unassigned eight, 7 and 8 are directed to the Control Room.



Notice that in cases like this, the Routing Matrix includes combinations that you are unlikely to wish to choose, such as **Headphones R + Studio L**.

If you wish, you can prevent these from being displayed by choosing the **Options, Preferences** command, then selecting the **Audio** settings page.



This includes a **Channel naming** section, where you can turn off the option to **Show non-standard stereo channel pairs**.

Notice that if for some reason you did wish to direct your output to any non-standard pair, you could still do so by selecting each of these outputs individually on the matrix.

### 2.25.3 The Undo History

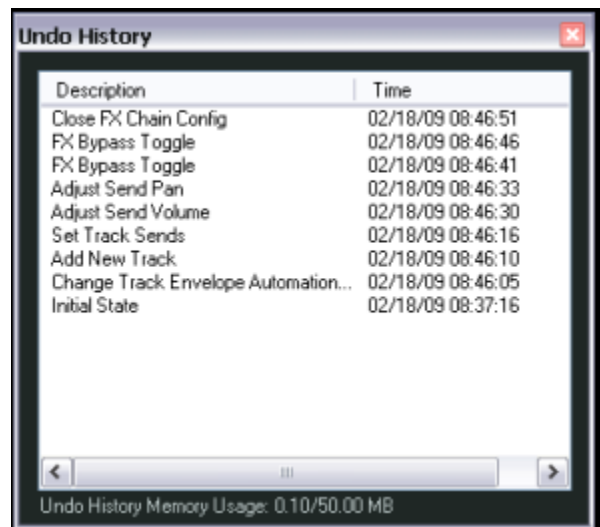
Using **Edit, Undo** or **Ctrl Z** to undo previous actions is a fairly standard feature of most Windows applications.

REAPER takes this further with an **Undo History** window. It can be opened from the **View** menu or by pressing **Ctrl Alt Z**.

If the preference **Show Last Undo Point in Menu Bar** (on the Appearance page of your Preferences) is enabled, then your last undoable action will be displayed on the menu bar. Clicking on this will also open the Undo History window.

This window lists all your actions for the current work session. Not only can you undo your previous action, you can roll your project back to any previous state just by double-clicking on that action.

In fact, REAPER's undo management capabilities go a lot further than this, but we'll get to these later.

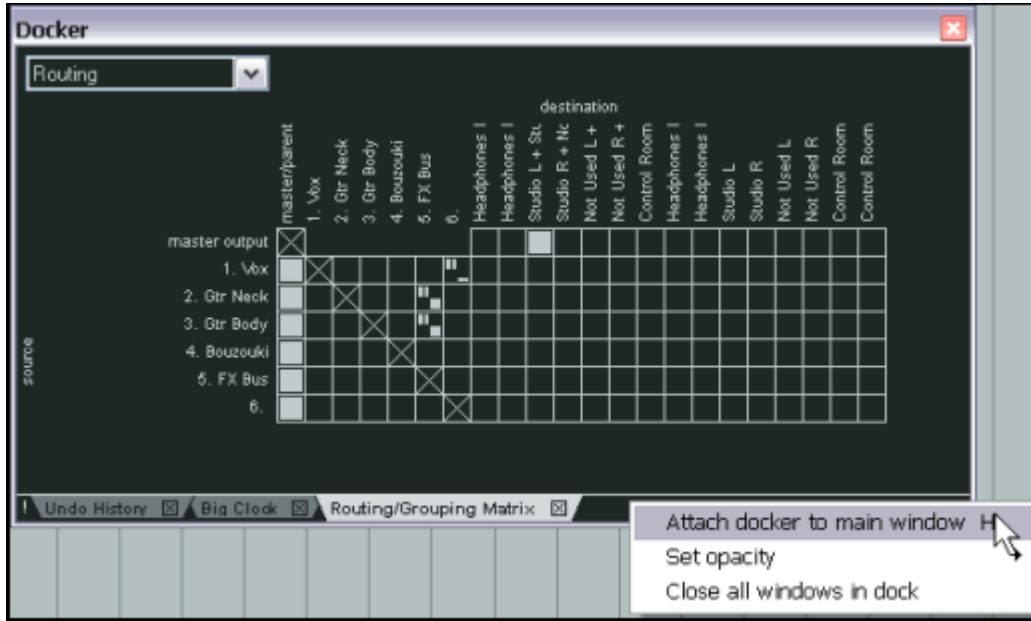


## 2.26 Docking and Floating

Too many views on the screen at once creates too much clutter. That's when the Docker becomes useful.

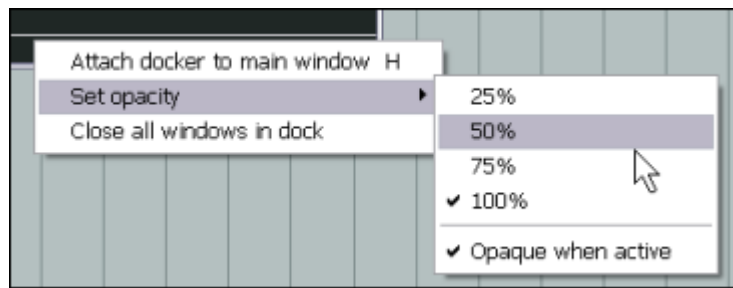
Right clicking over the title bar or background area of any window will cause a context menu to be displayed which will offer a list of choices relevant to that window. In many cases, their purpose will be obvious. This menu will include the option to **Dock Window in Docker**.

When a series of windows are all docked, at the foot of the Docker you will see a series of Tabs, which are used to select which item is displayed by the Docker at any time. In the illustration below, the Docker includes three items.



Notice also that:

- If you close a Window, next time it opens its docking status will be the same as when it was closed. That is, if a Window is docked when it is closed, next time it is opened it will still be docked.
- To undock a window, right click over the background or tab area of the window and deselect the **Dock Window in Docker** option.
- The Docker can itself be attached to the main window or detached and floated. Right click over the small exclamation mark in the bottom left corner of the Docker or on a vacant part of the docker's tab bar and use the option to **Attach Docker to Main Window** to toggle.
- Right clicking over the same area after detaching the Docker from the Main Menu will also give you access to the **Set Opacity** feature. This can be used to ensure that when floated and not in focus, the Docker is transparent.



**Tip:** The keyboard shortcut **Alt D** can be used as a toggle to show or hide the Docker.

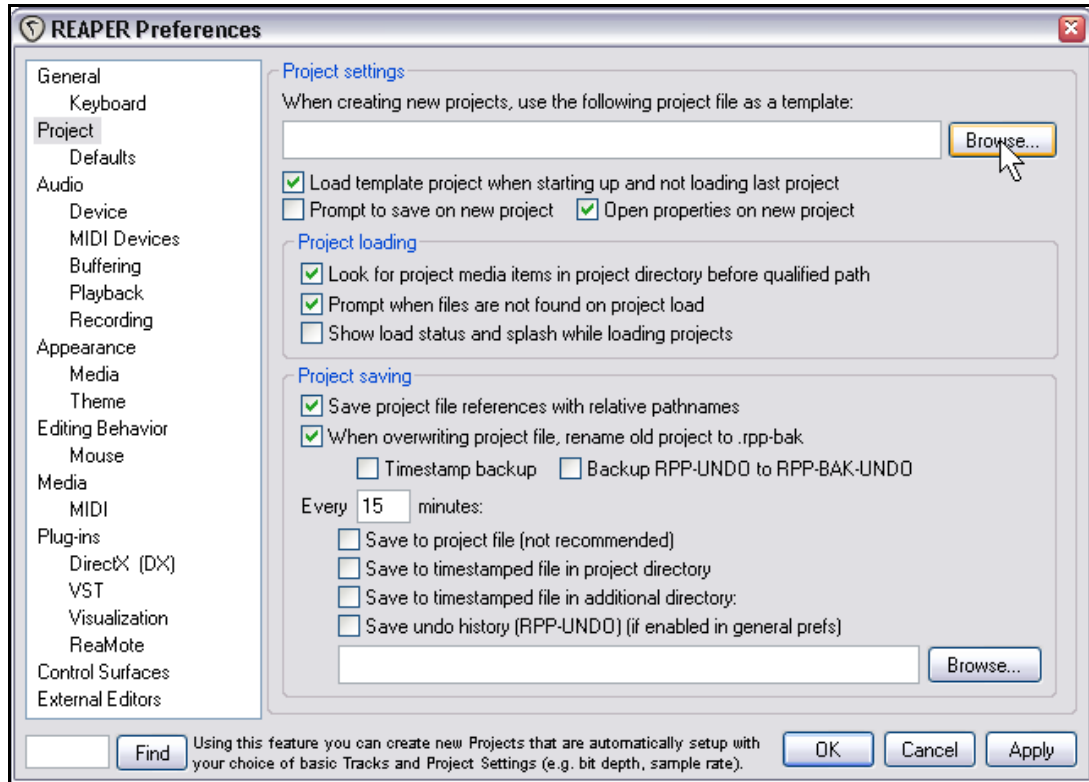
### 3 Recording with REAPER

This chapter will take you thru everything you need to know to get started with recording in REAPER. At the end of the chapter, you will find a helpful checklist.

#### 3.1 Creating a New Project

To create a new project file, you can either use the **File, New Project** command, or press **Ctrl N**.

The **Project** page within the **Options, Preferences** dialog box can be used to determine how REAPER behaves each time you create a new project:

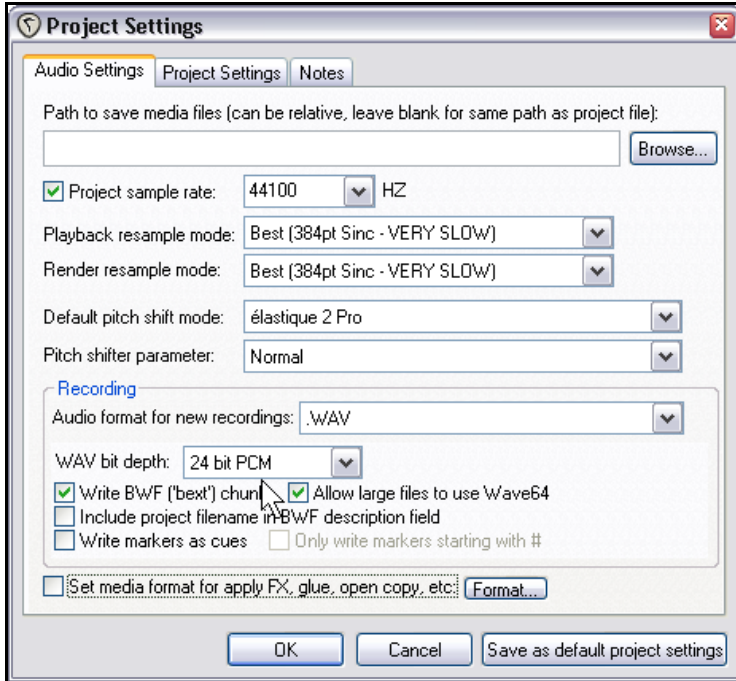


Amongst the most useful options on this screen are the following:

- **Specify a template file for project.** This enables you to create a project with, for example, tracks, buses and routing already set up for you in your preferred fashion. This feature will be covered in detail later in this section.
- **Open properties on new project.** If this option is selected, the **Project Options** dialog box will automatically be displayed every time you create a new project. This can help ensure that you select the correct recording format and other settings that you require.
- **Automatically create a backup each time your file is saved and overwritten.** This helps protect you against accidental loss of work.
- **Automatically save to a timestamped file at intervals you specify.** This can help to protect you from the consequences of an unforeseen circumstance such as a power outage or a computer crash.

## 3.2 Setting Audio Project Options

After creating a project file, you should display the **Project Settings** window – **Alt Enter** – to ensure that you are using your preferred **Audio Settings**. Below are shown two examples of your many options.



### WAV format.

Suitable if your recording is intended ultimately to be published as Audio CD or DVD.

The settings shown on the left would make a sensible choice when the final output is to be CD audio. As a rule, 24 bit is preferred for recording.

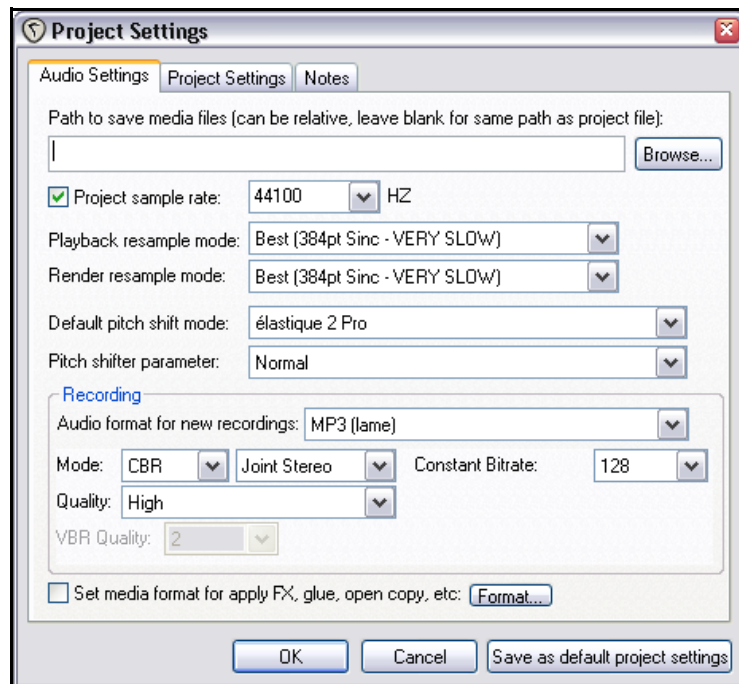
If the recording is to be finalised in DVD format rather than CD, however, you should select a sample rate of 48000 instead of 44100.

Some people prefer to use 88200 for CD and 96000 for DVD. Provided your sound card can handle it, REAPER lets you do this. Be aware, however, that increasing sample rate also increases media item file size and slows down processing.

### MP3 format.

Especially suitable for distribution of your work over the Internet or via I-Pod (or similar).

The settings shown on the right make a fairly sensible starting point, though you might wish to consider raising the bit rate, perhaps to 192, for a better quality outcome.

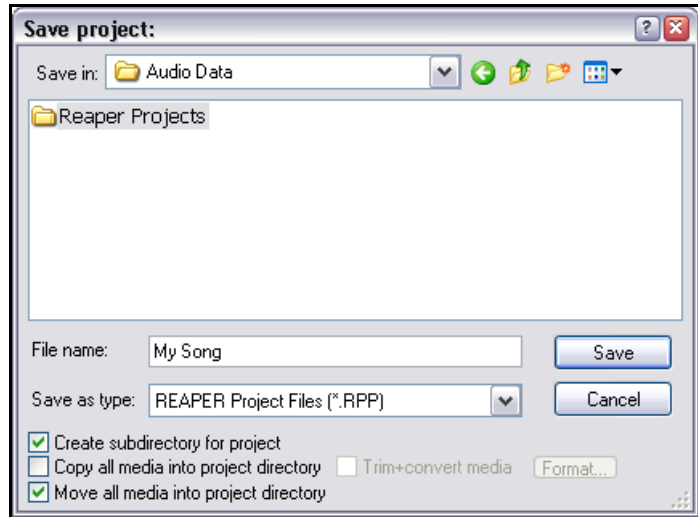


### 3.3 Saving the Project File

After creating a file, it is a good idea to save it, using the **File, Save Project** command, or the keyboard shortcut **Ctrl S**. You will need to specify a name for your project file.

If you select the options to **Create subdirectory for project** and **Move all media into project directory** (see right), the project and all its media files will automatically be saved into their own folder.

You should also make sure that you get into the habit of frequently resaving your project after making changes. The easiest way to do this is simply to press **Ctrl S**.

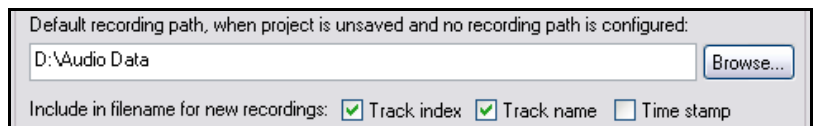


### 3.4 Creating and Naming Tracks

Assuming that you have created a new empty project file, the next thing you will want to do is to create a track or a number of tracks for recording.

A project can contain as many or as few tracks as you want. You can add tracks using the **Track, Add Track** command or by pressing **Ctrl T**. Alternatively, you can simply double-click anywhere in the vacant area of the Track Control Panel.

It is advisable to name the tracks before you start recording. To do this, double-click in the track name area and type the name. This ensures that the Wave (or MP3, or whatever) file that is created when you record will be given a sensible name that matches the track. Note that under **Options, Preferences** you can display the **Recording** settings page and decide your default recording path and which items are automatically included in your track's file names. These can be any combination of Track Index (number), Track Name, and the time of the recording.



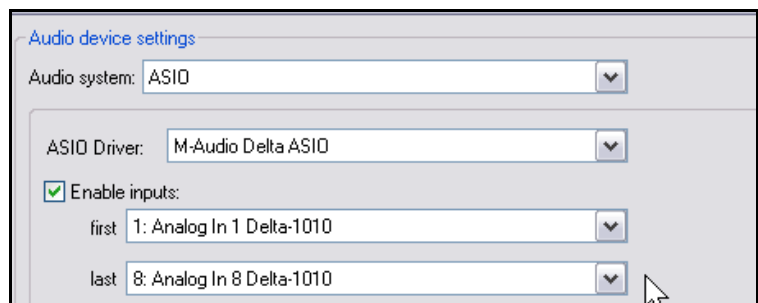
REAPER supports multitrack recording. The number of different sources that you can record at the same time is limited by the number of enabled inputs (under Preferences, Audio, Device) on your audio soundcard. The example shown here uses eight analog inputs.

Before commencing recording, for each track you will need to:

- Arm the track for recording.
- Assign the Input that is being used.
- Check that the sound level is right for recording.

Optionally, you may also:

- Select a recording format other than the default.
- Turn input monitoring on.



**Note:** You do not need to specify when creating a track whether it is to be a Stereo or Mono track. Notice, however, that when assigning the track input for recording, that can be either a single mono input or a stereo pair.

## 3.5 To Prepare and Record One Track

1. Choose the **Options, Record mode: Normal** command to make sure that **Record Mode** is set to **Normal**.
2. Click on the **Record Arm** button for that track (it's just below the track number). This will cause the track's VU meter to be displayed.
3. Click the mouse over the little arrow near the right end of the VU meter for that track. This displays a menu (right). The exact options on that menu will depend on which sound card and audio device(s) you have installed.
4. Select the required input from the menu. This will be the one to which the microphone or line that you are using for recording is connected. In most cases, this will be a **Mono Input**.
5. Audition the sound while you adjust the volume on your audio desk or sound input device, so as to get a good strong signal without clipping. If in doubt, aim to peak at about  $-10\text{dB}$ . *Note that the recording level cannot be controlled by adjusting the Track's volume fader: that controls only the playback level.*
6. Press the **Record** button on the **Transport**, or use the keyboard shortcut **Ctrl R**.
7. To finish recording, either press **Stop** on the Transport, or press **Space**, or press the **Record** button again, or press **Ctrl R**. Now click on the **Record Arm** button for this track to "disarm" it.



### Note 1:

If you stop recording by pressing the **Record** button or with **Ctrl R**, the recorded media are automatically saved.

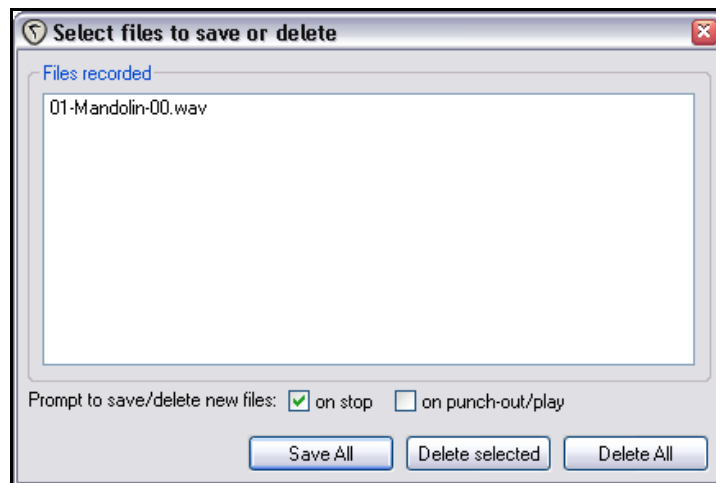
If you press **Space** or **Stop** a dialog box will be displayed which offers you the opportunity to save or delete any of your recordings (see left).

This can be useful, for example, if you have armed and recorded more tracks than you intended.

### Note 2:

REAPER supports "on the fly recording". This means that you can also arm additional tracks after the recording has started. Those tracks will then also be recorded from the point at which you arm them.

Similarly, if you are recording more than one track, you can stop recording one while continuing to record the others by clicking on the **Record Arm/Disarm** button to disarm just that track.





## 3.6 To Prepare and Record Multiple Tracks

Of course, to prepare multiple tracks for recording, you could repeat steps 1. to 3. (above) as many times as you have tracks, but that might be tedious – and besides, it's too easy to make a mistake in selecting one or more of your audio inputs. You could end up with one input being recorded more than once, and perhaps another input being accidentally missed out.

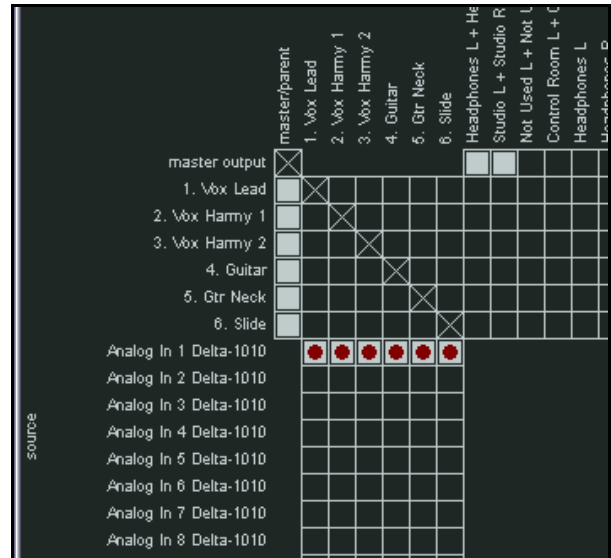
This is something that, at one time or another, is likely to happen with most DAW software. To avoid this problem, follow this sequence:

Select all tracks to be recorded. After making your selection, click on the **Record Arm** button of any one of them to arm the entire selection.

1. Display the **Routing Matrix** (right). In this example, we are assuming that we are recording six tracks at a time. Notice that by default, all six tracks are assigned to the first input. If you were to record now, the signal from the first input would simply be recorded six times!
2. Click in the appropriate cells in the Routing Matrix to assign each track an input.

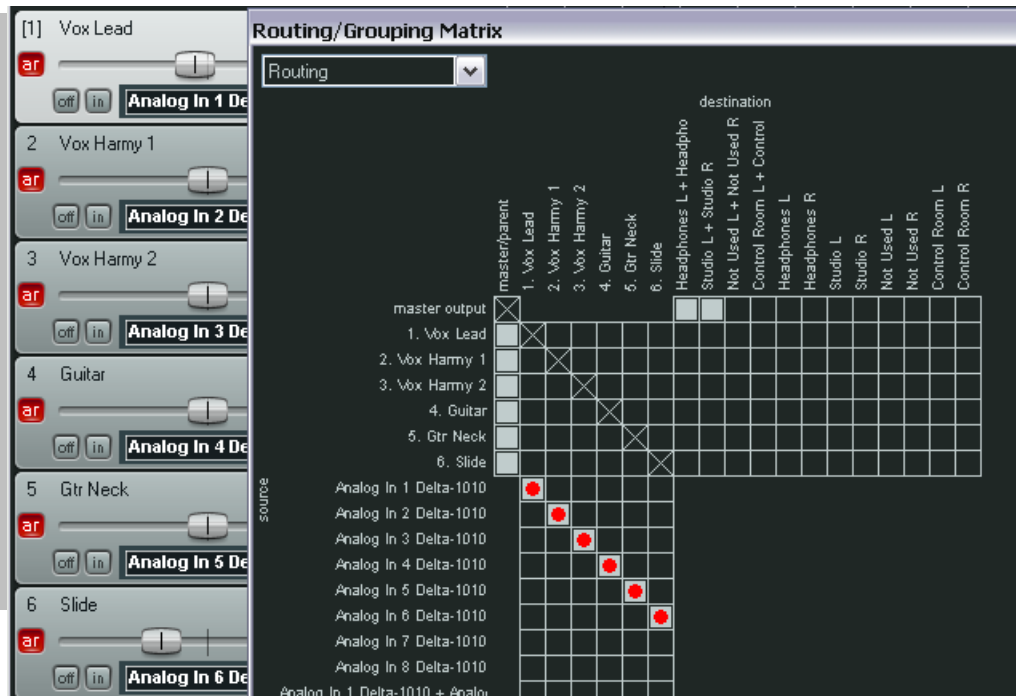
In this example (see below), we are assuming that Input 1 is to go to Track 1, Input 2 to Track 2. Input 3 to Track 3, and so on.

3. Monitor the strength of the signals and record as before.



**Tip:** To insert a new track at the end of your project, you can simply double click in the Track Control Panel area, just below the last existing track.

Consider whether you wish to use the option **(Project Defaults)** to Set Automatic Record Arm when track selected for new tracks.



## 3.7 NEW! Auto Arming Tracks

If you wish, you can ensure that any individual tracks are automatically armed for recording when selected and unarmed when deselected. Simply select the track(s) then right click over the record arm button for any track in the selection and choose **Automatic record arm when track selected**. The button display will change accordingly (see right). This command can be toggled on and off.

To set all tracks in a project to auto arm, right click over any track number and choose **Set all tracks to automatic record arm when selected**.

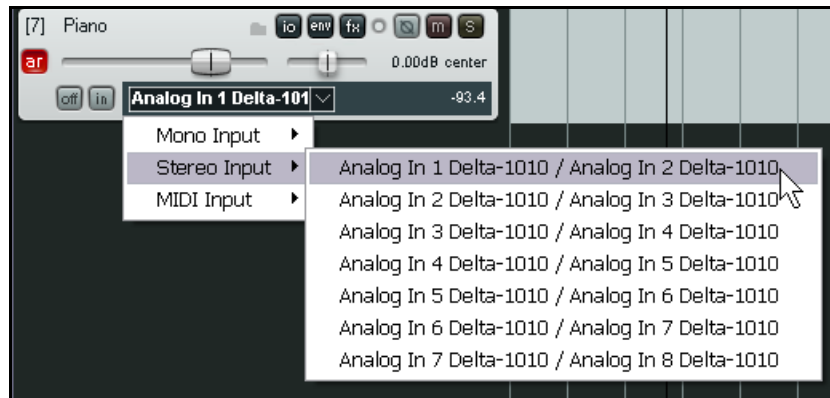


## 3.8 Recording Stereo Tracks

At times, you may wish to record from two inputs direct to a stereo track. This might be the case, for example, if you are uploading some old recorded material from audio cassette into REAPER.

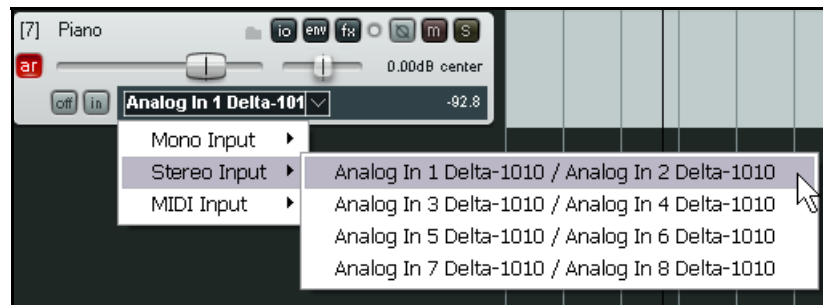
By default, when you specify a stereo input for your recording, REAPER offers you a selection of options which includes a number of unmatched pairings.

For example (see right), it would be unusual if you wanted to use inputs 2 and 3 together as a pair for recording a stereo track.



As has already explained in Chapter 2, you can open the Audio page of your Preferences settings and turn off the option to **Show Non-Standard Stereo Channel Pairs**.

This will reduce your available stereo paired inputs from a list such as that shown above to a more logical selection such as that shown on the right.



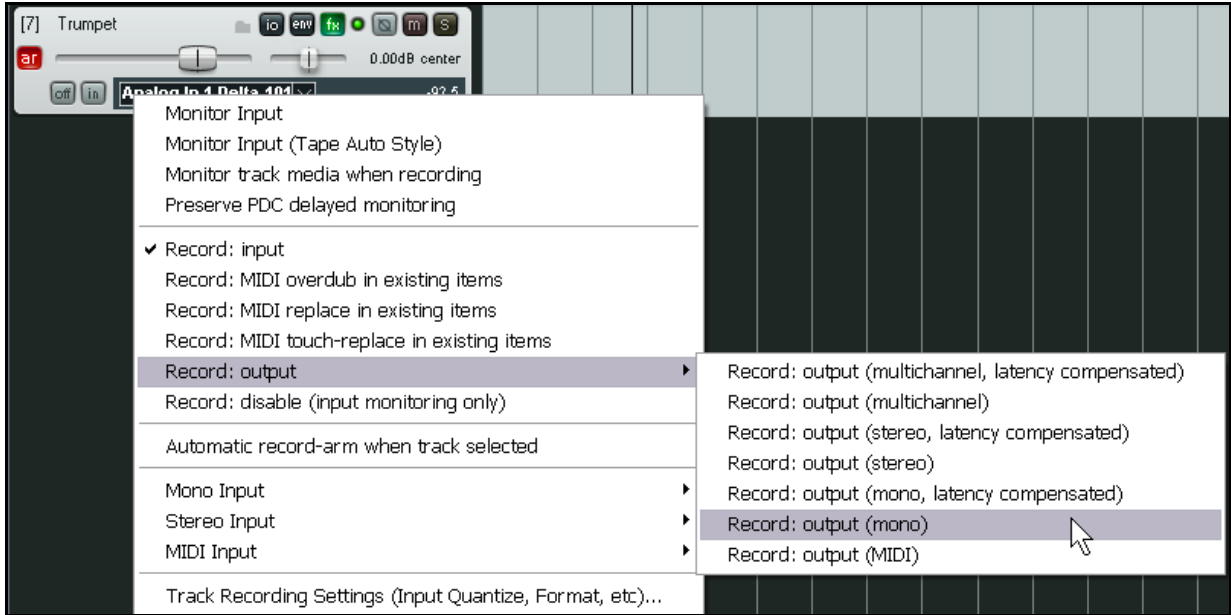
## 3.9 Recording a Track's Output

When you record a track's input, you record the signal exactly as it comes into the computer, without any FX that are in the FX chain being recorded with the signal. This is the method of recording that is most commonly used. Of course, you will still be able to hear the FX being applied later when you play the track back.

However, with REAPER it is also possible to have FX applied to a signal and recorded with that signal, as the track is recorded. Of course, if you choose to do this, you cannot simply remove the FX from the track afterwards if you change your mind. To do this:

1. Select the track, and arm it for recording as before.
2. Select the required input as before.
3. Open the FX window and insert the required FX.

4. In the Track Control Panel, right click on the **Monitor Input** button and make sure that Monitor Input is turned on.
5. Still in the Track Control Panel, right click on the **Arm Record** button or the **VU Meter** and select the required **Output Mode**. For audio this may be multichannel, stereo or mono but is usually likely to be **Mono** (see below).



6. Monitor the signal strength and FX level.
7. When ready, record as before.

**Note:** As well as recording with software FX (as in the above example), REAPER also lets you record using an external FX device in the same way as you might use an insert device on an analog desk. We'll cover this towards the end of this section.

### 3.10 Recording the FX On Their Own

One real fun feature of REAPER is that when you have set up a track to act as an FX Bus (see Chapter 2), you can record just the FX on its own to a separate media file (usually WAV or MP3). This can, of course, be the output of a single FX or an entire FX chain.

Doing this opens up all sorts of creative options later when it comes to mixing. To do this:

1. Select the FX Bus track and arm it for recording.
2. You might wish to also turn up the track's **Receives** to get a good strong signal – you can always turn down the volume when playing it back later.
3. Set the track to Monitor Input and chose a **Recording Mode**. This is likely to be **Output, Stereo**.
4. Play the song and monitor the signal level.
5. Rewind to start and press Record.
6. Stop recording when finished.

**Tip:** If you do record a track's FX in this fashion, you will most likely want to set the FX to bypass mode after doing so. It is nevertheless a good idea to leave the FX inserted in the track's FX bin, as a record of how the FX was produced.

## 3.11 Track Templates

After you have set up a track (or a number of tracks) for recording, you might think that you may wish to use this same track set up again in some future projects. This can be done using **Track Templates**.

### To create a Track Template from an existing track (or selection of tracks):

1. Select the track or tracks.
2. Choose the **Track, Save Selected Tracks as Track Template** command.
3. When prompted, type a template name. If you wish, you can select the option to **Include track items in the template**. If so, any audio and MIDI items on the track will be included. Then click on **Save**.

### To import an existing Track Template into a project:

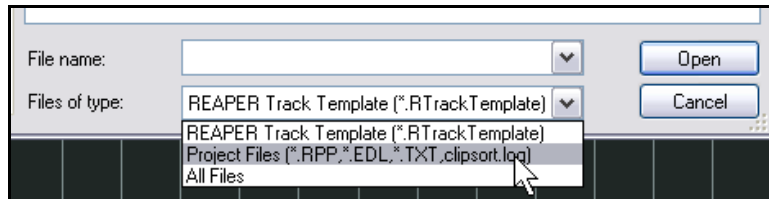
1. From the REAPER menu, choose the **Track, Insert Track from Template** command.
2. Depending on how your templates are stored, either select the required template from the menu, or choose **Open Track Template**, then choose the required template and click on **Open**.

**Note:** All of a track's properties and settings are saved into the template, including track name, inputs and outputs, any FX plug-ins (with any parameter settings, parameter modulation, and track controls), sends and receives. However, if a track included in a track template includes any sends to or receives from any track or tracks not included in the template, then these sends and receives will not be saved into the track template.

## 3.12 Importing an Existing Project

You can use the **Track, Insert Track from Template, Open Template** command to import an entire existing REAPER project into your current project. Everything comes in exactly as it is in the original project file – media items, track settings, FX, routing, etc. Note however that items that are not track specific (such as markers) are not imported.

To do this, simply select **Project Files** as the File Type when the **Open Track Template** dialog box is displayed, navigate to select the file you wish to import, then click on **Open**. The tracks from the imported project file are inserted immediately below the currently selected tracks.



## 3.13 Project Templates

A Project Template goes further than a Track Template in that it can be used to create an entire Project File, based upon the structure and settings of the template file. For example, Project Settings (including Audio Settings) are saved with a project template, along with the screen layout, which views are open, how they are sized, whether they are docked, and so on. However, unlike when creating a Track Template, you should remove the media clips and items from a file before saving it as a project template, otherwise every time the template is used to create a new file, those media items will be inserted. (Unless, of course, there are media clips that you actually *want* saved into the template).

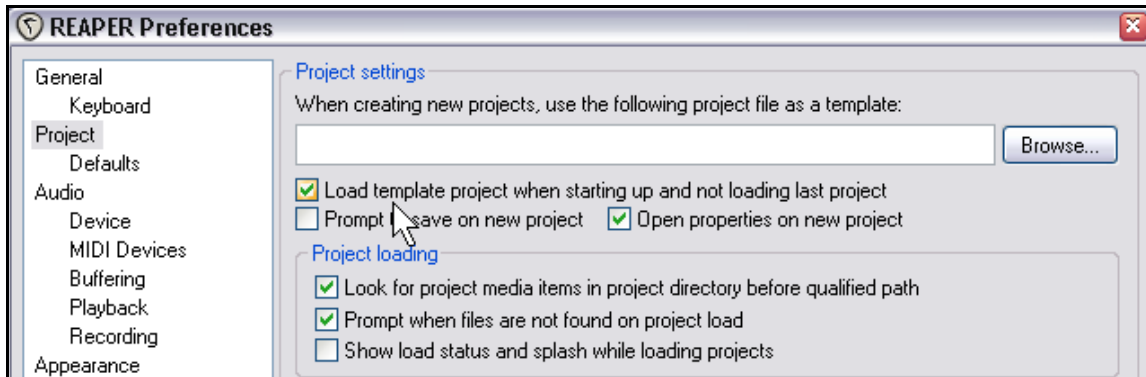
### To create a Project Template:

- With the source project file open, choose the **File, Project Templates, Save As Project Template** command. When prompted, give the template a name, then click on **Save**.

### To create a new file based on a Project Template

- Choose the **File, Project Templates** command, then click on the name of the required project template.

To use a Project Template as the basis of all new project files created:



1. Choose the **Options, Preferences** command.
2. Display the **Project** settings screen.
3. If you wish, select the option **Load Template Project when Starting Up and Not Loading Last Project**.
4. Click on the **Browse** button near the top right corner of the screen. Navigate to your Project Templates folder – this will be **C:\Documents and Settings\UserName\Application Data\REAPER\Project Templates** (where **UserName** is your user name)
5. Select the required Project Template file.
6. Click on **Open** to return to the **Preferences** window.
7. Click on **Apply** then on **OK** to close this window.

**Tip:**

If you are specifying a default project template (such as in the above example) it is a good idea to also save an empty project as a project template called **Empty Project**. Then, whenever you want to create a new file that doesn't use your default project template, you can do so by simply choosing from the menu **File, Project Templates, Empty Project**.

**Tip:**

When you are recording, make sure that the incoming signal is not too loud, or you can damage your recording equipment. Here's what to do:

1. Turn the input or gain control on your input device (e.g. firewire device or desk) all the way **down**.
2. If recording an instrument in-line, insert one end of the line into the instrument and the other end into your input device. Turn the output on the instrument fully **up**
3. Audition the instrument, gradually raising the input or gain control on your input device until it is about right.

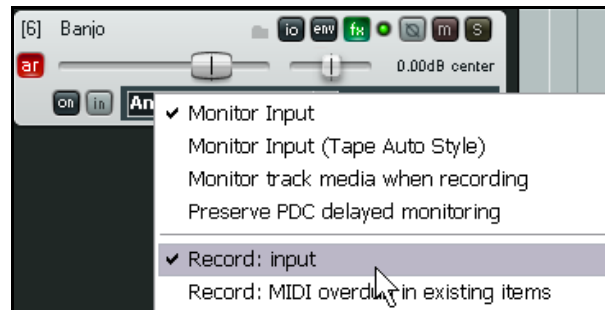
### 3.14 Layered Recording

The term *layering* refers to a recording technique in which two or more instruments and/or voices are recorded for the same song, but not all at once. Usually, the tracks are recorded one at a time.

An initial track is laid down – this is often a guide track which will be discarded at the end of the recording process. Then each other track is recorded while the musician or singer listens thru headphones to a mix of what has already been recorded and what she is recording now.

In order to use this layered recording method:

1. With Record Mode set to Normal, record the initial track, as explained earlier.
2. After recording this track, make sure that the output of this track is directed to the Master. *Make sure also that you "disarm" this track.*
3. Make sure that the Master is directed to whichever audio hardware outputs are connected to your headphones or headphone amp.
4. Add another track. Name it. Arm this track for recording. Select the Input used by the microphone or line that is to be used to record this new track.
5. Make sure that Input Monitoring is turned on for this track, and that the Record Input option is selected (see right).
6. Adjust the Volume levels of the previously recorded track (using the track fader) and the volume level of the incoming signal (using your external mixer desk or audio device, or audio device control software) until you are happy with your headphone mix.
7. Press **Ctrl R** to start recording, and **Ctrl R** again to stop when finished. Again, disarm this track when you have finished recording on it.
8. Repeat this procedure for all other tracks to be layered. Of course, at step 6. you can feed into your Master a mix of all tracks previously recorded up to that point.



**Tip:** Many sound cards and USB or Firewire audio devices are supplied with software that can be used for input monitoring and headphone mixing. This is especially the case for those devices that have multiple inputs and outputs. If you use that software for input monitoring, then you should turn off the input monitoring option within REAPER.

**Try it now!** Open the supplied project file **All Through The Night.RPP** and save it as **All Through The Night LAYERS.RPP**. Have a go at recording another instrumental track of your choice to go into this project. Any instrument you choose!

### 3.15 Overdubbing and Punch Recording

At times, you might want to go back to an existing track to re-record a section of that track with which you are not satisfied, to correct perhaps just a few notes of an instrument, or a line or two of a vocal.

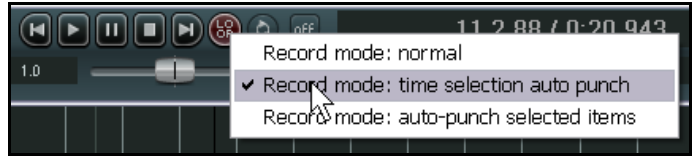
Punch recording makes it easier to do this.

With punch recording, you can play back in your headphones the previously recorded track, along with any other instruments while you record. At the point where you want recording to begin, however, the track on which you are recording will cut out, and the recording will commence. At another point specified by you, the recording will stop, and the existing recording will come back in.

### 3.16 Punch Recording

To use Punch Recording, follow this sequence:

1. Right click on the Record button on the Transport Bar and choose **Record mode: time selection auto punch**. The button display will change (see right).
2. Select the track and arm it for recording.
3. Make sure that the track output is sent to the Master and that Input Monitoring is enabled.
4. Make sure that the Master output is directed to the audio hardware outputs to which your headphones or headphone amp is connected.
5. Click once on the existing media item to select it.



6. Click and drag along the background area between or below the media items to select the region that you want to be re-recorded (see above).
7. Rewind the track to a point a short way before the position where you wish to start recording. This can be done by simply clicking at the required place on the timeline.
8. Press **Ctrl R**. You will now hear the existing recording up to the start of the defined region, where you can re-record the required passage.
9. When prompted, accept the option to save your recorded media.

Notice that your track now contains two media items, with the new one superimposed on the old



What's happened to the originally recorded passage? Well, it's still there and you can still use it if you like. You'll find out how when we get to look at **Takes**.

**Tip:**

REAPER supports the standard Windows editing techniques. Editing will be covered in detail in later sections, but for the time being, if you make a mistake or change your mind when overdubbing, you can use **Ctrl Z** to undo the recording or you can select the unwanted media item and use the **Delete** key to remove it.

**Tip:**

Don't forget to restore normal recording mode when you have finished your punch recording.

## 3.17 Fades and Crossfades

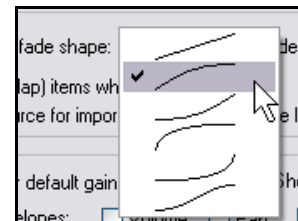
REAPER offers you the option to apply automatic crossfades and fades in and out of your recorded items. This feature can be turned on and off or customised thru the **Options, Preferences** menu, Project Defaults.



You can select a preferred shape and duration (length) for your fade curves. Clicking on the image of the curve (shown above) causes you to be offered a number of choices (see right).

If you prefer not to use automatic fades, set the default length to 0.0:000

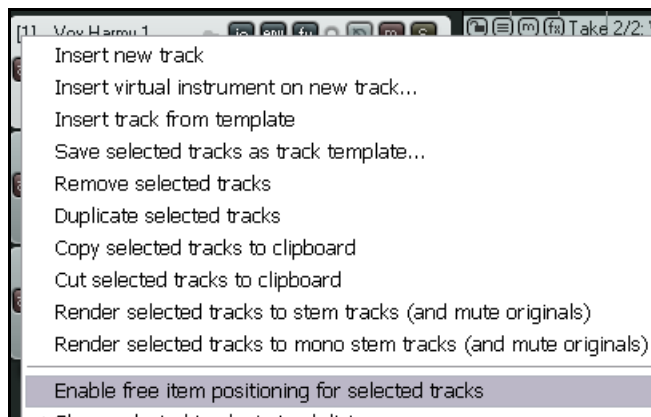
As you will see later, you can easily change the default fade type and/or length for individual media items.



## 3.18 Recording Multiple Alternative Takes

REAPER's multiple takes feature can help you when you want to record several versions of a track to see which you prefer. It works like this:

1. Set record mode to normal (**Options, Record Mode: Normal**).
2. Make sure that **Free item positioning** is *not* enabled for the tracks being recorded. Right click over the Track Control Panel for the selected tracks and make sure this option is not ticked. We'll see what this means later.
3. Record your first take of the track.
4. Rewind to the start then record your next take.
5. Repeat step 3. as many times as you wish.



In the example shown here, an initial vocal track has been recorded, then above it two takes have been made of a vocal harmony track. Notice the text displayed with the name of the media item displayed for the Harmony Vox track. It begins with the text **Take 2/2**.





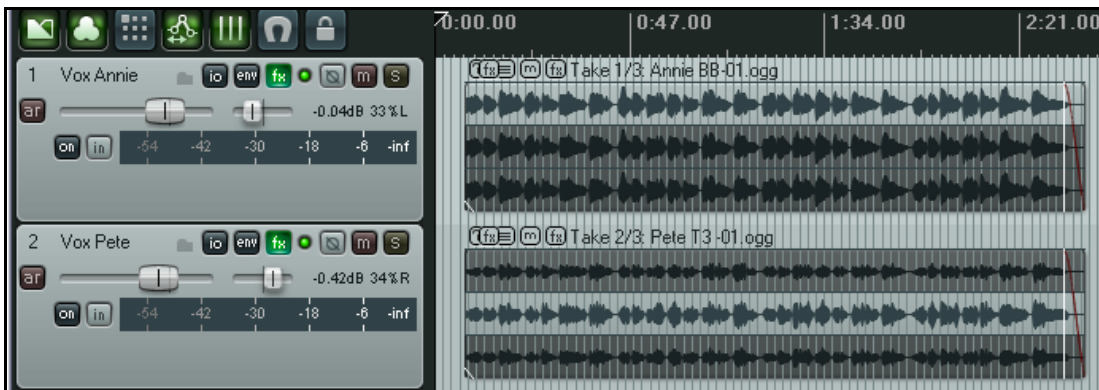
### 3.19 Showing Takes in Lanes

Optionally, when you have multiple takes, you may choose to have them displayed in lanes. This of course takes up more room on the screen, but has the advantage that it makes it easier to see for your various tracks which take is currently selected. This option is toggled on and off by pressing **Ctrl L** or by choosing **Options, Show All Takes in Lanes (when room)** from the Main Menu.



In the first example shown below, three takes have been made of a vocal duet. For both tracks, the third take is currently selected and will be played:

In this second example, Take 1 has been selected for the first track and Take 2 for the second track.



In this third illustration (below), the tracks have been minimised, so only one lane is visible. However, as long as the option to Show All Takes in Lanes remains active, the lanes will automatically be restored to view when the tracks are expanded.



**Note:** When you create multiple alternative takes in this way you will later be able to easily pick the best passages from each of your takes and join them together as a single item. The method for doing this will be explained later in this User Guide.

## 3.20 Working With Multiple Takes

Where an item includes more than one take, you can right click over any take and use the **Take** command to control and manage your multiple takes. The Take submenu is quite extensive - we'll explore most of its features in Chapter 7. For the time being, however, you should be aware of the following, especially if your takes are not displayed in lanes.

Command	Shortcut	Effect
Next Take	T	Displays next take for selected track(s).
Previous Take	Shift T	Displays previous take for selected track(s).
Delete Active Take		Deletes currently displayed take for all selected track(s).
Crop to Active Take	Alt Shift T	Deletes all takes except currently active one for all selected track(s).
Explode All Takes to New Tracks		Creates a separate track for each take (see below).



**Explode All Takes to New Tracks** differs from **Show All Takes in Lanes** in that it lets you treat each take separately as a separate track. The picture above illustrates this.

Track 1 consists of two takes which are shown in lanes. After exploding these takes to new tracks we have (in addition to the original track) two new additional tracks, one for each take.

**Tip:** Be careful about using the **Delete** key when working with multiple takes. You might end up accidentally deleting all takes for all selected tracks. If you do this by mistake, you can press **Ctrl Z** to immediately undo this.

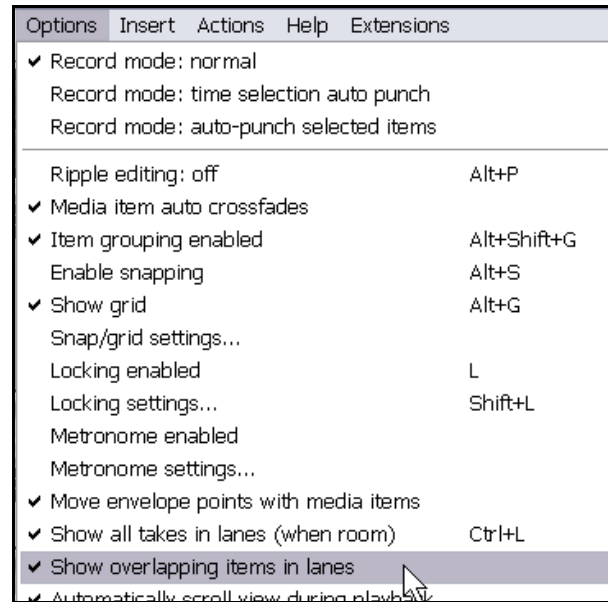
**Try it now!** Open the project file **All Through The Night LAYERS.RPP** (which you saved earlier) and add a vocal harmony track to this project. Use this track to record three takes – then save the file.

### 3.21 Overlapping Takes

Sometimes when you are creating multiple takes, you will want to start recording your new take just before the end of a previous take, so that the two items will overlap.

In cases such as these, you have the option to **Show overlapping items in lanes**. This command is on the **Options** menu and can be toggled on and off.

The example shown below illustrates this.



In the first picture (right) the **Vox Harmacy** track consists of two overlapping items.

If not for the cross-fades, you could easily not notice that there were two separate takes there.



The second picture (left) shows the same track with the same two takes, but with the option to **Show overlapping items in lanes** selected.

#### Note:

Where you have overlapping items like this you can manually adjust the length of the crossfade. We'll return to this topic in Chapter 6.

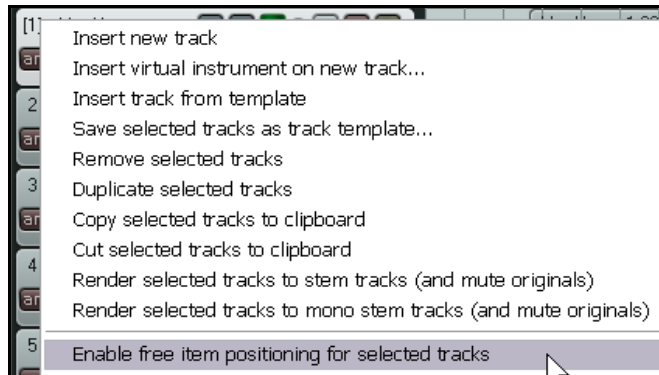
#### Note:

When you have the **Show overlapping items in lanes** option selected, you might also wish to right click over one of the items and also select **Item Settings, Play All Takes** from the context menu.

## 3.22 Recording Multiple Additional Items

We have already seen how you can use Reaper to record multiple takes on the same tracks. Later, you will be shown how to edit these, so as to take the best parts from each of several takes and then patch them together into a single track.

As an alternative to using multiple takes, however, you may wish to record additional items onto an existing track, perhaps overlapping. This is an example of where the option to enable free item positioning can offer you greater flexibility. By default, free item positioning is not enabled. To record extra items (rather than additional takes) on to an existing track, follow this sequence:



1. Set record mode to normal (**Options, Record Mode: Normal**).
2. Make sure that **Free Item Positioning** is enabled for the tracks being recorded. Right click over the Track Control Panel for the selected tracks and select **Enable free item positioning for selected tracks** if this is not already ticked.
3. Record your first item for the track.
4. Position the cursor at the point where you wish to record the second item. Record this item.
5. Repeat step 4. as often as required.

### Example



In the screen shot shown here, Track 2 contains a Vocal Track and Track 1 a Vocal Harmony for the first half of the song.



In the second screen shot, the option for **Free item positioning** has been enabled for Track 1. The mouse pointer shows a small handle that can be used to adjust the height of this media item.



In the third screen shot, a second Vocal Harmony has been recorded on to Track 1, overlapping the original harmony.

Notice that this is not an alternative take of the first harmony, but an *additional* media item

**Note:** In the Options, Preferences, Project, Defaults window there is an option to make free item positioning enabled for your tracks by default.

### 3.23 Recording with Empty Events

Empty Events are a clever device which can be helpful when you are overdubbing or layering. If you know exactly the regions where you want recording to start and stop, you can define these regions by inserting empty events. Then, when recording is commenced, only those regions defined by the empty events will actually be recorded.

Let's take an example where a vocal track has already been recorded, and we now want to lay down a harmony vocal, where this harmony is only used for the chorus line of the song. This is how you would do this:

1. Insert a new track to be used for the vocal harmony. Ideally, you should name this track straight away.
2. Arm the track for recording. Assign an audio input in the usual way. Turn on **Monitor Input** for this track, and make sure the output from the Master is directed to your headphones.
3. Use the **Options** menu to ensure that **Record mode: auto punch selected items** is chosen. Notice the appearance of the Record button in the transport bar changes.
4. To create an empty item, first make sure that your new track is selected. Click and drag to define a time selection, then use the **Insert, Empty Item** command to create the empty item. Repeat this as often as required. If necessary, click and drag to adjust their exact positions.



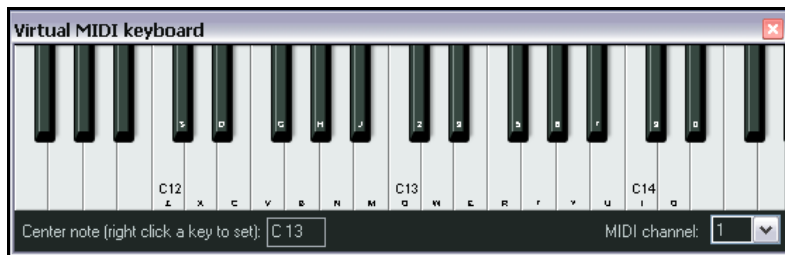
5. If you need to resize any of them, hover the mouse over the border between the end of the event and the background, about half way up. Click hold and drag to the left to make it shorter, or to the right to make it longer. Then release the mouse.
6. Select all of the required events. To do this, use the **Ctrl** key while clicking on each in turn. An example of what you should now have is shown below. If you need to reposition the Edit Cursor before recording, do so by clicking on the Timeline.
7. Press **Ctrl R** to start recording. When finished, press **Ctrl R** again to stop. If prompted, accept the option to save all files. Disarm the track.
8. Your screen should now show something similar to this:



## 3.24 Recording MIDI

You have a number of options for recording MIDI, depending on what equipment you have and how it is set up. In every case, however, the principle is the same:

- You will need to use either REAPER's virtual keyboard or a MIDI input device, such as a keyboard attached via a MIDI In port on your sound card or other audio device.
- You will need to create a track (or assign an existing one) for your MIDI recording.
- You will need to assign an output device for your track.
- You will need to assign a Channel for the MIDI item.
- You will need to turn Input Monitoring on to be able to hear what you are playing.

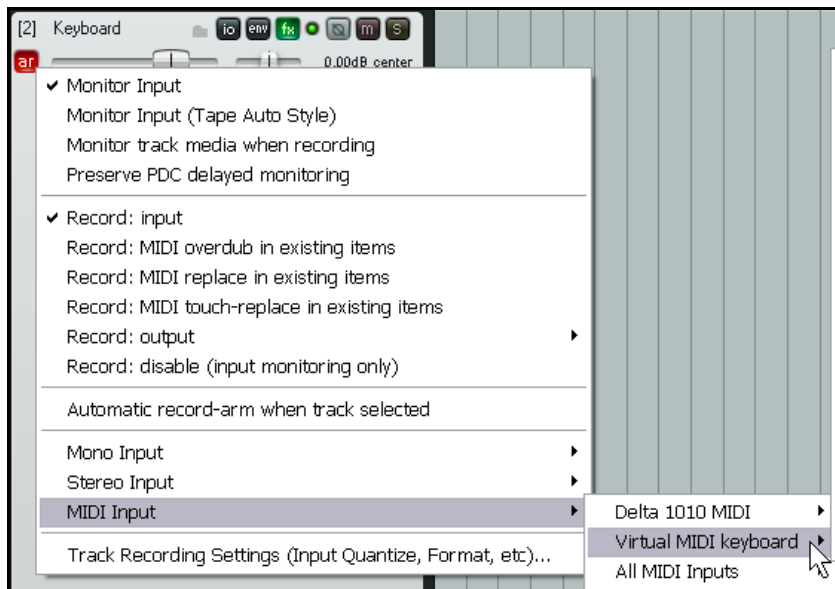


REAPER's **Virtual MIDI Keyboard**, can be played using your mouse or PC keyboard.

This keyboard is displayed using the command **View, Virtual MIDI Keyboard**. The shortcut keys **Alt B** can be used to toggle display on and off.

### Procedure for Recording a MIDI Track

1. Insert a new track into a project file. Arm this track for recording.
2. Make sure that your MIDI keyboard is connected to the MIDI Input of your sound card or Audio Device and that it is switched on. In this example, we will be using the **REAPER Virtual MIDI Keyboard**. If this is not visible, press **Alt B**. Right click over any key that you wish to make your centre note.
3. On the track you are using, right click over the **Rec In** button and make sure that Monitor Input and Record Input are both selected, and that you have selected the Virtual MIDI Keyboard as the MIDI Input device, and that you have selected a MIDI Channel (in this example, select **All Channels**).
4. Make sure that the Track's output is directed to the Master, and that the Master output is directed to the hardware audio outputs to which is attached the speakers or headphones that you wish to use when recording.



## 3 - Recording with REAPER

5. In this example we will use a Software Synthesizer. Open the FX Bin for this track. You will need to insert a Software Synthesizer here. You can use any such VSTi or DXi synth that you already have installed. In this example, we will be using **VSTi ReaSynth (Cockos)**, which is included with REAPER. For the time being, leave the ReaSynth parameters at their default settings. (Later in this guide you will learn more about ReaSynth.)
6. Press **Ctrl R** to start recording. Play a simple tune on the Virtual Keyboard. Use your mouse or PC Keyboard – for example, **zxcvbcxz** will play half a scale up and down. When finished. Press **Ctrl R** again to stop recording. If prompted, save your media item.

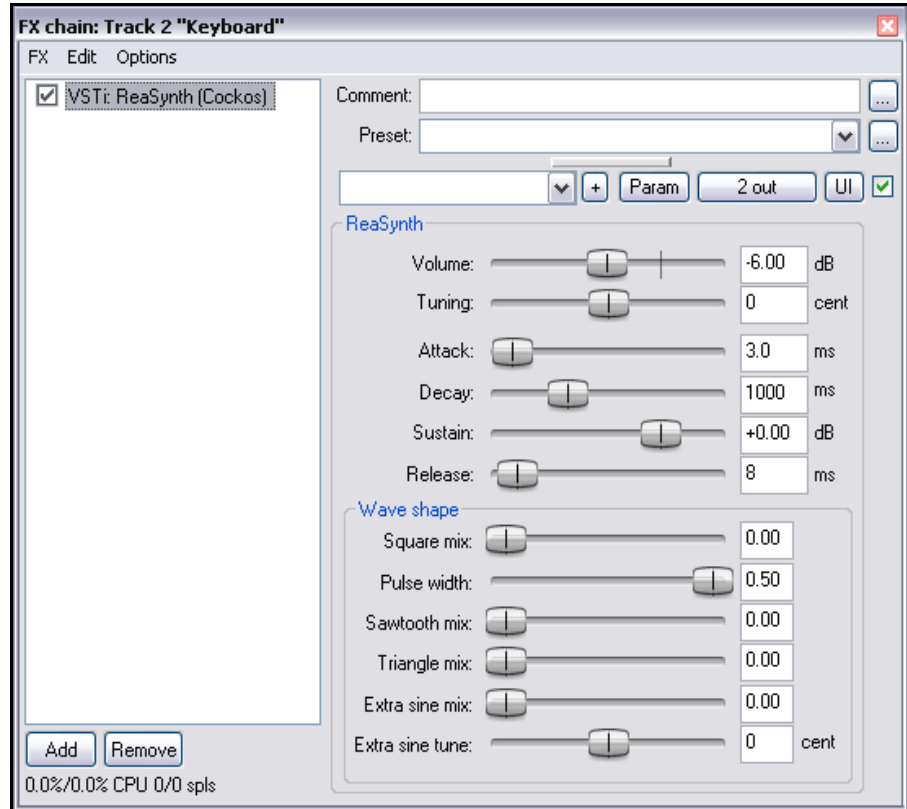
Later in this guide, we will see how the midi data that has been recorded can be edited using REAPER's built in midi editor.

### Procedure for Playing Back a MIDI Item

Play the track, as you would any other. As it plays back, you can alter the nature and shape of the sound by adjusting the soft synth parameters.

When you have found a sound that you like, you can click on the ... button (indicated by the mouse cursor in the illustration, right) and then choose **Save Preset** to name and save that set of parameters. Your named preset will now be able to be recalled from the Preset drop down list.

You can make and use presets in this way for all FX Plug-ins and Synths.



**Note:** This last example demonstrates one important difference between MIDI and Audio.

With **Audio** the actual sounds made by the instrument or voice are recorded. It is possible to use real time FX like EQ, Compression and Reverb to alter how the audio item sounds when it is played back, but the audio item itself stays the same.

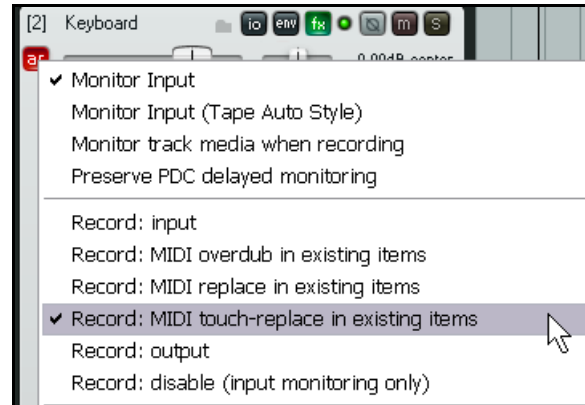
With **MIDI**, you are essentially recording a series of instructions that by themselves have no sound. The music is created when those instructions are fed to a synthesizer. Thus, by changing the parameters of the synthesizers settings – or even by changing the synthesizer – we are able to produce a completely different sound.

**Note** Unlike some other DAW programs, REAPER makes no artificial distinction between a MIDI track and an Audio track. MIDI items and Audio items can be combined in the same track.

## MIDI Recording Modes

When recording MIDI, you should select one of five recording modes. In the above example, we used **Record Input**. This mode will record new items as a new take over any existing items. However, in addition there are:

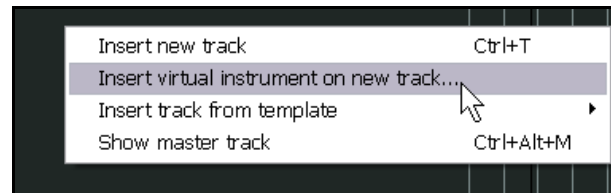
- **Record MIDI overdub in selected items :** this will add new notes **within** existing items while preserving what is already there.
- **Record MIDI replace in selected items:** from the moment you start playing until you stop recording, existing MIDI notes within the item will be removed and your new material recorded in its place.
- **Record MIDI touch/replace in selected items:** existing MIDI notes within the item will be removed when you play a new note on the same channel and your new material recorded in its place. All other existing recorded material will remain as it is.
- **Record Output -> Record Output (MIDI)** Similar to the input mode, but records the MIDI signal coming out of the FX chain.



**Try it now!** If you have a MIDI keyboard, open the project file **All Through The Night LAYERS.RPP** (which you saved earlier) and add a MIDI keyboard track to this project.

## 3.25 Recording With a Virtual Instrument

If you are intending to use a virtual instrument (such as a VSTi or DXi plug-in) for recording a MIDI track, you should choose the **Insert virtual instrument on new track...** command. This command can be accessed either by choosing **Insert** from the main menu (then **Virtual instrument on new track**), or by right clicking over the vacant Track Control Panel area and selecting the required command from the context menu.



You will then be presented with a selection of all the virtual instruments that you have installed on your system.

Double-click on the required item. The track will be created, armed and named and the instrument displayed.

The example shown here is for **ReaSynDr**, which requires four outputs. If the item selected is one that (like this) requires multiple outputs then REAPER will create the initial



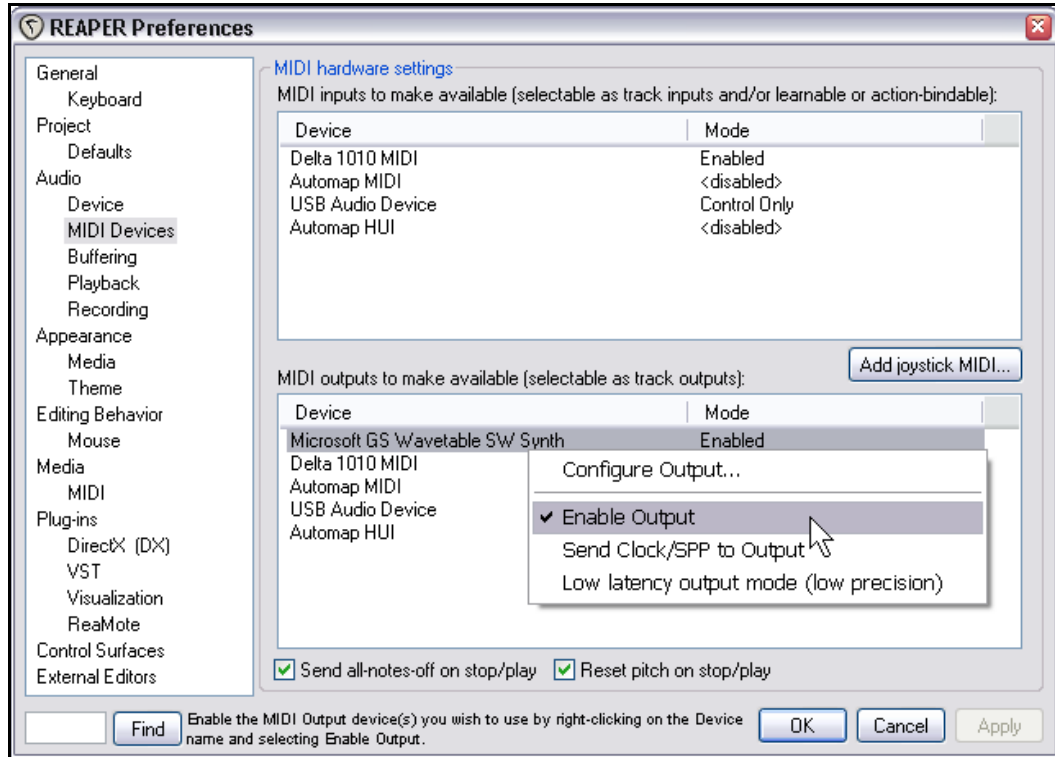
track and prompt to ask you if you would like the other required tracks to be automatically built.

If you select **OK** the entire output chain will be built for you, as shown on the left.



### 3.26 Using Microsoft GS Wavetable SW Synth

If you do not have any other synthesizer at your disposal, you can still use the Microsoft GS Wavetable Synth that is included with Windows. This can be especially useful for playing any existing MIDI files that you may wish to import into REAPER. You will be shown how to import files later in this section.

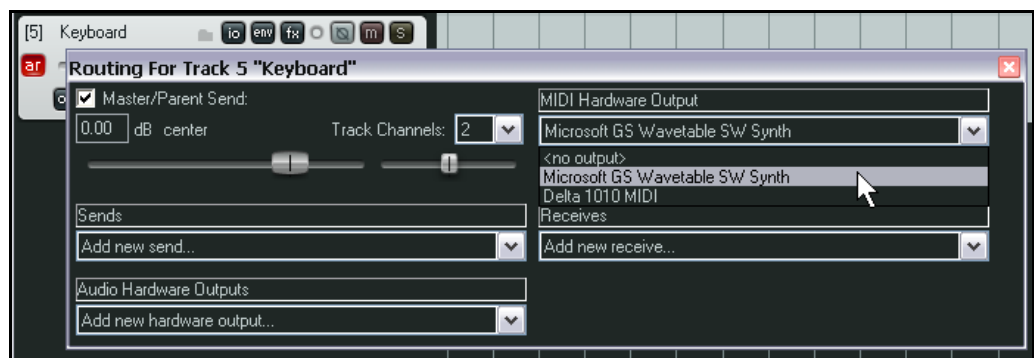


To enable the Microsoft GS Wavetable SW Synth:

1. Go to **Options, Preferences** and display the **MIDI Devices** screen.
2. Under MIDI Outputs, right click on Microsoft GS Wavetable SW Synth and select **Enable Output**.
3. Click on **Apply**, then on **OK**.

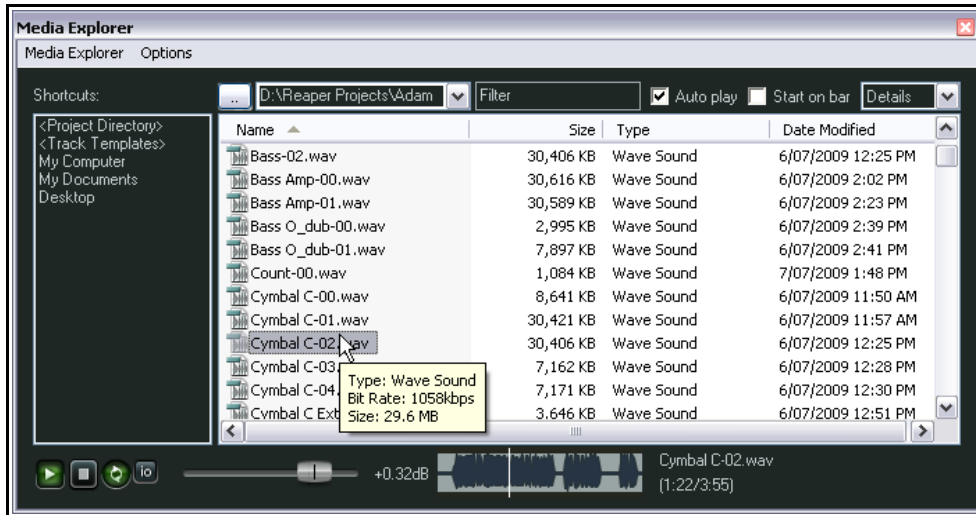
This Synth will now be available as a MIDI Hardware Output on your various input/output and routing screens.

When you are recording MIDI, you can if you wish now use the **Microsoft GS Wavetable SW Synth** as your output device instead of using a software synth (see above).



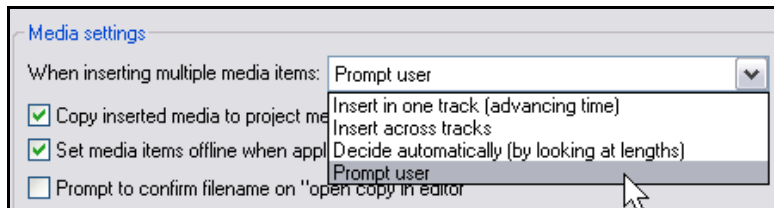
## 3.27 Importing Media

You can incorporate existing media items (such as MP3, MIDI and WAV files) into a REAPER project. This can be done from the main menu, using the **Insert, Media File ...**, but it's probably easier and more useful – and certainly more fun – to use REAPER's **Media Explorer**. The Media Explorer includes several handy features that make it easier for you to work with importing items.



The Media Explorer's state is toggled between displayed and hidden using the **View, Show Media Explorer** command, or the keyboard shortcut **Ctrl Alt X**. Amongst the Media Explorer's useful features are these:

- The Media Explorer can be docked and undocked in the usual way.
- You can navigate to display the contents of any folder in its main window, by clicking on the small button shown in the above illustration just above the column headed *Name*.
- You can add the currently displayed folder to the Media Explorer's shortcut list by using the **Media Explorer, Add current folder to shortcuts list** command. This makes it very easy to access frequently used folders without the need for complex navigation.
- You can preview any file displayed within the Media Explorer by clicking on its name. If the Auto play option is enabled, it will play automatically when selected. Notice also the small Transport bar beneath the Shortcuts Panel – this lets you Play, Stop and adjust the Volume for the currently selected media item. You can also click on any part of the displayed waveform to play back from there.
- To avoid possible clashes of tempo, you can right-click on the background of Media Explorer's transport bar and choose the option **Preview at Project Tempo if Media Contains Tempo Information**.
- By clicking on the I/O button, you can direct the Preview output to any audio output.
- Right clicking over the name of any media item will produce a context menu, whose choices include **Insert into project** and **Insert into project as new track**. Alternatively, you can just drag and drop, or double-click.
- Multiple selections can be inserted by making the selection and then right-clicking. The **Media** screen in the **Preferences** window includes a setting to control the default behavior of multiple insertions.

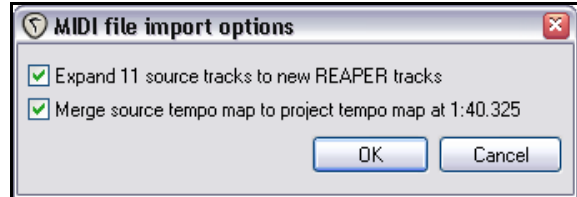


**Tip:** You can also use REAPER's Media Explorer to import and embed one entire project within another. This is explained in more detail in Chapter 9.

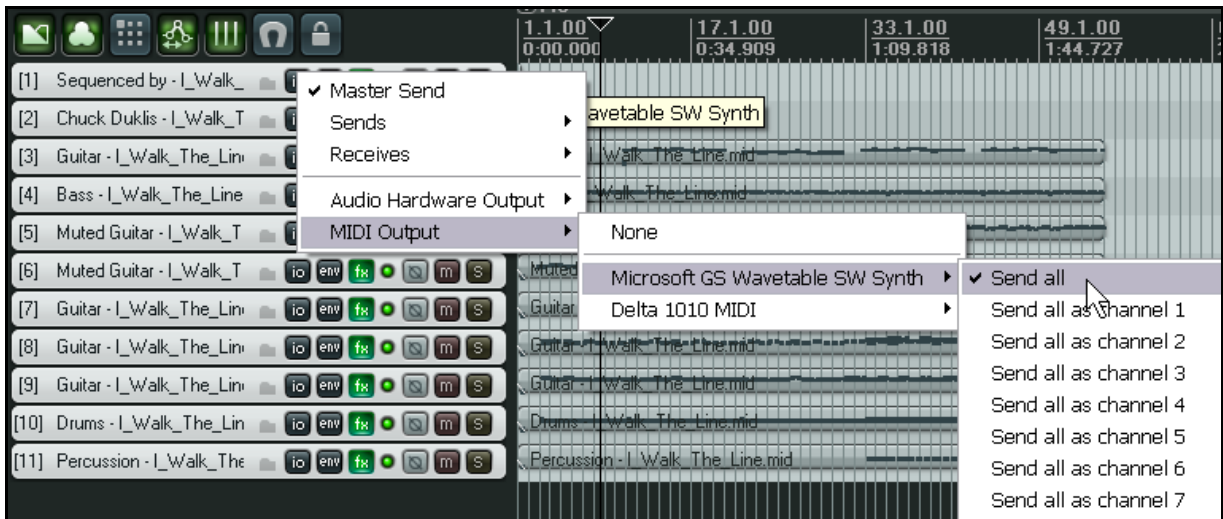
### 3.28 Importing MIDI Files

When you import a type 1 MIDI file into REAPER, you are offered the option of separating the tracks, or importing the file as one track.

Right click over the name of the MIDI file in Media Explorer and choose **Insert Into Project on a New Track** from the menu. A message such as that shown on the right will appear.



If you enable the **Expand**, the file will be imported as a series of separate tracks, one for each channel. Otherwise, the material will all be imported onto different channels within a single MIDI track.



To then assign these tracks to an external synth for output (to enable you to play the song), follow this sequence:

1. Select all of the imported tracks.
2. Right click over the I/O button for any one of these tracks.
3. Select **MIDI Output**, then the device, such as **Microsoft GS Wavetable SW Synth**, then select **Send All** or one of the **Send All as channel** options.
4. Save the file when you finished.
5. Play the file.

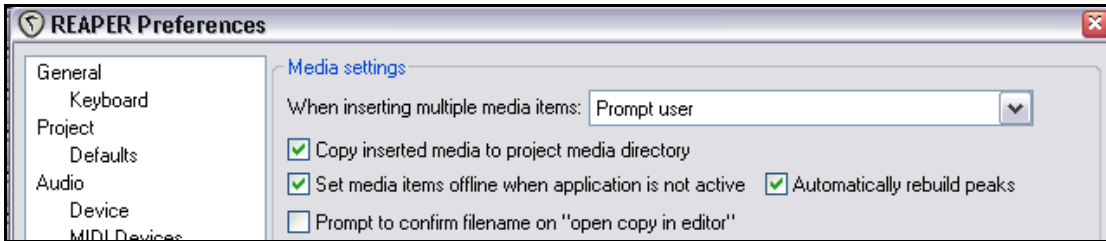
You might, of course, wish to use a software synthesizer (DXi or VSTi) to play the song. There are several ways of doing this, but the easiest is probably to place all of the tracks in a folder and then insert the synthesizer plug-in into that folder's FX Chain.

We'll come to the topic of folders and how you create them and set them up in Chapter 4.

## 3.29 Importing Wave Files

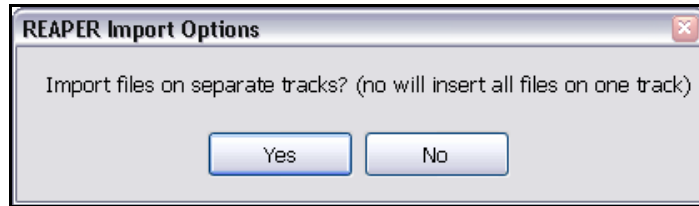
Wave files can be imported into a project in the same way as MIDI files, via the Media Explorer. For example, if you have a set of wave files that have perhaps been exported from another DAW application such as Cubase or Sonar, you can import them all together and automatically create a new track for each.

Alternatively, you can just drag and drop the files from REAPER's Media Explorer window, or even from Windows Explorer. If you intend to do this, you should be sure to select your preferred option under **Options, Preferences, Media** (*not Appearance, Media*). The same issues that are involved when importing MIDI files also apply here.



Your four options as the default behavior when you import more than one item together are:

- **Insert in one track (advancing item)** – each is placed one after the other in the same track.
- **Insert across tracks** – each item is placed in a separate track, all starting together.
- **Decide automatically** – if files are of the same length (file size) they will be placed in separate tracks, otherwise they will be inserted sequentially in the same track.
- **Prompt user** – you will be prompted to indicate your preference (see right).



Alternatively, you can use the same method as was outlined earlier for our MIDI items. Simply select all the files in REAPER's Media Explorer window, then right click and from the menu choose the **Insert Into Project on a New Track** command.

The files will be inserted at the current play cursor position. Below is shown the result of importing a number of samples all into a single track.



Note that the **Media** page of the Preferences window also includes a number of other options that are relevant when you are importing items:

- **Copy inserted media to project media directory** – causes a copy of the inserted media items to be made in the project's media items folder. It is generally advisable to enable this option because it ensures that all of your project's media items will then be kept together in the same folder.
- **Prompt to confirm filename on "open copy in editor"**– when opening a copy of any media item in your editor of choice, you will be prompted to name and save the copy before the wave editor is opened.

### 3.30 Using the Metronome

You can set up and use a Metronome when using REAPER for recording.

To do this, you need first to use the **Options, Metronome Settings** command to set up your metronome.

The **Options, Metronome Enabled** command is then used to toggle the metronome status on and off.

#### The Metronome Settings

**Enable Metronome:** This turns the built-in metronome on or off.

**The I/O Button:** Immediately to the right of the *Enable Metronome* option, this allows metronome output to be directed to the device of your choice (eg, Headphones).

**Metronome Routing:** This can route the metronome to a hardware output. Click on the little green button to the right of *Enable Metronome* and select from list of available hardware outputs.

**Enable During Playback:** This will turn the metronome on during playback.

**Count-in before playback :** This will enable a count-in before playback.

**Enable During Recording:** This will turn the metronome on during recording.

**Count-In During Recording:** This will enable a count-in before recording. Useful if you are recording yourself. It ensures that when you press **Ctrl R** the recording will not actually start until after the specified count-in. This gives you time to get back to the microphone and pick up your instrument.

**Count-In Length (Measures):** This defines the number of measures a count in should be. If it is the very beginning of a project, it will wait those number of measures before starting to record. If you select a place to record within a project, it will start the count in this many measures before the time that you want to record at.

**Volume:** Metronome Volume - This is the overall volume of the metronome.

**Secondary Beat Attenuation:-** This, in relation to the overall volume, the amount of the that secondary beats will be attenuated (or lowered in volume).

**Sample Selection:** You can also use Samples for your own metronome sounds.

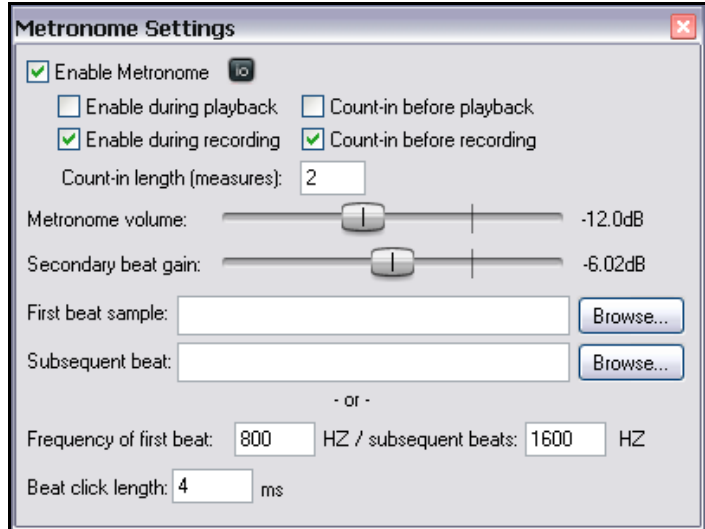
**First Beat Sample:** This is the sample for the first beat. (in 4/4, the 1).

**Subsequent Beat:** This is the sample for other beats. (in 4/4, the 2, 3, and 4). If you wish to have your samples used for the metronome in all your project you will need to set up the samples, save the project and a template (with any other project setting you think may be useful) then, in Preferences/Project specify that project as the default template to use for all new projects.

**Synthesised:** By default, REAPER uses a synthesised metronome. The below settings show what frequency in hertz the metronome uses.

Frequency of First Beat "xx" HZ    Subsequent Beats "xx" HZ

**Beat Click Length xx ms:** This is how long each beat click lasts.



**Tip:** The Metronome Time Base is controlled by the **Project Settings**. Press **Alt Enter** and display the **Project Settings** page if you need to change this.

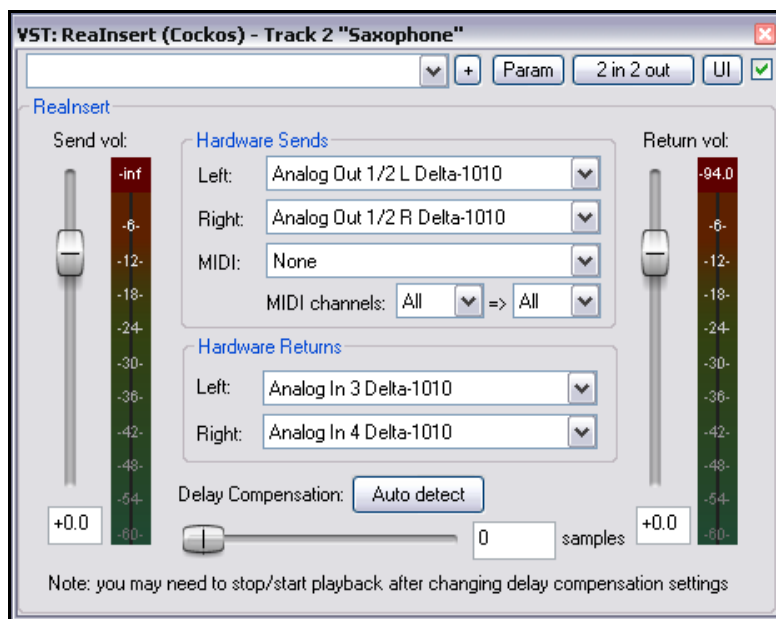
### 3.31 Recording with External FX

One special feature of REAPER is the way it can be used to record a track using an external hardware FX device in much the same way as you might use an external device as an insert when recording on an analog desk. It does so by making use of a special plug-in called **ReaInsert**.

Here's how it's done. If you want to try it out step by step, create a new REAPER project file, insert a track, then get your FX device ready.

#### Example

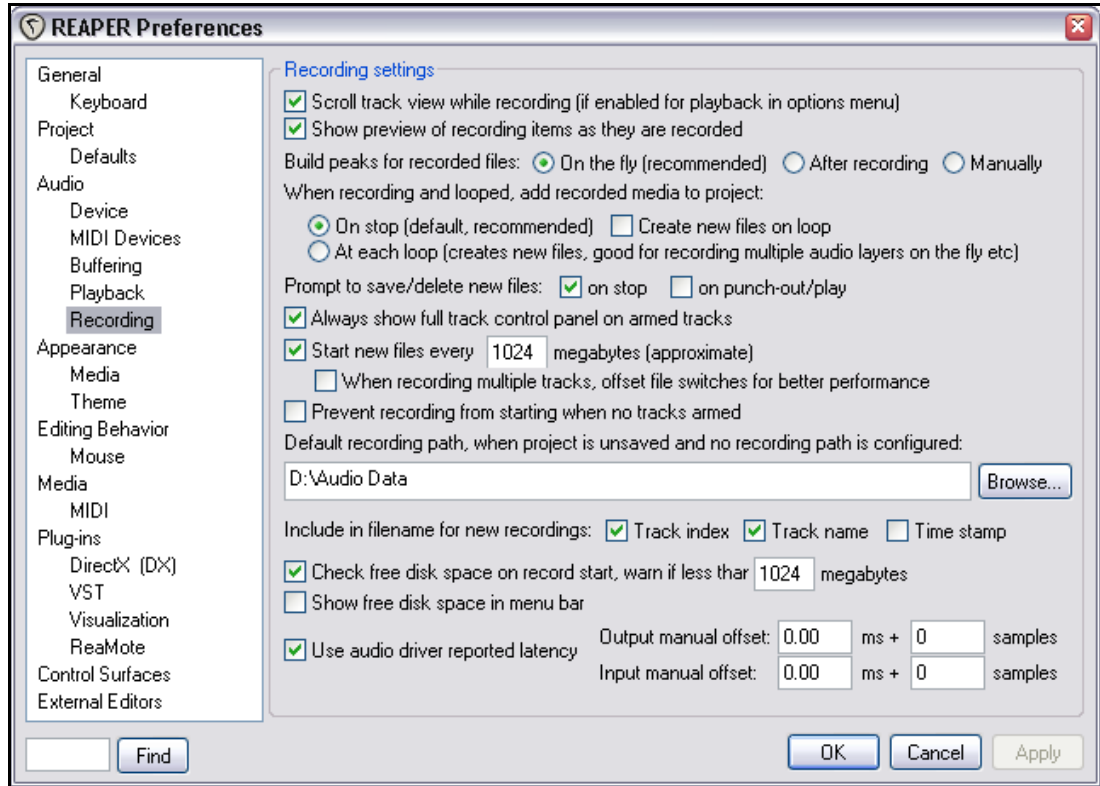
1. Connect an otherwise unused audio output to the input for your FX device.
2. Connect the output of your FX device to an otherwise unused audio input.
3. Create a new REAPER project files and add a single audio track. Give this track a suitable name. Let's record a vocal with the FX on it.
4. Connect your microphone to an otherwise unused audio input. Switch on the FX Device.
5. Arm the track for recording in the usual way. Select the input device (to which the line or microphone is attached), select **Monitor Input** and specify that you want to **Record Output** and choose your required option (such as **Mono, Latency Compensated**), just as we did in the section **Recording a Track's Output**.



6. Now display the FX Window for this track, and add the **FX VST:ReaInsert** to this window (see above).
7. Specify the actual Hardware Sends and Returns that you set up at steps 2. and 4.
8. Make sure the FX Device mix is set to 100% Dry, then click on **Auto Detect**. This enables REAPER to calculate the required degree of delay compensation.
9. With the track's output directed to your headphones, monitor the required Volume and FX Levels, including the FX Wet/Dry mix.
10. When you are ready, Record.
11. When finished, don't forget to disarm the track and set the ReaInsert plug-in status to **Bypass**.

### 3.32 Preference Settings for Recording

The **Recording** page of the **Preferences** window can be used to specify a number of options about REAPER's recording behavior.



Available options include:

- To scroll track view while recording.
- To display a preview of media item peaks as they are being recorded. This is useful to confirm that you really are recording and haven't, for example, forgotten to arm one or more tracks.
- To automatically display the whole Track Control Panel (including VU meters) when a track is armed.
- When to add recorded media to a project when loop recording.
- Whether to prompt to save files when recording is stopped. If you disable this option, files are automatically saved.
- Prevent recording from starting if no track is armed. You may wish to turn this off if you are using layered recording for a track (or tracks) where recording is not required to start until some way into the song.
- To specify a default path for your recorded files. This can help you to keep track of your work. For good housekeeping, this should preferably not be the same as your REAPER program directory.
- Which items to include in the file names for recorded media – you can include any combination of the track index number, the track name and the time stamp (or none of these).
- To check for free disk space before recording, and to display the amount of free disk space on the menu bar.

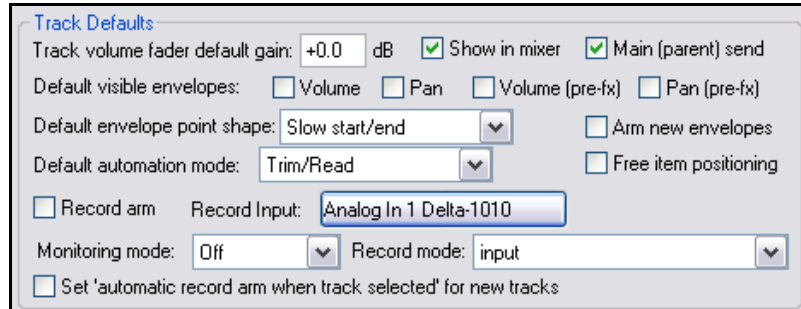
## 3.33 Track Preferences for Recording

The REAPER **Track Defaults** settings includes a number of items that you can use to help make the recording process a little easier.

These settings can be found on the **Project Defaults** page of the **Options, Preferences** window.

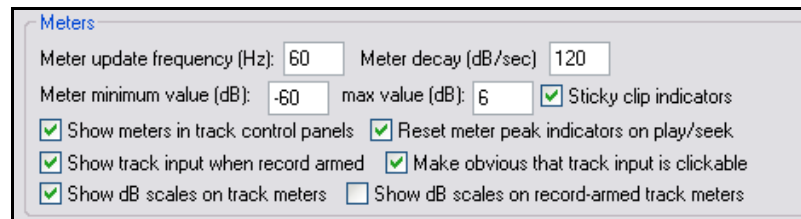
Settings on this page include:

- The default gain level for the track's volume fader.
- Whether the track's output should be routed to the Main send.
- Whether new tracks are automatically armed for recording when they are inserted.
- Whether Input Monitoring should by default be on or off for new tracks.
- Which Record Mode should be the default for new tracks.



Notice also that under **Options, Preferences, Appearance** there are a number of settings which together determine how your track VU meters are presented.

For example, you can choose whether or not to **Show track input when record armed** and to **Make obvious that track input is clickable**. Disabling this latter option may improve the clarity of the display on your VU meters.



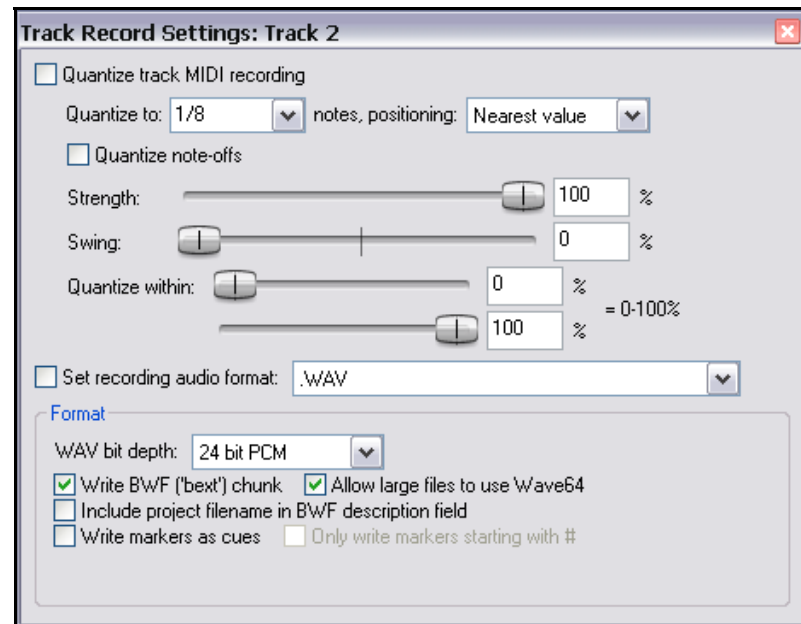
## 3.34 Recording with Mixed Formats

REAPER allows you to use different recording formats for different tracks in the same file.

The default format for each new track that you create will be determined by your **Project Settings**. To change these for any track, simply right click over the track's VU meter, then from the menu choose **Track Recording Settings**.

You can choose any of the formats **WAV, AIFF, Monkey's Audio, FLAC, MP3, OGG Vorbis**, or **WavPack lossless compressor**.

Depending on which format you choose, you will be presented with a range of options appropriate to that format.

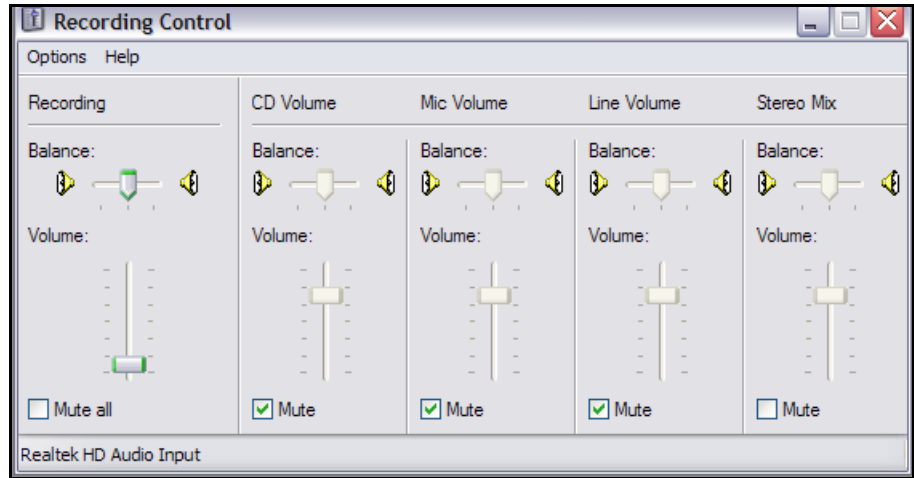




### 3.35 Recording an Internet Audio Stream

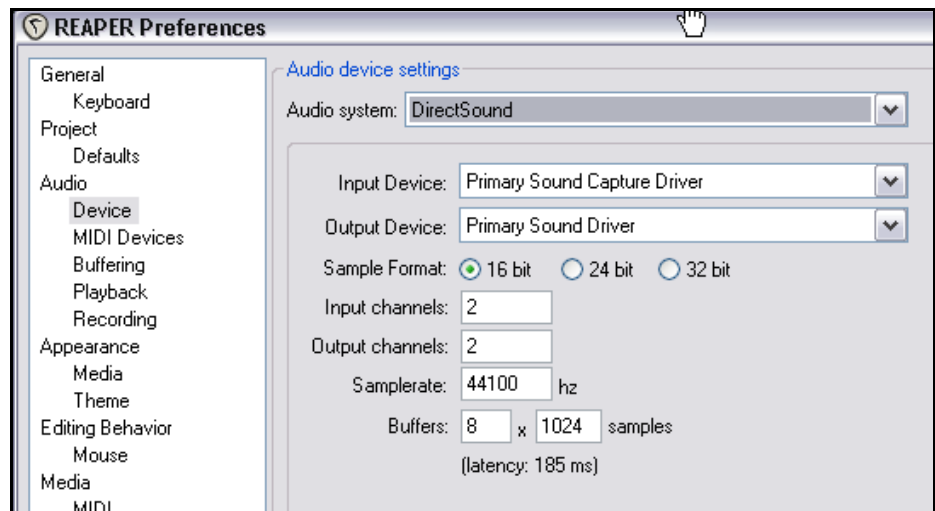
You can use REAPER to record any audio stream that you are receiving over the internet. Of course, before doing so you should make sure that you are not in breach of any copyright restrictions.

The exact method required will depend on your hardware setup, including your sound card. Your sound card will be provided with some sort of software for changing its settings. This may or may not have its own icon within the Windows Control Panel. If you are not sure how to access it, you can click on the Windows **Start** button, choose **Run**, then type **sndvol32 -r** and press **Enter**.



In overview, these are the steps that you will need to perform.

1. Access your sound cards control software and modify its settings to select (depending on the options available) either **Stereo Mix** or **What You Hear**. Shown above is an example of the settings for a Realtek sound card. In this example, input from all, other sources (Microphone, Line, etc) has been temporarily disabled.





2. Open your web browser and find the page containing the item that you wish to record.
3. Open REAPER, create a new file and add a track.
4. The next step may require a little experimentation. Depending on the equipment you are using, it might be necessary to change your **Options, Preferences, Audio, Devices** settings to **Direct Sound**. An example is shown here.
5. Arm your track for recording, making sure to select the correct input.
6. Press **Ctrl R** to start recording. In your web browser, play the item that you wish to record. When finished, stop recording and save your work.

**Note:** Don't forget when you have finished, to restore both your Sound Card Recording Control options and REAPER's Audio Device Preferences to their previous settings.

## 3.36 REAPER Audio Recording Checklist

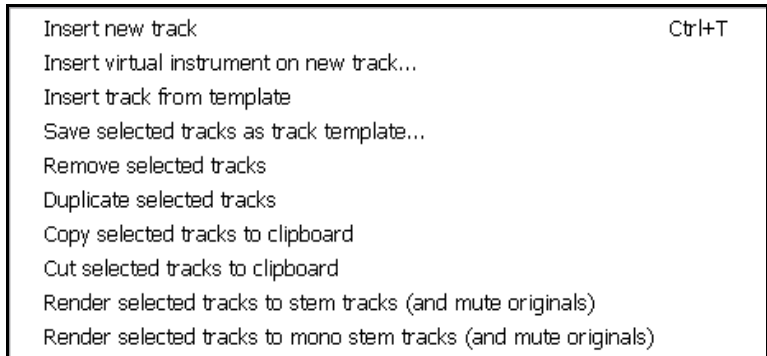
The following checklist should be taken as guidelines only. In many cases you can vary the suggested order (for example, you can switch on your PC and start REAPER before getting together your microphone and leads if you wish). In other cases the order is critical (for example, you should always connect your microphone to your preamp before turning on the phantom power supply). If you are not sure, the safest thing to do is to keep to the exact same sequence outlined here.

Item	Comment
<b>Preparation</b>	<p>Set up all external recording equipment needed (microphones, stands etc).                      All faders and gain controls on mixer and/or sound device turned right down.                      Phantom power (if available) turned off.                      Everything connected that needs to be connected (e.g. microphone leads to mixer or sound device).                      Turn equipment on, but check volume on speakers isn't too loud.                      Connect headphones to headphone amp or sound device.                      If phantom power required (for condenser microphone), turn it on.</p>
<b>PC Preliminaries</b>	<p>Turn on PC and wait for Windows to open.                      Open REAPER with required project file. Save file.</p>
<b>Project Settings</b>	<p>Check recording format and settings – e.g. 24 bit WAV at 44100 Hz.                      Is a different format required for this track?                      Make sure Record Mode is set to Normal.</p>
<b>Track Settings</b>	<p>Named and armed for recording?                      Track Input Monitoring on or off? Use the Sound Card's direct input monitoring if available in preference to REAPER's.                      Record Input selected?                      Correct input channel selected?</p> 
<b>Test Recording Levels</b>	<p>Start low and work up.                      Record a small sample to test levels: the examples below show too low, too high and about right. It is better to be too low than too high.</p> 
<b>Recording</b>	<p>Press <b>Ctrl R</b> to record and again to stop recording when finished. Save media items.                      Press <b>Ctrl S</b> to save project file.</p>
<b>Evaluating</b>	<p>Unarm track before playing back recorded tracks to evaluate them.                      Especially if listening thru headphones, disable Input Monitoring (or turn faders and gain controls on the input device right down), to prevent live ambient sounds from being mixed in with your recorded material.</p>

## 4 Project Arrangement Basics

### 4.1 Managing Tracks

In Section 2, we introduced some very basic REAPER track management features, such as Volume, Panning, Mute and Solo. In this section, we will be exploring these features in more depth, as well as introducing many others. Many of the commands and actions involved in track management are available from the menu that is displayed when you right click over any track number. The illustration (right) shows only the first few of these.



Remember that at any time you can use **Ctrl Z** to undo your last action. REAPER's Undo capabilities are described in more detail later in this section.

**Tip:** Before continuing, you might wish to open the supplied project file **All Through The Night.RPP** and save it to a new name such as **All Through The Night EDITS.RPP**. You can then use this file to try out and experiment with some of the ideas presented in this section.

### Copying, Deleting Moving and Ordering Tracks

A number of techniques can be used for carrying out these various track management tasks.

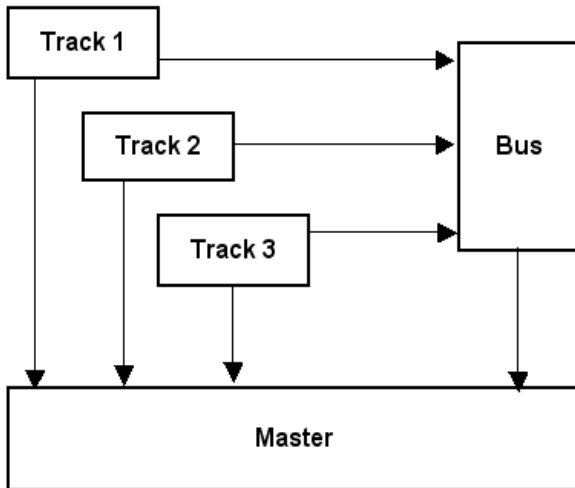
Task	Method
<b>Move a track up or down the track order</b>	Click on or around the track number, then click and drag the track up or down the track list, then release the mouse. All media items are moved with the track.
<b>Move two or more adjacent tracks up or down</b>	Select the control area for all required tracks. To do this, click on the track number for the first track, then hold <b>Ctrl</b> while clicking on the track number(s) of the other tracks. Then click and drag up or down. All media items are moved with the tracks.
<b>Delete a track</b>	Click on or around the track number, then press <b>Delete</b> , or right click (see menu above) and choose <b>Remove selected tracks</b> . All media items are removed with the track.
<b>Delete two or more tracks</b>	Use <b>Ctrl</b> with the left mouse click to make your selection, then press <b>Delete</b> , or right click and choose <b>Remove selected items</b> . All media items are removed with the tracks.
<b>Copy a track as the next track</b>	Right click over the track number, choose <b>Duplicate selected tracks</b> . All media items are duplicated with the track. To do this with more than one track, select all required tracks first.
<b>Copy a track to a specified location</b>	Click on the track number. Press <b>Ctrl C</b> . Move to the required location then press <b>Ctrl V</b> . All media items are duplicated with the tracks. To do this with more than one track, select all required tracks first.
<b>Display the Master in Track View</b>	Right click anywhere in the Track Control Panel area, below the last track. Choose <b>Show master track</b> . The keys <b>Ctrl Alt M</b> can be used to toggle this display on and off.

## 4.2 Folders, Sends and Busses

In Section 2 of this User Guide, you were shown how to create a track and use it as a bus, for example to add the same reverb effect to a number of tracks. The signal flow that we created can be represented by the following diagram.

### Reaper Routing Examples

#### 1. Sending to a Bus with Master/Parent Send Enabled on Tracks



The sends that you create for each track send a portion of the signal to the Bus track, which applies the effect, and then sends the processed (wet) signal on to the Master. At the same time, so long as the **Send Master/Parent** option within each track's I/O window remains ticked, the dry signal for each track is also sent directly to the master, where it is mixed together with the signal from the Bus.

If you were to turn off the **Send Master / Parent** option for your three tracks, then your Bus effectively becomes a submix.

However, REAPER offers you an often smarter way of creating a submix, which is to use Track Folders. You will be shown how to do this in the section that follows.



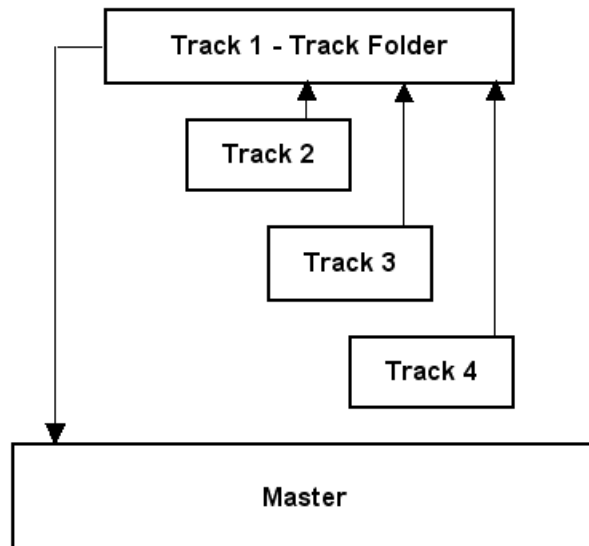
Before we do this, however, let's first get a handle on the basic concept of what a Track Folder is and how it works.

In essence, a Track Folder is a track that acts as a submix for all of the tracks within it. In the case of child tracks inside a parent Track Folder, the **Send Master / Parent** option directs the output of individual tracks not directly to the Master but to the Track Folder (Parent). Thus, output of all tracks from a track folder goes to the Master not directly but via the Track Folder.

The illustrations (above and right) show one track folder (parent) which contains three child tracks.

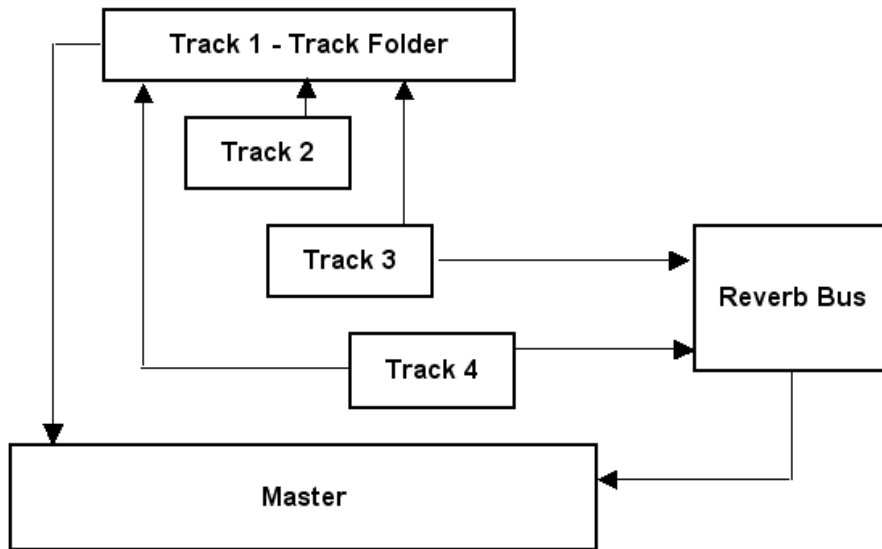
### Reaper Routing Examples

#### 2. Using a Track Folder



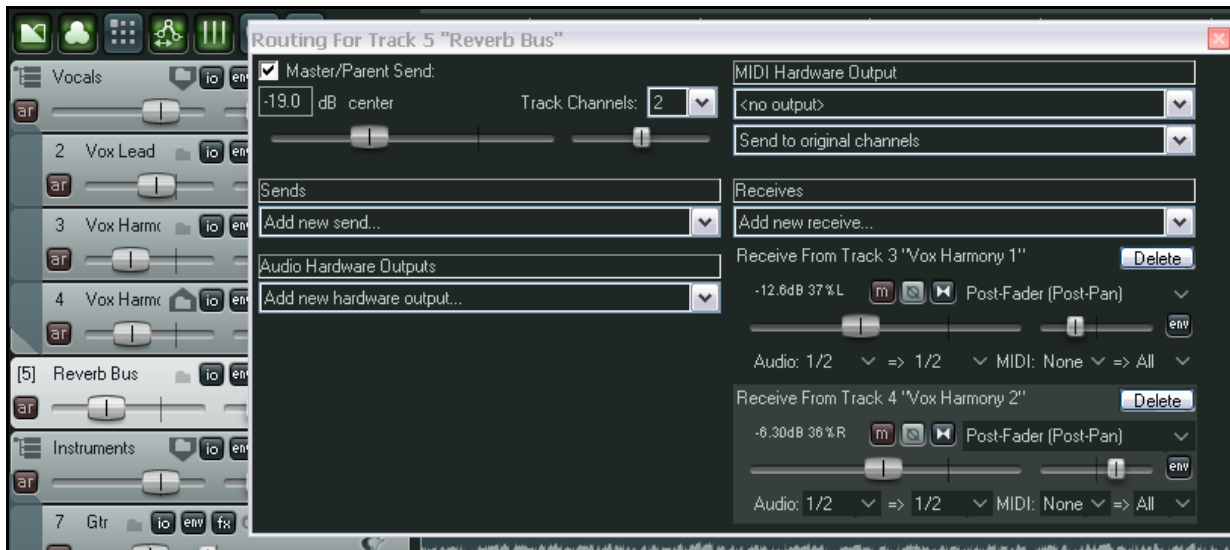
### Reaper Routing Examples

#### 3. Using a Track Folder and Auxilliary Buses



This third example (left) shows three tracks within a folder, where two of the three tracks also use a send to send a portion of their track signals to a Reverb Bus.

This reverb is then mixed in (at the Master) with the signal sent there from the Track Folder.



The illustration above is of the project represented by the flow chart at the top of the page. It shows the track structure of the project, together with the I/O window for the track that serves as Reverb Bus.

As you get to use REAPER more and more, you will see that its routing capabilities, including the way it uses folders, is one of its greatest strengths. Let's look first at how you set up folders, and then how you can even create folders within folders.

**Tip:** A quick way to create a send from one track to another in either the Track Control Panel or the Mixer is simply to click and drag from the **IO** button on one track to the **IO** button on another. This will open the Send Controls dialog box to enable you to specify the various settings.

## 4.3 NEW! Creating and Using Track Folders

Folders can be used to group tracks together. When a number of tracks are grouped together in this way, the folder controls can be used to control all tracks in the folder. For example, you can use the **Volume** controls for individual tracks within a folder to set the *relative* volume levels for the different tracks. You can then use the Volume control for the folder to control the overall combined volume level of the tracks in that folder. Another example is that the **Mute** and **Solo** controls for the folder will cause all tracks in the folder to be muted or soloed. In addition, you can, of course, continue to use each track's individual Mute and Solo controls.

The example illustrated (right) shows a folder called **Vocals** that contains three individual tracks. The folder itself is soloed, and one of the tracks within the folder is muted. This results in only two of the tracks being heard when the song is played.

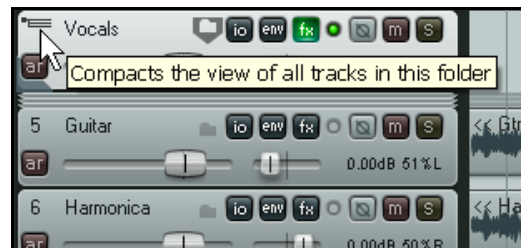


To create a track folder, follow this sequence:

1. Create all of the tracks in the Track Control Panel in the usual way. The first one will later become your folder track and control the mixed output levels sent to the master for all of the tracks within the folder. Name this track as you wish. In the example shown, it has been named **Vocals**
2. Name your other tracks. You can record the media on these tracks either before or after moving them into your folder. In the example shown, the media has been recorded.
3. Click on the folder icon (this is the first button to the right of the track name). The status of this track will be changed to folder. This is indicated by both the down pointing arrow on the icon and the three small horizontal bars that replace the track number. All your other tracks will now be placed inside this folder. You can see this because they are indented.
4. Now identify this same button for the track that is to be the last track in the folder. In this example this would be track 4. This button cycles between the track being a folder, a normal track, or the last track in a folder. Click this button as necessary until it changes to last track in folder status, represented by an upwards pointing arrow (see picture on right).



The three bars that replace the track number can be clicked to toggle between three different view states for the folder's contents. Normal state is shown above. Below are the minimized (left) and hidden (right) states.



### 4.3.1 Nested Folders

REAPER allows you to nest folders within folders, to as many levels as you like.

The project shown here is an example of this. Notice that:

- There is a top level folder called **Vocal Tracks** which holds three vocal tracks.
- There is another top level folder called **Instruments** which holds two sub-folders (Acoustic Guitar and Other Instruments) as well as a Bass Guitar track.
- The two sub-folders **Acoustic Guitar** and **Other Instruments** each enclose tracks and are also themselves sub folders nested within the Instruments folder.
- There are two more top level folders, called **Drums** and **Reverbs**.

The sequence below retraces how this hierarchy of sub-folders was in this case created.

1. The four main level folders - Vocal Tracks, Instruments, Drums and Reverbs were set up in the usual way: Track 1 was made into a folder, Track 4 last track in folder, Track 5 Folder, Track 12 last track in folder and so on.
2. The folder icon on track 6 (Acoustic Guitar) was used to make that track into a folder. Because this track is in an existing folder, it became a sub-folder.
3. Track 8 was made last track in folder by clicking its folder icon twice.
4. Track 9 was made into a folder in the same way as Track 6.
5. Track 11 was made last track in folder by clicking its folder icon twice.



### 4.3.2 Changing Folder Structures

There are two methods that you can use to change a project's folder structure. One is simply to use the various track's folder icons to make every track a top level track before starting all over again, the other is by dragging and dropping. Let's assume that we want to move the Mandolin from the Other Instruments Folder to the Acoustic Guitars folder.

1. Click and hold the mouse on the track number for the track that is to be moved. Notice the horizontal blue bar.



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2. Drag the track up to its new position (see below left). The blue bar indicates the position.
3. Release the mouse. The track is moved to its new position (see below right).



4. Now let's change our mind again and move it out of the folder altogether. Start by repeating step 1 - that is, click and hold the mouse over the track number to select it.
5. Drag it above or below the folder (in this case above) until you can see from the width of the horizontal blue bar that it is positioned as a top level track (below left). Release the mouse to drop the track into its new position (below right).



One real benefit of using folders is that they make it very easy with just a few clicks to contract and expand different tracks and groups of tracks.

Shown here(right), for example, is how you might want to display your project when ready to do some serious work on just your drum tracks.





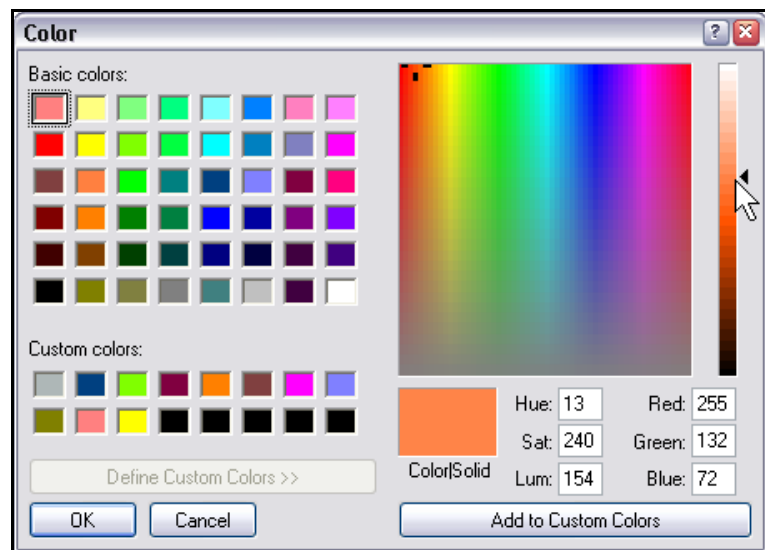
### 4.4 Track Colors

Besides keeping tracks together in folders, you can use color as an effective means of helping you visually identify the relationship between different tracks.

To do this, simply select the track (or tracks) in the Track Control Panel, then right click and use any of these commands:

Command	Effect
<b>Set selected track colors to custom color...</b>	Opens a Color Selection dialog box for you to select a color for the track's media items.
<b>Set selected track colors to random colors</b>	Sets the media items for each track in the selection to a different randomly chosen color.
<b>Set selected track colors to one random color</b>	Sets the media items for all tracks in the selection to the same randomly chosen color.
<b>Set track color to default</b>	Restores the track's color to the default for the current color theme.

The illustration (right) shows an example of how the **Colors** interface (displayed by choosing the **Set selected track colors to custom color...** command) can be used specify different colors for different tracks and groups of tracks.



### 4.5 Color Themes

REAPER also supplies a number of color themes that you can use to present your projects attractively.

To select from the themes supplied with REAPER, use the **Options, Color Themes** command.

In addition, a very large number of themes are available in the **Theme Pack**. This is available for free download at <http://www.cockos.com/reaper/download.php>

You can also visit the REAPER User Forums for more themes.

## 4.6 NEW! Track Icons

Icons can be added to tracks to enhance them with a visual representation of their content. You can drag your own .PNG or .JPG files from Windows Explorer and drop them on to any track in the track control panel, or right click over the track number and choose **Set Track Icon...** from the track menu to use any of those supplied with REAPER. This opens the **Load Image Resource** dialog box, from which you can make your selection and click on **Open**.



Shown above is an example of a project which uses track icons. Remember that if you create a track template from a track which displays an icon, then the icon will be saved with the template.

To display these icons also in the Mixer, open the Mixer, display its menu and choose **Show Track Icons in Mixer**.

To remove icons from any track or selection of tracks, first select the tracks (in either the track control panel or the mixer) then right-click over any selected track icon and choose **Remove Track Icon** from the menu.

## 4.7 NEW! Hiding Tracks

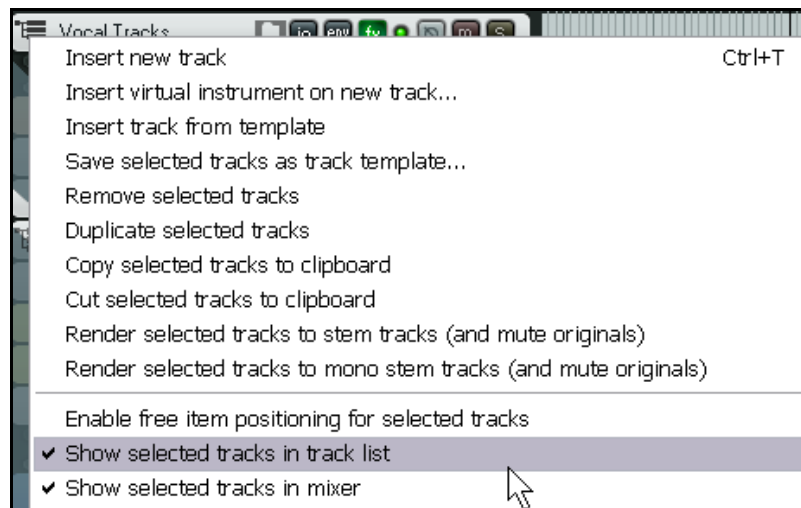
Any track (or selection of tracks) can be hidden from the track list (in main view) or mixer.

To do this, select the tracks and right click over the track number for any track in the selection, either in REAPER's main view or in the mixer.

You can then deselect either the option to **Show Selected Tracks in Mixer** or **Show Selected Tracks in Track List**.

To restore previously hidden tracks to view, select the view in which they are still displayed, then select the tracks.

You can then right click and turn back on whichever of the **Show** options you previously turned off (see right).



### 4.8 Track Control Modifiers

Four features used extensively in auditioning tracks are the **Volume** and **Pan** faders and the **Mute** and **Solo** buttons. The basic functions of these controls has been covered in Section 2. However, REAPER gives you additional functionality by using modifier keys with these controls:



#### Volume Controls

Modifier Key	Effect
<b>Alt</b>	When mouse is released, fader returns to its original position.
<b>Ctrl Shift</b>	With more than one track selected, only the control for the current track is affected.
<b>Ctrl</b>	Allows for more precise control of fader level.
<b>Double click</b>	Reset to zero.

#### Pan Controls

Modifier Key	Effect
<b>Alt</b>	When mouse is released, fader returns to its original position.
<b>Ctrl Shift</b>	With more than one track selected, only the control for the current track is affected.
<b>Ctrl</b>	Allows for more precise control of fader level.
<b>Double click</b>	Reset to centre.

#### Mute Controls

Modifier Key	Effect
<b>Shift</b>	When more than one track is selected, only the current track is toggled.
<b>Ctrl</b>	Clears all mutes.
<b>Alt</b>	Unmutes selected track(s), mutes all others.
<b>Ctrl Alt</b>	Mutes selected track(s), unmutes all others.

#### Solo Controls

Modifier Key	Effect
<b>Shift</b>	When more than one track is selected, only the current track is toggled.
<b>Ctrl</b>	Clears all solos.
<b>Alt</b>	Solo selected tracks only, excludes output from any sends.
<b>Ctrl Alt</b>	Solos selected track(s), unsolos all others.

#### Bulk Track Mute/Solo

To mute or solo a whole range of tracks in one action, click and drag in the TCP from the mute or solo button of the first track in the range to the same button on the last track in the range, then release the mouse button. Repeat this action to unmute/unsolo all muted or soloed tracks within a range.

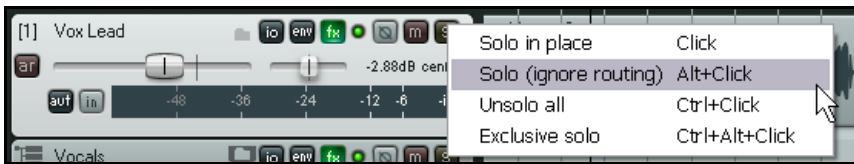
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## Track Control Modifiers: Right Click Options

If you have difficulty in remembering how the different modifier keys behave with the mute and solo buttons you have the option of right clicking over either button instead of using the keyboard. In both cases this causes a context menu to be displayed from which you can select your required action.



The Mute control context menu



The Solo control context menu

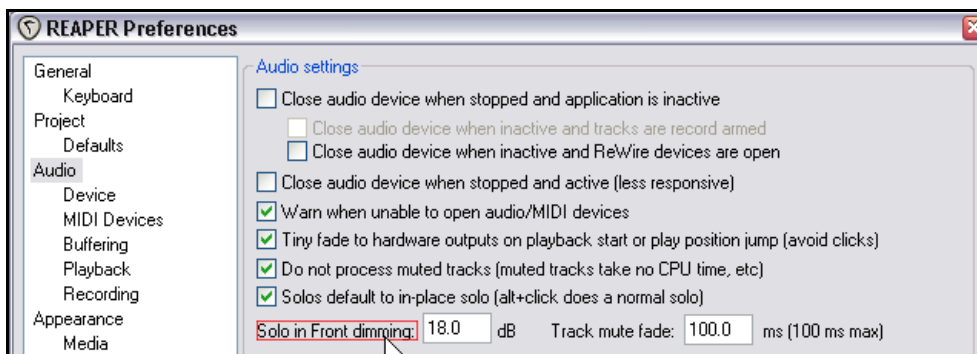
## Volume Faders



Right clicking over the volume fader of any track or folder will open a window displaying volume and pan faders not only for the track itself but also for any sends and receives associated with that track. An example is shown here.

Right clicking over the Pan fader opens a window which can be used to change that track's pan law. This subject is discussed elsewhere in this user guide

## 4.9 Solo In Front



The solo in front feature allows you to hear the rest of your project quietly in the background when a track or track selection is soloed. This feature is toggled on and off by the **Options, Solo In Front** command.

The level at which the background tracks are heard can be specified via the *Options, Preferences, Audio* settings page. Notice that this setting (in the above example it is set at 18dB) determines the number of decibels by which the background mix is *reduced*. This means that the higher the setting the quieter the background mix will be heard and vice versa.

### 4.10 Track and Parameter Grouping

The topic of track and parameter grouping is a huge one with an extraordinary range of options designed to help you especially in your mixing and arranging. It is based upon the following principle:

*You can define group relationships between different tracks and their parameters so as to ensure that when you make a change to one track in the group, changes are also made to the other tracks in the group.*

The nature of these relationships can vary from being quite simple to rather complex, and everything in between. Everybody will have their own different ways in which REAPER's track grouping feature can be helpful. Let's look at some possible examples. These examples have been selected primarily for learning purposes. You might or might not find the actual examples themselves to be useful for you.

- You might have two tracks that you wish to keep at a constant volume relative to each other. In this case, you could ensure that whenever one is faded up or down then so is the other.
- You might have two tracks that need to be panned opposite each other. In this case, you can ensure that when one is panned in one direction, the other is automatically panned in the other direction.
- You might have two or more tracks that you wish to treat as a group so that they are always soloed and muted together.

Let's take a look at these examples to begin with. By way of preparation, we can create a special project file for this purpose.

#### 4.10.1 Basic Track Grouping

##### Example

1. Open the file **All Through The Night.RPP** and immediately save it as **All Through The Night GROUPS.RPP**
2. Select Track 1 (Vox) and press **Ctrl T** to create a new track immediately below it. Name the new track **Instruments**.
3. Select the two Guitar tracks and the Bouzouki track, then drag and drop them into the Instruments track, as shown here. If you prefer, instead of drag and drop you can use the track's folder buttons to create the folder.
4. Save this file.



There are several ways to create and manage your groups. This can be done either using the **Track Control Panel** or the **Track Grouping Matrix**. We'll take a look at both methods.

5. First, you need to make sure that the track grouping is enabled, Choose the **Track** command from the main menu. If **Track grouping enabled** (near the bottom) is not ticked, click on this command to select it. If it is already ticked, just click on the REAPER title bar.
6. In the Track Control Panel, select tracks 3 and 4. We are going to group them.
7. Press **Shift G** to open the **Grouping** dialog box. Alternatively, you could right-click over the selected items and choose **Track grouping parameters...** from the context menu. Either action causes the following dialog box to be displayed.

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8. We wish to group together the volume controls for these two tracks. Select both the options **Volume Master** and **Volume Slave** as shown. We will explain the meaning of Master and Slave shortly. **Close** the Grouping box.

9. To make sure that the group relationship is displayed on screen, choose the **Options, Preferences** command and select the **Appearance** page.

Identify the item **Track grouping indicators** (near the bottom). You can choose to display your group indicators as either **Ribbons** or **Lines on edge**.

In the example shown below, the **Lines on edge** option has been selected.

10. Click on **OK** to close the Preferences dialog box.

11. Click on Track 1 in the Track Control Panel.

12. Your screen should now resemble that shown below, with a thin red horizontal line below both grouped faders.

13. If you now adjust the volume fader of either of these two tracks, the other volume fader in the group will move with it.

14. You can still adjust either volume fader independently of the other by holding the **Shift** key while you make the adjustment.

15. At the moment only the volume controls for these tracks are linked. Other items such as pan, mute, solo will all still function independently.

16. We now wish to group the pan controls for these two tracks, this time with a reverse (or negative) relationship rather than a positive one. We could do this by again displaying the Grouping dialog box, but instead we are going to use the Track Grouping Matrix.

17. First, pan track 3 about 30% left and track 4 about 30% right. Now choose the **View, Track grouping matrix** command. This opens a window that can be used to show up to 32 different track groups. We are just concerned for now about Group 1.

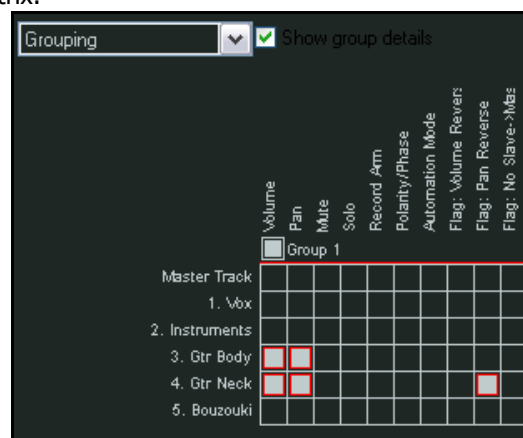
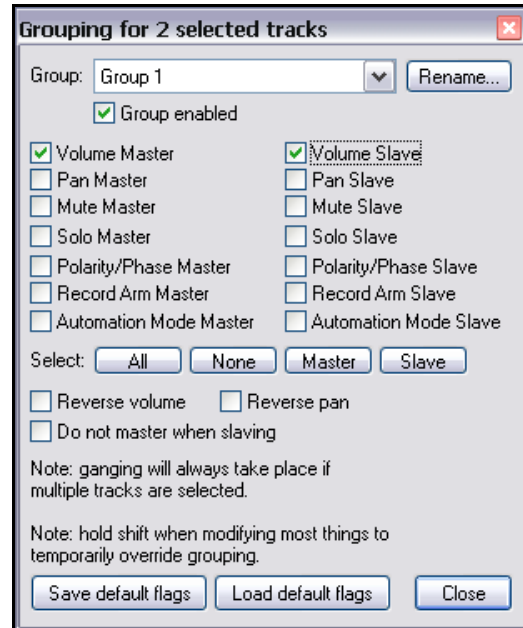
18. Click in the cells where the **Pan** column intersects with Track 3 and Track 4. For either one (but only one) of these tracks, click also on the **Flag: pan reverse** option, as shown.

19. Save the file.

20. Move the pan fader for track 3 further to the left. The fader for track 4 will move with it but in the reverse direction (that is, to the right).

21. To name the group, right click anywhere over the matrix for this group to display the **Grouping** dialog box that we used earlier. Click on **Rename**, then type a name such as **Guitars**.

22. Click on **Close** to then close the Grouping dialog box.

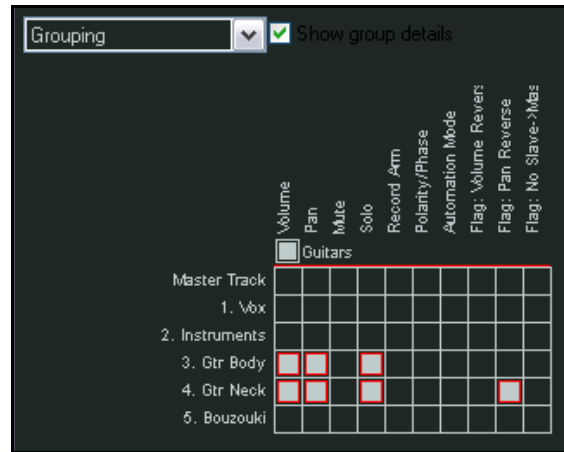


## 4 - Project Arrangement Basics

23. In the Track Grouping Matrix, select the **Solo** option for tracks 3 and 4 (see below right).
24. In either the Track Control Panel or the Mixer, click on the Solo button for either of these tracks.

Notice that both tracks are soloed.

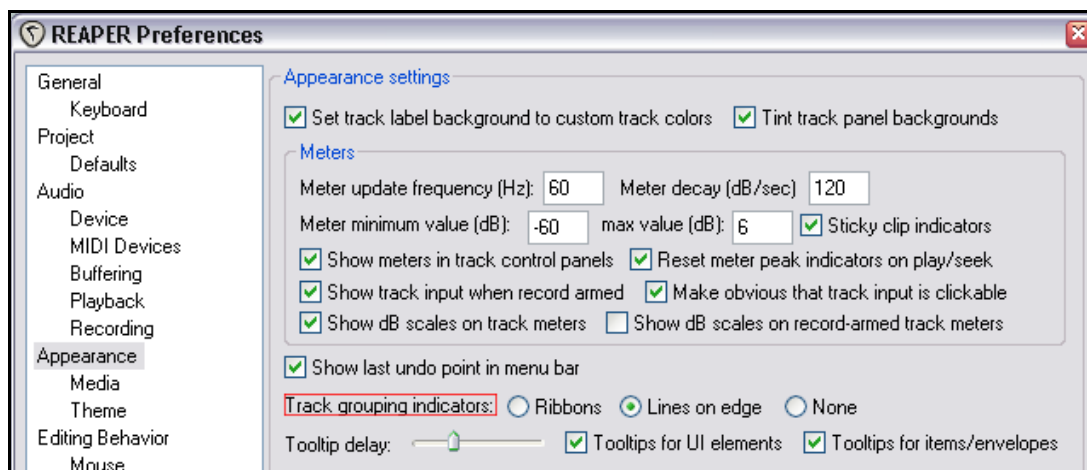
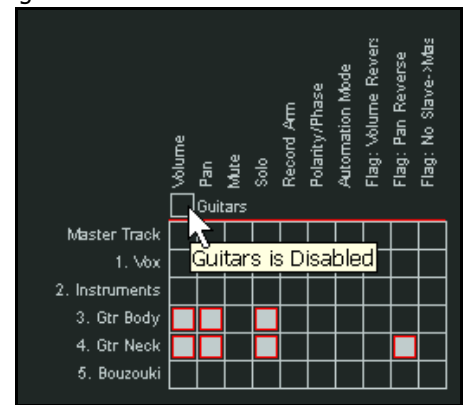
25. Click again on the Solo button for either of these tracks. Notice that neither track is now soloed.
26. Hold down the **Shift** key while clicking on the Solo button for track 4. Notice that only track 4 is now soloed. You have also created a reverse relationship for this parameter.
27. Click on the Solo button for track 4. It will be unsoloed and track 3 will now be soloed.
28. Hold down the **Shift** key while clicking on the Solo button for track 4. This removes the reverse relationship and creates a normal link for these two parameters.



You can see how by using the **Shift** key, you can toggle the relationship for these items between positive and negative.

29. Save the file.
30. Click in the **Enable/Disable** box for this group (as shown). The group is now temporarily disabled. You can adjust any parameter for any track within the group without affecting any other parameter.
31. Click again in the **Enable/Disable** box for this group. The grouping is enabled again.
32. Save the file.

Shown below is where you set the option to use or not use track grouping indicators. To view this screen, use the **Options, Preferences** command, then select **Appearance**.



### 4.10.2 Track Grouping Basic Controls

In order to do this ...	Using the Track Control Panel	Using the Track Grouping Matrix
<b>Define the tracks in a new group</b>	Select the tracks in the Track Control Panel, press <b>Shift G</b> then select at least one parameter.	Display the Track Grouping Matrix and select at least one parameter (such as Volume) for each track to be included in the group.
<b>Name a group</b>	Press <b>Shift G</b> , select the required group number and click on <b>Rename</b> .	Right-click over the group matrix, select the required group number and click on <b>Rename</b> .
<b>Adjust all linked faders for a group</b>	Adjust the fader for any one track in the group.	In Mixer view, adjust the fader for any one track in the group.
<b>Adjust the fader for only one track in a group containing linked faders</b>	Hold <b>Shift</b> while adjusting the single fader.	In Mixer view, hold <b>Shift</b> while adjusting the single fader.
<b>To define a pan or volume relationship as reverse for a track within a group</b>	Select the track in the Track Control Panel and press <b>Shift G</b> . Click on <b>Reverse Volume</b> or <b>Reverse Pan</b> as required.	In the track row, click on the intersection cell for <b>Pan Reverse</b> or <b>Volume Reverse</b> .
<b>To change an existing toggle parameter relationship (such as Solo, Mute or Record Arm) into a reverse one</b>	Hold <b>Shift</b> while clicking on the appropriate button (such as Solo or Mute) for the individual track.	In Mixer view, hold <b>Shift</b> while clicking on the appropriate button (such as Solo or Mute) for the individual track.
<b>Link more parameters for tracks in an existing group</b>	Open the Grouping dialog box for the group and select the required parameters.	Click on the intersection cells where the required parameter column meets the track rows.
<b>Add another track to an existing group</b>	Select the track in the Track Control Panel and press <b>Shift G</b> . Display the drop down group list and select the required group. Select the required parameters.	Click on intersection cell where the required parameter column meets the row for the track that is being added.
<b>To remove a track from an existing group</b>	Select the track in the Track Control Panel and press <b>Shift G</b> Unselect all selected items except <b>Group enabled</b>	Depending on whether the items status is Slave, Master or both, click once, twice or three times on the appropriate intersection cell until it shows blank.  If more than one parameter is linked, do this once for each parameter.
<b>Enable/Disable group</b>	Press <b>Shift G</b> , select the group from the drop down list then click in the <b>Group enabled</b> box.	Click in the group's Enable/Disable box.



### 4.10.3 Master and Slave Track Grouping

A control which is master only is one that when adjusted will also change the setting for all slave members of the group but which will not itself be controlled by other group members, not even other masters.

A slave only control is one that when adjusted will not change the setting for any other members of the group but which will itself be affected when any group member with master status is adjusted.

Up until now, all of the items that we have selected for grouping have been acting as both master and slave. This has meant, for example, that moving either volume fader will also cause the other to move. However, there will be times when you may want a particular item to function as only a master or only a slave. Let's consider some examples.

We'll work thru two examples. The first will be relatively straightforward and is designed solely to help you to understand the master/slave concepts. The second example will be a little more difficult, but will demonstrate a very real example of when using master/slave relationships can be useful.

#### Example

1. If not already open, open the file **All Through The Night GROUPS**.
2. In the Track Grouping Matrix, click on the appropriate cell to add the **Bouzouki volume** fader to the **Guitars** group. Click twice more and its status will change first to **M** then to **S** as shown on the right.
3. If you now move the volume fader for either guitar track, the slave fader for the Bouzouki will also move. However, if you move the Bouzouki fader, because it is only a slave none of the other faders in the group will be affected.
4. Now click on the **Gtr Body Volume** cell. This sets its status to master only (indicated by the letter M). This means that it can still be used to control other slave tracks, but will not itself be controlled by any other. Let's recap the status of our three volume controls:

	Volume	Pan	Mute
Master Track			
1. Vox			
2. Instruments			
3. Gtr Body	M		
4. Gtr Neck	S		
5. Bouzouki	S		

**Track 3** is master only. When you adjust it, track 4 will also be adjusted (because it has slave status as well as master status) and track 5 will be adjusted because it is a slave.

**Track 4** is both master and slave. When you adjust it, track 3 will not be adjusted because it is master only, but track 5 will be adjusted because it is a slave.

**Track 5** is slave only. That fact alone is sufficient to ensure that when adjusted it will not cause any other volume faders in the group to be moved.

5. We are now ready to move on to the next example.
6. Make the necessary changes on your Track Grouping to ensure that your guitar group is now set up as shown on the right. The Bouzouki has been added as master and slave for volume control only. All other controls have also been restored as master and slave.
7. We are now going to create a second group to link the Vox and the Bouzouki. This will create a situation in which because the Bouzouki belongs to both groups unwanted consequences can occur! We will then resolve this by redefining certain master/slave relationships.
8. In your Track Grouping Matrix, change the name of **Group 2** to **Vox Bouzouki** and select the volume faders for both these tracks for inclusion in this group, as shown below. Notice that the Bouzouki relationship is defined as reverse, so that as the Vox is faded up the Bouzouki goes down, and vice versa.

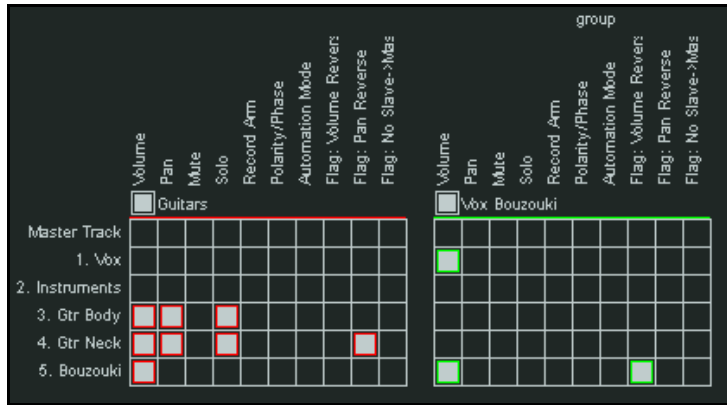
	Volume	Pan	Mute	Solo	Record Arm	Polarity/Phase	Automation Mode	Flag: Volume Reverse	Flag: Pan Reverse	Flag: No Slave-Flags
Master Track										
1. Vox										
2. Instruments										
3. Gtr Body	M									
4. Gtr Neck	S									
5. Bouzouki	S									

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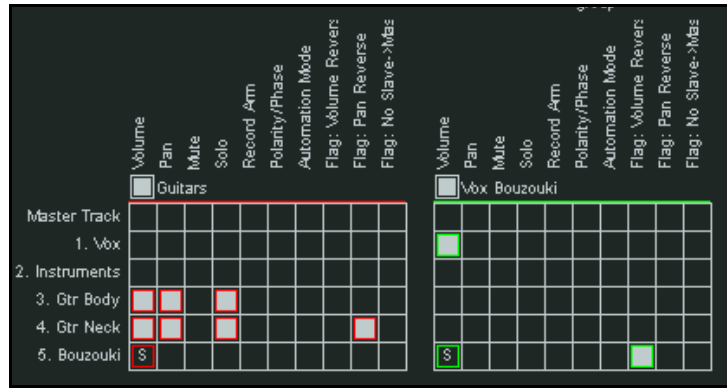
- Notice also that in this example our group includes one track that is in a track folder and one that is not. Groups can cut right across the boundaries of track folders.
- Now move the **Volume** fader on the **Vox** track up a little. *As you do, notice that all three instrument faders are lowered.* Fade either guitar track down a little. The Vox track will be increased in volume.

This clearly is not what we wanted to achieve. It is happening because the track that exists in both groups - the Bouzouki - is both master and slave in both groups.

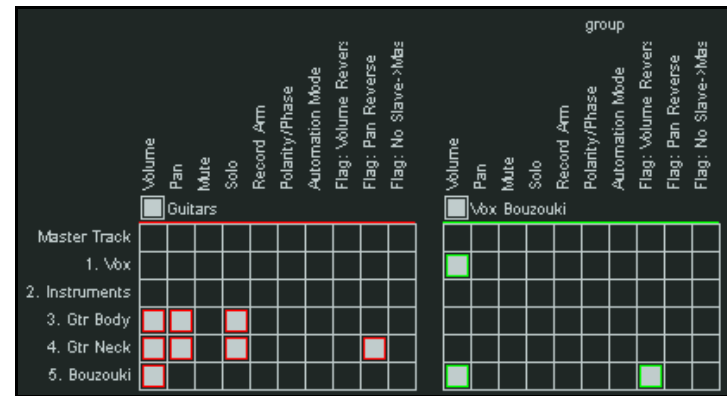
- One somewhat inelegant solution might be to disable one group every time we want to work with the other group. This would work, but could involve a lot of fiddling around.
- There are a number of other more satisfactory options available, depending on exactly how we want our faders to behave. Here is one method, shown on the right.
- In both the **Guitars** group and the **Vox Bouzouki** group, change the status of the **Bouzouki** track to **slave**.



- We have now ensured that you can adjust the volume of the **Vox** track or either of the two guitar tracks without any changes being made outside of their group.
- This solution may well be what we want, but there is another possibility. Suppose that we want the option of using the Bouzouki volume fader to control both groups. At the moment it controls neither.



- In this case, we can restore its master/slave status in both groups, and also select in both groups the option not to master when slaving (see right).



- You will now find that changes to the Bouzouki fader will affect both groups, while changes to the other faders will affect only the individual group.
- Save the file.

### 4.10.4 Group Parameter Status Indicators

If you choose to have visual track grouping indicators displayed in the track control panel and mixer, then the exact position of those indicators gives you information about that item's group status. Here are some examples.

In this first example, in track view you can see that the volume faders for tracks 3, 4 and 5 have been made into a group.



Track 3 has been set to master only. The colored bar underneath the fader occupies only the left half of the fader length.

Track 4 is slave only, as indicated by the fact that the colored line occupies only the right half of the fader length.

Track 5 is master and slave. Hence the line runs for the whole length of the volume fader.

Here is the same example again, but with ribbons rather than lines.



Track 3 has been set to master only. The colored ribbon shown on the fader occupies only the top left corner of the fader.

Track 4 is slave only, as indicated by the fact that the colored ribbon occupies only the bottom right corner of the fader.

Track 5 is master and slave. Hence there are ribbons in both the top left and bottom right corners.

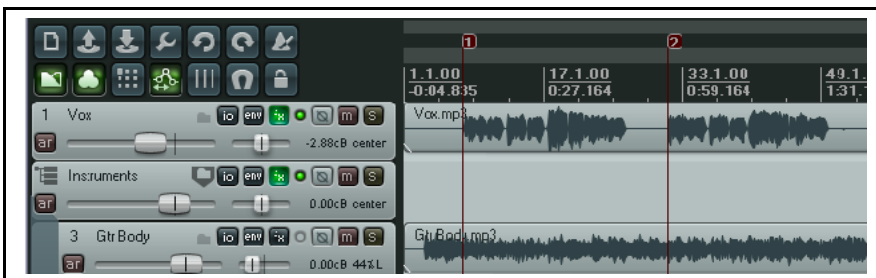
This last illustration shows the same arrangement in mixer view, again with ribbon indicators. The information is indicated in essentially the same way.



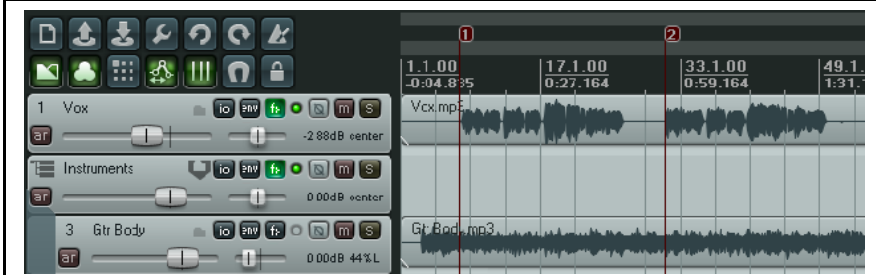
## 4.11 Displaying Grid Lines

REAPER lets you determine whether or not to show grid lines in your projects. If you choose to show them, you have a number of options to determine how they are displayed. The preference is a personal one. In this section we will look at three examples of how you might choose to use grid lines if you wish. The display of grid lines is toggled on and off using the

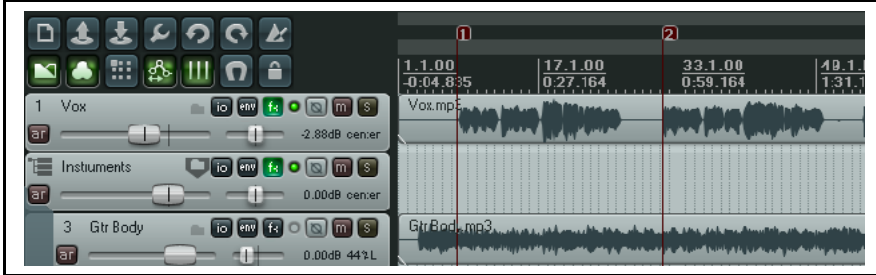
**Options, Show grid** command or the keyboard shortcut **Alt G**. Grid line settings are accessed via the **Options, Snap/grid settings** command or the keyboard shortcut **Alt L**. The examples below illustrate the effects of various permutations of grid setting options.



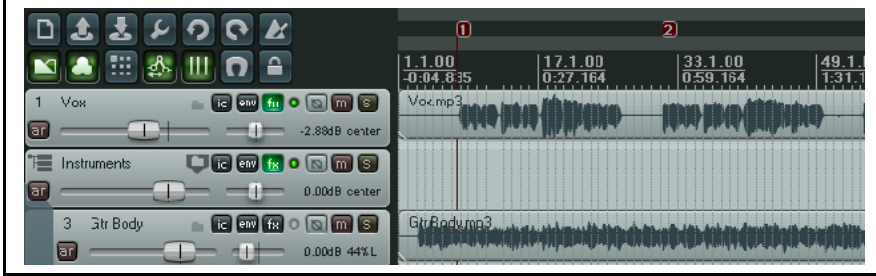
**Show grid disabled.**



**Show grid enabled.**  
Spacing 1 beat, minimum 20 pixels.  
Grid line thru items,  
Marker line over items.  
Dotted grid lines not selected.



**Show grid enabled.**  
Spacing 1 beat, minimum 5 pixels.  
Grid line under items,  
Marker line over items.  
Dotted grid lines option selected.

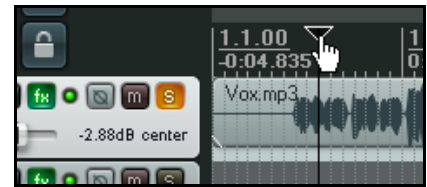


**Show grid enabled.**  
Spacing 1 beat, minimum 5 pixels.  
Grid line over items,  
Marker line under items.  
Dotted grid lines option selected.

Later in this User Guide, you will be shown how you can use your grid settings to automatically snap various REAPER objects and items to position.

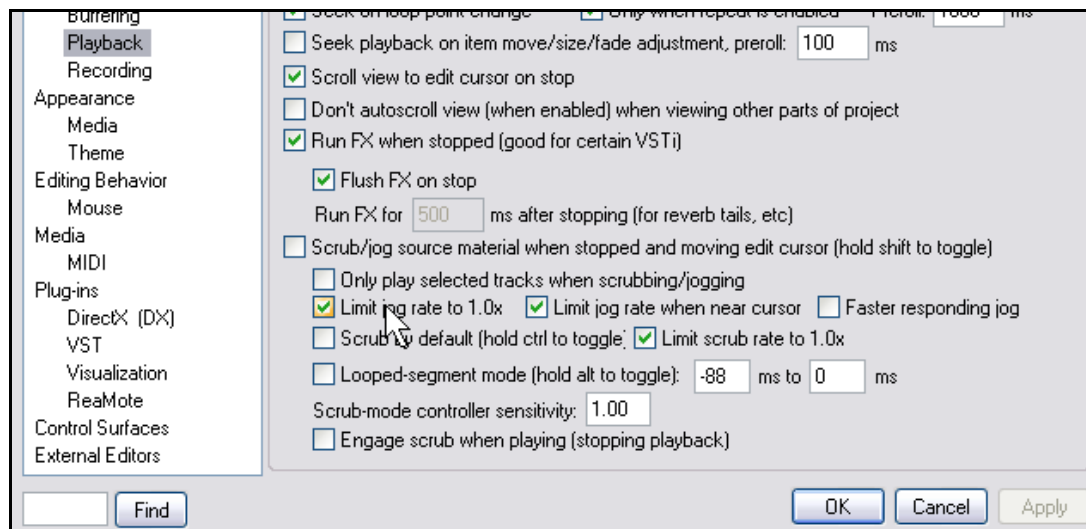
### 4.12 Audio Scrubbing

Scrubbing is a technique that originated in the pre-digital days when all recording was done with magnetic tape. It helps you to move within a project, or track, or group of tracks, to audition or locate a particular section. Scrubbing is most commonly used in REAPER when your project is not playing, but you can over-ride this default setting.



To scrub a portion of a song, simply position your mouse over the triangle that is located on the top of the edit cursor, as shown on the right. This causes the mouse pointer to change to a white hand. You can then click and drag in either direction. You'll probably find when scrubbing that you will want to zoom in quite closely on your project.

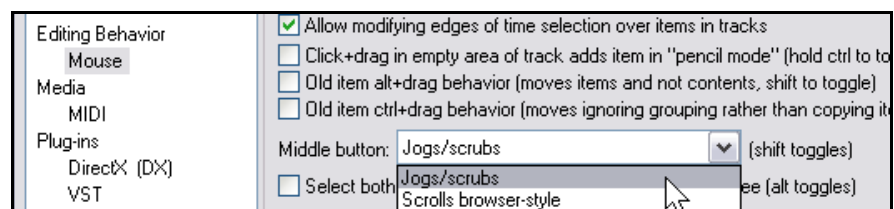
You can set your scrub preferences in the **Audio, Playback** page of the **Options, Preferences** window, as shown below.



Notice in particular that:

- You can enable or disable scrubbing as the default behavior. Holding the **Shift** key down while dragging the edit cursor will temporarily over ride this setting. This means that even with **Scrub/jog source material** not selected (as shown above), you can still hold the **Shift** key down to scrub when you wish.
- You can also choose to be able to engage scrub mode to over-ride normal playback.
- If you enable the **Only play selected tracks** option, then only those tracks currently selected will be heard when you apply scrubbing.
- You can limit the scrub rate (speed) to no more than normal playback speed. This makes it easier to identify the audio material when scrubbing.
- By default, holding down the **Ctrl** key while scrubbing will enable **Jog** mode. In this mode scrubbing will be much slower. This can help when looking for very short glitches, for example when zoomed in close.

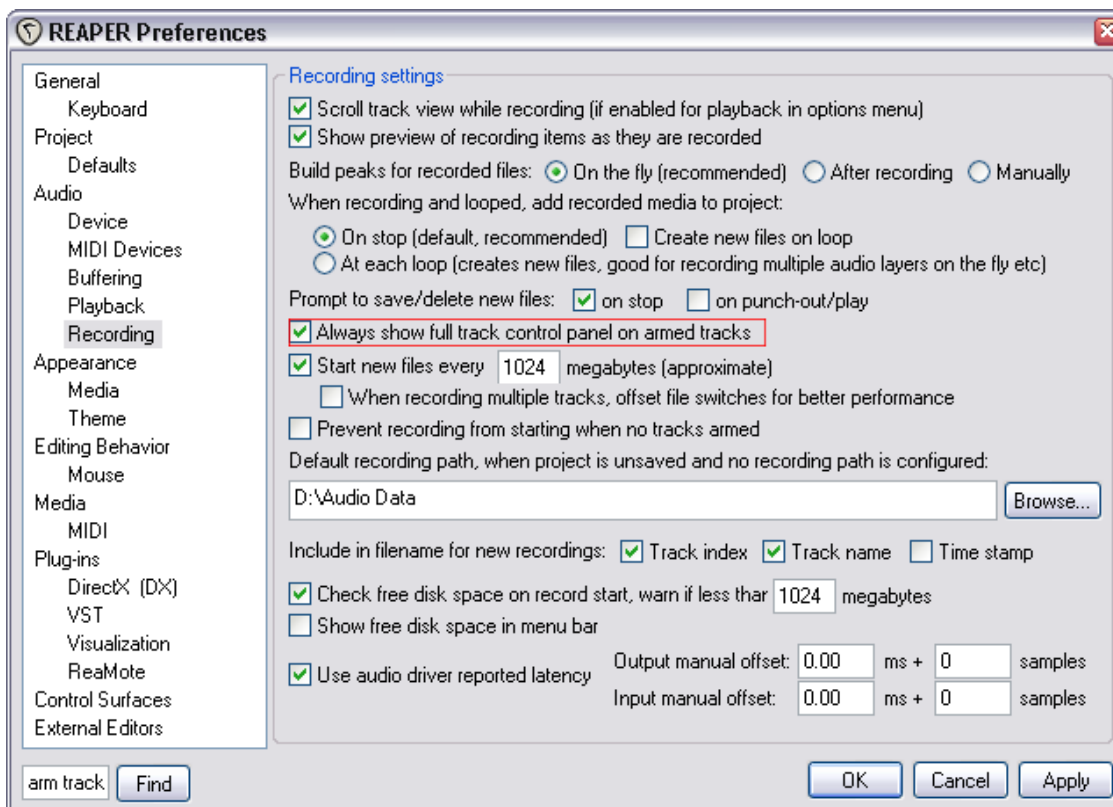
Notice also (right) that if scrubbing is enabled and you have a three button mouse, you can set the middle button to jog/scrub if you wish.



## 4.13 Searching the Preferences Settings

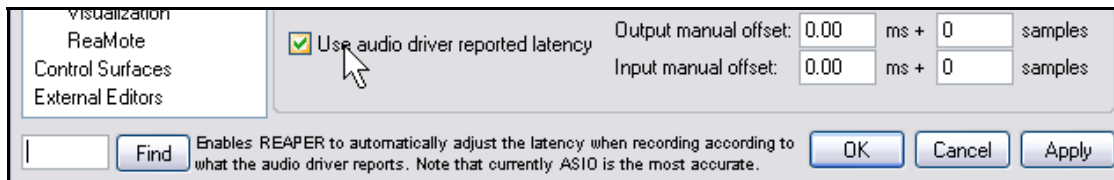
You have already come across a number of REAPER's preferences settings. For example, we have looked at some of the preferences settings for Audio Devices, MIDI Devices, Recording and Projects. The more you work with REAPER, the more you will realise how very many preferences settings there are. In fact, there are so many that it can sometimes be difficult to remember which page you need for a particular setting.

To help you here there is a text box and a **Find** button near the bottom of the Preferences window. You can enter any word or phrase in the box, click on **Find** and the first occurrence of that word or phrase will be shown. If this isn't the item that you're looking for, each time you click the **Find** button the next occurrence of that word or phrase will be shown. In each case, the item will be displayed with a colored highlight.



In the example above, we have searched for the term "arm track".

Notice that in addition to this, you can obtain more information about any item in the Preferences settings by hovering your mouse over that item. This causes a tooltip to be displayed next to the **Find** button. An example of this is shown below.



### 5 Managing Track and Item FX

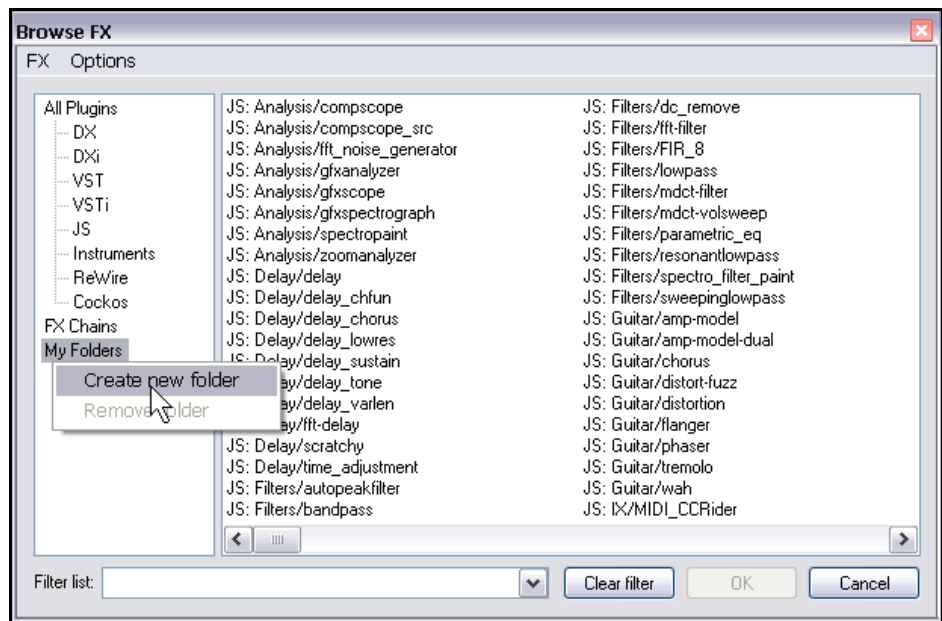
We have already covered the basic techniques involved in using effects (Direct X and VST) with REAPER tracks. We are now going to look at some of the options available to help manage and use your FX more effectively. We'll be looking in detail at how you use some of the more important individual plug-ins later (Chapter 16): in this section we're mainly concerned with the broader issues of managing and organising plug-ins.

#### 5.1 Grouping FX

FX can be grouped for your convenience in any way you wish. For example, if you use chorus, delay and reverb a lot, you might wish to create one group called Chorus/Delay and another called Reverb. If there is a set of plug-ins (for example, Bootsy) that you use frequently, you can create a separate group for them. You can create as many groups as you wish, and the same plug-in can be placed in multiple groups. For example, you could place the Bootsy EpicVerb plug-in both in a group called Reverb and in a group called Bootsy.

##### To create a FX group:

1. Use the command **View, Show FX Browser** or the keyboard shortcut **Shift F**. If any track is currently selected, the Add FX window will be opened. Otherwise the Browse FX window will open. You can use either.
2. Right click over the text **My Folders** where shown (right) and choose **Create new folder**.
3. Type a name, then press **Enter**.



##### To add FX to a group:

1. Select the category **All Plug-ins** in the left hand panel of the FX window. This will ensure that all FX are available to you.
2. Drag and drop the required FX from the right hand panel to the folder into which you want the FX to be listed. Use **Ctrl** with left mouse click to build up a multiple selection, then drag them all together.

##### To display and select from a group

1. In the left panel of the FX window, click on the name of any FX group to display its contents in the larger right hand panel.
2. Double click on any FX name within that group (listed in the right hand panel) to add it to the current track.

**Tip:** If you leave the **FX Browser** open, you can add any FX to any track simply dragging and dropping to the required track in the Track Control Panel or Mixer Control Panel.

**Tip:** You can add FX from an existing folder to any track directly from the TCP. Right-click over the FX button and choose **Add FX** from the menu, then select the folder and finally the FX.

## 5.2 Filtering Track FX

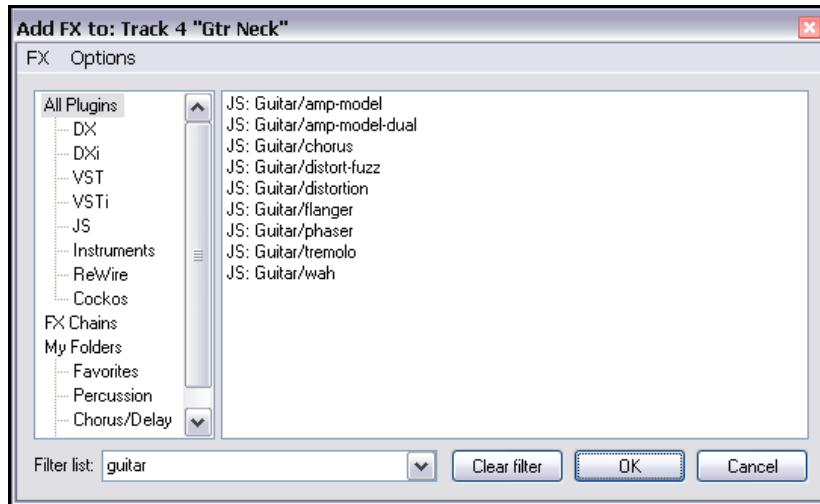
Even with the use of Groups, finding the right FX can still be time-consuming and frustrating if you have a large number installed on your system and are maybe looking for that something special for a particular track. That's where FX filtering can be useful.

By entering a text string in the **Filter list** text box in the **Add FX** window for any track, you can immediately identify all FX which match your specified criteria.

### Example 1

You want to experiment with adding some FX to a Guitar track – something time-based perhaps, perhaps something a bit different. You don't really know what FX it is that you want exactly. You could start by finding out which FX have the word *guitar* included in their name.

1. Display the FX window for the track in question and click on the **Add** button. Make sure that on the left you have selected **All Plugins**. In the **Filter List** box, type *guitar*
2. Notice (assuming of course that you have selected them), the names of all FX which match your filter criteria, will be displayed.
3. Select as many of these as you wish (use **Ctrl** with left mouse click to build up a selection) then click **OK** to add them to the track's FX chain.
4. You can now enable and disable these at will, experimenting as you wish.

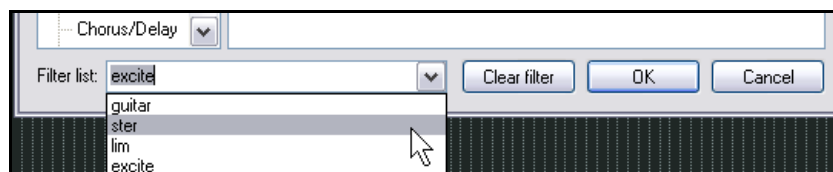


### Example 2

Suppose that you are looking for something to use for EQ on a particular track, but you aren't sure which one to use. Try this:

1. Stop and think for a moment. What text string is likely to be common to the names of just about any suitable plug-in that you might want to use? How about *eq*?
2. Display the FX Window for the track in question, select **All Plugins**, click the **Add** button, then if any previous text is displayed in the filter list (from a previous search) click **Clear Filter** then in the **Filter List** text box type *eq*
3. You can now select and use any of the items displayed.
4. Drag and drop any item of your choice to any Track FX button to add it to that track's FX chain.

Notice that REAPER will remember your previous filters. You can access them from the filter drop down list, by clicking on the down pointing arrow shown here. In this example, previous searches have included *lim* (for limiter) and *excite* (for exciter).



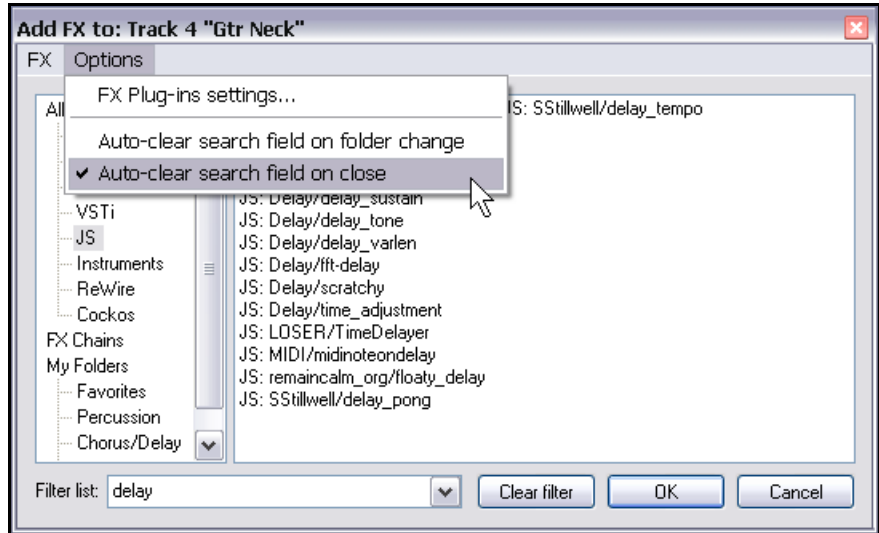


### 5.3 Clear FX Filter Options

REAPER offers you two options to help you determine how you would like your FX filters to be applied.

You have the option to **Auto-clear search field on folder change** and **Auto-clear search field on close**.

You can enable (and disable) either one or both of these options via the **Options** menu within the **Add FX** window (see right).



Option	Explanation
<p><b>Auto-clear search field on folder change</b></p>	<p>If this option is enabled, the Filter list will automatically be cleared when you choose a different folder for searching.</p> <p>In the example shown above, this option has not been selected. This means that if you were to change your folder selection from JS to, say, Cockos, the filter would still be applied, and only those plug-ins in the Cockos folder with <i>delay</i> in their name would be displayed.</p> <p>If, however, you were to enable this option, then switching from the JS folder to the Cockos folder would cause all Cockos plug-ins to be listed.</p>
<p><b>Auto-clear search field on close</b></p>	<p>If this option is selected, the Filter list will be automatically cleared when the Add FX window is closed. This would be the case in the example illustrated above.</p> <p>Next time the Add FX window is opened, all plug-ins will be displayed.</p> <p>If this option is not selected, the filter will be retained and automatically applied to your Add FX window next time it is opened.</p> <p>This will be the case whether it is opened again for the current track or for any other track.</p>

## 5.4 Copying Track FX

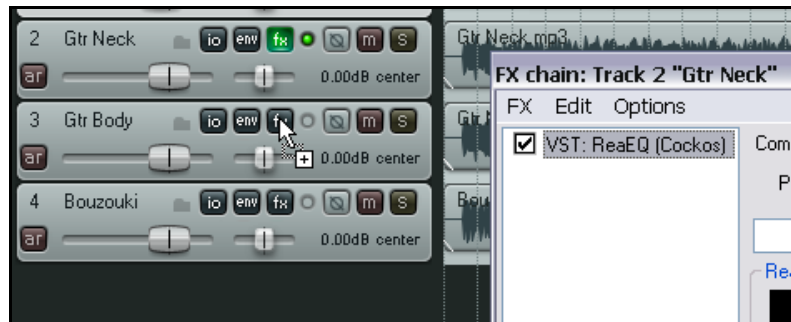
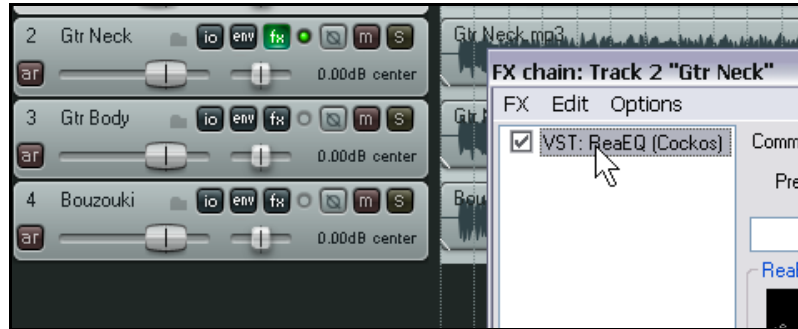
Any track FX can be copied from one track to any other track, or tracks. When a track FX plug-in is copied in this way, the settings and parameter values are also copied with it.

To do this, simply select the required plug-in in the FX window of your source track, then use the mouse to drag and drop to the FX button of any other track. This can be done either in Track View or Mixer View.

### Example

For this example, open the file **All Through The Night EDITS.rpp** that you saved earlier in this section. If you did not make this file, use any other file which has more than one track.

1. Click on the **FX Button** for the track **Gtr Neck** to open the FX Window for this track.
2. Insert the **VST ReaEQ(Cockos)** plug-in into this window (see above right).
3. Hover the mouse over the text **VST ReaEQ**. Press and hold down the left mouse button and, holding it down, drag the mouse to point to the FX button of the **Gtr Body** track (notice the mouse cursor position, right).
4. Release the mouse. The ReaEQ FX will now have been copied into this track (see below right).



You can of course repeat this as often as required to copy the same plug-in to other tracks.

Of course, when you copy an FX in this way, any settings and parameter values that you have set will be copied with it.

**Tip:** If there are several plug-ins that you wish to copy from one track to another, you can select all the plug-ins (Click on the first then Shift Click on the last) and use this method to copy them all together.

## 5.5 NEW! Moving Track FX

To move (rather than copy) a plug-in from one track to another, simply hold down the **Alt** key while you drag and drop it, using the method explained above.

### 5.6 Renaming Track FX

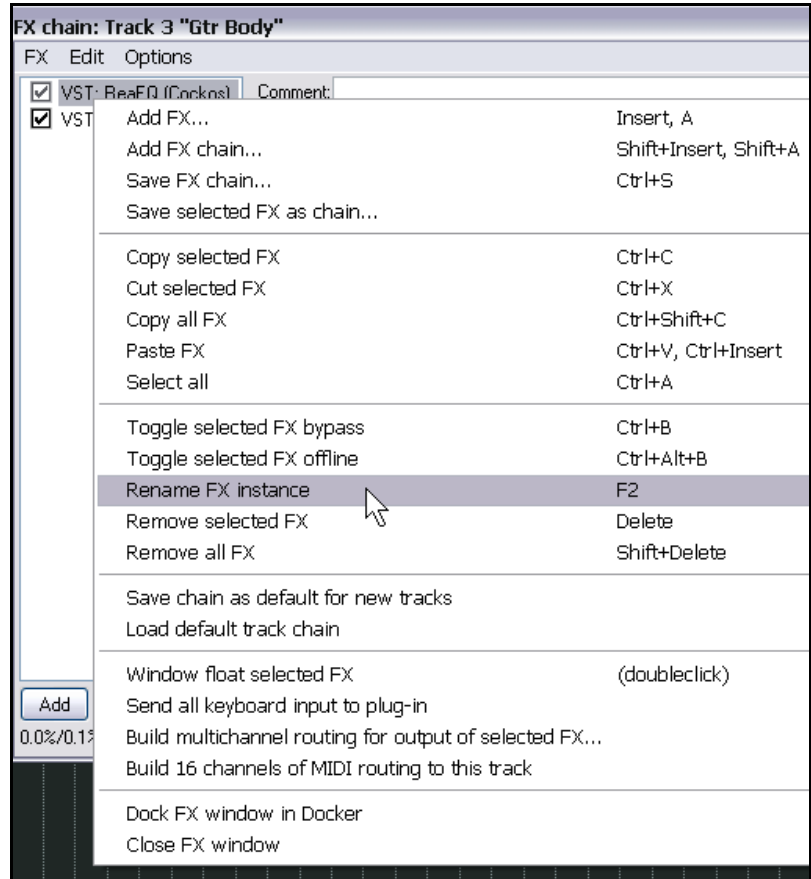
You can rename individual instances of FX Plug-ins so that the name that appears in the FX window in both Track View and in the Mixer reflects what the mixer displays a custom description of the FX purpose in that particular instance.

To do this, simply select the plug-in and press **F2**, or follow this sequence:

- Right click over the FX Item in either the FX Chain window, or the FX Bin in the Mixer view (see example right).
- From the menu, choose **Rename FX instance**.
- Type your custom name.
- Press **Enter**.

Note that your custom name will only be applied to that single instance of the FX Plug-in.

Other instances of the plug-in will not be affected.

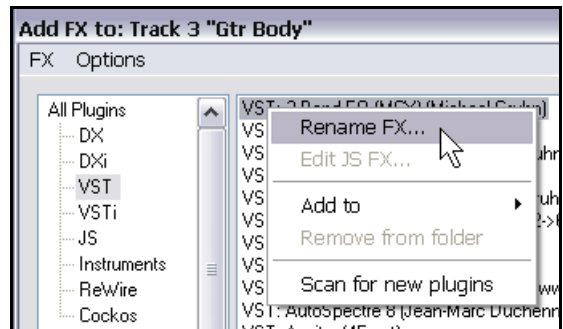


### 5.7 Changing the Default FX Name

The default name of any Direct X or VST FX plug-in can be changed by following a similar procedure to that outlined above, but this time selecting the Plug-in inside the FX Browser Window.

- Display the FX Browser Window (**View, FX Browser** or **Shift F**).
- Right Click over the plug-in that you wish to rename.
- Choose **Rename FX** from the menu.
- Type the new name.
- Press **Enter**.

Note that you cannot change the default name of JS plug-ins in this way.



## 5.8 Per Item FX

REAPER allows you to apply FX to individual tracks and also to individual media items within a track. This can be useful when a track, for example, consists of several media items, and you wish to add an effect (such as reverb or delay) to just one of the items only. If you have selected the option to display the **FX** and **FX Empty** item icons (**Options, Preferences, Appearance Media**) you can click on any item's **FX** button to open its FX window. Depending on other preferences, this button could be imposed on top of the item or it could be floating above it, and you may see other buttons. (see right).



Otherwise you can select it and use the default keyboard shortcut **Shift E**.

To add a plug-in to an individual media item, follow this sequence:

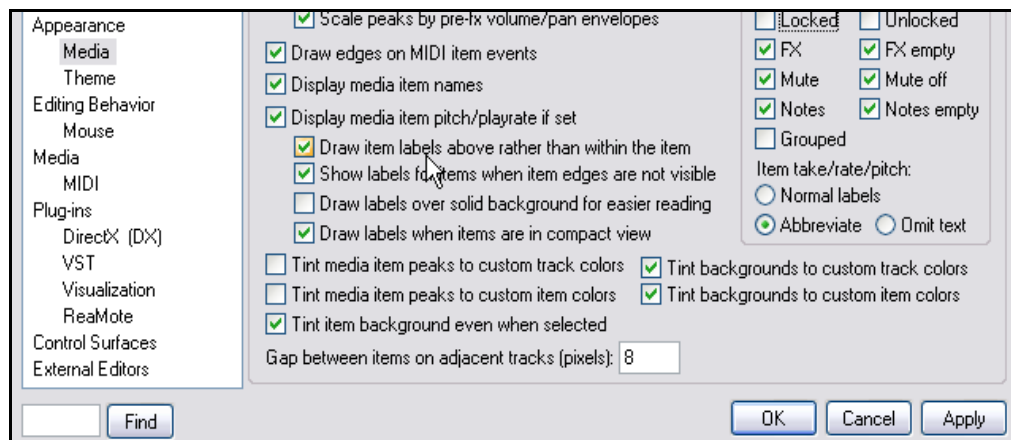
- Select the Media Item.
- Display FX Chain for that item. The **Add FX to Item** window will also be displayed.
- Double-click on the required Plug-In.
- Adjust the parameters to suit.
- Close the FX Window.
- Notice that by default, the Media Item will display an FX button, together with a chain which shows the names of all FX inserted in that media item (see right).

### Managing Item FX

To do this ...	You need to do this ...
<b>Make changes to an item's FX Chain</b>	Click on the item's FX Button.
<b>Delete an item's FX Chain altogether</b>	Hold <b>Alt</b> while you click on the item's FX Button.
<b>Copy an item's entire FX Chain to another item</b>	Drag and drop the FX button from one item to another.

Shown here are the settings which determine if and how the various buttons are displayed for individual media items. We'll return to this in detail in Chapter 6, but for now just notice that there are item icons (buttons) available for an items Locked status, FX Chain, Mute Status and Notes.

If you enable the option **Draw Item Labels Above Rather than within Items** then the buttons will be displayed (with the item name) above the item. if you disable this option, they will be superimposed on the media item itself.



### 5.9 Using Item FX with Multiple Takes

When you use the multiple alternative takes method of recording your tracks, each take is treated as a separate media item. This means that you can insert separate FX plug-ins into individual takes, as shown in the example below.



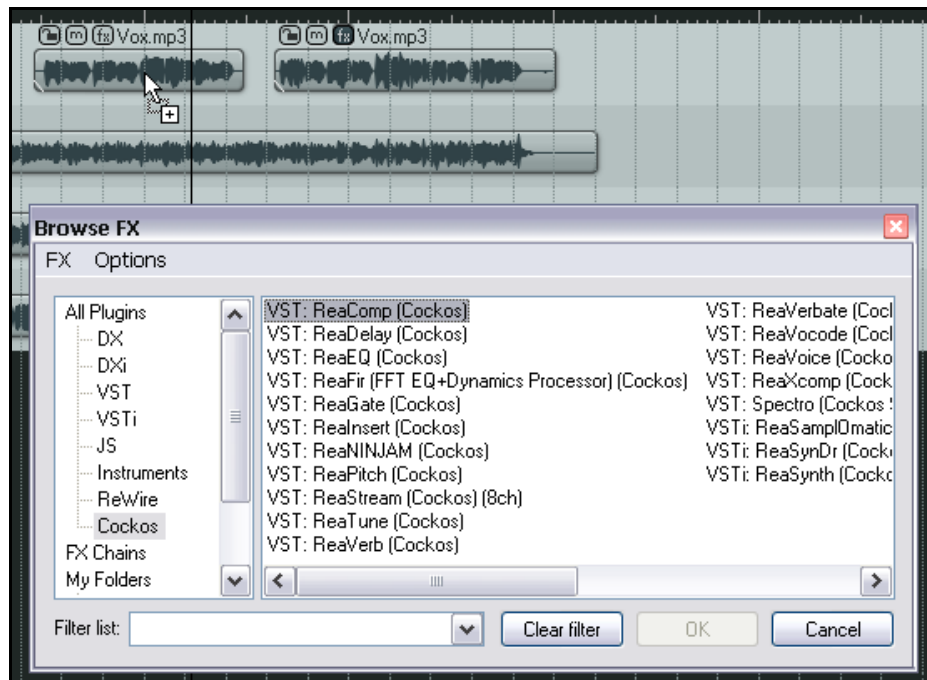
Of course, you can insert the same FX into each take and apply different parameters and settings for each one.

### 5.10 Adding FX to Multiple Items

If you have several media items to which you want to add various different plug-ins, it might not always be convenient to be constantly opening and closing the different Item FX Windows.

In this event, you can make life a little easier for yourself by following this method:

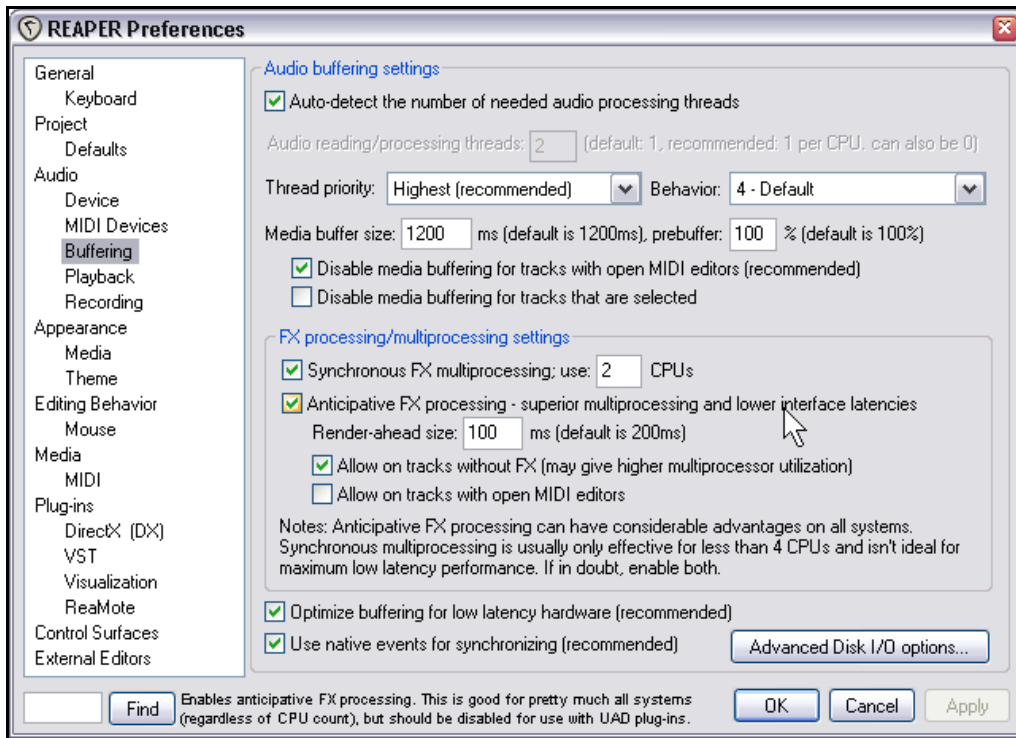
- Press **Shift F** or use the **View, FX Browser** command to display the **Add FX (FX Browser)** Window.
- You can now drag and drop any FX from the Browser Window to any media item or media items as required. There's no need to aim for the item's FX button - you can drop it anywhere on the media item (see below). Do this as many times as you wish, then close the FX Browser Window when finished.



**Tip:** Remember that you can keep the FX Browser window docked in the docker if you wish. If you use the docker to display the FX Browser window, then create a Windows Screen Set for that view, pressing the shortcut key for that Screen Set will automatically restore the FX Browser to the front of the docker.

## 5.11 Optimizing FX Performance

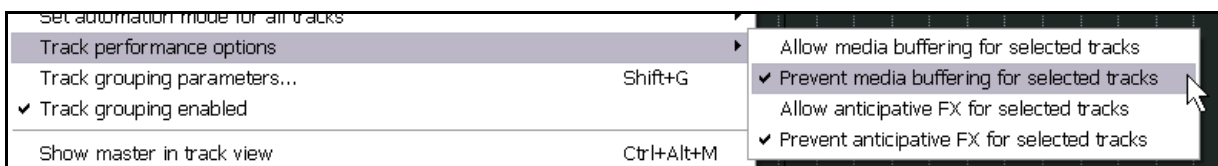
Some plug-ins can be quite greedy in their use of CPU. This especially tends to be the case with delay based FX, such as Delay, Chorus, and especially Reverb. REAPER provides a number of options which you can use to minimize the drain placed on your computer resources by your plug-ins. These options can be found in the **REAPER Preferences** window (**Ctrl P**) under the heading **Audio, Buffering**.



There's no "one size fits all" optimal settings. It depends on various factors, including which processor(s) you are using and which plug-ins. However it shouldn't be too difficult to experiment. Note in particular the following:

- Try using the default settings for **Media Buffering** at first. You can adjust them later.
- **Synchronous FX multiprocessing**. Try turning this on if your PC has multiprocessors.
- **Anticipative FX processing**. This can yield large reductions in CPU usage, but too aggressive a setting can cause pops and crackles on playback. If working with UAD-1, for best results, both Synchronous FX and UAD-1 Synchronous modes should be enabled. Anticipative FX should be disabled. UAD-2, however, is compatible with Anticipative FX mode and this is recommended for best low latency performance..
- **Optimize buffering low latency hardware**.

If you find that any particular plug-in or FX chain gives you problems with media buffering or anticipative FX processing, you can disable either or both for individual tracks using the **Track Performance Options** on the Track Control Panel right-click menu.



### 5.12 Opening a File in Recovery Mode

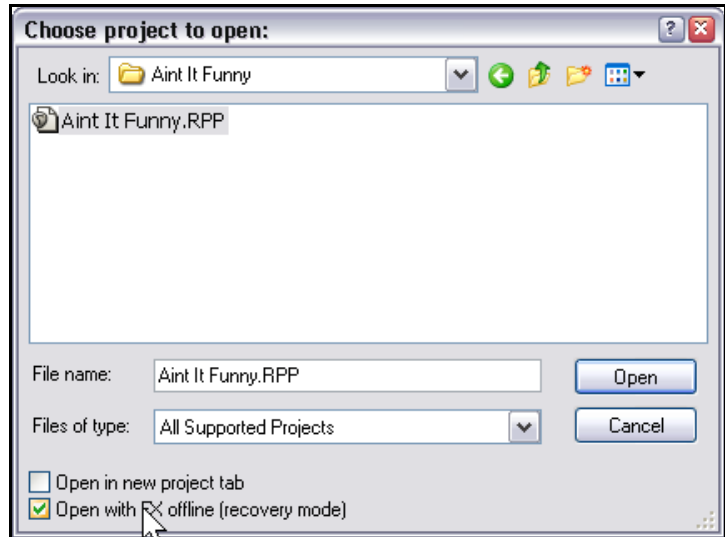
Any computer program will crash given the right (or wrong?) circumstances. REAPER is remarkably stable, but nevertheless there may be occasions when you experience a crash.

In the majority of cases the crash will have been caused by a problem with some third party VST, VSTi, DX or DXi plug-in.

If this happens, you should enable the option to **Open with FX offline (recovery mode)** when re-opening the file (see right).

This will open the file with all FX set to offline. By reintroducing them online one at a time, you should be able to identify which is the plug-in that is causing the problem.

The easiest way of fixing the problem would then be to remove this plug-in altogether and replace it with a different plug-in with equivalent functionality.



### 5.13 Stem Rendering

Stem Rendering is a technique that can be applied to ease your CPU load if it becomes (or is in danger of becoming) overstressed. The item is rendered to a new track, whilst the original track remains but is automatically muted and the FX bin is bypassed.

This offers you the convenience that if you later wish to change the FX in a stem rendered track, you can delete the rendered track, unmute the original, and make your changes. This is how it works:

1. In the **Track Control Panel** area, right-click over the track number.
2. From the menu, choose **Render selected tracks to stem tracks (and mute originals)** or (to render an existing stereo track as mono) **Render selected tracks to mono stem tracks (and mute originals)**

Stem rendering has a similar effect to a process known in some other DAW software as freezing tracks.



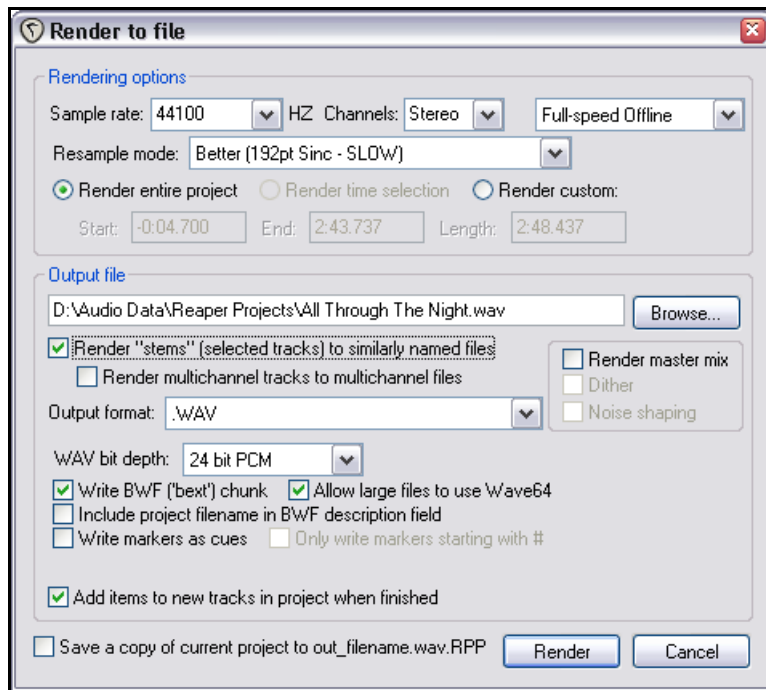
If you only wish to freeze the track FX without creating a separate track, you should consider using **Apply track FX to item as new take** instead. This is covered later, in Chapter 7.

**Tip:** Hovering your mouse over any track's **FX** button causes a tooltip to be displayed, listing the plug-ins present in that track's FX bin. It displays this information even if the FX bin is set to bypass.

### 5.14 Stem Rendering a Group of Tracks

You can apply stem rendering to a group of tracks, so that they will be mixed down to a single mono or stereo wave file. To do this:

1. Place the required tracks into a folder.
2. In the Track Control Panel, select the folder.
3. Choose the **File, Render** command.
4. Make sure your selected options include **Stereo** and **Render "stems" (selected tracks) to similarly named files**. If you wish, also select the option to **Add items to new tracks in project**.
5. Select your required output format (e.g. WAV) and format specifications (e.g. 24 bit).
6. Click on **Render**.



**Note:** If you are working with multichannel tracks You can also render your output in multichannel format. We'll have more to say about that in Chapter 15.



In the above example, the contents of the Guitar Tracks folder have been rendered to a single stereo track and the folder has then been muted.



### 6 Editing Tracks and Items

#### 6.1 Headphone Monitoring

While you are listening to and evaluating your various recorded items, it's usually recommended practice to use the monitors (speakers) in your studio or control room.

Additionally, however, you may wish to also use headphones from time to time, perhaps for those occasions when you need to focus on particular details on a particular track or media item.

Assuming that you have a PCI sound card or other audio device (Firewire or USB) which supports multiple outputs, here's a neat little trick.

1. Assign **Output Aliases** to your outputs, as explained in Chapter 1.
2. Display your Routing Matrix and assign the output from the Master to the Control Room speakers.
3. Put on your headphones.
4. As you play the song,



4. As you play the song, click on the appropriate cells on the routing matrix to also direct any particular track on which you wish to focus to your headphones. Of course, you can change from track to track, or add as many or as few as you want at any time.

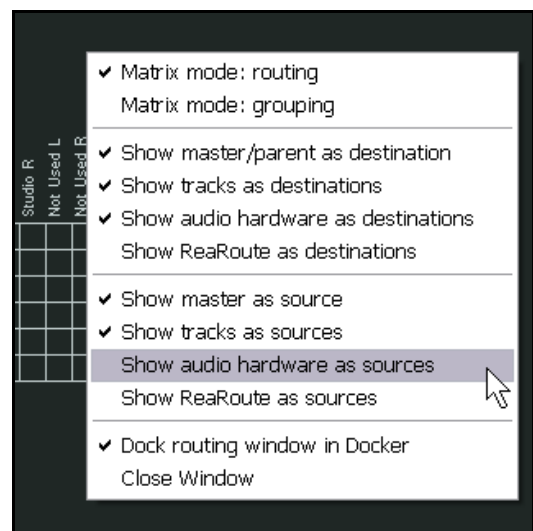
In the example shown (above), the entire mix (from the Master) is being heard thru the Studio Speakers, but only track **1 Vox** is being heard thru the headphones.

Remember that you can right click over this grid cell to display the controls for this send (such as Volume).

This can be also a good technique to use when you have with you a musician who wants to particularly hear his own track while you are mixing!

Furthermore, when you are mixing down, you might not wish to see all of the available routing information available – it can get quite complex. You might wish to keep the routing matrix display as simple as possible for the job in hand. For example, if you are focussed purely on mixing, you might not need to see all the various input assignments.

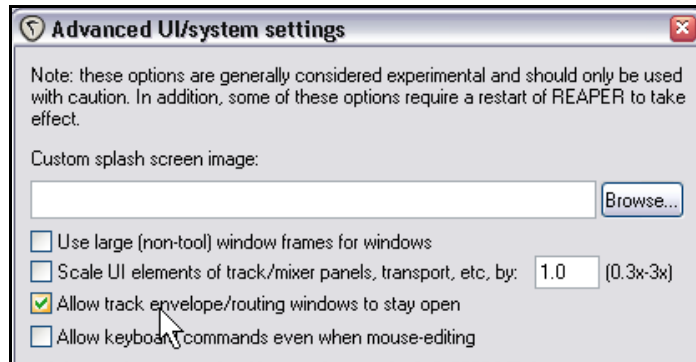
Right clicking over the background area lets you customise its display. In the example shown here, by unchecking **Show audio hardware as sources** we have simplified the display. If you have installed ReaRoute, consider also disabling the options to **Show ReaRoute as destinations** and **Show ReaRoute as sources**.



### 6.2 Creating a Headphone Mix

Provided your sound card includes at least two pairs of outputs, we can make the process of headphone monitoring easier and more flexible by creating a headphone mix. This is how it is done.

1. Connect your Headphones to your Headphone Amp, and your Headphone Amp to one pair of outputs.
2. Create a new track and name it **Headphone Mix**.
3. Choose the **Options, Preferences** command, select the heading **General** then click on the **Advanced UI/System tweaks ...** button and make sure that **Allow track envelope/routing windows to stay open** is enabled.
4. Click **OK** then **OK** again to close the Preferences window.
5. Select your **Headphone Mix** track and open the **I/O Routing Window**.
6. Add an **Audio Hardware Output** to the paired outputs to which your Headphone Amp is connected.
7. Disable the **Master/Parent Send** for this track.



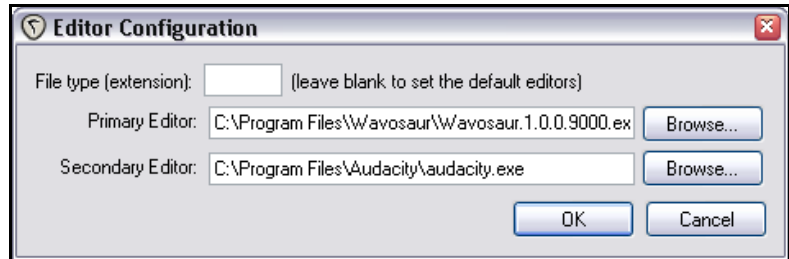
8. You can now use the Pan and Volume faders for your receives, together with the Mute buttons, to control your headphone mix.

### 6.3 Using an External Editor

We will shortly be showing you how to use REAPER's editing facilities to edit your media items. Before that, though, it's worth mentioning that if you have another program (such as Adobe Audition, Audacity or Sound Forge) which you wish to use in conjunction with REAPER for editing your items, you can do this quite easily.

#### To specify your external editors:

1. Choose the **Options, Preferences** command, then display **the External Editors** screen.
2. Click on the **Add** button
3. Use the **Browse** buttons (shown right) to identify and select your preferred wave editors.



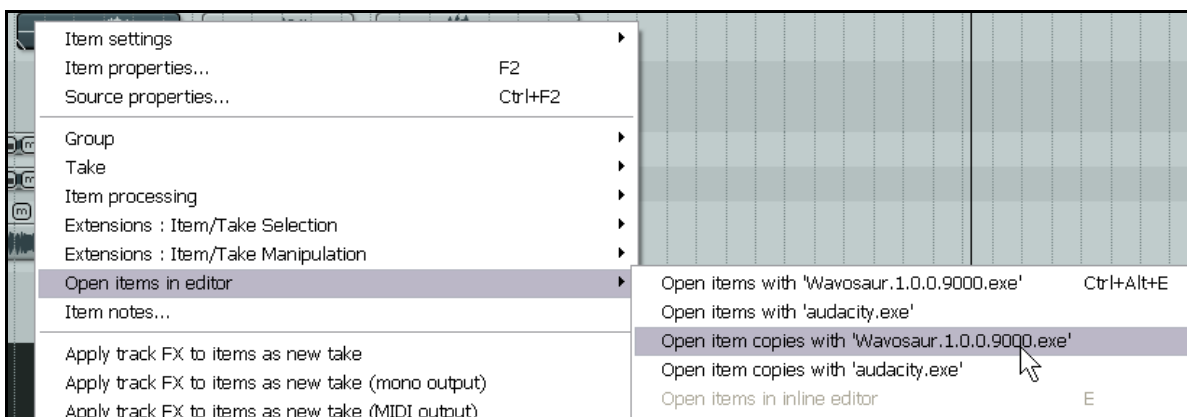
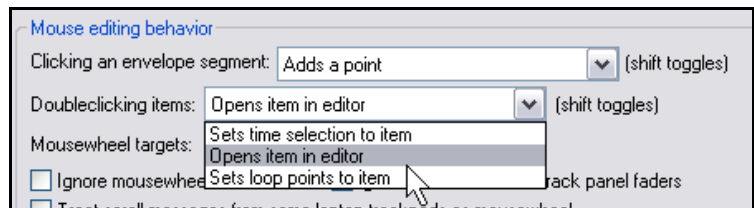
4. Click on **OK**, then **OK** to close the Preferences window.

Notice that you can specify different editors for different file types, e.g. WAV, MP3, Midi.

#### To use your external wave editor:

There are two ways you can access your preferred external editing program from within REAPER:

- Go to **Options, Preferences** and select the **Editing Behavior, Mouse** screen. There you can set the double-click behavior so that double clicking on an item will automatically open the editing program with that item.
- Within a REAPER project, right click over the media item that you wish to edit. From the menu, choose either **Open Items with Editor** then, from the sub-menu, select either the option to open the item itself or to open a copy of the item.



If the external editor works destructively on your files then the safer option is to open a copy. This copy will then be inserted into your track when you save it, close the editor and return to REAPER.

### 6.4 Editing Items in REAPER

The topic of editing items in REAPER is a big one. REAPER features a comprehensive range of editing techniques, for managing the items within your projects.

If you have worked with other audio software, you might find REAPER's ways a little strange at first. The first question you might have when you look at the screen is, "Where are all the editing tools?" The answer is ... there aren't any! At least, there aren't many! But as you are about to see, that doesn't mean that REAPER isn't up to the job. You just get the wave editing features that you need, but without the screen clutter.

There are some basic concepts that you need to understand about REAPER's design philosophy and structure before learning individual editing techniques. For example:

- Item Editing in REAPER is non-destructive. Edits made to items are unique per item and do not alter the content of the source file. You can experiment knowing that your original recorded files are safe.
- Item Editing in REAPER basically consists of selecting an item, or a portion of an item (range), then doing something to it – such as splitting it, deleting it, copying it or moving it.
- Sometimes, three or four steps might be required to achieve an editing task. If there are tasks like this that you need to use frequently, you can assign a single Keyboard Shortcut to the entire sequence of tasks.
- To some extent, you can customise REAPER's editing behavior thru the **Editing** settings within your **Options, Preferences** window. We will take a look at this screen and its various options later in this section.

There are just two more general issues that you need to be aware of before we move on to look at REAPER's editing capabilities. They are:

1. How REAPER uses standard Windows editing techniques.
2. The REAPER Undo History window.

### 6.5 Standard Windows Features

Within REAPER, when you're working on a project, most standard Windows keyboard shortcuts and mouse behavior works pretty much as you'd expect them to. Some others are less obvious. Some examples are given in the table below.

To do this with the mouse ...	You need to do this ...
<b>Move a media item</b>	Drag and drop.
<b>Copy a media item</b>	Hold <b>Ctrl</b> with drag and drop.
<b>Render media item to new location</b>	Hold <b>Ctrl</b> and <b>Alt</b> with drag and drop.

To do this with the keyboard ...	You need to do this ...
<b>Delete a media item</b>	Select it and press <b>Delete</b> . This will remove the item from the project, but the file will not be removed from the project's directory.
<b>Move a media item</b>	Select it and use <b>Ctrl X</b> to cut, <b>Ctrl V</b> to paste.
<b>Copy a media item</b>	Select it and use <b>Ctrl C</b> to copy, <b>Ctrl V</b> to paste.

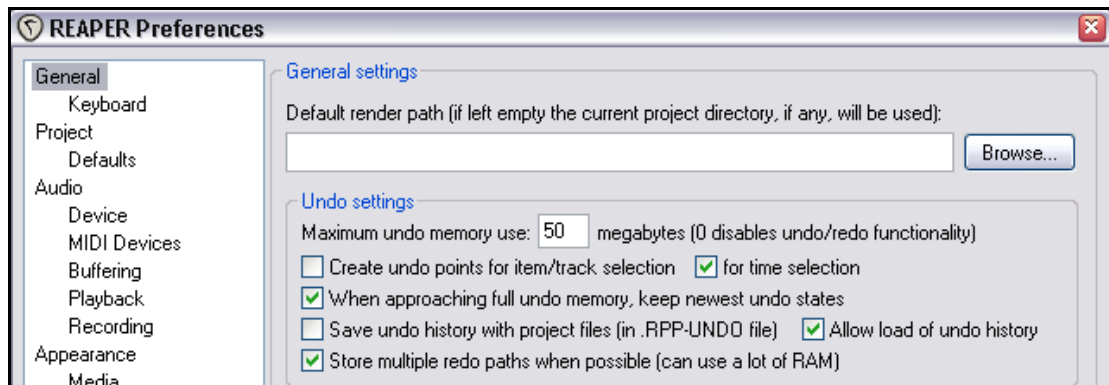
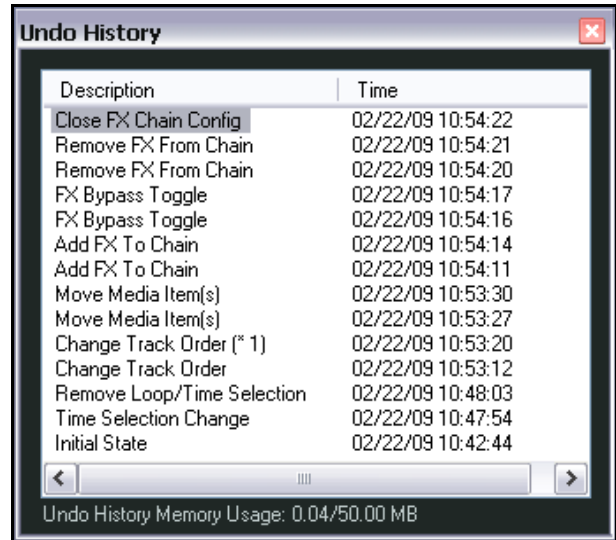
### 6.6 The Undo History Window

In addition, REAPER's Undo feature is very user friendly and powerful. The **View, Undo History** command – or the keyboard shortcut **Ctrl Alt Z** – toggles open and closed the **Undo History Window** (see right). You can double click on any item displayed in that window to go back to that point.

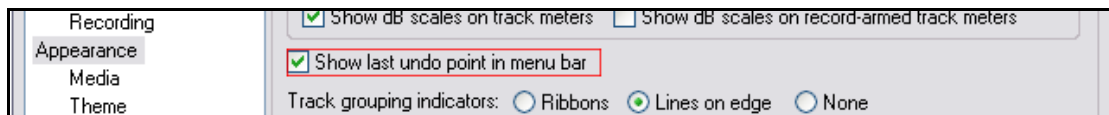
The **General** settings page under **Options, Preferences** includes a section which you can use to determine the behavior of the Undo History.

In particular, you can:

- Specify the maximum number of Megabytes of memory to be allocated to Undo. Setting this to zero will effectively disable this feature.
- Specify whether item selection and/or time selection are to be included in the Undo History.
- Ensure that if the allocated Undo storage area becomes full, the most recent actions will be retained in the Undo History.
- Save your Undo History with the Project File. This means that even after retrieving the file at some later date, you will still be able to revert the project to an earlier state if you wish.
- Store multiple undo/redo paths. We'll get to some examples of this later.



On the **Appearance** preferences page, you can enable or disable the option **Show last undo point in menu bar**. If you enable this, your last undoable action is shown after the last command on the menu bar. You can click on this at any time to open and display the Undo History window.



Note also that the Undo History window is dockable.

## 6.7 REAPER Editing Fundamentals

Many of the basic editing tasks that you will be performing in REAPER involve the use of fairly intuitive standard Windows procedures for selecting and manipulating items.

Here is a summary.

### Select Items

- Select an Item by clicking on the Item. The color of the Item will change to indicate it has been selected.
- Select multiple Items by using **Ctrl Click**.
- Select adjacent Items by using **Shift Click**.
- Select groups of Items by right-clicking and dragging a marquee around the Items.

### Split Items

- If no Item is selected, pressing S will split all Items on all Tracks at the Edit Cursor position.
- If Item(s) are selected, pressing S will split all selected Item(s) at the Edit Cursor position.
- If Item(s) are selected, pressing Shift S will split all selected Item(s) at the Time Selection.

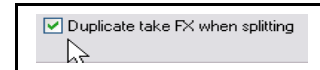
**Note:** If an item containing an FX chain is split, then by default both of the resulting items will contain that FX chain. This is illustrated below.



Before split...

... and after.

You can turn this option off on the **Options, Preferences, Media** screen.



### Heal Split Items

To reconnect media item that have previously been split:

- Select the media items in the track.
- Right click over any media item within the selection and from the menu choose **Heal splits in selected items**.

**Note:** If a number of previously split items each containing an FX chain are healed, then only the FX Chain of the first of the items is retained. This is illustrated below.



Before heal...

... and after.

### Copy Items

There are several ways to copy item/s in REAPER.

- Use Keyboard Shortcut **Ctrl C** to copy any selected Items.
- Right-click on an item and select **Copy selected items** from the menu.
- Select an item, then select **Edit, Copy** selected items.
- Hold down the **Ctrl** key while dragging the Item(s).

### Cut Items

Cut removes the item to the Clipboard. There are several ways to Cut Items.

- Use Keyboard Shortcut **Ctrl X** to cut selected item/s.
- Right-click on a selected item and select **Cut selected items** from the menu.
- Select **Edit, Cut selected items**.

### Paste Items

There are several ways to paste items in REAPER.

- Use **Ctrl V** to paste an Item at the current cursor position. If a Track is selected, the item will be pasted into the selected Track. If no Track is selected, the Item will be pasted into the last selected Track.
- Right-click on a Track and select **Paste** from the menu. If a Track is selected, the Item will be pasted into the selected Track. If no Track is selected, the item will be pasted into the last selected Track.
- Select **Edit, Paste**. If a Track is selected, the item will be pasted into the selected Track. If no Track is selected, the item will be pasted into the last selected Track.

### Copy or Cut Part of an Item

You can copy or cut a selected part of an item to the Clipboard.

- Select the item then make the time selection in the usual way.
- To copy the selected area, right-click on the selected item and select **Copy selected area of selected items** from the menu, or press **Ctrl Shift C**, or
- To cut the selected area, right-click on the selected area and select **Cut selected area of selected items** from the menu, or press **Ctrl DELETE**.

Copy selected items	Ctrl+C
Copy selected area of selected items	Ctrl+Shift+C
Copy loop of selected area of items	Ctrl+Alt+L
Cut selected items	Ctrl+X
Cut selected area of selected items	Ctrl+DELETE
Paste	Ctrl+V
Remove selected items	

### Delete Items

Delete completely removes the item from the project. There are several ways to delete items. Where an item has several takes, all takes will be deleted, not just the active one.

- Use the **Delete** key to delete selected item/s.
- Right-click on a selected item and select **Remove selected items**. This will delete any selected items.
- Select **Edit, Remove selected items**.

### Move Items: General

Items can be moved (that is, repositioned) using either of these methods:

- Select the item to be moved, then use the mouse to drag and drop, in the standard windows fashion.
- Select the item to be moved, then **Cut** the item. Position the edit cursor at the required place, select the required track and **Paste**.

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## Move Items: Special

A number of keyboard shortcuts exist for moving items in ways that might be difficult to control with drag and drop, or cut and paste. For example:

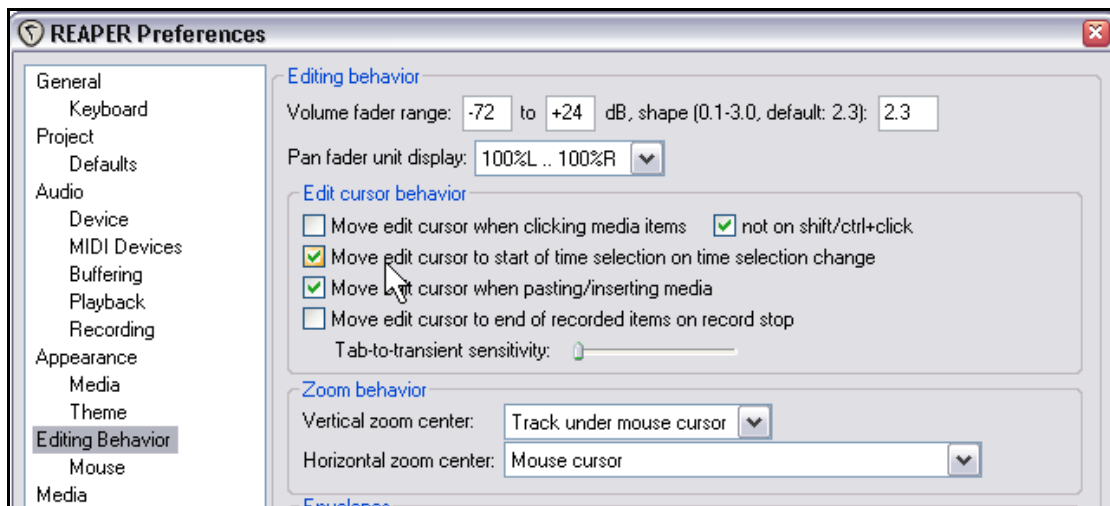
Default Shortcut Key	Purpose
Num Pad 1	Slide item a little to the left
Num Pad 3	Slide item a little to the right
Num Pad 4	Move item a little to the left
Num Pad 6	Move item a little to the right
Num Pad 8	Move item up one track
Num Pad 2	Move item down one track

**Note:** This feature is often referred to as "nudge". With REAPER, nudging is always relative to the screen display. For example, if you are zoomed in very closely on an item, then nudging left or right will move or slide it backward or forward thru a much smaller unit of time than if the view was zoomed out to display the full project.

**Tip:** Double click on a track's index number in the Track Control Panel to select all the items in that track.

## 6.8 Editing Behavior Preferences

You should be aware of at least some of REAPER's main editing behavior preferences and how they work.



In particular, notice that you can specify whether or not the edit cursor is relocated when the time selection is changed.

You can also specify how REAPER is to behave when you zoom vertically – e.g. **Last selected track** or **Track under mouse cursor**.

More information about Editing Behavior Preferences can be found in Section 15.



### 6.9 Manipulating Areas and Selections







Sometimes you may wish to perform an editing action on part of a media item – for example, to move or copy an area to somewhere else. In order to do this, you need to understand one important aspect of REAPER’s design paradigm. Before performing any editing action on any part of an existing media item, you must first select the area on which you wish to work.

**Note:** If in the examples that follow, your selection snaps so as to select an area larger than that which you are trying to select, then *Snapping* is enabled. This will be explained shortly. In the meantime, you can press **Alt S** to toggle the snap feature off.

Copy selected items	Ctrl+C
Copy selected area of selected items	Ctrl+Shift+C
Copy loop of selected area of items	Ctrl+Alt+L
Cut selected items	Ctrl+X
Cut selected area of selected items	Ctrl+DELETE
Paste	Ctrl+V
Remove selected items	
Trim items to selected area	
<hr/>	
Split items at cursor	S
Split items at prior zero crossing	Alt+Z
Split items at time selection	Shift+S
Heal splits in selected items	

#### Example

In this example, let’s assume that you want to select part of an existing waveform media item and copy it to another track.

- Select the media item from which you wish to copy a selected area.
 
- Hold down the **Ctrl Key** while you hover the mouse over the start of the area you wish to copy. Still holding the **Ctrl** key, **right click** and drag the mouse to mark the selected area, then release both the mouse and the Ctrl key. The area will now be marked (see above).
 
- Right click over the area to display the context menu. Notice this includes a number of commands such as **Copy selected area of selected items**, **Copy loop of selected area of items**, **Cut selected area of selected items**, and **Split items at time selection**. In this case, you need to choose **Copy selected area of selected items**.
 
- Select the track to which you want the item copied, and position the cursor at the required place (see above).
 
- Press **Ctrl V** or choose **Edit, Paste** from the Main Menu.
 
- The new media item will now be pasted at the cursor position (see right).
 

**Tip:** Provided that you do not copy the selected area as a loop, it doesn’t matter if you don’t quite get your selection exactly right. For example, you can slip-edit to the left and from the left to include any material at the start of the item that you accidentally omitted, or slip edit from the right end to the left to remove any superfluous material that you may have accidentally included. We will cover slip-editing shortly.

## 6.10 Snapping with Combined Snap/Grid Settings

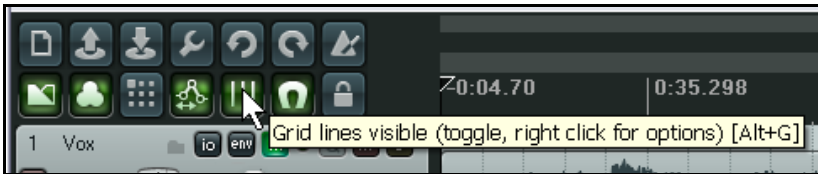
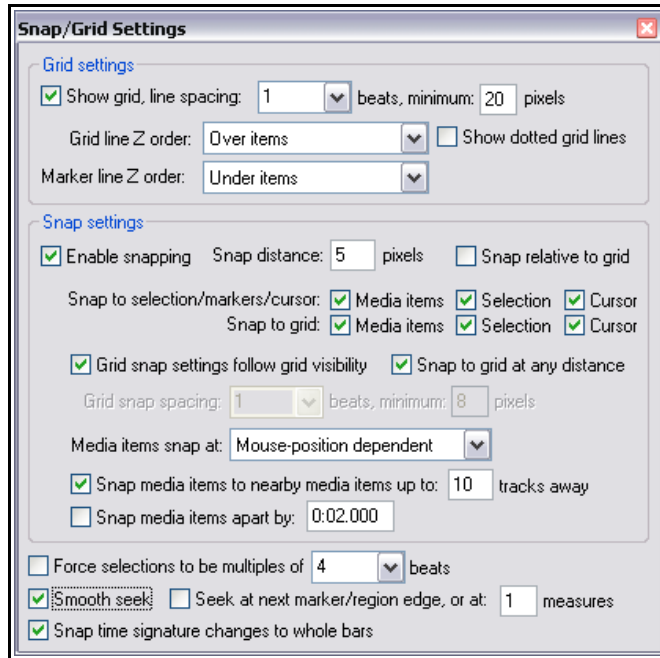
You have already learnt how to define your grid settings. These determine whether or not a grid is displayed in your track area, and if so how that grid appears.

The **Snap/Grid Settings** window (shown right) can also be used if you wish to ensure that various actions and/or items are automatically snapped into position according to your settings. This, for example, might be to the nearest beat.

The Snap/Grid Settings dialog box is accessed by choosing the **Options, Snap/Grid Settings** command, or by the keyboard shortcut **Alt G**, or by right clicking on the Grid button on the REAPER toolbar (see below).

The keyboard shortcut **Alt S** is used to toggle the Snap feature on and off.

You can decide whether you want snapping applied in all or any of the ways listed in the table below.



Item	Explanation
<b>Media Items</b>	Ensures that media items when created, moved or edited will be snapped according to your settings - at their start, at both the start and the end, or as determined by the mouse position at the time. <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <p>Media items snap at: <span style="border: 1px solid gray; padding: 2px;">Mouse-position dependent</span></p> <p><input checked="" type="checkbox"/> Snap media items <span style="border: 1px solid gray; padding: 2px;">Mouse-position dependent</span> tracks away</p> <p><input type="checkbox"/> Snap media items <span style="border: 1px solid gray; padding: 2px;">Only snap at start/snap offset</span></p> <p><input type="checkbox"/> Snap media items <span style="border: 1px solid gray; padding: 2px;">Snap both start/end</span></p> </div>
<b>Selection</b>	Determines whether your time and loop selections should be snapped.
<b>Cursor</b>	Determines whether your cursor should be snapped.

Notice the **Snap Distance** settings. These enable your snapping to be more flexible. For example, you might set your grid spacing at, say 50 pixels, specify snap distance of, say, 5 pixels and turn off the option to **Snap to grid at any distance**. This will ensure that snapping to grid will occur only when you click the mouse within 5 pixels of one of the grid lines. Otherwise, the cursor will be positioned at the exact place where the mouse is clicked.

Notice that you also have the option to make snapping **Relative to Grid**.

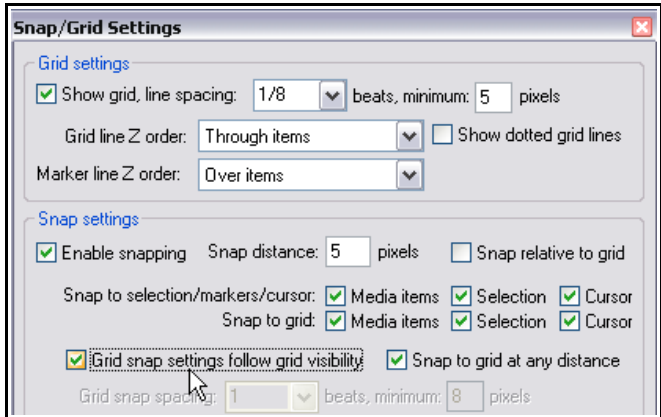
### 6.11 Snapping with Separate Snap and Grid Settings

In the examples discussed in the previous sections, REAPER was set up to use the same set of snap parameters for grid display as was used for snapping. In other words, the snapping would take place to the nearest grid position.

You might wish to change this, especially to reduce screen clutter. This might occur for example, if you wish to use very tight snapping settings, as shown on the right here.

Notice that in this instance, as before, the option **Grid snap settings follow grid visibility** has been enabled.

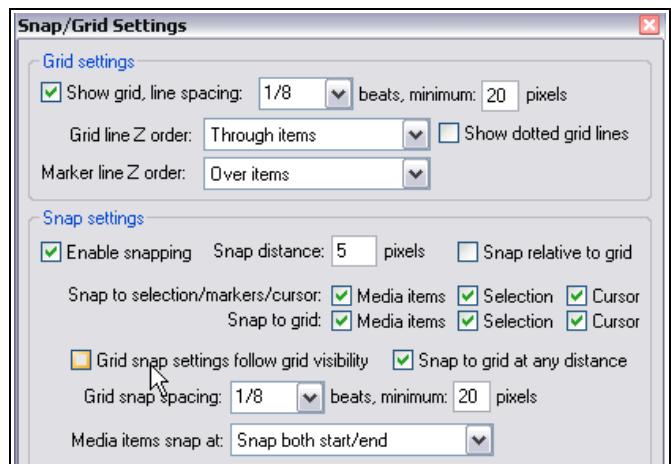
This produces the cluttered look shown in the first example below. In this second example, we have disabled the option **Grid snap settings follow grid visibility**.



We have also changed the **minimum pixels** setting for **grid line spacing**, in this case to 20 pixels, whilst still specifying (just below the point where the cursor is shown on the screen shot) a **grid snap spacing** of one eighth beats.

This produces a less cluttered display on the screen, as can be seen in the example shown below. The cursor position shown in this example is the exact spot that it has been snapped to – but this time the grid lines are not displayed at every single snap position.

You have just seen two examples. The effect of snapping is exactly the same in both cases, but the way it is displayed is varied. The best way to learn and understand how different permutations of these settings are applied and displayed is to experiment with them.



**Tip:** When snapping is enabled, this can be over ridden when selecting a loop along the timeline by holding down the **Ctrl** key while you make the selection.

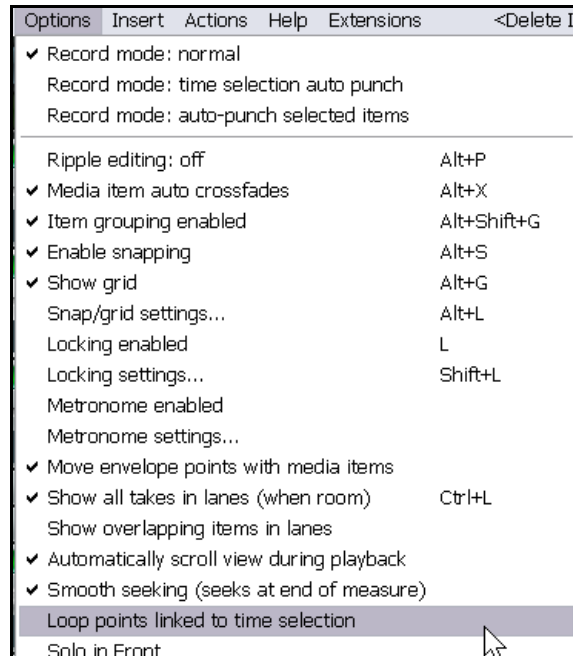
## 6.12 Separating Loop Selection From Time Selection

By default, your time selection is linked to your loop selection. This means that when you select a time area other than that currently selected, the loop selection changes with it. However, you can change this behavior by turning off the option **Loop points linked to time selection** (see illustration right).

When this option is disabled (i.e. not ticked), you can still use the **Alt** key while you click and drag along the timeline to change both the time selection and the loop selection together.

### Example

For this example we will be assuming that **Loop points linked to time selection** has been turned off.



In this first example, we have dragged along the timeline to create a loop.



Now we have dragged within the track area, just below the media item.

A new time selection is made within the loop area, but the original loop selection remains.



Next, we have right-clicked over the area and chosen **Split items at time selection** from the menu. We now have a separate item (for example, to be muted, or have any of its properties changed), but the original loop area is still selected.



Here we have made another new time selection, which we could also edit as required.



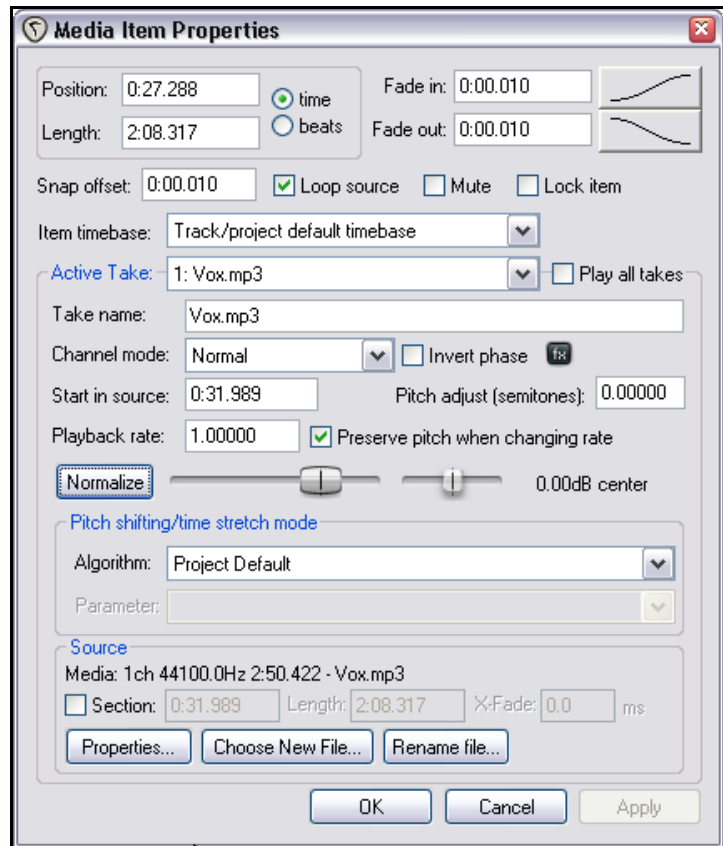
Notice that we can carry on working with different time selections, but our original loop area remains intact. If you wish, you can still play this loop area over and over again while working on different time selections within it.

### 6.13 Media Item Properties

Before working thru some examples of REAPER editing in action, we just need to know a little about Media Item Properties. All items have a page of property settings which help determine the behavior of that item. Often, editing in REAPER consists of selecting an existing item (or creating a new one) and then changing its properties.

You don't need to understand every single one of these properties before you get started, just to know where this information is accessed and changed. Some of the properties you can set within this dialog box include:

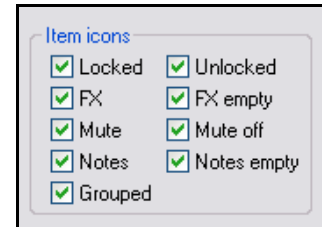
- Position: entering a precise figure here will move the start of this media item to exactly that position.
- Length of media item (shown in time or beats)
- Fade In and Fade Out: you can define both the length and the shape.
- Loop source: whether or not the item is looped.
- Mute status: whether or not the item is muted.
- Item lock status: whether or not the item is locked.
- Select active take and/or Play All Takes.
- Active take name. By default REAPER will use the media item file name, but you can change this.
- Whether or not to play all takes. Obviously, this only applies where two or more takes exist for the media item.
- Channel mode: this is discussed on the page after this one.
- Invert phase.
- Open Item FX Window.
- Pitch adjustment.
- Playback rate.
- Whether to preserve the item's pitch when the playback rate is changed.
- Adjust Volume and Pan, Normalize Volume.
- Which algorithm is to be used for pitch adjustment.
- Rename the source file, or replace the source file with a different one.



Some of these items – such as **Loop Source**, **Mute** and **Invert Phase** – are also available on the **Item Settings** menu. We'll get to this shortly. In addition, for many of them Keyboard Shortcuts either already exist or can be defined. You will be shown how to create your own keyboard shortcuts later when we examine the **Actions List Editor**.

## 6.14 NEW! Media Item Icons

For several of the settings in the Item Properties dialog box there are icons (buttons) available that can be used as a quick way of accessing these commonly used features. The display of buttons is turned on and off in the **Appearance Media** page of the **Preferences** settings (see right).



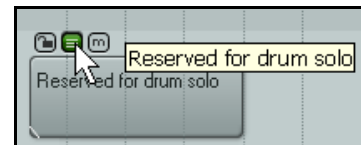
On the settings sheet the icons are listed in two columns. Ticking the options in the first column means that the icons will be displayed only when the item has been enabled (by using a keyboard shortcut, the menu, or the Item Properties dialog box). Ticking the options in the second column means that the icons will be displayed whether the feature is enabled or not. For example, if you tick the **Mute** option in the first column but not in the second, then the mute button will be displayed only when the item is muted. The button both indicates the track's mute status and can be used to unmute it. If, however, you choose to tick this item in both columns then the mute button will always be displayed (provided there is sufficient room) on all media items, and can be used as a toggle to unmute it.



In the example shown (left) we have two media items, both with lock status, notes, mute and FX buttons displayed. The first item is muted and the second item is locked.

## 6.15 Item Notes

The Notes button (or right click over any item and choose **Item Notes ...** from the menu) can be used to open a text box that can be used to enter any text notes for that item. When notes have been entered, a small Notes icon will appear on the item. Hovering the mouse over this icon will cause the notes to be displayed as a tool tip. Click on the icon to open and edit the Notes window.



Within the **Notes** window you can click on the **Load** button to load any .PNG or .JPG image file. The option **Use as item background** can be selected to display that image with the icon. Optionally, you may also choose to **Stretch to fit item**. An example of a media item displaying an image is shown here.



## 6.16 Adjusting Item Volume

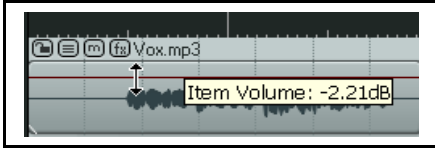
Other than by using envelopes (which we'll get to in Chapter 14) there are three methods available to you for adjusting the volume of individual media items. These are:

- Using the item volume handle.
- Using the volume fader in the Item Properties box.
- Normalization.

### 6.16.1 The Item Volume Handle

The **Item Volume Handle** is the quickest and simplest way to adjust the volume of individual media items. This is a horizontal bar that sits across the top of each of your media items. Initially it will not be visible until you hover your mouse over the top of the media item to reveal a double headed vertical arrow.

You can click and drag with your mouse down to lower the volume level (see first illustration). To pick up the handle from the top of the media and increase the volume from there, hold down the **Shift** key while dragging (see second illustration).



Lowering the item volume handle.



Raising the item volume handle.

### 6.16.2 The Volume Fader

The Item Properties dialog box includes a horizontal fader (next to the normalize button) which can be used to raise or lower an item's volume. After adjusting the level, click on **Apply** to apply it to the item. This method is useful especially if you are making adjustments to both volume and pan settings together, or if you do not wish the item volume handle to be displayed.

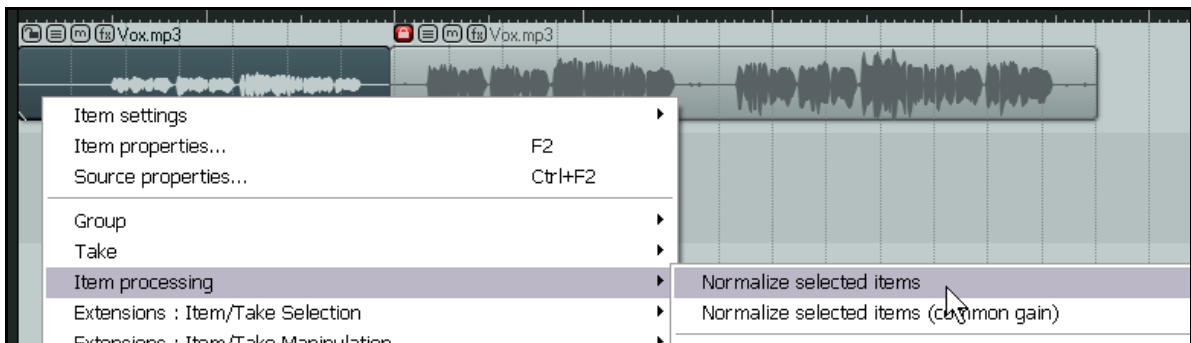


### 6.16.3 Normalizing Items

The term *normalizing* refers to adjusting the volume of an item (or selection of items) to a standard level. This can be especially useful if some of your tracks have perhaps been recorded at too low a level. To do this:

1. Select any item (or group of items) to be normalized.
2. Right click over the selection.
3. Choose **Item processing** then either **Normalize selected items** or **Normalize selected items (common gain)** from the menu.

Use the **common gain** option if you want the level on all items to be raised by the same amount, or relative to each other. This will be the amount by which the loudest of the items can be increased without clipping.



If you want every selected item to be normalised independently of each other do not select the common gain option. This can be expected to resulting a greater increase in volume for some items than if the common gain option had been selected.

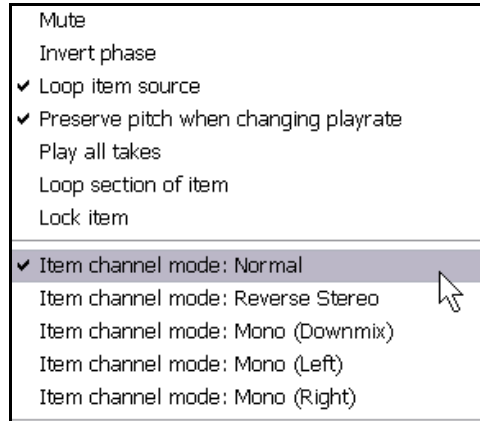
Any individual item can also be normalized by clicking the **Normalize** button inside the Item Properties dialog box. This is especially useful if you need to make changes to other item properties while you are normalizing.

## 6.17 Changing Item Channel Mode

Right clicking over any Media Item and choosing **Item Settings** from the context menu chooses a sub-menu of options to be displayed.

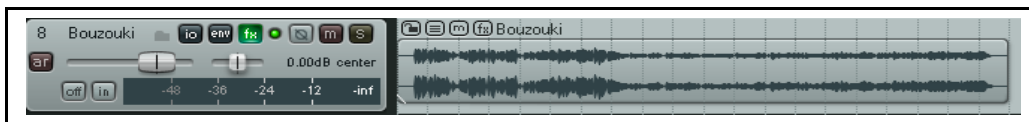
Notice in particular that for stereo media items, you have a number of simple **Item Channel Mode** options. These are:

- **Normal:** maintains or returns the stereo item to its original channel state.
- **Reverse Stereo:** swaps left and right channels.
- **Mono (Downmix):** combines both left and right channels into a single mono channel.
- **Mono (Left):** produces a single mono channel using only the output from the original left channel only.
- **Mono (Right):** produces a single mono channel using only the output from the original right channel only.

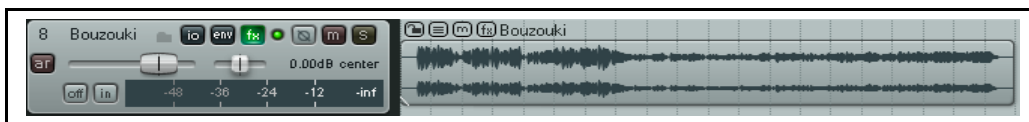


### Examples

Some examples are illustrated below. Note that these changes are non-destructive. You can switch an item between these different states as often as you wish. For example, to convert a stereo media item to two mono items quickly and easily, you can simply duplicate, then set one to Mono (left) and the other to Mono (right)



**Mode:  
Normal**



**Mode:  
Reverse  
Stereo**



**Mode:  
Mono  
(Downmix)**



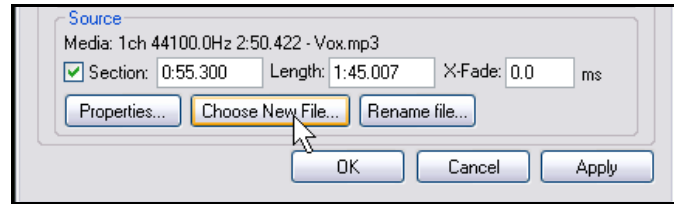
**Mode:  
Mono  
(Right) –  
based on  
the original  
example**

Channel Mode can also be changed from inside the Media Item Properties dialog box.

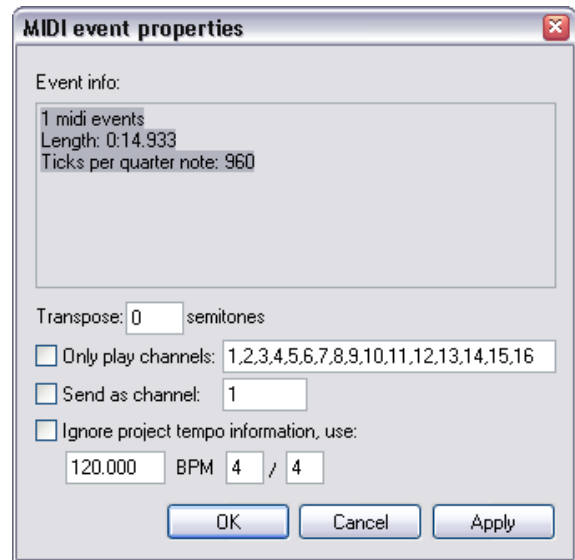
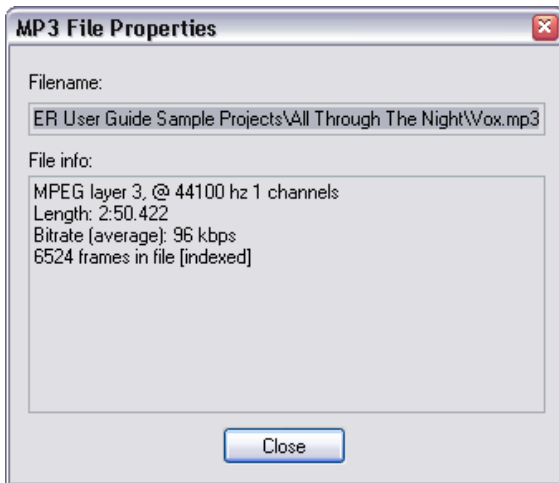


### 6.18 Source Properties

You have just seen how you can use the **Media Item Properties** dialog box to determine how a media item behaves within your project. Within that dialog box, you also have the option to change the media item contents with **Choose New File**, or to rename the item using the **Rename File** option.



In addition, you can right click over any item in your Track View and choose **Source Properties** from the context menu. This displays information about the format of the original Audio file or MIDI recording which is the source of the item. In the case of MIDI items, you can also modify some properties, such as restricting which channels are played. Examples are shown below:



### 6.19 REAPER Editing and Auditioning Example

Most new users of any digital audio software struggle with editing at first, especially if they are used to another program which uses different techniques. The best way to understand what's going on is to work thru some examples. These examples assume that you have the option to *Link loop points to time selection* enabled.

Open the file **All Through The Night.RPP**. Use the **File, Save Project As** command to save it as **All Through The Night EDITS.RPP**.

The examples that follow are designed to help you to learn and understand the use of REAPER. They are not intended to cover every possible feature – you can explore these for yourself – nor is it suggested that they represent a particularly good arrangement of this song.

1. We are going to make a copy of the Bouzouki track and then play around with the sound. In the Track Control Panel, right click over the Track name or number for this track, then from the menu choose **Duplicate Selected Tracks**.
2. Change the name of this new track to **Bouzouki Copy**. Press **Ctrl S** to resave the Project File. You should do this regularly without needing to be reminded!
3. In the Track Control Panel, click on the track number for the first Bouzouki Track then hold the **Ctrl** key and click on the track number for the second track. Both tracks are now selected.



## Up and Running: A REAPER User Guide v 3.11

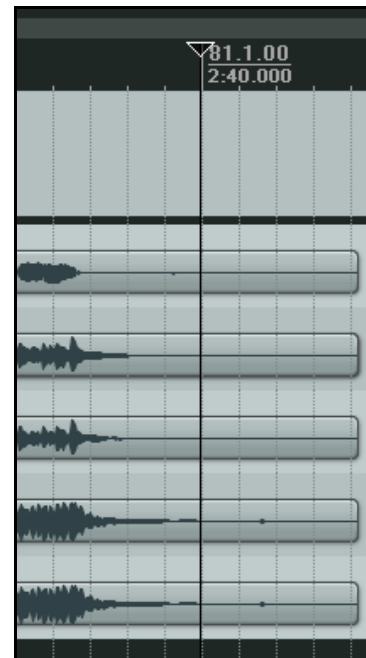
- Click on the **Solo** button for either track – both will be soloed.
- Use the mouse to lower the volume fader on either track to around  $-7\text{dB}$  – both tracks will be lowered. As you get near to the  $-7\text{dB}$  mark, hold the **Ctrl** key down for more precise movement.
- Holding down the **Shift** key, move the Pan fader for the first Bouzouki Track to around 55% left, and, still holding the **Shift** key, move the Pan fader for the second Bouzouki track to around 55% right.
- Right click over the Media item for the second Bouzouki Track. Choose **Item Properties** from the menu. Change the **Position** to **0:00.007**. Click on Apply then OK. This causes this track to be nudged 7 milliseconds to the right, thus adding a very small delay effect that makes the instrument sound more full bodied.

- Press **Ctrl S**. Play the Song.
- While it plays, hold down **Ctrl** and click on the **Solo** button for either of the Bouzouki tracks. This clears both the Solos.
- Right click just beneath the **Track Control Panel** area and choose **Show Master Track**.
- Adjust panning and volume for the various tracks to get a reasonable mix. You might choose to end up with something similar to that shown on the right. Press **Ctrl S**.



- In the example shown, you might be happy with the overall balance between the different tracks, yet the overall volume of the Master might be just a tad too loud in parts.
- Open the **FX** bin for the Master and insert into it the JS/Utility Limiter. Set the maximum volume in the Limiter to  $-0.5$  dialog box, close the FX window, and make sure the Volume Fader for the Master is set to  $0\text{dB}$ . You should now be able to play the song without clipping.

- Notice there is an extended period at the end of the song that we might wish to remove. Position the Play Cursor at around the position shown (right). Make sure that no track is selected, then press the letter **S** to split all tracks at the cursor mark.
- Note that whereas before each track consisted of one item, each now has two items. The items (to the right) that you have just created by splitting should still be selected.



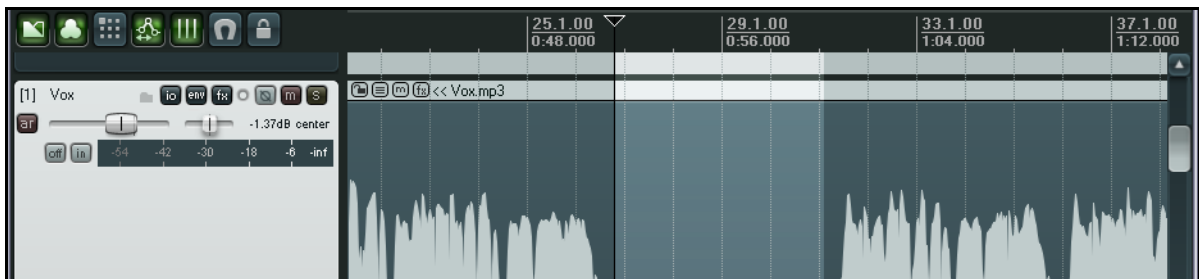
- Press **Delete** to remove these items. Press **Ctrl S** to save. You should have got this message by now – we'll stop reminding you.
- Now we're going to do something really clever – we're going to mute *part* of an item. To do this, we'll first need to make a separate item containing just the area you want muted.
- Select the media item (peak) for the **Vox** track. Position the Edit Cursor round about the 56 second mark.
- Press the **~** key (**Shift `**) to maximise the current track. Press **Ctrl Alt Up** or **Ctrl Alt Down** until the **Vox** track is displayed. At this level of magnification you can see that some unwanted sounds have been recorded during a passage when the singer is not singing. As likely as not, this is probably headphone bleed. We're going get rid of it.
- If you want to hear it first, you can of course **Solo** that track and play it. Don't forget to Unsolo when finished.

## 6 - Editing Tracks and Items

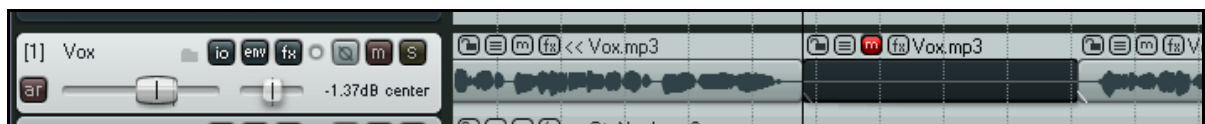
21. With the edit cursor at or near the 56 second mark, repeatedly press the **+** key, until the area we want to deal with occupies most of the screen.
22. Click once on the media item to select it.



23. Click and drag just below the timeline to select the region that we wish to work with (see below).



24. Right click over the media item and choose the command **Split Items at Time Selection**. This creates a new item, and this new item is still selected.
25. Click on the **Mute** button for this new item..
26. Press the **~** key again to return the whole of your song to the display.
27. Play the song. Notice that the **Vox** track is now muted during the passage that we have been working on.



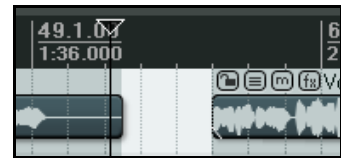
28. Press **Ctrl S** to save. We'll be returning to this example shortly.

**Tip:** When you are playing back a song, in the course of editing you may from time to time wish to reset your VU Peaks without needing to stop and restart playback. To clear one peak, simply click on the peak number shown at the right hand end of the VU meter in track view. To clear all peaks, hold down the **Control** key while you do this.

## 6.20 Editing Media Items During Playback

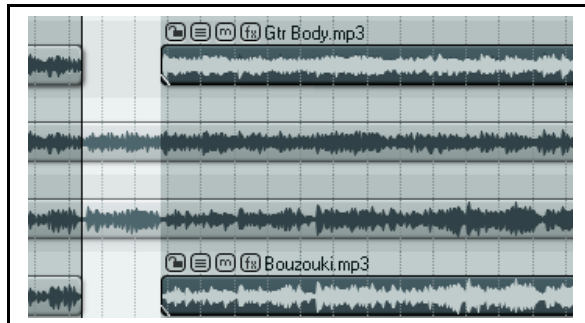
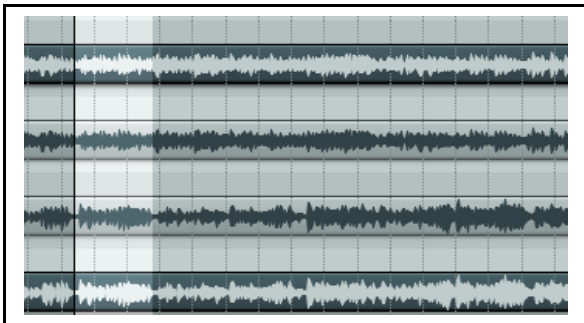
At times you may wish to edit a media item while the project is playing and without stopping playback. For example, you might wish to select and mute part of a media item. You can do this using the following method, which is the same whether or not you have the option **Loop points linked to time selection** enabled:

1. Play the project.
2. Select the area of the item that you wish to work with (for example, to mute, delete or copy) by holding down the **Alt** key and **clicking and dragging with the right mouse button** along the required portion of the track. The result of this is shown above right.
3. Right click over the selected area and make your choice from the menu. For example:
  - To remove the selected area, choose **Cut selected area**. The effect of this is shown on the second screen shot (right).
  - To create a separate item choose **Split items at time selection**.



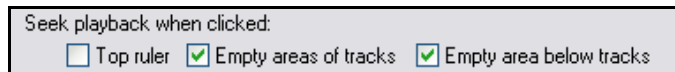
### Notes:

1. You can do this with more than one adjacent track at a time by simply extending the mouse over both tracks when you are making your selection.
2. You can even do this for media items in non-adjacent tracks. Select the first area as explained above, then hold **Ctrl** while you click on any subsequent tracks. In the first of the two screen shots below, tracks 1 and 4 have had an area selected in this way. In the second screen shot, the same selected area has been cut from both media items.



### Managing the Play Cursor

By default, when a project is playing, pressing **Stop** (or **Spacebar**) will stop playback and return the play cursor to its previous starting position. Pressing **Pause** (or **Enter**) will pause playback at the current play cursor position. There is, however, a third option. You can click on the Time Ruler, an empty area of any track or anywhere in the empty area below the last track.



Each of these will have one of two effects, depending on your **Options, Preferences, Audio, Playback** settings. Notice the options under **Seek playback when clicked**.

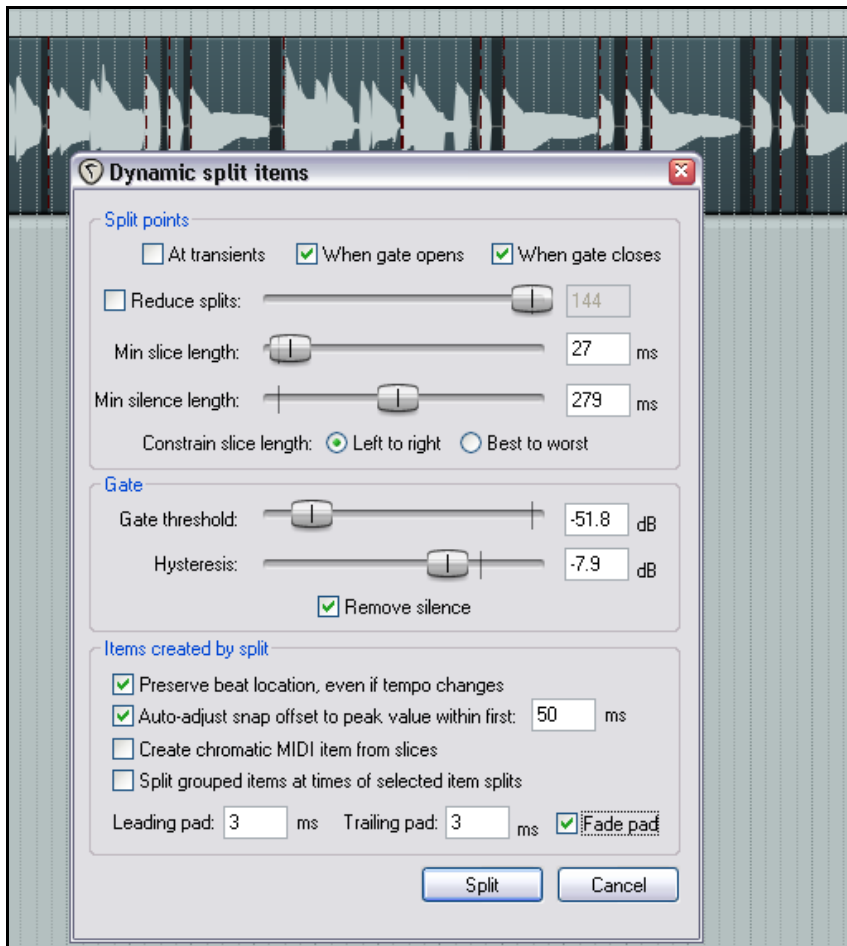
For any of these options that are ticked, clicking at any point will cause the playback to be immediately moved to that point. For any of these options that are not ticked, the play cursor will be moved to that point the next time playback is stopped.

### 6.21 Dynamic Splitting - Remove Silent Passages

REAPER's Dynamic Splitting is a powerful feature which can be used for all sorts of purposes. Many of these are designed to help you with tempo based composition, but it has other more widespread applications. One such use is to clean up a track and remove those passages that should be silent. This can be handy, for example, with a vocal track, to automatically clean up the passages between verses which might contain unwanted background noises such as breathing or shuffling sounds.

Suppose that you have recorded such a vocal track. With dynamic splitting you can effectively tell REAPER to go thru the track and take out all of the passages where the vocalist isn't singing. These are the passages where you want the track to be silent and which otherwise might contain various breathing or other unwanted sounds.

To do this, you first select the media item then right click over it and choose the **Item processing, Dynamic split selected items...** command. You then need to select the required parameters before splitting.



You are given immediate visual feedback before executing the command. Each split point is indicated by a colored vertical line, and those areas marked for removal are shown as darker.

Dynamic splitting will be examined in more detail later, in the context of tempo based music production, but when applied to this particular task it can be used as explained in the table below.

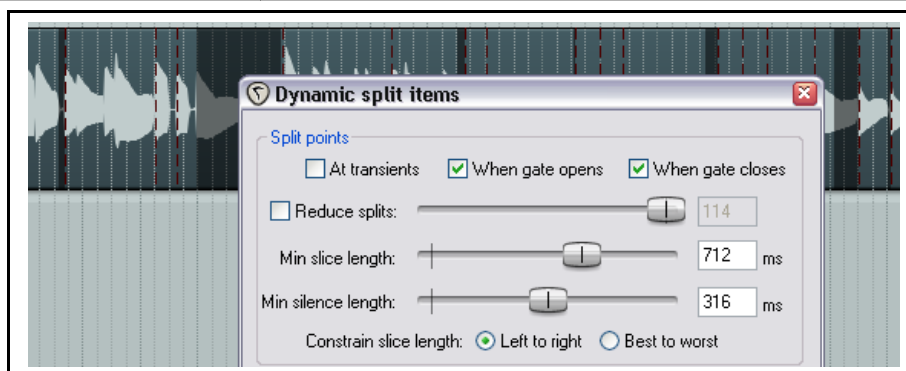
Start with settings similar to those shown above and adjust then as necessary.

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### Summary of Dynamic Splitting Parameters

When used in this way, dynamic splitting basically employs a noise gate to tell REAPER how often and where to split your media items and which areas are to be removed.

Dynamic Splitting Parameter	Setting to Remove Silent Passages
<b>At transients</b>	Deselect this option when using dynamic splitting for this purpose.
<b>When gate opens</b> <b>When gate closes</b>	Both of these options need to be turned on, so that REAPER can work out the beginning and end of each passage that is to be removed.
<b>Reduce split</b>	In most cases, when using dynamic splitting for this purpose this item should be deselected.
<b>Min slice length</b>	This sets the shortest length for any slice. You will probably need to experiment to get it right. Usually, this should be set to a low value. Happily, REAPER's dynamic splitting interface gives you immediate visual feedback. You can see by looking at the screen when your settings are right. The illustration below shows the effect of setting this value too high. Notice that it can result in some recorded passages also being removed



<b>Min silence length</b>	This is another parameter that will require fine tuning. Set too high it will fail to catch all the periods of silence,
<b>Constrain slice length</b>	In most cases for this particular application this setting should not matter. If in doubt, try both and be guided by the visual feedback.
<b>Gate threshold</b>	This setting is important, but usually has a reasonable range of acceptable values. If you make this too low you might allow unwanted sounds thru the noise gate. If you set it too high you risk deleting quieter passages of the recorded material. Start around -50dB and make any necessary adjustments from there.
<b>Hysteresis</b>	This setting can be used to adjust the level at which the gate closes relative to that at which it opens. In the example shown above, the gate will close at -62.5 dB and reopen at -50 dB. Raising the hysteresis figure closer to or even above 0dB will have the effect of creating more splits.
<b>Remove silence</b>	This option should be enabled.
<b>Fade Pad</b>	Enabling fade pad can help ensure a smoother transition.
<b>Other settings</b>	Leave them as shown here

### 6.22 Crop Project to Selection

In the course of recording your tracks, it's not unusual to end up with a period of silence at the beginning, before your song actually starts, and varying periods of silence at the end of your various tracks, where you have perhaps allowed the recording to continue longer than is necessary, to make sure that you don't lose the decay of a particular instrument.

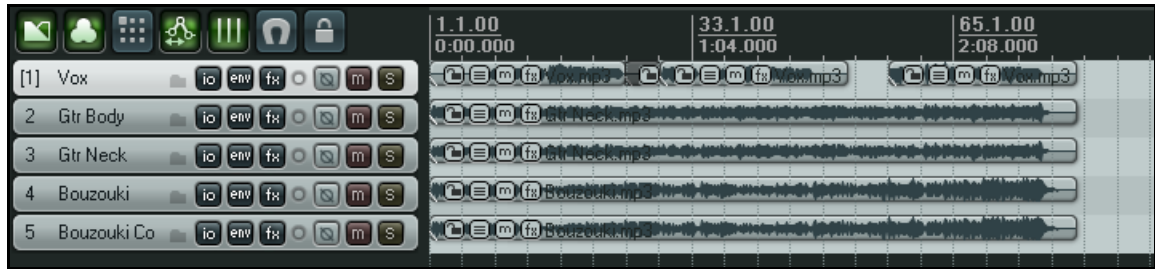
Of course, you can fix this by slip-editing your tracks individually, then dragging and dropping them to the start of your timeline. A quicker way would be to **Crop project to selection**.

To crop a project to selection, do this:

1. Click and drag along the background area to mark the area that you want to keep – see picture below.



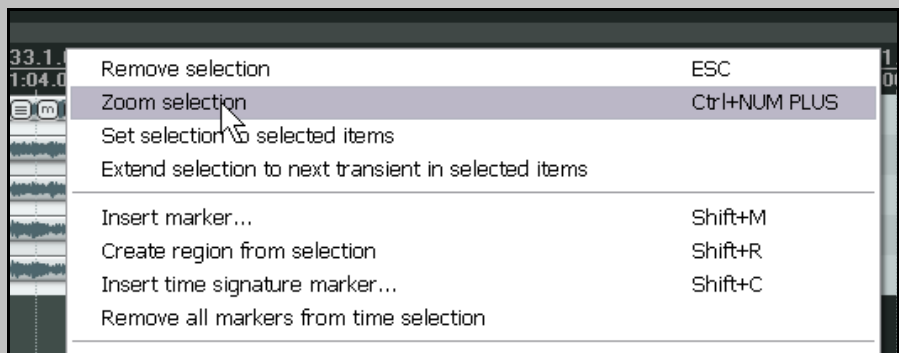
2. Right click over the Timeline and choose **Crop project to selection** from the menu. Press **Esc** to remove the time selection.



3. Save the file.

**Tip:** If immediately after cropping to selection (and before pressing **Esc**) you again right click over the Timeline and choose **Zoom selection** from the context menu, your project will expand horizontally to fit the width of your Track View window.

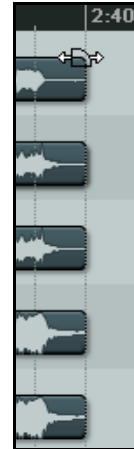
You can use the keyboard shortcut **Ctrl Numpad PLUS** to do this if you prefer.



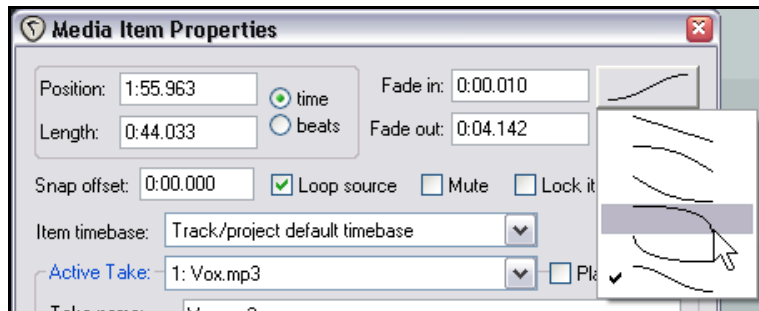
## 6.23 Adjusting Fades

If you select the rightmost clip in each track and zoom in, you will see that there is a fadeout curve at the end of each item. You can change both the shape and duration of this curve, either using the mouse, or thru the **Item Properties** dialog box.

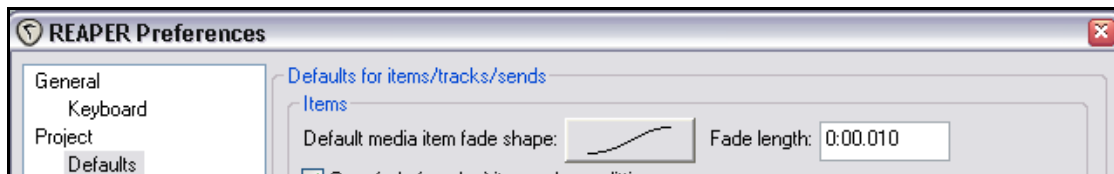
1. Select the rightmost item on each track.
2. Hover your mouse over the border between the end of any track and the background area, near the top of the media item. The mouse changes to display a curved shape.
3. Click and hold down the mouse button. Drag to the left to increase the length of the fadeout (see picture left) then release the mouse.
4. Notice that the fadeout curve is now more gradual. But we want it to start sooner.
5. Make sure that these five media items are still selected.
6. Place the mouse over the border between the end of any item in the selection and the background area. Notice it changes to a horizontal double-headed arrow.
7. Click, hold and drag the mouse a little to the left. Notice that because the tracks now become a little shorter the fadeout, though still the same length, will begin sooner.
8. Now select any one of these items, right click over it and select **Item Properties**. Notice that the new length of the fadeout has been recorded here. If you wish, you can also adjust the length of a fadeout by changing the value in the dialog box.



9. Notice (above right) also that, still in the **Item Properties** dialog box, you can change the shape of the fade curve if you wish. This can also be changed in Track View by hovering the mouse over the fade for any track (or selection of tracks) until the mouse displays a fade curve. Right-click for a menu of different curve shapes



Notice that your **Preferences** dialog box includes an area on the **Project Defaults** screen where you can specify default fade and crossfade behavior.



**Tip:** You can change the shape of any individual fade (in or out) by right clicking over the fade at the start or end of the media item, then choosing from the list of shapes that is displayed.

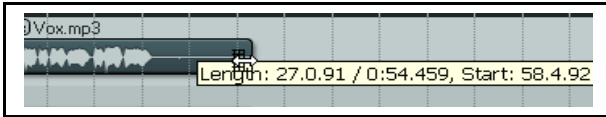


### 6.24 Slip Editing

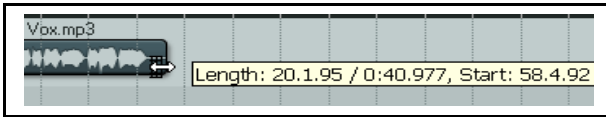
You can slip-edit unwanted passages from the start or end of a media item by following this sequence:

- Hover your mouse over an item's left or right edge so that the mouse appears as a double headed horizontal arrow,
- Click and drag to the left or right (as appropriate), then release the mouse.

Illustrated is an example of slip-editing, before and after:



An example of a single media item before slip editing.

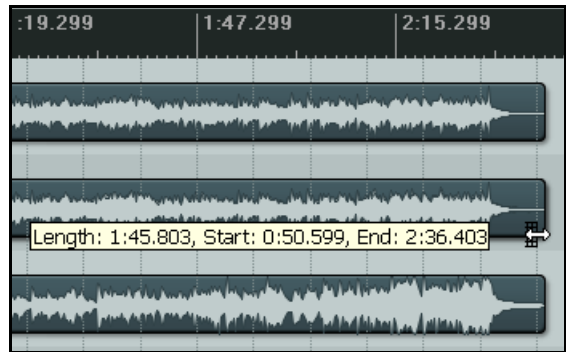


An example of the same media item after slip editing.

### Slip Editing Multiple Items

To slip edit several items in different tracks, simply select all the media items required (hold the **Ctrl** key while clicking on each item required), then slip edit any item in the selection.

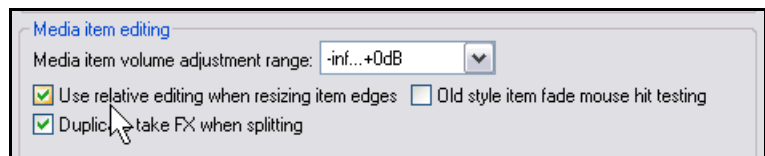
The example on the right shows three items in three separate tracks being slip edited together.



To slip edit several items in the same track, you must first ensure that the option to **Use relative editing when resizing item edges** is enabled. This option can be found under **Options, Preferences, Media**.

You can then select several items in the same track and slip edit them together.

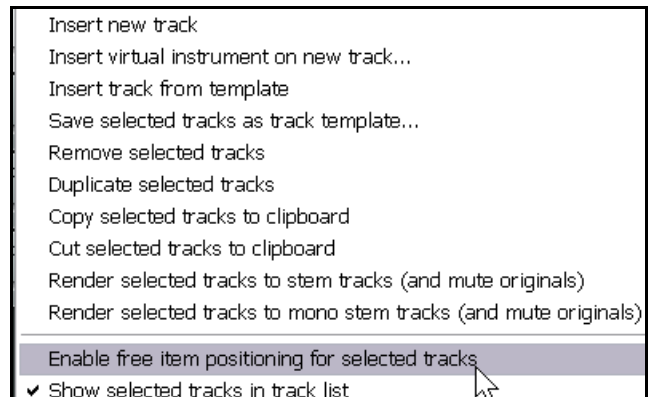
When **Use relative editing** is enabled, you can also apply fades to multiple media items by holding **Ctrl Alt** when applying the fade.



### 6.25 Free Item Positioning

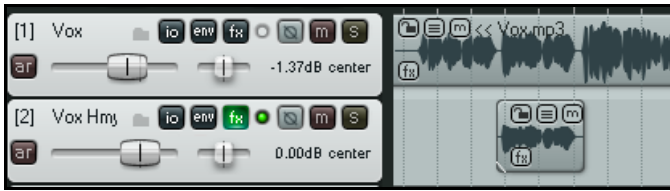
Choosing the option for **free item positioning** enables you to move your media items around freely within a track or tracks. This can be helpful, for example if you want two or more media items to play simultaneously or to overlap on the same track. To turn this feature on:

- Select the track (or tracks) for which you wish to allow free item positioning.
- Right click over the Track Control Panel and choose **Enable free item positioning for selected tracks** from the context menu.



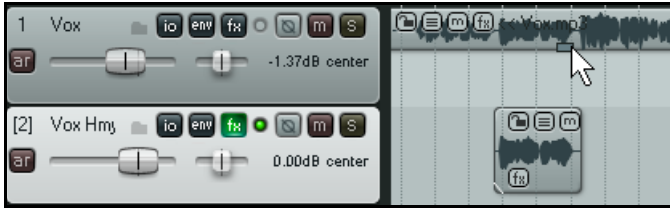
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The following series of illustrations demonstrates an example of how this feature might be used.



In the first screen shot (left) we have a Main Vocal and a Harmony Vocal on different tracks. We might find it convenient to place these together on the same track.

In the second screen shot, we have enabled free item positioning for the Vox Main track.



Notice that there is a small handle (shown by the mouse cursor) which can be used to adjust the height of this media item.

In the third screen shot (below), the media item for the Vox Hmy track has been dragged and dropped into the Vox Main track.



When this track is played, both these media items will play together. In fact, in this example, Track 3 can now be deleted.

Notice that even after free item positioning has been enabled, you can still use the **Media Item Properties** dialog box (F2) to adjust such aspects as volume and panning for individual media items.

## 6.26 Coloring Individual Items

You can change the colors of individual media items (or selections of media items) by right clicking over the item (or any item in a selection) and choosing the command **Item settings, Set selected items to custom color**.

### Examples

In the example shown above, our vocal track has been split into six individual items. Let us suppose that these go verse, chorus, verse, chorus, verse, chorus and that for whatever reason we wish to emphasise the choruses.

We can select the three items, then right click over any of them and choose **Item settings, Set selected items to custom color** from the menu.



We can then select any color we wish from the **Colors** dialog box and click on **OK**. These items are now shown in the selected color.



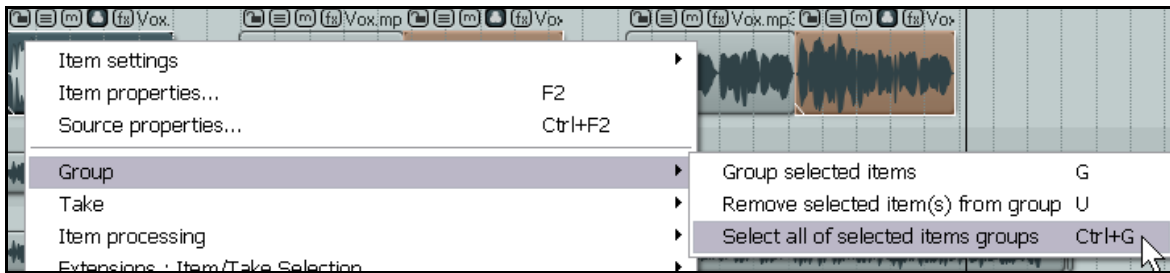
Other available commands include **Set selected items to random color** and **Set selected items to one random color**. To remove a custom color, choose **Set selected item color to default**.

### 6.27 Grouping Items

Provided that Grouping is enabled – **Options, Item Grouping** command, or **Alt Shift G** – items can be grouped together to facilitate working with them. Select the items and use **G** to add them to a group. If you prefer, you can use the **Item grouping** button on the REAPER toolbar to toggle grouping on and off. In the example shown below, items 2 and 4 have been grouped. Notice that for these grouped items an additional icon is displayed (see position of mouse cursor).



Further items can be added to a group. Select any item in the group, then press **Ctrl G** to select the entire group. Hold the **Ctrl** key while you click on those items that you wish to add to the group, then press **G**. Note that **U** removes a selected item from a group. You can also use the **Group** commands from the right click item menu to manage groups.



#### Example

Here is a simple example, using the file **All Through The Night EDITS.RPP**

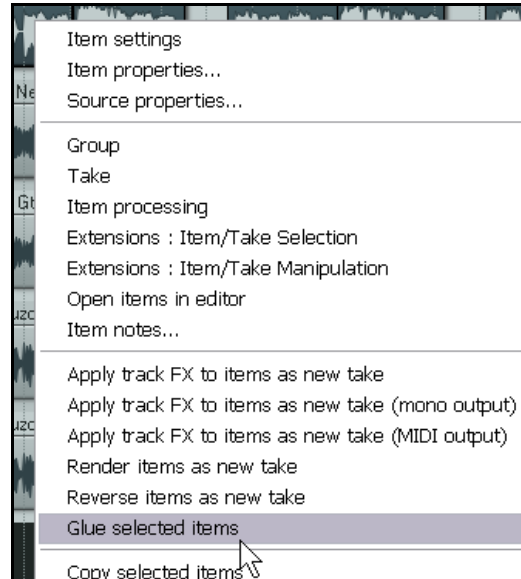
1. We'll start by tidying up this file a little. Select the first of the muted items on the **Vox** track, then hold the **Ctrl** key while you select the second muted item. Press **Delete** to remove these. This track should now comprise three items.
2. Check your **Options** menu to ensure that **Grouping** is enabled. If it isn't, turn it on. Notice that by default, the keyboard shortcut **Alt Shift G** can be used to toggle Item Grouping on and off.
3. Select the first of the Items (audio clips) in the Vox track. Hold down the **Ctrl** key while you select in turn each of the other two items for this track.
4. Press **G** to bind them into a group.
5. Click on any other item to select it. Now click again on the rightmost item in Vox items group to select that. Click and drag to the right then release the mouse. Notice that the whole group moves together.
6. Obviously, we don't really want to move our Vox items to this place. Press **Ctrl Z** to restore them to their former position.
7. Now select the first of the Vox items and press **U** to remove it from the group. Click and drag to the right the last of the Vox items – this time, the first item does not move with the group.
8. Press **Ctrl Z** to undo.
9. Now click on any media item outside the group. This deselects the group.

## 6.28 Glue Selected Items

Grouping items is useful when you wish to be able to work with them as a group, whilst also ensuring that each item still retains its individual properties. When you group items, you will be able to later remove items from the group and adjust any of the settings in that item's *Item properties* window should you wish to do so.

However, if you wish to permanently treat the items as one, you should consider using the **Glue selected items** command. When you glue items together, a new media item is created and they become one. For example, two MIDI items glued together will automatically and always open together in the same MIDI Editor window. Two audio items glued together will now share the one *Item properties* window. Keep in mind that items that have been glued together can be later split up any way you wish. This can be useful if you later realise that you need to adjust one or more properties (such as perhaps panning or playback rate) of a portion of a glued item. To glue together a number of adjacent items in a track, follow this procedure:

1. Select all of the items that you wish to glue. The easiest way to do this is probably to right click and drag the mouse across the items.
2. Right click over any item in the selection and choose **Glue selected items** from the context menu.

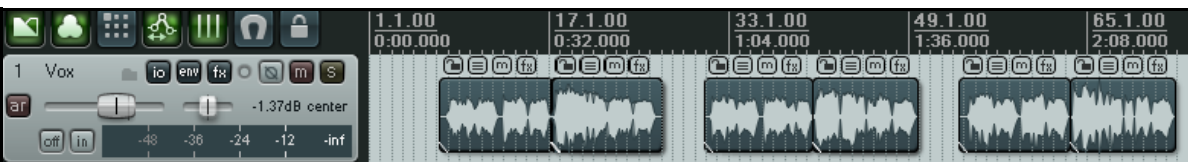


### Example

In the example shown below, a track is made up of five separate media items:



By positioning the mouse initially over the first item, then right clicking and dragging to the last item before releasing the mouse, we ensure that all items are selected.



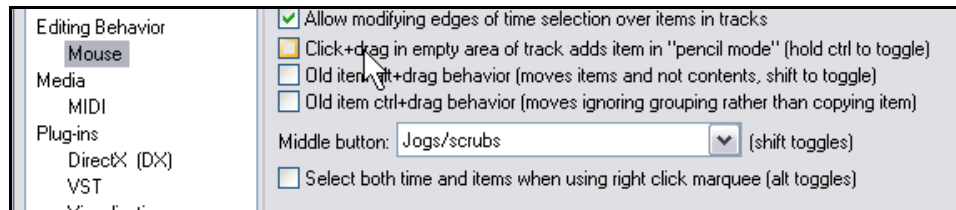
We then right click over this last item (where the mouse is shown above) and choose **Glue selected items** from the menu. As a result, the five items are joined into one, as shown below.



### 6.29 Creating and Copying Items in Pencil Mode

REAPER includes an optional pencil mode that can be used to either create new media items or make copies of existing ones.

How the feature works is determined thru the **Click and drag in empty area of track adds item in pencil mode** option.



This option can be found on the **Editing Behavior, Mouse** page of the **Options, Preferences** window.

If this option is enabled, clicking and holding your left mouse button over any empty area of the track background area accesses pencil mode. Otherwise, you will need to hold the **Ctrl** key while clicking to use pencil mode. When pencil mode is engaged, the mouse cursor will change to resemble a small pencil (as shown below) whenever the mouse is hovered above an empty area of the track view window. You can then click and drag to create the required item.

#### Example



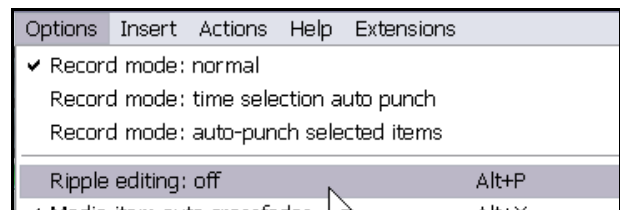
In the above example, the second of the tracks shown has free item positioning enabled, and the mouse behavior setting is as shown at the top of this page. We have selected the item in this track, then used **Ctrl** with click and drag to create a copy of this item underneath it.

**Tip:** Remember that you are able within your **Snap/Grid Settings** to determine whether media items, including those created in pencil mode, should be automatically snapped according to your snap settings.

### 6.30 Ripple Editing

Ripple editing is a good way to perform an edit within a busy timeline and maintain sync relationships. When you perform a ripple edit, you are essentially adjusting the duration of a clip by manipulating its In and Out points and by doing so the items beyond the edit points are adjusted by the same value.

To access Ripple Editing, choose the **Options, Ripple editing** command, or use the keyboard shortcut **Alt P**, or use the **Cycle Ripple Editing Mode** button on the main toolbar. The same action (choosing the command or using the shortcut) toggles the Ripple Editing status between three states:



**Off:** This is the default mode. Items will not shift when you do edits on a track.

**One Track:** If you select the ripple editing option once, it will select one track ripple editing. This means anything you do to items on that track will affect other items of the same track.

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**All Tracks:** If you select the ripple editing option once more, it will enable the All tracks ripple editing. This means anything you do to ANY of the items on ANY track will affect the ENTIRE project. Helpful for deleting entire sections of songs.

In this mode, markers and automation are locked to the items that they relate to, so as you move items the associated markers and automation move too. Using this mode on multiple tracks is very useful for editing multitrack recordings of live material - everything that belongs together stays together in sync as you edit. Conversely, using this mode with an item on a single track makes REAPER behave rather like a stereo editor.

For instance, if you split the item at a couple of places (so you now have three items) then delete the middle piece, the remaining pieces join up, but unlike with a normal stereo editor, you can adjust the join by dragging the ends of the items appropriately. If you want to move material from one place to another, you can split at the insertion point, drag the material to the right of the insertion out of the way, then make the insertion and drag the displaced material to join it. All items to the right of the dragged item will stay together and markers and automation will move correctly too.

### Examples

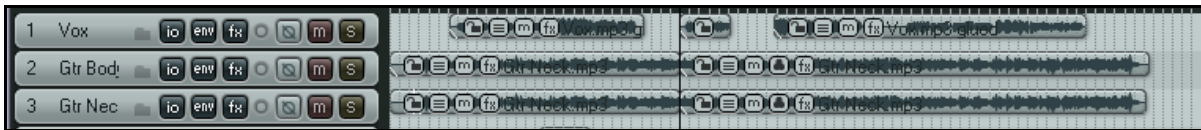


The three illustrations below show the effect of copying the third media item in the first track shown above, then pasting the copy in between the first two media items on the same track.

In the first instance, Ripple Editing is set to **Off**. In the second instance, Ripple Editing is turned on for just the **One Track**. In the third instance, Ripple Editing is turned on for **All Tracks**.

#### Ripple Editing Off:

None of the existing media items are moved to make more room for the new one.



#### Ripple Editing One Track:

Media items are moved over only on the track in which the new material is inserted.



#### Ripple Editing All Tracks:

Media items are moved over on all tracks.



### 6.31 Trim to Selected Area

If you want to trim a media item or track from both the start and the finish at the same time you can do so. Just follow this sequence:

1. Select the media item (or items).
2. Click and drag in the track background area to select the area that you want to keep.
3. Right click over a selected media item and choose **Trim items to selected area**.

If **Ripple Editing** is turned on, the area that is trimmed will also be removed from the timeline, otherwise some empty space will be left. T

**Tip:** If your **Snap/Grid Settings** are set to include **Media Items**, then provided that snapping is enabled, snapping will be applied when you select the area to be trimmed..

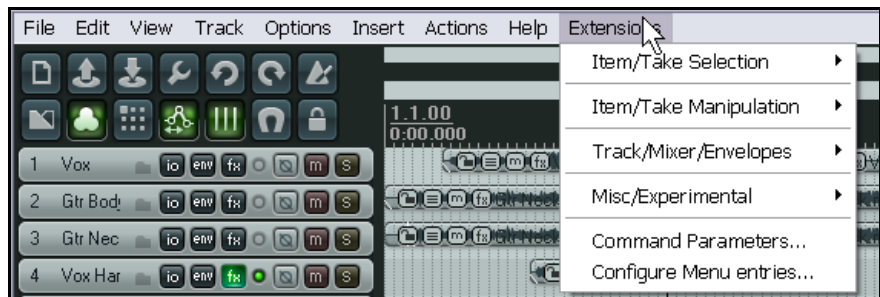
### 6.32 Xenakios Extensions

As you get to know REAPER better you will find that there are a number of editing and related actions that you will want to use frequently. This might include, for example, actions as diverse as lining up a selection of items with the edit cursor, or adjusting the volume on an entire selection of media items in one action. You will find that many of these actions – and much more - are available as a plug-in to REAPER by downloading and installing the **Xenakios Extensions Pack**. To do this, you simply follow this sequence:

1. Go to <http://stash.reaper.fm/tag/Extension-Plug-ins> or <http://sites.google.com/site/xenakios/>
2. Select the file **reaper\_xenakios\_command.dll** and download it.
3. Copy the downloaded file to the folder **C:\Program Files\REAPER\Plugins**
4. Start REAPER in the usual way.

You will now find that there is an additional command – **Extensions** – on the REAPER main menu (see right). These commands are also available on the right click context menu for media items.

REAPER is being constantly improved, as are these extensions. Your menu may not be identical to that shown here. Be prepared to explore this menu and its various submenus for yourself.



Some of the actions that you might find especially useful (from the **Extensions**, **Item/Take Selection** and **Item/Take Manipulation** menus) include:

**Move Selected Items To Edit Cursor**  
**Trim/Untrim Item Left Edge To Edit Cursor**  
**Trim/Untrim Item Right Edge To Edit Cursor**  
**Rename Selected Take(s)**  
**Choose New Source File For Selected Takes**  
**Select First Take In Selected Items**

**Nudge Item Volume Down**  
**Nudge Item Volume Up**  
**Reset Item Volume To 0.0**  
**Set Volume And Pan Of Selected Takes**  
**Set Volume Of Selected Items**  
**Select Last Take In Selected Items**

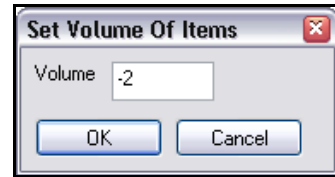
## Example

The Xenakios Extension Pack contains so many useful items that it would require an entire separate manual to explore all of the options. Some of these commands apply to tracks and are available by right-clicking on the track name or number and choosing **Xenakios Extensions** from that menu. Others apply to items and are available by right-clicking on the item and choosing either **Extensions: Item/Take Selection** or **Extensions: Item/Take Manipulation** from the menu. Let's look at one simple example to get you started.

In this example you will be shown how to use one of these items – **Set Volume of Selected Items**. It's then up to you to explore the other Xenakios Extension commands.

*This example requires that you have already downloaded and installed the Xenakios Extension Pack.*

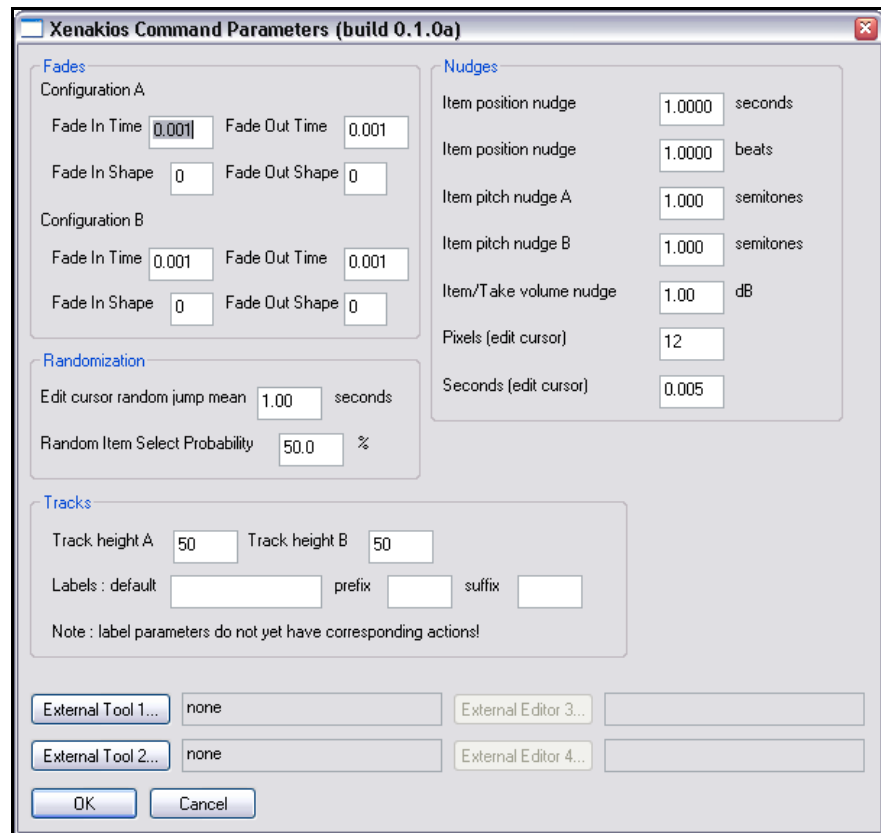
1. Open the file **All Through The Night.RPP** and immediately save it as **All Through The Night XEN.RPP**.
2. Click on the media item called **Gtr Body.mp3** then hold the **Ctrl** key while you click on the media item **Gtr Neck.mp3**. Both items should now be selected.
3. Right click over either selected item, and choose **Extensions: Item/Take Manipulation** from the menu, then **Set Volume of Selected Items**. A prompt **Set Volume of Items** will be displayed.
4. Type **-2** (as shown right) and press **Enter**.
5. Notice that both these media items have now been lowered by 2 decibels.



As you explore the various Xenakios extension commands, you will see that many of them use *parameters*. For example, you will come across commands like **Set fades of selected items to Configuration A**, **Set fades of selected items to Configuration B**, **Set selected track height to A**, and **Set selected track height to B**.

You define the values that you want assigned to these parameters in the **Command Parameters** window, accessible from the **Extensions** command on REAPER's main menu (see right).

If you find the sheer number of these extension commands a little intimidating at first, you can use the **Configure Menu Entries** command from the **Extensions** command on REAPER's main menu to hide those Xenakios extension commands that you feel you are less likely to need.





### 7 Arranging and Editing Multiple Takes

Earlier, in Section 3, we looked at how you can create multiple takes when you are recording.

The editing and arrangement techniques that you have already learnt can also be applied to editing a project with multiple takes. Of course you have a number of options at your disposal for doing this. This example is intended really to get you thinking about how you might approach the task. You have two main methods at your disposal. You can either:

- Explode the takes to new tracks. You can then work on and edit each track separately and (if you wish) join them all back to a single track when you have finished, *or*
- Work on and edit the various takes all within the single track on which they were recorded. We'll get to this method later in this section.

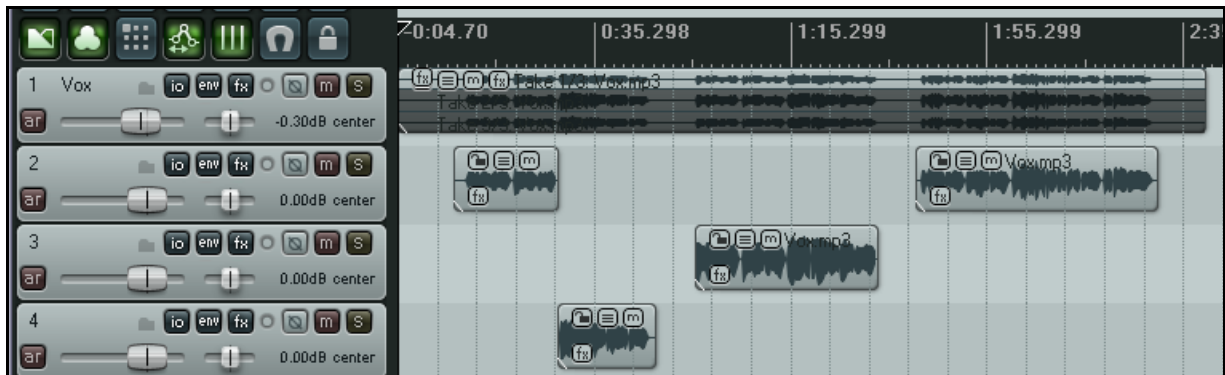
#### 7.1 Exploding Takes to Multiple Tracks

We'll start by looking at the first of these two methods. Let's suppose that we have recorded three takes of a vocal track. Here we can right click over the item and use the **Take, Explode all takes to new tracks** command.



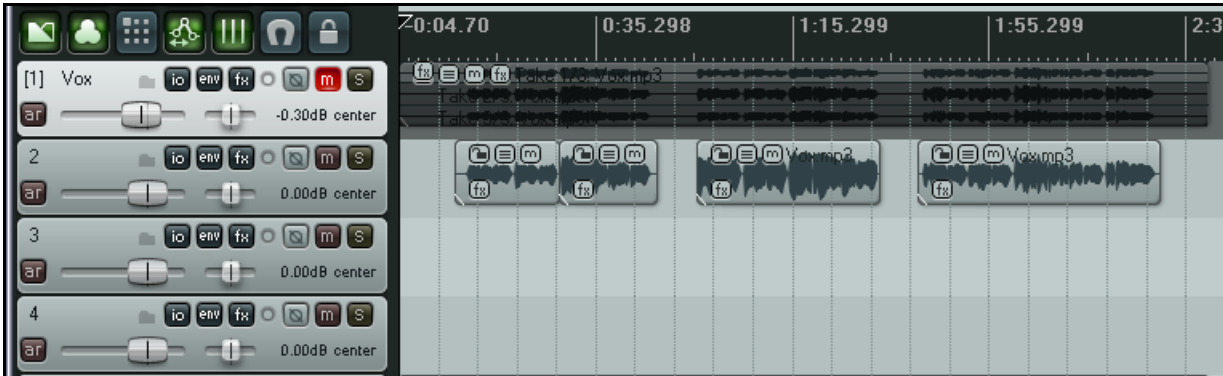
Notice that this command creates (in this case) three extra as yet unnamed tracks – the original track with its three takes is still intact. After auditioning, we have decided which parts we want to use from each take.

In the next illustration, we have edited the various takes to leave only the portion of each take that we wish to keep. This has been done using the various techniques that have been covered in Chapter 6.



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Finally, we select the various items from tracks 3 and 4 and use the **Num Lock 8** key to move them up to track 2. Track 1 is now muted and could of course be hidden if we wish. Tracks 3 and 4 serve no further purpose and could be deleted.



You could now select all of the items in track 2 and use the **Glue Selected Items** command to bind them together as one media item.

Notice here that the original muted track with the three takes on it is still available. This makes it easy at some later time for us to change our selections that have gone into making the new Track 2 if we wish to.

### 7.2 Crossfades

If you intend to arrange your media items so that they overlap at all, then you should first decide whether or not you want REAPER to add a crossfade. This feature is turned on and off using the **Auto Crossfade** button on the main toolbar (or the keyboard shortcut, **Alt X**).

The curves of crossfades can be edited like any other. You can extend the crossfade in either direction by moving the fade bars (so long as there is material left in the item) and that if you press shift while dragging the crossfade, you can slide it bodily to a new crossfade point.



Using these techniques can ensure that an otherwise abrupt edit is smoothly disguised by a gradual transition at the best edit point.

### 7.3 Exploding Takes in Place

Another interesting option is to use the **Take, Explode all takes (in place)** command. This has the effect of merging all takes on the track into a single take. Here's an example of when you might wish to do this. The track shown here includes a lead vocal that runs the whole length of the track and two more takes of vocal harmonies for the choruses only. These have had their individual item properties (such as pan and volume) adjusted to give you the sound that you want.



By exploding all takes in place, all this material is written to a single take on a single track, so that you can now treat it as one vocal item for the purposes

of setting an overall volume level, adding FX and so on.

### 7.4 Editing Multiple Takes

You don't need to explode takes to multiple tracks in order to edit them. In this section we'll see some of the ways in which you can edit your takes all within a single track.

#### Slice and Dice

When you choose the **Option to Show all takes in lanes (when room)** there is a neat technique known as *slice and dice* that helps you combine the best of each take together, to play as one track.

To do this, you simply **Split** the track in as many places (and at the exact points) that you think appropriate, then select from each slice your preferred section. An example is shown below:



Track 1 has been sliced in six places to create seven sections. For each section, the take shown with the light background has been selected. When the track is played, they will play seamlessly together as if they were a single take. After completing the *slice and dice*, there's no need any longer to show the separate layers:



You can also right click over the track's media items and choose the **Take, Crop to active take** command to discard the unwanted segments.

**Tip:** When you use Lanes and Slice and Dice in this way, you can use the Num Pad keys 1 and 3 to slide items left or right if their timing is slightly out of sync with other takes. The exact amount by which these keys will slide your selected media item(s) will depend on how closely you are zoomed in or out.

#### Play All Takes

You have the option, if you wish, of playing all takes in a track. You might wish to use this, for example, for a double-tracking or vocal harmony effect. Just right-click over one of the takes and choose **Item settings, Play all takes**.

#### Further Explode and Implode Options

As well as being able to **Explode all takes to new tracks** and **Explode all takes (in place)** you have a number of other related **Take** menu choices. These are:

**Explode all takes (in order):** This explodes all takes within the selected track and places them sequentially one after the other.

**Implode selected items across tracks into takes:** Creates a new track using the selected items as takes on that track.

**Implode selected items on same track into takes:** Converts the selected items (on one track) into a series of takes on that track.

## 7.5 Take Envelopes and Take FX

We'll have a lot to say about envelopes in Chapter 14, including how to manage and edit them. For now just notice that you can create any of three envelope types for any or all of your takes. These are volume envelopes, pan envelopes and mute envelopes. All three options are available from the right-click **Take** menu.

Individual takes can also be assigned their own FX. Select the take and press **Shift E** to display the FX Window for that take. Alternatively, you can use the command **Show FX chain for active take** from the right-click **Take** menu. This menu also includes a command to **Remove FX for active take**.

Next take	T
Previous take	Shift+T
Delete active take	
Crop to active take	Alt+Shift+T
Duplicate active take	
<hr/>	
Show FX chain for active take	Shift+E
Remove FX for active take	
<hr/>	
Take volume envelope	
Take pan envelope	
Take mute envelope	

## 7.6 Applying FX to Items as New Takes

Another important use that you may have for takes is to apply track FX to items as new takes.

You might wish to do this if you are running low on CPU. Remember that you can consult REAPER's **Performance Meter** to show how much CPU is used by FX on a track by track basis.

Just suppose that you notice that one or more of your tracks are particularly CPU intensive. Here's what to do:

1. Select all of the tracks involved.
2. Right click over any of the selected media items and from the context menu choose **Apply track FX to items as new take** if you want a stereo take, or **Apply track FX to items as new take (mono output)** if you want your new take to be Mono. If the items are MIDI items, you may choose the option **Apply track FX to items as new take (MIDI output)**.
3. Make the new take active and click on the **FX enabled/FX disabled** toggle button for the track(s) in question, in order to disable the track FX.

Of course, at any time you can re-enable the Track FX, make any changes to the Track FX settings, or make changes to your track FX chain, and apply your changes again as a new take. This process of applying a track's FX as a new take is in some respects similar to Stem Rendering. It effectively serves the same function as freeze and unfreeze in some other DAW applications.

## 7.7 Creating a Duplicate Take

To create a duplicate of any take, follow this procedure:

1. Select the required take.
2. Right click over the media item.
3. From the context menu, choose the **Take** command, then **Duplicate active take** (see below).

## 7.8 Crop to Take

Crop to Take can be used when you have finally sorted out exactly which portions of each take you wish to keep for your track. By right-clicking over the current active take and choosing **Take, Crop to Active Take** from the menu you can ensure that all of the unwanted take portions and segments are removed from the track. This can make managing the track easier.

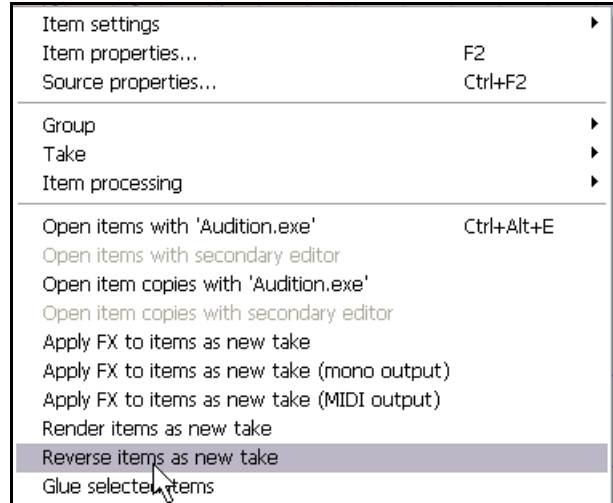
### 7.9 Reversing Items as New Takes

The **Reverse items as new take** feature of REAPER can be used to create some interesting effects. You can reverse an item as a new take by following this procedure:

1. Select the Media Item.
2. Right click over it.
3. Choose **Reverse items as new take** from the menu.

Notice that:

- If you wish to play both the original track and the reversed track together and at the same time, you can do so by selecting the item, pressing **F2** to display the **Item Properties** settings and selecting the option to **Play all takes**.
- If you wish to send the reversed take to a different track altogether, select the item, right click over it, then choose the **Take** command then **Explode all takes to new tracks**.



### 7.10 Non Destructive Editing

We mentioned earlier that REAPER uses non-destructive editing. Here is a short demonstration of what this means in practice:

1. Position the Edit Cursor about 15 secs into the song and at that point select the media item for the first track in your file **All Through The Night EDITS.RPP**. There should be just one clip for the entire track.
2. Press **S** to split this track. The rightmost item should now remain selected.
3. Press **Delete** to delete this. That of course was a deliberate mistake. Of course, you could press **Ctrl Z** to undo this, but let's suppose that you've not noticed the mistake until perhaps a few days later.
4. Press **Ctrl S** to save the file, then close REAPER.
5. Open REAPER again, and make sure this file is displayed.
6. Position your mouse over the boundary between the end of your truncated item and the background area, so that it displays a double-headed arrow.
7. Click, hold and drag the mouse to the right all the way to the end of the song. Notice that the original clip is restored. All you need do is redraw your fadeout curve!
8. Save the file.



## 8 Loops, Markers and Regions

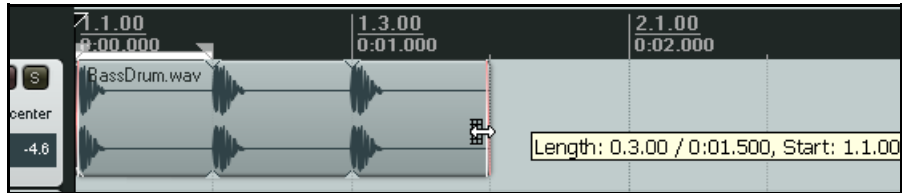
### 8.1 Creating Loops

Any Audio, MIDI or Click Source Item can be looped. The loop point is defined by the duration of the source Media. If you insert an item that is four bars long, it will loop every 4 bars, if it is 8 bars, it will loop every 8 bars, etc.



#### To Loop an entire Item:

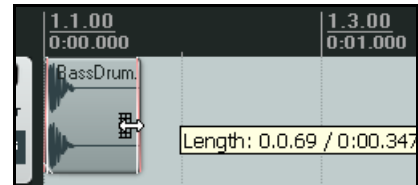
1. Hover the mouse over the an edge of the Item until the Cursor changes to a double-headed arrow (see right).
2. Drag the Cursor to extend the Item. Each loop point will be indicated by a notch in the item edges. Extend as required.
3. The length, start time and end time of the looped item will be displayed as you drag the edge of the loop.



#### Cropping and Looping:

If you wish to loop only part of an item, then the item must first be cropped and glued.

1. As before, hover the mouse over the edge of the Item until the Cursor changes to a double-headed arrow. Click and drag the mouse in on the item to make it shorter, so that you are left with only that part of the item that you want to use as the basis of the loop. Release the mouse button.
2. Right click over the item and from the menu choose **Glue selected item**.
3. Now drag the Cursor to extend the Item. Each loop point will be indicated by a notch in the edges of the item. Extend the loop as required.



#### Changing Playback Rate:

There may be times when you will wish to change an item's playback rate.

Taking the same example as above, if you were to display the **Item Properties** box for the original item, make sure that **Preserve pitch when changing rate** is selected and change the **Playback rate** to 1.2, then this would have the effect shown on the right.

The original item (looped) is shown on the right above the modified item (also looped).



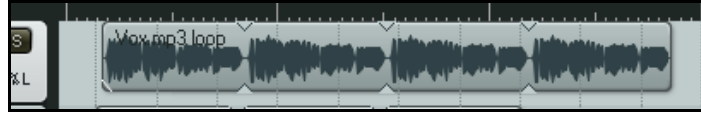
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## Creating a Loop from a Time Selection

Another method is to select the required item, highlight the required part of the item as a time selection, right click, choose **Copy loop of selected area of items**, remove the original, then paste in the loop in its place. This is shown here:



1. Select first the source item, then select the area that you wish to loop (see above). Right click and choose **Copy loop of selected area of item**.
2. With the area still selected, press **Delete** to remove it.
3. Press **Ctrl V** to paste in the area to be looped.
4. Drag the cursor from the edge of the item as before to create the loop.



## 8.2 Creating and Navigating with Markers

Markers are like bookmarks. They can help you when you are navigating, arranging and editing your projects.

Markers are inserted at the current Edit Cursor position. They can be inserted at any time, whether or not the project is being played.

Command	Default Shortcut	Effect
<b>Insert Marker</b>	<b>M</b>	Inserts numbered Marker at present position
<b>Insert Marker (and prompt for name)</b>	<b>Shift M</b>	Inserts numbered Marker at present position and prompts for a marker name.
<b>Right click mouse over Marker</b>		Displays menu with options to Remove Marker or Edit Marker

### Keyboard Shortcuts

Default Keyboard and Mouse Shortcuts for creating and navigating with markers are:

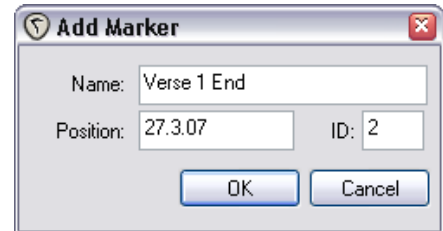
Mouse/Keystroke	Default Function
<b>1</b> on main keyboard, not Num Pad thru <b>9</b> on main keyboard, not Num Pad.	Go to Marker 1 thru 9
<b>0</b> on main keyboard, not Num Pad.	Go to Marker 10
<b>]</b>	Go to next Marker or Project End
<b>[</b>	Go to previous Marker or Project Start
<b>Right Click on Transport Bar</b>	Displays menu. Choose <b>Jump to marker</b> to go to any Marker.
<b>Double click on timeline between two markers</b>	Select area between the two markers.
<b>Click and drag marker along timeline</b>	Moves the Marker.
<b>Double click on Marker</b>	Edit the Marker.
<b>Alt Click on Marker</b>	Remove the Marker.



### Example

This example illustrates the use of markers.

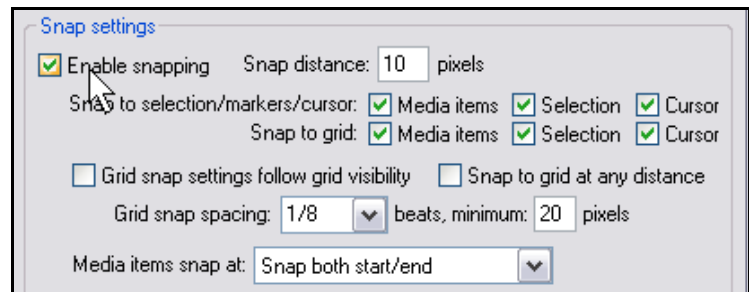
1. Open the sample file **All Through The Night.RPP** and straightaway save it as **All Through The Night MARKERS.RPP**
2. Play the song. Just before the place where the vocal starts. Press **Shift M**. When prompted, type as the name **Verse 1 Start** and press **Enter**
3. At the end of the first verse, press **Shift M** again, name this marker **Verse 1 End** and press **Enter**.
4. Create similar markers for the start and finish of Verse 2 and Verse 3. These will be at or around 1:00, 1:38, 1:46 and 2:35
5. Save the file.
6. Press **1** on your keyboard (not the numeric keypad). Notice the edit cursor jumps to the start of Verse 1.
7. Press **2**. Notice it jumps to the end of Verse 2.
8. Double click on the Timeline between markers 2 and 3. Notice that this area is now selected.
9. Right click over the timeline and choose **Zoom selection**. You could now do any close editing work required for this selection.
10. Press **Esc** to clear the selection, then **Ctrl PgDn** to restore the whole project to view. Save the file.



### 8.3 Snapping to Markers

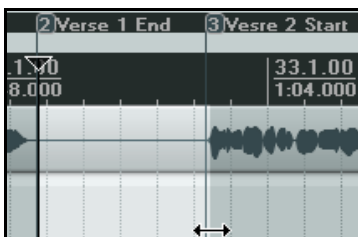
Optionally, you may wish to ensure that when you are making a time selection, the boundaries of the selection will automatically snap to nearby markers at the start and/or end of the time selection (if any such markers are present).

Consider the portion of the **Snap/Grid Settings** shown on the right. Notice that snapping has been enabled, with a snap distance of 10 pixels defined.



With snapping *disabled*, it can be quite difficult to make a selection which ends exactly at a marker. When you attempt to make such a selection, you might end up with the selection shown in the first of the screen shots below. Notice that the end of the selection doesn't quite match the marker.

However, in the second example shown, with snapping *enabled* and the settings shown above, as soon as you drag the selection to within 10 pixels of the marker position, the selection will automatically snap to the marker.



Notice the effect of making exactly the same selection with the above snap settings disabled (left) and enabled (right).



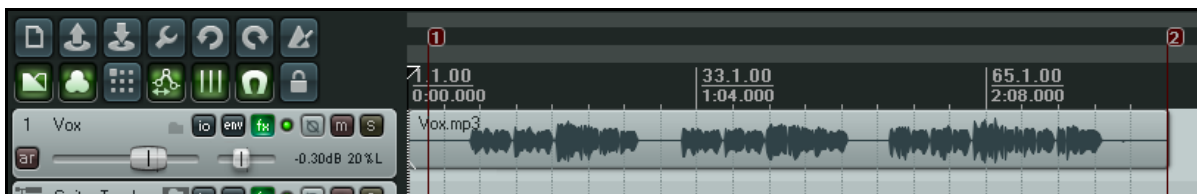
## 8.4 Repositioning and Rearranging Markers

If you want to reposition any of your markers you can, of course, do this by dragging them along the timeline. However, it is sometimes smarter to use keyboard shortcuts to do this. This is especially likely to be the case, for example, if you want to insert a marker out of sequence, or between two existing markers.

Keyboard Shortcut	Default Function
<b>Ctrl 1</b>	Add Marker 1 at, or move it to, the current edit cursor position.
<b>Ctrl 2</b>	Add Marker 2 at, or move it to, the current edit cursor position.
<b>Ctrl 3</b>	Add Marker 3 at, or move it to, the current edit cursor position.
<b>Ctrl 4</b>	Add Marker 4 at, or move it to, the current edit cursor position.
<b>Ctrl 5</b>	Add Marker 5 at, or move it to, the current edit cursor position.
<b>Ctrl 6</b>	Add Marker 6 at, or move it to, the current edit cursor position.
<b>Ctrl 7</b>	Add Marker 7 at, or move it to, the current edit cursor position.
<b>Ctrl 8</b>	Add Marker 8 at, or move it to, the current edit cursor position.
<b>Ctrl 9</b>	Add Marker 9 at, or move it to, the current edit cursor position.
<b>Ctrl 0</b>	Add Marker 10 at, or move it to, the current edit cursor position.

### Example

In the first screen shot (below), a project contains two markers, one at the start and one at the project.



Suppose that we now wish to reposition Marker 2 at the start of the second verse. We can simply position the edit cursor there and then press **Ctrl 2**.



Now let us suppose that we want to create Marker 4 at the end of the song, reserving Marker 3 for a position as yet unspecified. We can position the edit cursor at the end of the song and press **Ctrl 4**.



### 8.5 Removing Markers

There are two main methods of removing unwanted markers.

#### To remove a single marker ...

Position the mouse over the marker "flag" and hold down the **Alt** key while you click the left mouse button. Alternatively, you can right-click over the marker flag and choose **Remove Marker** from the context menu.

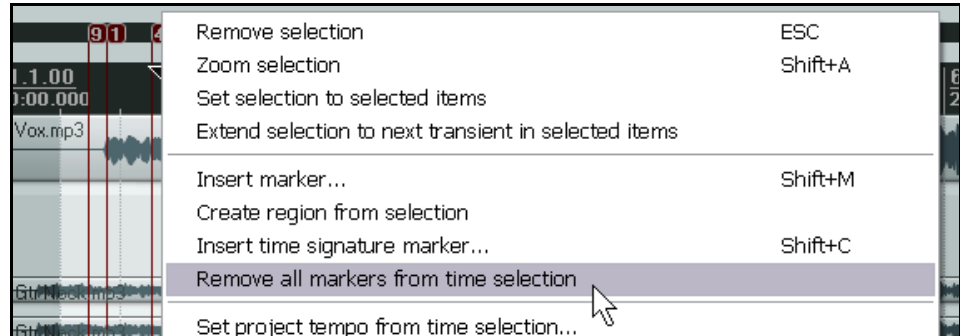


#### To remove a series of markers ...

Define a time selection that includes all of the markers that you wish to remove.

Right click over the space just above the marker "flags" within the time selection, and choose

**Remove all markers from time selection** from the context menu.



### 8.6 Regions

Regions essentially take the idea of markers one step further. You can create regions for your projects, making it easy to identify, select and work with different passages of a song.

Mouse/Keystrokes/Command	Effect
<b>Shift R</b> or <b>Right Click, Add Region from Selection</b>	Create a new region, based on the current selection.
<b>Shift Double click on Region icon.</b>	To change name or other properties of the region.
<b>Double click on region icon, or Right Click on region icon, Select Region</b>	Makes the area of the region the current selection
<b>Alt Click on region icon</b>	Removes the region.

#### To create a Region from two existing Markers ...

1. Make sure the **Option** for **Looped points linked to time selection** is enabled.
2. Double click above the timeline between the markers to make the selection.
3. Right click and choose **Add region from selection.**

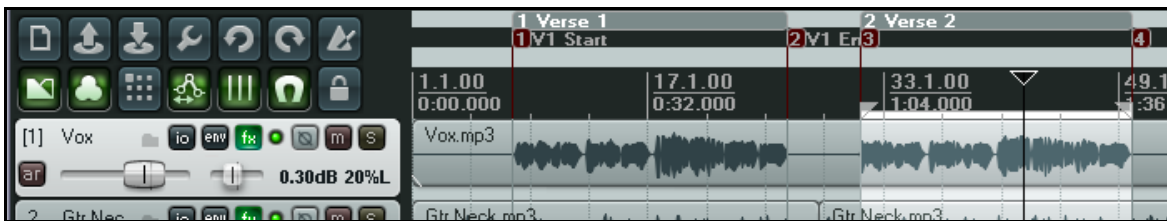
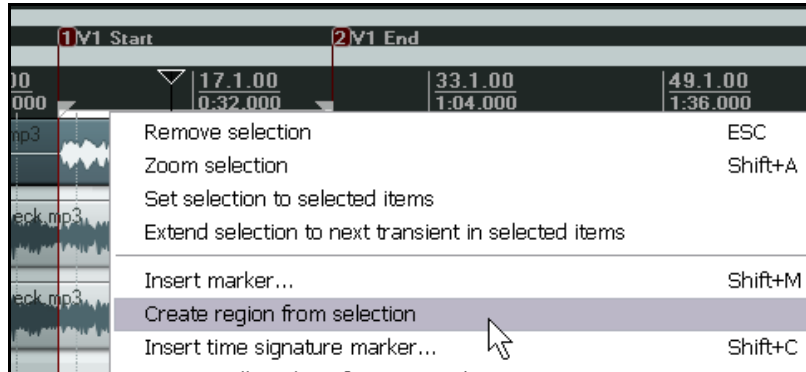
#### To create a Region from scratch ...

1. Click and drag across the background area of the Track View to make the selection.
2. Right click and choose **Add region from selection.**

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## Example of working with Regions

1. Make sure that the **Option** for **Looped points linked to time selection** is enabled.
2. In the file **All Through The Night MARKERS.RPP**, double click on the timeline between your first two markers. This causes this area to be selected.
3. Right click over the timeline, between the markers, and choose **Create Region from Selection**.
4. Right click over the new region's icon, then choose **Edit Region**. Type **Verse 1** and press **Enter**.
5. Double click on the timeline between markers three and four to select this area. Press **Shift R** to define a region. Right click over the icon for this region, choose **Edit Region**, type **Verse 2** and press **Enter**.
6. Repeat this process using the area between markers five and six to create a Verse 3 region. Keep this region selected.
7. Press **Ctrl** with the **+** on the Numeric Pad. This zooms in on that region.
8. Press **Ctrl PgDn** to restore the whole project to the screen.
9. Press **Esc** to remove the current selection.
10. Save this file.



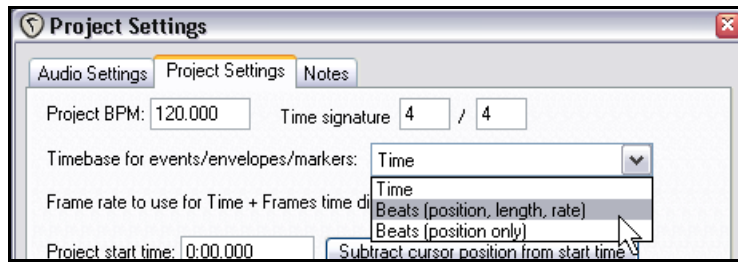
**Tip:** Once you have created regions, you can move them around, by dragging and dropping the Region Marker, just above the Timeline.

## 8.7 Changing the Project Timebase

You can select Time, Beats (position, length, rate) or Beats (position only) as the timebase for your envelopes, events and markers. To do this:

1. Press **Alt Enter** to display the **Project Settings** window.
2. Make your choice from the drop down list (right), then click on **OK**.

You can also change the beat by clicking in the **BPM** box (on the Transport Bar) and entering a number.



### 8.8 Markers and Media Cues

If you need to share your media files with other applications that use media cues (for example, Sound Forge) you can convert your markers to media cues when rendering.

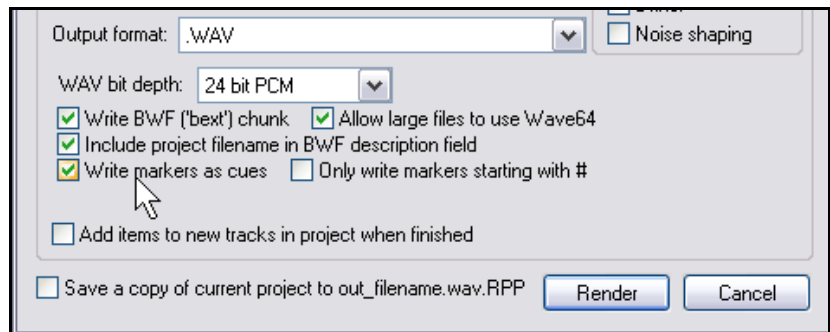
REAPER also has an option on the View menu (enabled by default) to show media cues where they exist on imported media items. Moreover, you can use the **Item Processing** command to create markers within REAPER for these media cues.

#### Example



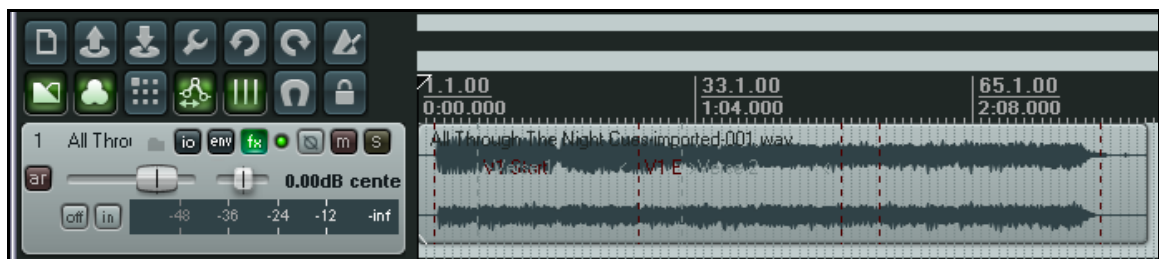
1. In the screen shot shown above, our project includes a number of markers:

2. We can now render the file (using the **File, Render**) command, making sure that we select the option to **Write markers as cues**.



3. If the rendered file is later imported back into REAPER, perhaps in a new project file, we can see that the media items

contains cues which correspond exactly with the original markers. This is illustrated below. Notice the series of vertical broken lines which indicate the positions of the media cues.

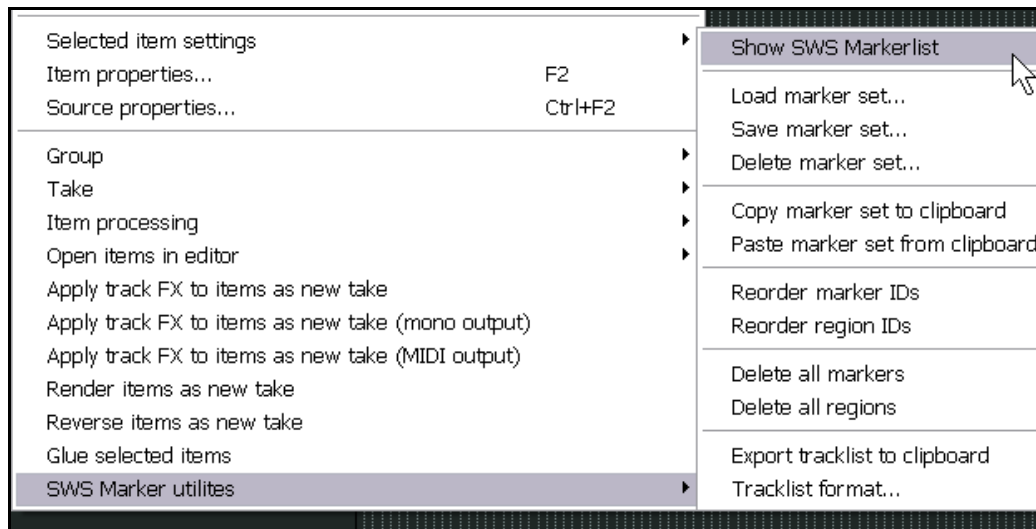


4. If we now select the media item then right click and choose **Item processing** then **Import media cues from selected items as project markers** then a set of REAPER markers is automatically created to replace the media cues.

## 8.9 Managing Markers and Regions

A Program Extension is available, courtesy of SWS, which can be used to help you manage your markers and regions. For example, it can be used to renumber your markers, or to save and recall different sets of markers for different tasks. To obtain and install this extension, follow this sequence:

1. Go to <http://standingwaterstudios.com/reaper> and download the SWS extensions from there.
2. Install the downloaded file .... It will find the correct directory for you.
3. Start REAPER in the usual way. You can now access the extension commands by choosing **SWS Marker utilities** from REAPER's **Edit Menu**.



### Examples

In the example below, four markers have been created to mark the beginning and the end of the lead vocal in both of the first two verses. Notice, however, that these are numbered in the order in which they created, which is not in sequence. By displaying the **Edit** menu and choosing **SWS: Marker utilities** and then **Reorder marker IDs** we can ensure that these markers are numbered correctly.



Now let's suppose we need to work on the Guitar Tracks. We can save our Vox track markers (in case we need them later), and create a new set of markers to help us work with our Guitar tracks.

In this case we can use **Edit, SWS: Marker utilities, Save marker set** to save the set. In this case, we save it as **Lead Vox**. We can now use the command **Edit, SWS: Marker utilities, Delete all markers** (*not* Delete marker set) to remove them, then create our new markers as shown below. We can again use **Edit, SWS: Marker utilities, Save marker set** to save the new set of markers. In this case, we save it as **Guitars**.

## 8 - Loops, Markers and Regions

We can now use the command **Edit, SWS: Marker utilities, Load marker set** to switch between our different sets of markers for different editing tasks.



Notice that you can use **Edit, SWS: Marker utilities, Show SWS Marker List** to display the Marker List window. This can be used to help you manage your markers, using the right click menu commands (see left).

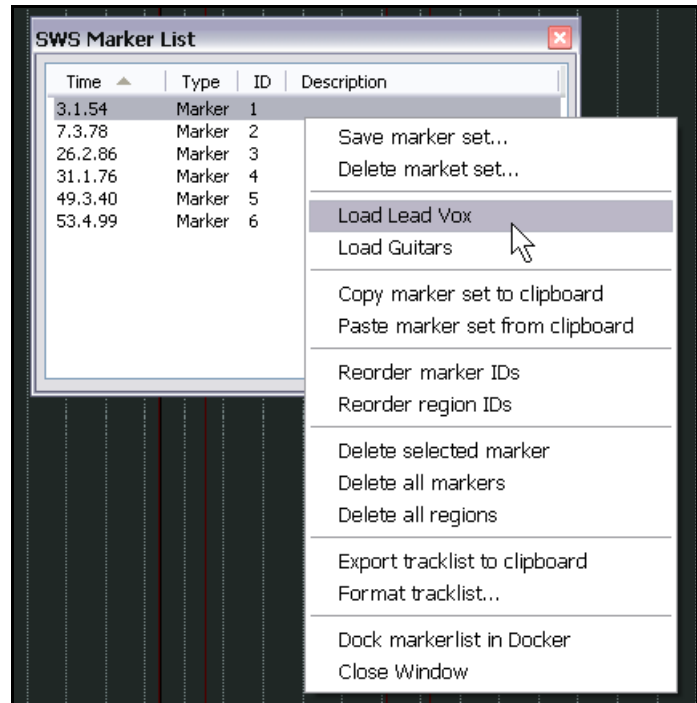
Notice also that included on that menu are the options to load any of your named marker sets.

You can also click on any position shown in the Time column to immediately move the cursor to that marker.

In Chapter 13 we'll be looking at how you can assign your own keyboard shortcuts to various REAPER commands and actions.

You can also assign keyboard shortcuts to any of the SWS marker management commands.

Notice that the SWS Marker List window is also dockable.



### Summary of SWS Marker/Region Utility Commands

Command	Explanation
<b>Show SWS Marker List</b>	Opens and displays the <b>Marker List</b> window. This stays open until you close it.
<b>Load Marker Set ...</b>	Displays the <b>Load Marker Set</b> prompt for you to select any previously saved marker set to be loaded.
<b>Save Marker Set ...</b>	Saves all current markers into a new set. Prompts you for a name before doing so.
<b>Delete Marker Set ...</b>	Displays the <b>Delete Marker Set</b> prompt for you to select any previously saved marker set to be deleted.

Summary of SWS Marker/Region Utility Commands	
Command	Explanation
<b>Copy marker set to clipboard</b>	Copies all current markers into the Windows clipboard. These can be pasted into another REAPER project if you wish.  This can be useful, for example, if you have more than one project file all of which are different versions of the same project.
<b>Paste marker set from clipboard</b>	Pastes into the current project all markers previously copied into the Windows clipboard.
<b>Reorder marker IDs</b>	Renumsers all currently displayed markers, from left to right. You should definitely consider using the Action List Editor to assign a keyboard shortcut to this one.
<b>Reorder region IDs</b>	Renumsers all currently displayed regions, from left to right.
<b>Delete all markers</b>	Deletes all currently displayed markers, but does not affect the contents of saved marker sets.
<b>Delete all regions</b>	Deletes all currently displayed regions.
<b>Export track list to clipboard</b>	Exports track list.
<b>Track list format</b>	Lets you specify which information is to be included when the list is exported to the clipboard.

## 8.10 Tempo Based Music Production

### 8.10.1 Time Based Music Basics

REAPER incorporates a number of features which make the program a good choice for tempo based music production. Some of these elements (such as creating loops and various item properties) have already been mentioned in the context of other uses. Others have not yet been mentioned. In this section we will draw these elements together to give you a flavour of how REAPER can be used for the production of tempo based music. Creating tempo based music is a process that largely consists of creating and sequencing loops from audio samples. These become the building blocks from which a work is created. Individually they can vary in length from a single note to a complete rhythmical pattern, and anything in between.

One advantage that sampling has always had over MIDI has always been sound quality. There are any number of human performance techniques and subtle variations that it is virtually impossible to simulate with MIDI. However, until recently MIDI held one big advantage over sampling. A MIDI track can easily be transposed without altering its tempo, and its tempo can be changed without affecting its pitch. This has not always been the case with audio.

Take the example of drum loops. One of the biggest problem with using samplers to trigger drum loops has been that when the tempo changes, so does the pitch. Samplers change pitch by slowing things down or speeding things up. This means that as you play keys up and down your keyboard, you must vat the same time handle the issue of beat changes. It becomes well nigh impossible to get the exact tempo you want without having to open the sampler and make adjustments to the loops.

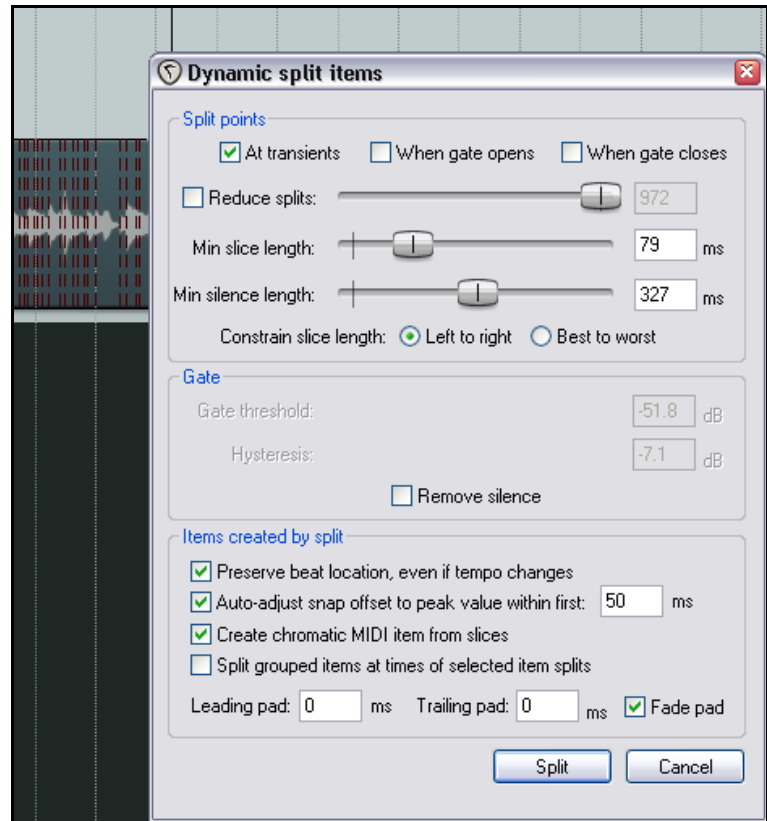


Today, however, there are any number of tools available that can do all this for you. The time and pitch altering tools that come with REAPER use high quality algorithms which give you all the options you need to change or maintain such factors as length and intonation. It thus becomes possible to modify samples accurately and without distorting their essential characteristics.

ReCycle is one program that has become popular because its REX grooves automatically arrange themselves to the project tempo on import. Bring in a groove and it always fits the song. Take a set of items representing slices in a rhythmic groove, set their timebase to beats, and change the tempo -- magic! They move all over the place but remain exactly in rhythmic time according to the tempo.

Using REX files you are able to play back loops at different tempos without altering the pitch. You're on your way to being able to create drum loops and other sounds exactly the way you want them, and with relatively little effort.

We'll have more to say about ReCycle later, and indeed about REAPER's own dynamic splitting capabilities which puts this magic at your disposal. After dynamic splitting, you merely need to double click in the BPM area of the transport bar, enter a number and, hey presto! The whole track plays faster, or slower, in perfect pitch. What's more, the whole track will speed up or slow down naturally, without glitches, pauses or stuttering.



### 8.11 Project Settings

Before creating any music, you should make sure that your project settings are specified correctly. To display the project settings dialog box, press **Alt Enter** or choose the command **File, Project Settings...** from the main menu. In particular, check the following:

- Under **Project Settings**, Project Beats per Minute.
- Under **Project Settings**, Time Signature.
- Under **Project Settings**, Timebase for events. You can select Time, Beats (position, length, rate) or Beats (position only).
- Under **Audio Settings**, Default pitch shift mode and parameter.

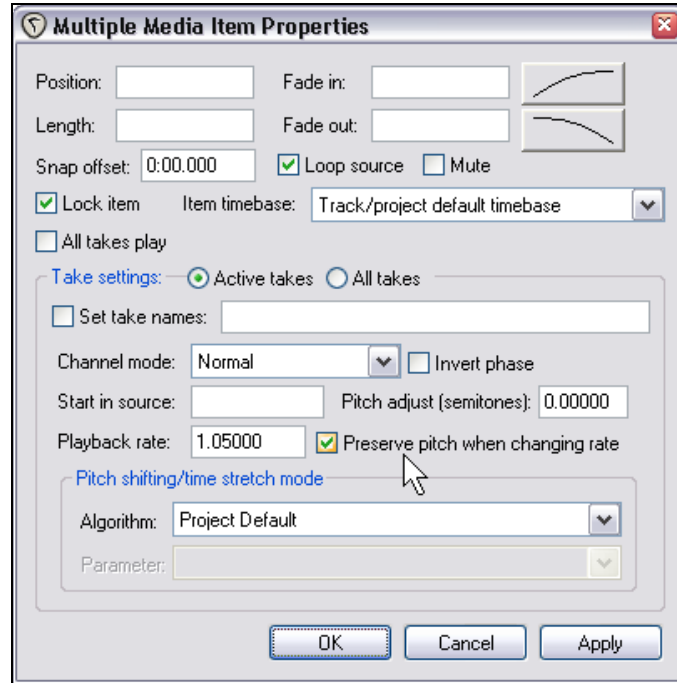
You can change properties such as Beats per Minute and Time Signature as often as you need to during the song. For example, you can increase the tempo for one passage then restore it to its original setting at the end of that passage. Shortly we will see an example of how this is done.

## 8.11.1 Audio Media Item Properties

You can record your own media items or import them from existing files. You can also change various properties such as playback rate and pitch for individual media items.

As well as being able to specify parameter settings for individual media items, you can also set these for multiple items. For example, if you have imported or created a number of media items and you wish to change the pitch or playback rate for several of them you can select those items and press **F2** (or right click anywhere in the selection and choose the **Item properties...** command from the menu).

REAPER will then offer you the option of changing the properties of all these items together or adjusting them individually. If you choose **Yes** the dialog box shown here is displayed. In the example shown, we are increasing the playback rate for the selected items by 5% and preserving the original pitch.

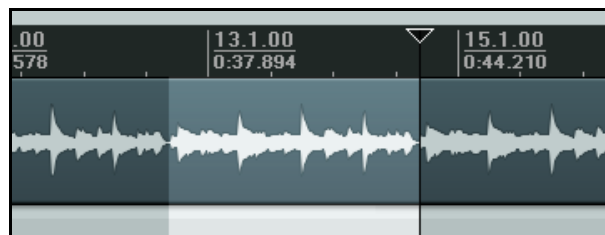


Notice that you can override the project default **Pitch Algorithm** if you wish. This can be quite important, as you may find that different algorithms work better with different kinds of audio item (such as vocal, snare, kick or bass guitar). More information about time stretching can be found in the section **Time and Pitch Manipulation**.

## 8.11.2 Creating a Loop from a Time Selection

If you wish to take part of an existing media item and use it to create a loop there are several ways of doing this. Several of these have already been discussed. Often the easiest is to:

1. Select the item.
2. Select the area of the item required for your loop. It does not matter whether the option **loop points linked to time selection** is enabled or not.
3. Right click and choose **Copy loop of selected area of items**.
4. Select a convenient location in the track area and press **Ctrl V** to paste.



One attraction of this method is that there are a number of useful actions relating to the Time Selection for which you can assign keyboard shortcuts or create custom actions.

These can be used, for example, to extend the time selection in either direction, reduce it from either direction or nudge it in either direction. For more information on how to do this, please consult the section on **The Action List and Keyboard Shortcuts**.

### 8.11.3 Creating a Loop from Transients

Another method of selecting the area required for your loop is to use the transients in an existing media item. The following actions are just some of the many that can be assigned keyboard shortcuts within the Action List Editor. The Action List Editor is explained in Chapter 13.

Item navigation: Move cursor to nearest transient in selected item.

Item navigation: Move cursor to next transient in selected item.

Item navigation: Move cursor to previous transient in selected item.

Time selection: Extend time selection to next transient in selected items.

Assuming that you have assigned, say, the **Tab** key to **Move cursor to next transient in selected item** and **Ctrl Shift Tab** to **Extend time selection to next transient in selected items**, you can select the item, navigate exactly from transient to transient and select the exact area required.

You can then select the item, copy it and paste it elsewhere, then right click over it, choosing **Copy loop of selected areas of items** from the context menu.

These are just a few of the actions and commands that can be used to suit your own method of working when creating your tempo based projects. Explore the others and get to know them. They include:

Copy selected items	Ctrl+C
Copy selected area of selected items	Ctrl+Shift+C
Copy loop of selected area of items	Ctrl+Alt+L
Cut selected items	Ctrl+X
Cut selected area of selected items	Ctrl+DELETE
Paste	Ctrl+V
Remove selected items	
Trim items to selected area	
Split items at cursor	S
Split items at prior zero crossing	Alt+Z
Split items at time selection	Shift+S
Heal splits in selected items	

#### Copy selected area of selected items

#### Trim items to selected area

#### Split items at prior zero crossings

### 8.11.4 Beat Correction

REAPER includes a selection of assignable actions to assist you with beat detection and beat correction. There are actions to detect tempo, create measures from time selections, extend or swap time selections to the next transient, and more. You will find some of them on the context menus and all of them in the Action List. Any action in the action list can be assigned shortcut keys, run from the action list window itself, and/or added to REAPER's **Actions** menu. More information about using the Action List and its editor can be found in the section **The Action List and Keyboard Shortcuts**.

How you string these actions together is up to you. Here is an example. You might have a live performance that was not done to a click. With REAPER's actions and commands it is a simple process to go thru the track and manually tempomap the whole performance.

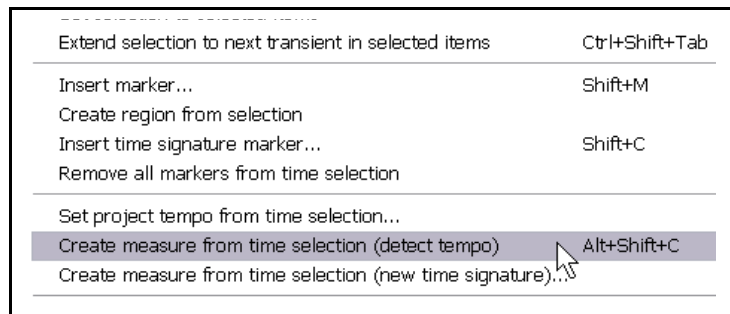
We're going to assume that you have created the following keyboard assignments:

<b>Tab</b>	Move cursor to next transient in selected items.
<b>Ctrl Alt Tab</b>	Swap left edge of time selection to next transient in selected items
<b>Ctrl Shift Tab</b>	Extend time selection to next transient in selected items.

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In the example shown here, we have used **Ctrl Shift Tab** to extend the selection out, as required.



We then instruct REAPER to **Create measure from time selection (detect tempo)**.

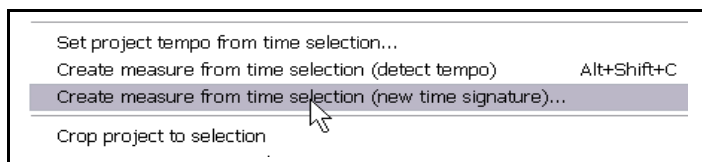
We could do this either from the timeline's context menu or using a keyboard shortcut.



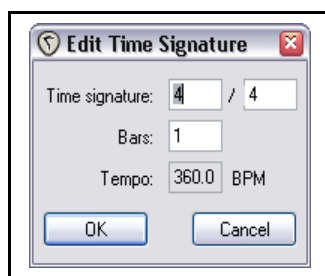
We then use **Ctrl Alt Tab** to capture the next time selection required, again using that time selection to create a measure with REAPER auto detecting the tempo.



This process is repeated for the next few measures until we come to the first place where a change of time signature is required.



By right clicking over the timeline we display the context menu (see left and below) and select the command **Create measure from time selection (new time signature)**.



This causes the **Edit Time Signature** dialog box to be opened, which you can edit at will then click on **OK**.

This process can then be repeated up to the end of the performance.

### 8.11.5 Quantizing Items

REAPER allows you to quantize your audio items. This essentially means lining them up according to the project tempo or time signature.

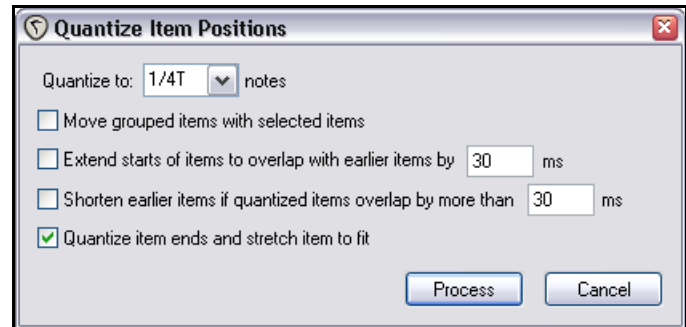
You might have a situation in which you have copied and pasted a sample several times within a track (or across several tracks) and you need to ensure that they are correctly aligned.

To ensure that all items are aligned to the beat, you simply do this:

1. Double-click on the track in the Track Control Panel to select all the media items in the track. Alternatively, you could right click drag with your mouse to "lasso" them.
2. Right click over any of the items, then choose **Item Processing** then **Quantize item positions to grid.**

This causes the **Quantize Item Positions** dialog box to be displayed.

3. Specify your required parameters, including the note length setting (1/8, 1/4, 1/2, 1, 2, etc.) and whether you want the items stretched to fit. An example is shown on the right.
4. Click on **Process** for the quantizing to be done.



In the example above, the option to also quantize item ends and stretch to fit was enabled.

### 8.12 Dynamic Splitting

Dynamic splitting is a very powerful feature which has a number of applications.

For example you might have recorded a pretty good bass line that you'd like to use for a song. Maybe it was recorded at 96 beats per minute. The timing might be a bit out at times but on the whole you're pretty pleased with it. The trouble is that you want to use 120 beats per minute for your new song.

Here's another example. Maybe you've recorded a killer slide guitar track. You like it but you think it would be pretty clever to give the tune one or two tempo changes. Dynamic splitting is the answer to both these challenges.

Dynamic splitting works on the principle that you can instruct REAPER to split any media item (or selection of media items) according to criteria that you specify. Basically it works like this:

- You first select the media item (or items) to be split.
- You right click over the item and choose **Item Processing, Dynamic split selected items...** from the menu.
- This causes the **Dynamic split items** dialog box to be opened.
- You give it the information that it needs to work out where to split your items. This will essentially either be to split the track at its transients or to use a noise gate to split whenever the audio volume falls below a specified amount. As you will shortly see, each has its separate uses.
- REAPER then "shadow splits" your selected item(s). That is to say, it indicates with a row of colored bars exactly all of the points at which the item will be split if the parameter settings are left as they are.
- You make such adjustments as you wish to the parameter settings until you are satisfied that they are right.
- You tell REAPER to go ahead and split the items.

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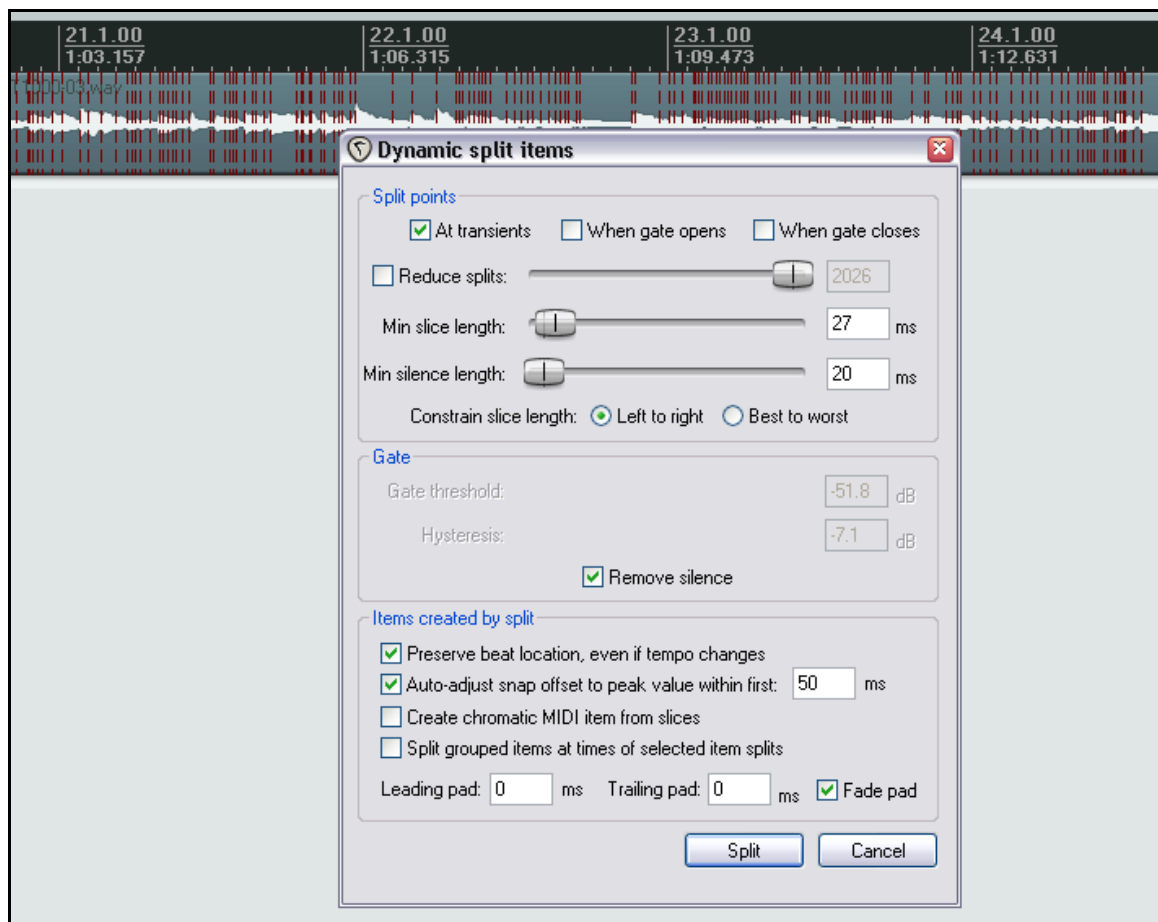
Once split, each slice of the original item will be set to the current timebase. If you wish, you can set any of the splits to any other timebase you choose. You can use the items together or individually, according to your needs. Suddenly you've got a whole library of samples!

Dynamic splitting is non-destructive. This means that your original audio files (WAV, MP3, AIF or whatever) remain intact. Nevertheless, if you are going to use this method to build a sample library, it's often a good idea to work on a copy of the original track. This just makes it easier to go back to the original if you wish to use it to make a fresh set of samples. Let's now take a look at an example or two.

### 8.12.1 Splitting a Media Item into Samples

In the examples below, we have selected a recording of a resonator guitar. We have then displayed the context menu and chosen **Item processing** then **Dynamic split selected items**. Studying these examples will help you to understand how the settings work. In every case, the **At transients** option should be enabled. These examples should be sufficient to get you started. After that, it's up to you to experiment according to your particular needs.

#### Example 1



Only a minimal number of options have been selected here.

Because we have specified a very low minimum slice length REAPER will seek out transients with a high degree of sensitivity. This will result in our media item being split into a very large number of items. This might be a suitable outcome, for example, if we are intending to introduce tempo changes to the song. The larger the

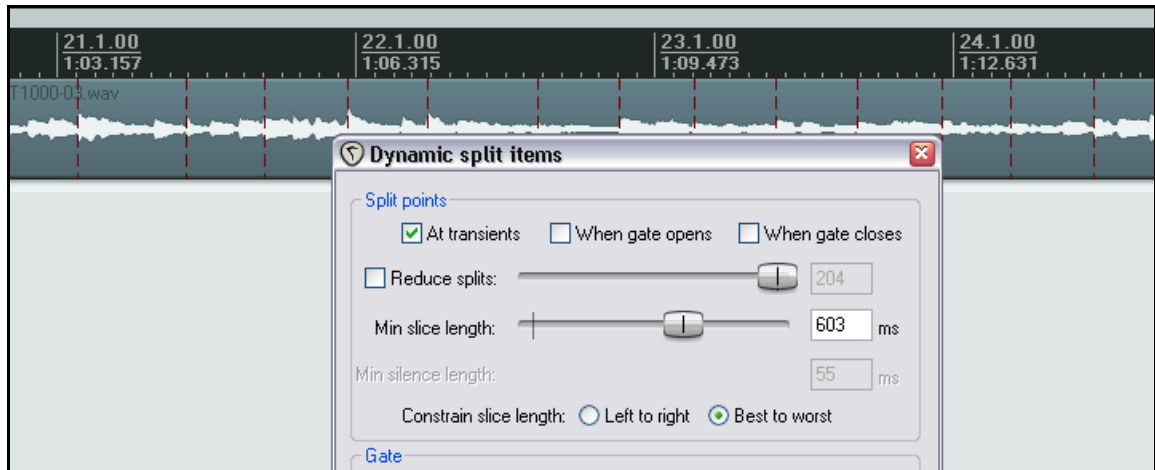
## 8 - Loops, Markers and Regions

number of samples and the shorter their length, the more sensitive and immediate will be the track's response to any such changes.

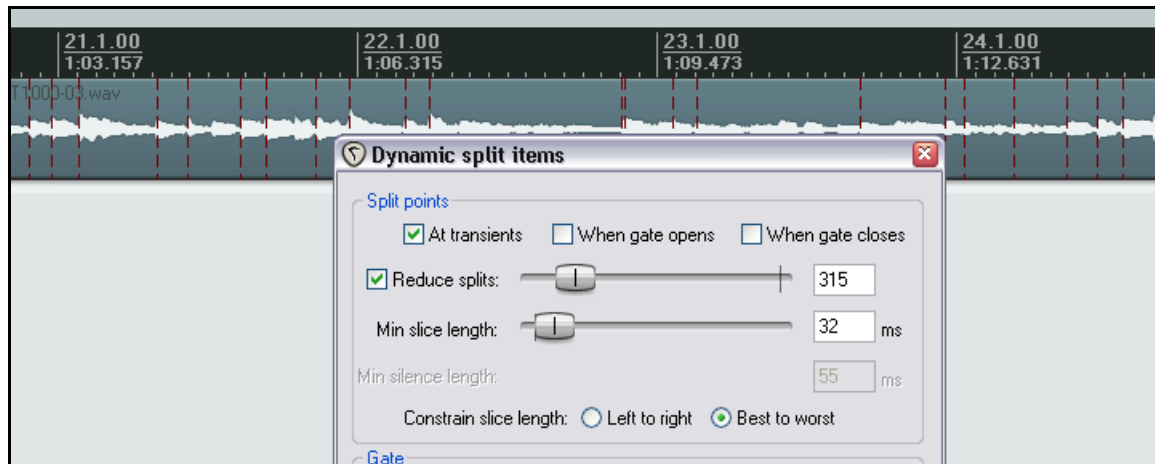
Notice that **Best to worst** has been elected as the method for constraining slice length. This option is likely to be preferred when splitting at transients.

Notice also that we have specified that we want to keep the beat locations unchanged even if the tempo changes.

Now let's see what happens when we bring some of the other options into play.



In the second case (above) we have increased the minimum slice length with the result that our media items are now longer and fewer. This might be more appropriate if we are creating samples to be used with a software synthesizer. However, we might want to do some more fine tuning.

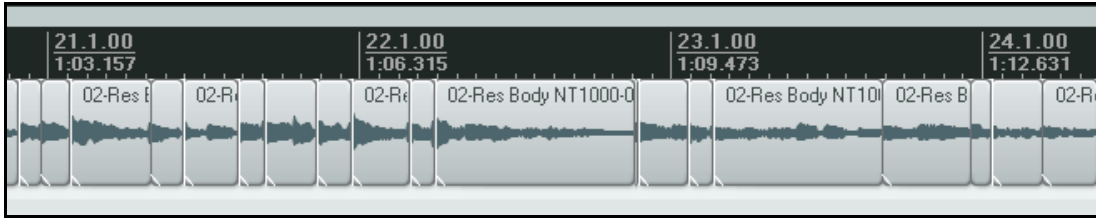


In this third example, we have used the **Reduced splits** option to reduce the number of splits. In this particular case, these settings might be about right for creating our sample library from this slide guitar track.

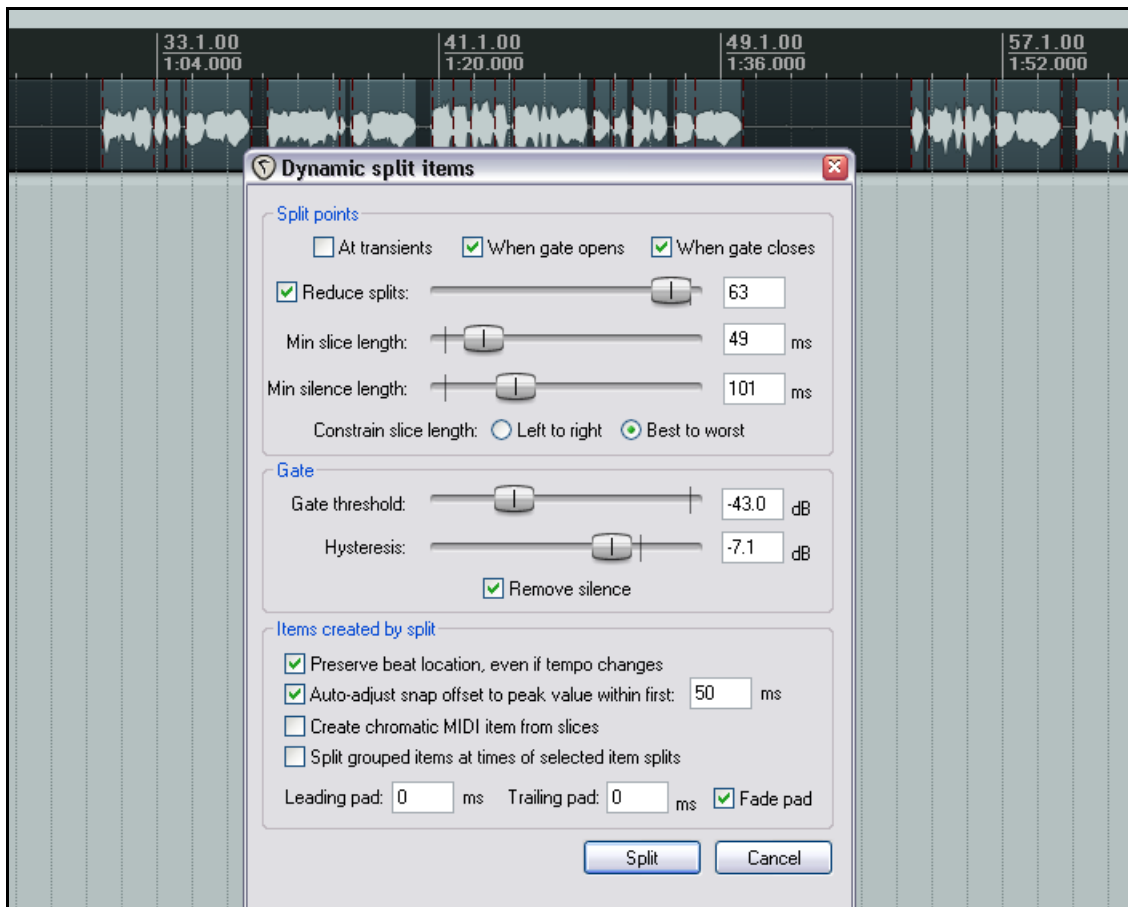
Before splitting, though, it might in some instances be worth considering whether you wish to enable the noise gate settings to enable you to also remove silence. Whether or not you would do this would depend largely on the instrument in question and the nature of the tune and arrangement. If the instrument is played continuously and produces an audio signal similar to that shown above, then there may be little point in engaging the noise gate.

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Below we can see how our original media item now looks after splitting.



This next example shows splitting at transients with a noise gate employed to remove unwanted background sounds such as drawing breath from a vocal track.



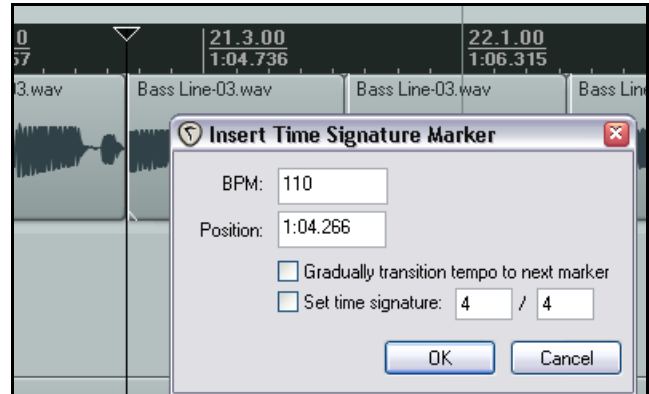
In this example if we were to set the gate threshold too low, too many unwanted sounds would still get thru. If we set it too high, we risk removing some of the quieter vocal material.



### 8.12.2 Changing the Project Tempo

Once an item has been dynamically split, you can create time signature markers for changes in tempo to which your music will respond when played back. To create these, follow this sequence:

1. Right click over the timeline and choose **Insert time signature marker...** from the context menu.
2. Specify your required changes in Beats per Minute or time signature. If you wish, you can select the option for a gradual tempo transition between markers.
3. Click on **OK**.



You can double-click on any time signature marker to edit its settings and you can drag it along the timeline to change its position.

### 8.12.3 Creating a Chromatic MIDI Item

When dynamic splitting you can select the option to **Create chromatic MIDI item from slices**.



This causes a MIDI item to be created that creates one MIDI event for each slice, moving up the chromatic scale.

One common application of this is for sample triggering.

Suppose that you have a groove that you have assembled from various items from different sources. You can now create chromatic midi from the items and then load those items into a sample player, each mapped to the next note in sequence. The midi will then play the groove. Moving the midi notes around changes the groove. It is also quite easy to swap out exactly what it is that is being triggered.

Another example is hit replacement.

You can dynamic split a drum part, creating chromatic midi from it. You then have one velocity-sensitive midi note for each hit. It's then a straightforward job to delete a bad hit and use the midi note to trigger a drum sample. Alternately, you can use the whole midi track to trigger a drum sample to double a recorded part (thereby fattening it).

The chromatic MIDI item can, of course, be edited like any other MIDI item with the MIDI Editor, and used to play any synthesizer or sample player. A comprehensive section on using the MIDI Editor can be found later in this User Guide.

### 8.12.4 Saving and Using Samples

After splitting, you can save any of the individual slices as samples. To save an individual sample, simply right click over it and choose **Glue selected items** from the context menu.

The sample wave file can then be imported for use with any VSTi sampling plug-in, such as ReaSampleomatic5000.

Remember also that if you save the original file with the split items, you can return to it as often as you need to whenever you wish to use it to create more samples.

### 8.13 REX File Support

REX files consist of sets of groove slices. They are created in and exported from a program called **Recycle** for the purpose of being used in the creation of tempo based music. You can import these files into REAPER either using the **Insert, Media** command or by dragging and dropping from the Media Explorer. When you do this, they will automatically position themselves according to the current tempo.

Once you have imported your REX files into REAPER, you can manipulate and use them in exactly the same ways as you can use other media items that have had dynamic splitting applied within REAPER.

For example, imported REX slices will keep their beat location even if the project tempo is changed.

### 9 More Project Management Features

#### 9.1 Lock Settings

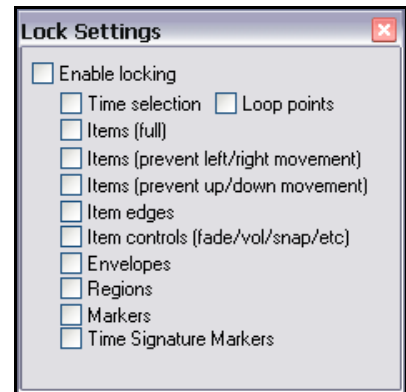
The Locking feature of REAPER can be used to effectively freeze certain aspects of a project file to prevent something accidentally going wrong.

There are two aspects to locking:

- Deciding which project elements you would like to be locked.
- Enabling or disabling the locking feature.

To display the Lock Settings window (shown right), press **Shift L** or right click over the lock button (the last item) on the toolbar.

The table below summarises some of the ways in which you might be able to make use of this feature.



Locking Option	Comment
<b>Time Selection</b>	This locks the current time selection so that, for example, if you accidentally click and drag at some other point along the timeline your time selection will remain unchanged. You can remove a locked time selection by pressing <b>Esc</b> then selecting <b>Yes</b> when prompted.
<b>Loop points</b>	Locks currently selected loop points.
<b>Items Full</b>	This option prevents you from making any changes at all to any of your existing media items.  For example, you cannot mute them, add FX to them, delete them, move them, slip edit them, or even access the Item Properties window or right click menu for any of your items.
<b>Items (prevent left/right movement)</b>	This option allows you to make any other changes you like to your media items except move them left or right.
<b>Items (prevent up/down movement)</b>	This option allows you to make any other changes you like to your media items except move them up or down.
<b>Item Edges</b>	This option disables actions such as slip editing
<b>Item Controls</b>	This option disables such actions as adding or modifying fades or adjusting the item volume control handle.
<b>Envelopes</b>	When selected, this option ensures that when locking is enabled you will not be able to make any changes to existing envelopes. For example, you will not be able to move points, add more points, or change shapes  You will still be able to add new envelopes for faders and plug-in parameters, but you will not be able to edit these in any way.
<b>Regions</b>	Locking regions prevents you from changing (for example by moving, deleting or renaming) existing regions. However, you will be able to create new regions with Lock Regions enabled.
<b>Markers</b>	Locking markers prevents you from changing (for example by moving, deleting or renaming) existing markers. However, you will be able to create new markers with Lock Markers enabled.
<b>Time Signature Markers</b>	This option locks time signature markers and prevents them from being modified.

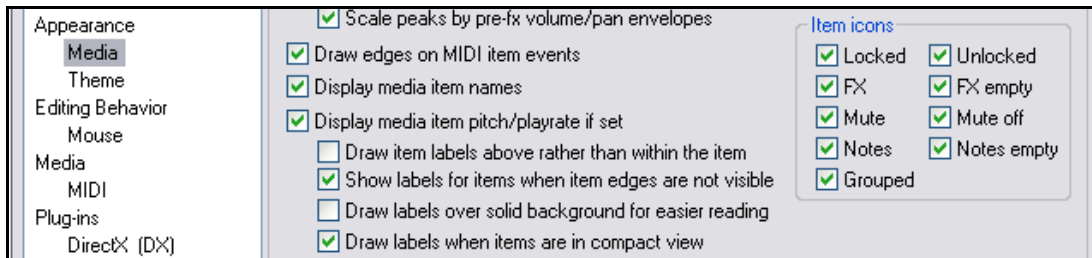
## Example

Let's suppose that we are happy with the way our media items line up, and we don't want any of them being accidentally nudged or moved to the left or right. You might have the wish to lock their horizontal position.

1. Choose the **Options** command, then **Locking Settings**.
2. Tick only **Items (prevent left/right movement)**.
3. Close this window.
4. Display the **Options** menu again – if **Locking Enabled** is not selected, turn it on.
5. Now try to drag and drop any of your items to the left or right. They won't move.
6. Press the **L** key – this toggles locking off again.

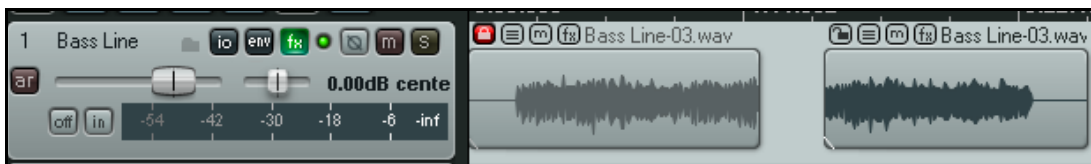
## 9.2 Locking Individual Items

Locking individual items ensures that those particular items are protected from accidental change, such as being moved or deleted, while at the same time leaving you free to manipulate other items as you wish



To make use of this feature, first ensure that both of the item icons **Locked** and **Unlocked** are selected (along with any other item icons that you wish to use) under your **Options, Preferences, Appearance, Media** settings (see above). Whether the icons are displayed on top of the media items (as in the example below) or in a lane above it will depend on whether you have enabled the option **Draw item labels above rather than within the item**.

Locking for individual media items is then toggled on and off by clicking on the small padlock icon that will be visible at the top left corner of the media item.



The example above shows a track with two media items. The first item has been locked (notice the closed padlock icon). It can now not be deleted or moved, unless its status is set to unlock. Similarly, you cannot grab the handle across the top of the media item and drag it down to adjust its volume, nor can you add a fade in or fade out. You can, however, open the item's FX Chain, and work with your plug-ins and FX in the usual way. The second item, however, remains unlocked (notice the open padlock icon). It can (for example) be moved, split or deleted, or have its volume lowered and a fade out added.

Locking and unlocking can also be performed with multiple items. To lock a number of items, simply hold the **Ctrl** key while you click on each item in turn to build the selection, then click on the padlock for any item included in the selection.

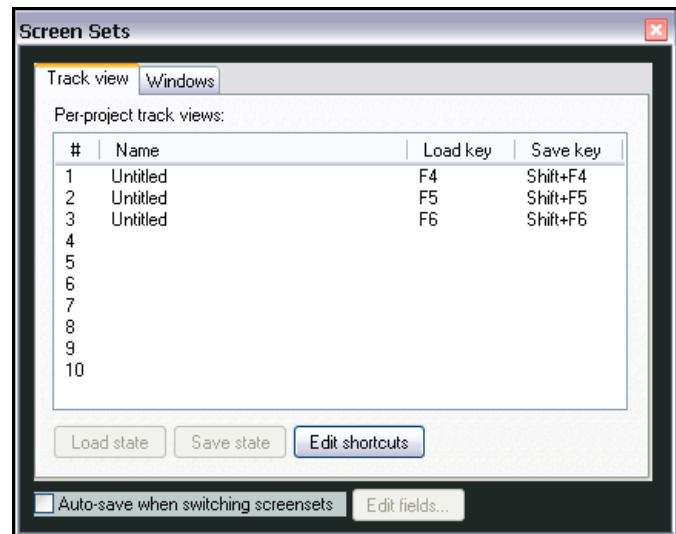
### 9.3 Using Screen Sets

Screen Sets enable you to save several different views of your project, so that you can easily select and recall them when editing or arranging. There are two types of Screen Sets – Track Views and Windows. **Track Views** are created and saved on a per project basis, whereas **Windows** screen sets are global.

#### 9.3.1 Creating and Using Track Views

The procedure is as follows:

- You use the **View, Show Screen Sets** command to show or hide the Screen Sets window (or the default shortcut, **Ctrl E**). Notice that the Screen Sets window may be docked (or undocked), using its context menu.
- Adjust your track layouts to suit.
- Select a Screen Set number from the Track Views page of the Screen Sets window.
- Click on **Save State** and name the set.

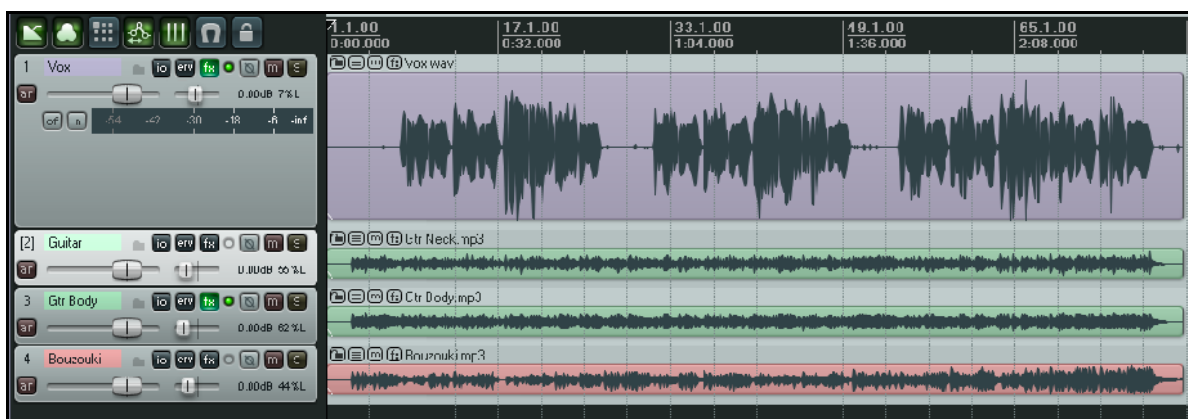


You can create up to 10 Track View screen sets. To recall a view, you simply double click on its name. You can also assign keyboard shortcuts to individual screen sets. Click on the **Edit Shortcuts** button in the Screen Sets window to access the **Action List Editor**. You will be shown how to use this in a later chapter of this book. By default, **F4** to **F6** are assigned to load each of your first three Track Views (as shown), and **F7** to **F9** to load your first three Windows Views.

Notice that there is also an option available to **Autosave when switching screensets**. If enabled, this ensures when switching from one screen set to another that any changes made to the layout of the first of these screen sets will be saved. Track view screen sets can be especially useful for editing media items and when you are working with envelopes. Envelopes will be covered in Chapter 13 of this User Guide.

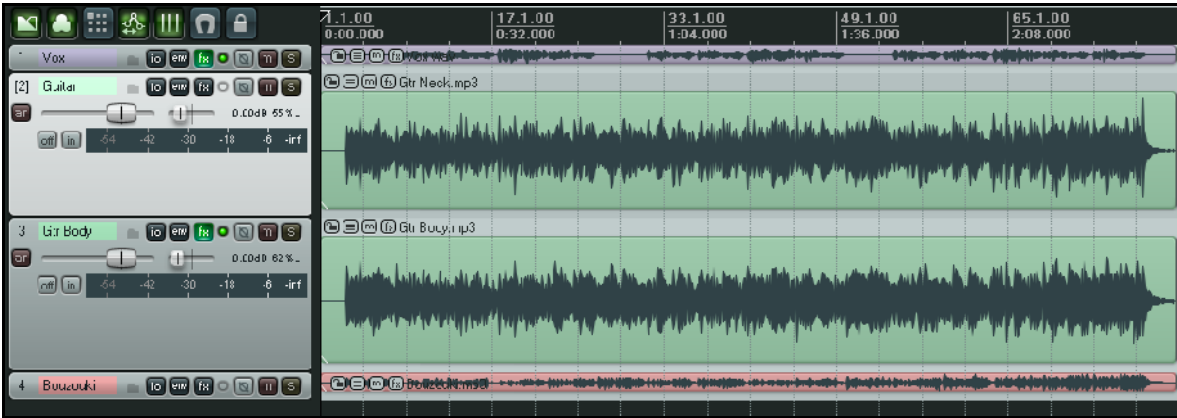
#### Example

- Open the file **All Through The Night.RPP** and save it as **All Through The Night SCREENS.RPP**.
- If you wish, use the **Set selected tracks to custom colors** command on the right click track control panel menu to choose different colors for the different tracks.
- Adjust the track height of your **Vox** track as shown:



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4. In the Track View page of the Screen Sets window, click on 1., then **Save State**, then type: **Vox View** then press **Enter**.
5. Now adjust the tracks view as shown below:

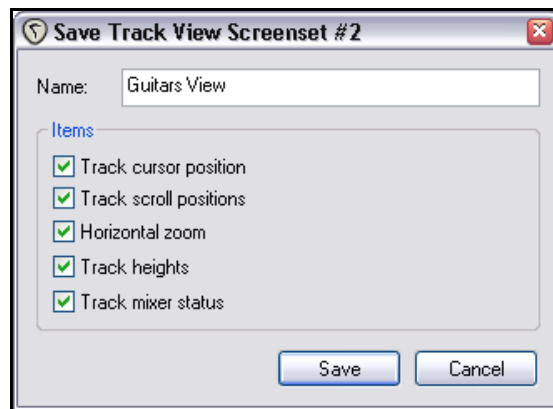


6. Assign Track View number 2 and save it as **Guitars View**.
7. You can now switch between these two track layouts by double-clicking on their names in the Screen Sets window.

Note that this simple example serves only to introduce you to screen sets and how to use them. They can be more powerful than just this. Notice that when you create a Track View screen set, there are a number of options that you may choose to include in or exclude from the view:

- Track Cursor Position
- Track Scroll Position
- Horizontal Screen
- Track Heights
- Track Mixer Status

One use of Track View Screen Sets can be to switch between different selections of tracks to be displayed in your Mixer. For example, one set might be used to show child tracks only, another to show only those tracks that have receives.



Notice also that there are default shortcuts keys for saving Track Layouts 1, 2 and 3. These are **Shift F4**, **Shift F5**, and **Shift F6** respectively.

### 9.3.2 Creating and Using Global Window Views

Unlike Track View Screen Sets, Windows Screen Sets are not project specific, but can be applied to all your projects.

The procedures for creating Window Views are similar to those used for creating Track Views.

- Decide which windows and views you want displayed, and how you want them laid out.
- In the Screen Sets window, select the **Windows** page, select a number and save your layout.
- To recall and open any layout, simply double-click on its name.

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- To change a layout, open it, make the changes, then save it back to the same name.

When saving a layout, there are a number of options that you may choose to include in or exclude from the view:

- Main Window Position
- Tool Window Positions
- Docker Selected Tab
- Mixer Flags
- Last Focus

The **Mixer** aspects of Screen Sets will be explained in more detail in Section 11 of this User Guide.

The **Last Focus** option can be selected to ensure that a particular view automatically is given focus whenever the Screen Set is loaded.



Notice also that there are default shortcuts keys for saving Windows Layouts 1, 2 and 3. These are **Shift F7**, **Shift F8**, and **Shift F9** respectively.

### 9.3.3 Auto Saving Screen Sets

You have the option to automatically save changes to your Track Views or Windows screen set layouts. To do this, simply ensure that the **Auto-save when switching screen sets** option is selected (see right).

This can be used to ensure for example, that if you change the selected tab to be displayed in the docker before switching to a different Windows screen set, when you return to the first screen set REAPER will have remembered which docker tab was last selected.

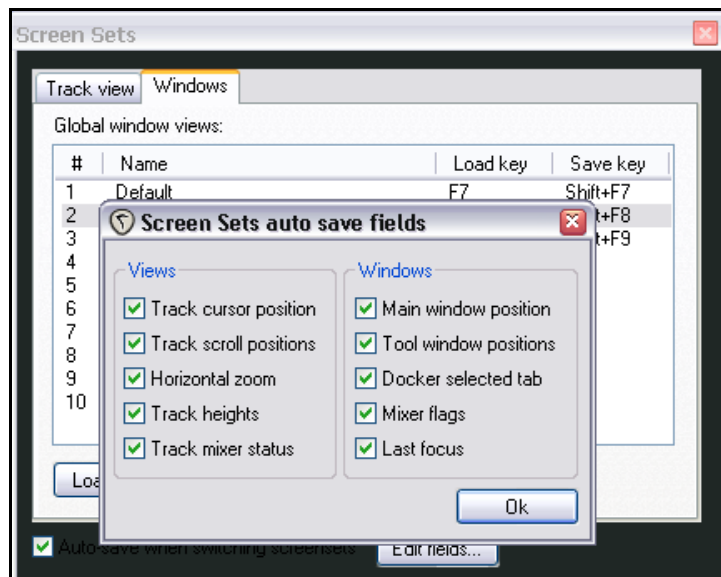
Options which you can choose to have automatically saved or not (as you wish) include:

#### Track View Auto Save Options

- Track cursor position
- Track scroll positions
- Horizontal zoom
- Track height
- Track mixer status

#### Windows Views Auto Save Options

- Main Window position
- Tool window positions
- Docker selected tab
- Mixer flags
- Last focus



## 9.4 NEW! Adding Parameter Controls to the Track Control Panel

Adding parameter controls to the track control panel makes it easier for you to manage those FX parameters that you find you need to tweak or adjust the most often.

You can add controls to any track to manage any parameters on any DX, DXi, VST or VSTi plug-in that has been inserted into that track's FX chain. You cannot, however, use this method to control parameters on JS plug-ins.

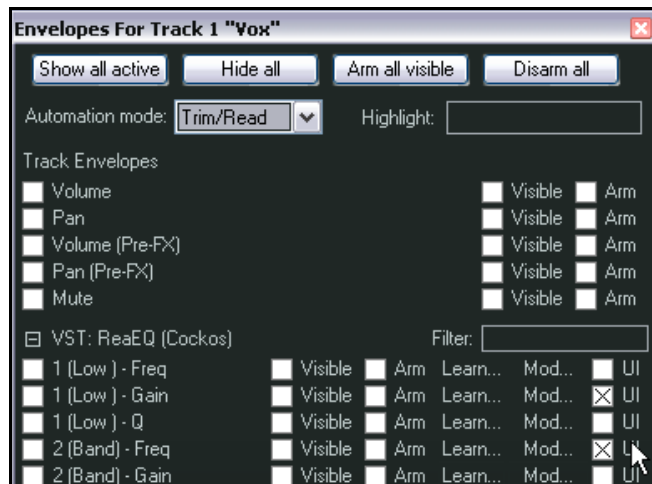


Shown here is an example. The plug-in ReaEQ has been inserted in the FX chain of a vocal track. Three of the EQ controls have been added to the track control panel – in this example, Band 1 Gain, Band 2 Gain and Band 3 Gain. These can be used to adjust these parameters without you needing to be repeatedly opening and closing the FX window.

### To Add Controls from the Envelopes Window

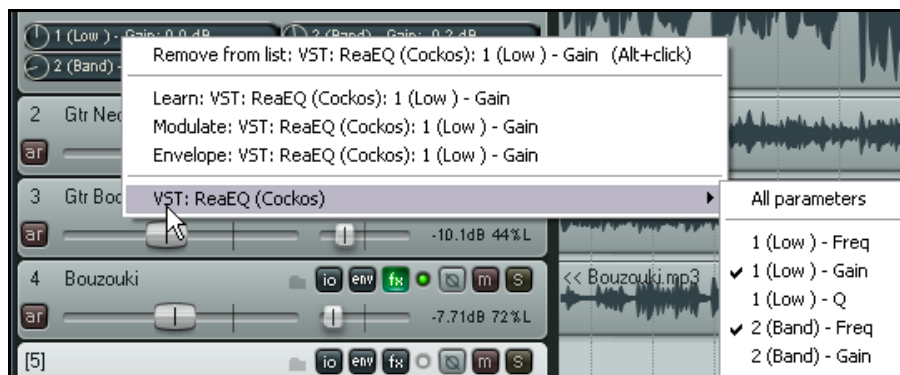
Follow this procedure:

1. Click on the track's **Envelope** button (this is located immediately to the right of its I/O button).
2. Identify the plug-in for which you wish to add the controls. In this example, this is ReaEQ.
3. If the parameters for this plug-in are not already displayed, click on the little + symbol that will appear immediately to the left of the plug-in's name.
4. Check the **UI** box (see right) for those parameters that you wish to control from the track control panel.
5. Close the Envelopes window.



You can also display these controls in the mixer panel. This will be explained in Chapter 11.

REAPER provides you with a number of tools for managing your parameter controls by means of a context menu. Right click over any existing parameter control to display a menu which allows you to:



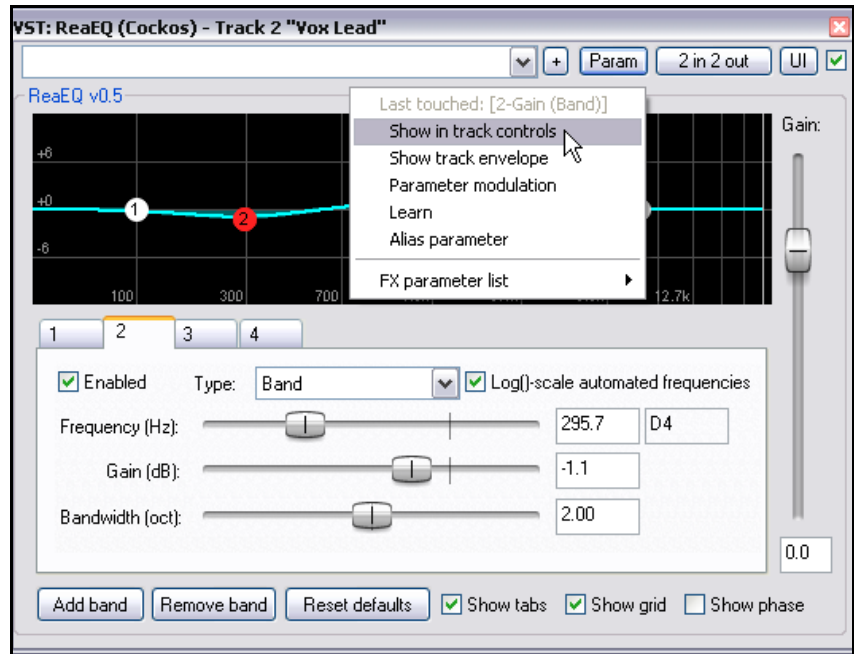
- Remove the control.
- Use **Learn** to assign a MIDI controller to that parameter.
- Use Parameter Modulation with this parameter (see Chapter 18).
- Add an Automation envelope for that parameter.
- Add more controls to the TCP for other parameters.



### To Add Controls from the Plug-In Window

Follow this procedure:

- Open the Window for the FX. The example on the right shows ReaEQ.
- Click once with the mouse on the control which you wish to use. If you are using an external control surface with this plug-in, you can instead tweak the appropriate fader, knob, button or rotary control on the control device.
- Click on the **Param** button in the FX window. This produces a menu (see right).
- From the menu, choose the command **Show in track controls**.



Notice that this menu has a number of other options. These include:

**Show track envelope.** This causes an automation envelope to be added for the FX parameter. We'll get to the subject of automation envelopes in Chapter 14.

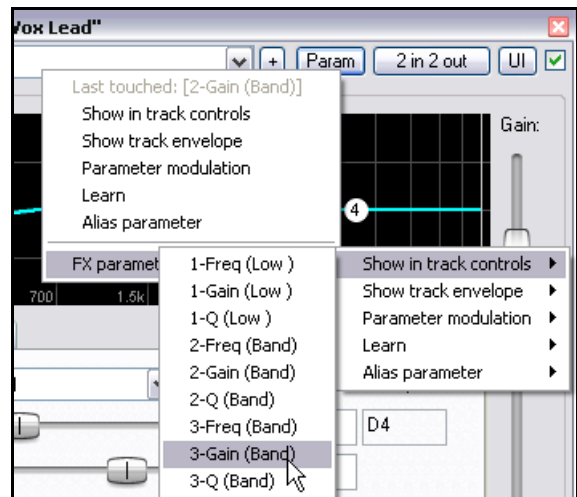
**Parameter modulation.** This is a more advanced topic, which will be covered in Chapter 18.

**Learn.** This can be used to assign control over this parameter to a widget (such as a fader, rotary or button) on an external control surface or similar device.

**Alias parameter.** This allows you to assign your own name for this parameter. This name will then be used in any track envelope, track control or parameter modulation that uses this parameter.

**FX Parameter List.** This displays a sub-menu of essentially the same options as the main menu (**Show in Track Controls**, **Show Track Envelope**, **Parameter Modulation**, **Learn** and **Alias Parameter**). This enables you to apply any of these options to any of the plug-in's other parameters.

In the example shown on the right, we are able to assign a track control for **3-Gain (Band)** without first having to touch the control.



## 9.5 NEW! Customizing the Main Toolbar

Customizing REAPER's main toolbar can make it easier to make REAPER work for you to work the way that you would like it to. For example, you can:

- Hide any of the default icons/commands that you do not wish to be shown.
- Assign a different REAPER command or action to any existing icon.
- Assign a different REAPER command or action to a new icon.
- Assign a custom action or macro of your own to a new or existing icon.

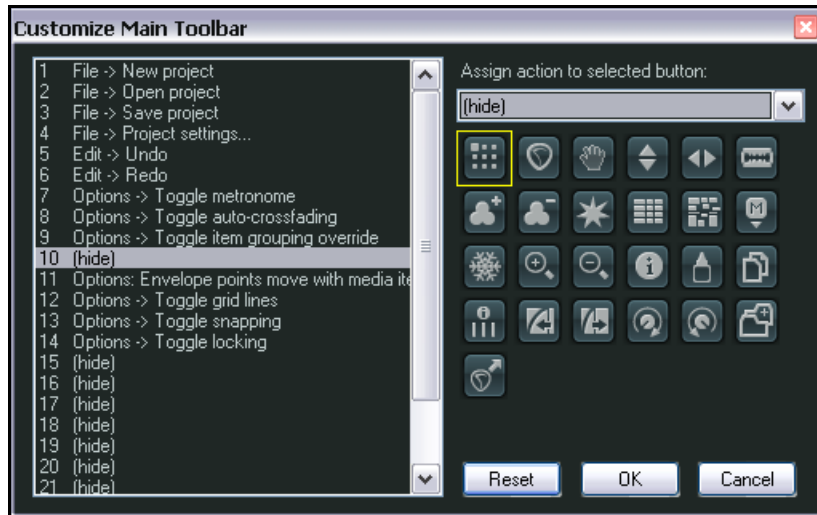
The topic of creating custom actions and macros will be covered in Chapter 13.

Any changes to the existing default toolbar layout are made thru the **Customize Main Toolbar** dialog box. This can be displayed by right-clicking over the empty area of the toolbar background, or by choosing **Customize Main Toolbar** from the **Options** menu. Here are some examples of how you can customize the main REAPER toolbar:

### To hide any of the default toolbar icons

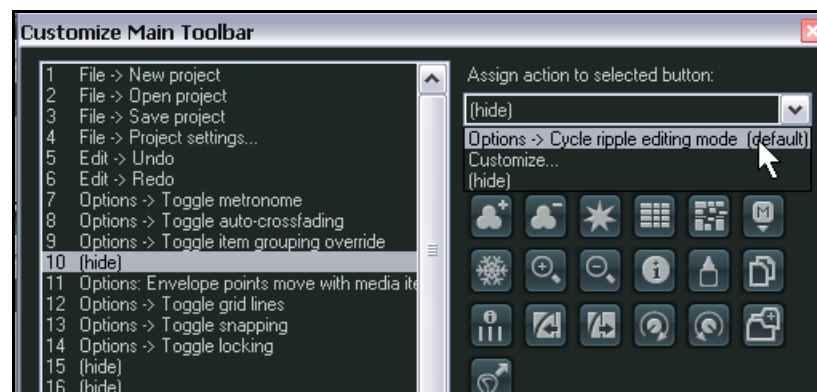
Follow this sequence:

1. Display the **Customize Main Toolbar** dialog box.
2. In the list of actions (left panel), select the item that you wish to hide. In the example shown here, this is **Options -> Cycle Ripple Editing Mode**.
3. Display the list of assignment choices and choose **(hide)**.
4. Click on **OK**.



### To restore to view a previously hidden icon:

1. Display the **Customize Main Toolbar** dialog box.
2. In the list of actions (left panel), select the hidden item that you wish to restore. In the example shown here, this is item number 10.
3. Display the list of assignment choices and choose the action from the drop down list.
4. Click on **OK**.

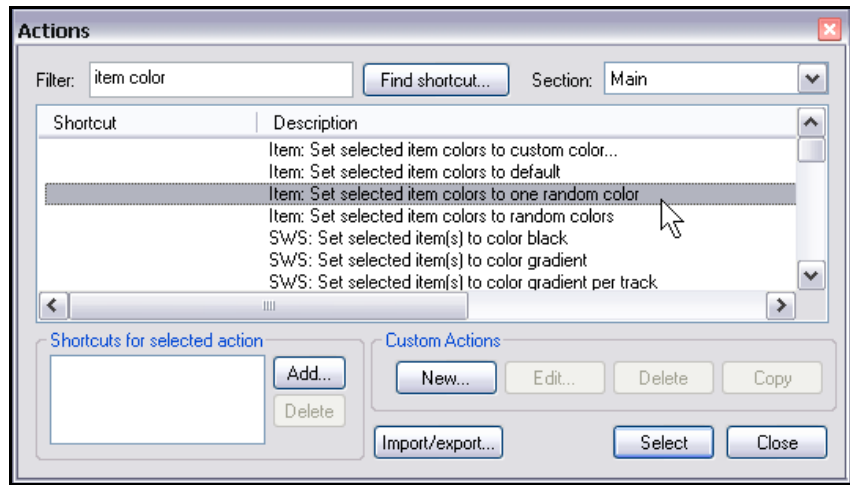
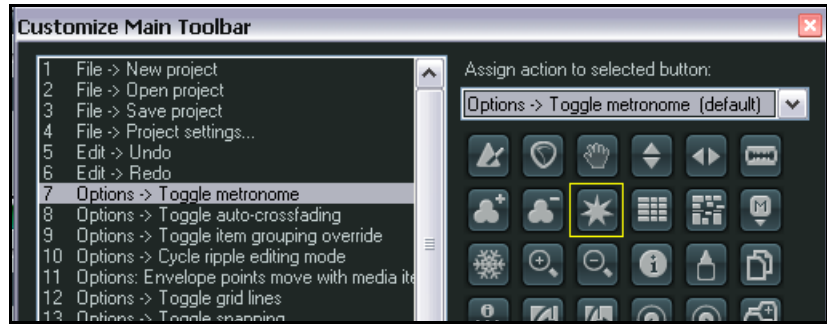


## 9 - More Project Management Features

### To add a command or action to the toolbar and assign it an icon:

In this example, we are going to create an icon to execute the command **Set selected item colors to one random color**.

1. Display the **Customize Main Toolbar** dialog box.
2. In the list of actions (left panel), select a number to indicate where you would like your new button to be placed. You can choose to either replace an existing icon (in the example shown here, we have chosen to replace item 7) or to add an extra one (to do this, in this example you would choose number 15).
3. In the right hand panel, select the icon that you wish to use.
4. Display the list of assignment choices and choose **Customize...** from the drop down list. This causes REAPER's **Action** window to be displayed. We'll examine this in depth and detail in Chapter 13, but for now ...
5. Browse the list of descriptions until you find the action that you want. If you like, you can type a word or some words in the **Filter** box to make this easier (see right).
6. Select this action (as shown) then click the **Select** button. This will return you to the **Customize Main Toolbar** dialog box.
7. Click on **OK**.



You will now see that your custom icon and action have been added to the main REAPER toolbar.



### To reset the toolbar to its original settings

1. Display the **Customize Main Toolbar** dialog box.
2. Click on **Reset**.
3. Click on **OK**.

## 9.6 NEW! Creating Smart Tools

If you have used other DAW software (such as Cubase, Pro Tools or Sonar) before coming to REAPER, then you may be used to using a toolbar to help with various editing tasks, such as splitting, deleting or muting items. You have already seen that this method of working is not native to REAPER. However, if you wish, you can create your own smart tools which can be used in a way similar to that with which you are familiar.

The Actions List includes a number of actions suitable for this sort of treatment. These include actions like **Item: Split Item Under Mouse Cursor**. In addition, you may also have created some custom actions of your own, for example to select and mute or delete items. You can find out more about creating custom actions like these in Chapter 13.

To create a Smart Tool for any such action or custom action, you first need to assign the action or custom to the toolbar, as explained in the section before this one. In this example, we have created a button to **Split Item Under Mouse Cursor**.

Then, to use it as a smart tool, simply do this:

1. Right click over the tool. The mouse cursor will change to the letter **A**. If you hover the mouse there long enough, a tool tip will be displayed.
2. Left click on (in this example) the item to which you want the action to be applied, at the exact position that you want the .action to occur.



In the example shown here, you would right-click on your user-defined Split tool, then click the mouse on any media item to split it at that point.

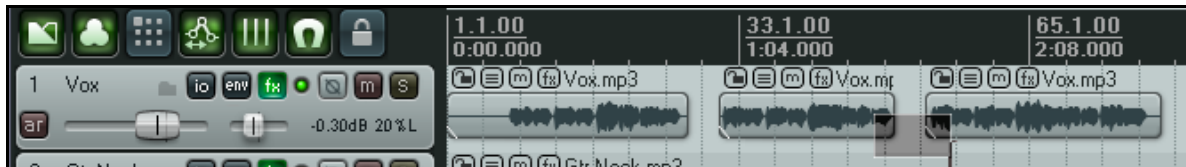
## 9.7 The Marquee

Marquee is a term that refers to a technique in which you can use your mouse as in imaginary lasso, to round up a whole bunch of media items and select them without having to go thru an otherwise long sequence of **Ctrl Click**. It can be especially useful when a project is made up of a large number of small items.

Here's how the REAPER Marquee works:

Action	Result
Right Click/Drag	Marquee select items.
Shift Right Click/Drag	Marquee select, add selected items to existing selection.
Ctrl Right Click Drag	Marquee select, toggling selected items state.

Note that you don't have to enclose an entire item to include it in your selection - it's sufficient just to touch it (as shown here).



If you look carefully at the above screen shot, you should be able to see that the second and third items have been selected by marquee.

### 9.8 NEW! Track Control Panel Help

You can choose to display any of a number of items of useful information just below the track control panel if you wish.

Simply right click just below the track control panel and select from these options:

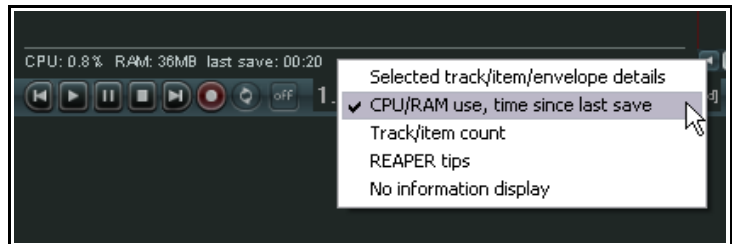
**Selected track/item/envelope details**

**CPU/RAM usage, Time since last save**

**Track/item count**

**REAPER tips**

**No information**





## 10 Pitch and Time Manipulation

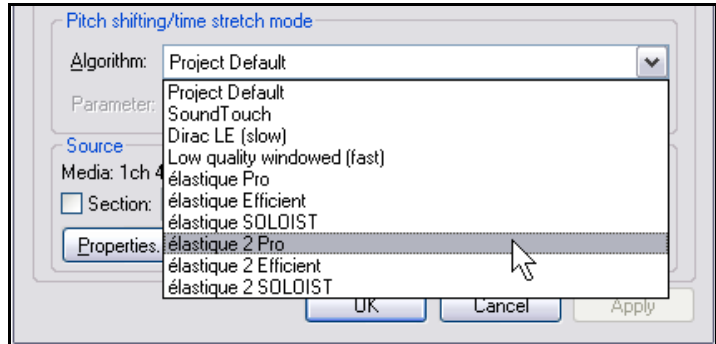
### 10.1 Changing Pitch for Individual Media Items

The pitch of any item can be changed from the **Media Item Properties** dialog box.

The pitch is measured in semitones. You can enter a number to raise or lower the pitch of any item by that number of semitones.

Notice that there is a drop down list that you can use to select your preferred Pitch shifting / Time stretching algorithm. The main choices are:

- Project Default.
- Sound Touch.
- Dirac LE (better quality, more CPU intensive).
  - Low quality windowed.
  - élastique 2 Pro (best).
  - élastique 2 Efficient (less resource intensive than elastique Pro).
  - élastique 2 SOLOIST (suitable for monophonic items).



If you choose one of these élastique algorithms, you should also select a Parameter from the different options available for each of the three algorithms. These are explained in more detail shortly.

To open the **Media Item Properties** dialog box for any item, first select the item, then press **F2**. Note that the default algorithm is determined by your Project Settings.

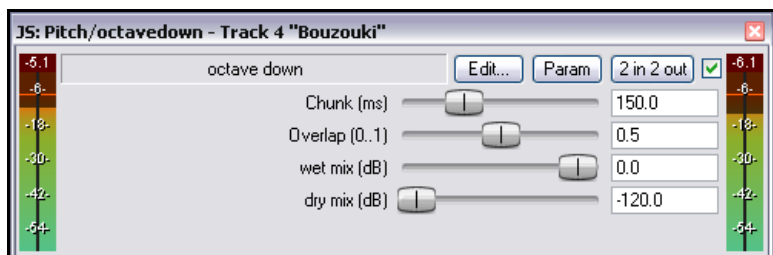
A number of keyboard shortcuts allow you to easily and quickly change the pitch of any selected item or group of items without needing to open the Media Item Properties box:

Keyboard Shortcut	Description
<b>Shift 9</b>	Move pitch down one semitone.
<b>Shift 7</b>	Move pitch down one cent.
<b>Shift 0</b>	Move pitch up one semitone.
<b>Shift 8</b>	Move pitch up one cent.

For more sophisticated and adventurous pitch shifting escapades you can try using one of the pitch manipulation plug-ins that are supplied with REAPER. Simply open the FX window for a track, click on **Add**, then in the filter list type *pitch* to display a list of what is available.

Shown right is the **Octavedown** plug-in. Other JS pitch shift plug-ins include fft-ps, mdct-shift, octaveup, pitch2, pitchdown and superpitch.

These are each suited to particular tasks, but the most powerful of the available pitch shift plug-ins is **ReaPitch** (see Section 10.3).



### 10.2 Understanding *élastique*

Pitch and time shifting are very powerful tools, but they can be quite complicated in their implementation. This section will introduce you to some of the basic principles and concepts as represented in *élastique* 2. You can find a lot more information at the zplane web site <http://www.zplane.de/index.php>

The summary information contained in this section has been largely garnered from that web site.

zplane's *élastique* family offers three different time-stretching (also known as time-scaling, master tempo or key lock) engines, optimized for different uses: *élastique* Pro, *élastique* efficient, and *élastique* SOLOIST. All three of them are able to run in real time.

#### ***élastique* Pro**

*élastique* Pro is a general purpose time-stretching engine that offers unmatched quality and easily fulfils the high quality demands of professional productions and broadcast applications. The time-stretching engine is based on state-of-the-art psychoacoustic models and signal processing theory. *élastique* Pro is based on a completely new approach to time-stretching, making stretching artefacts obsolete and thus providing sharp transients and crystal clear vocals without phasing artefacts. *élastique* Pro offers stable timing, inter-channel phase coherence and sample accurate stretching. As a special feature, *élastique* Pro allows you to do formant preserving pitch shifting not only for monophonic, but also for polyphonic input files to avoid the well-known mickey-mouse effect when pitching up or down. Last but not least, all of this can be done in real-time on current CPUs.

Additionally, the *élastique* Pro SDK package makes *élastique* efficient and *élastique* SOLOIST accessible thru the same API to make integration of different processing modes as easy as possible.

#### ***élastique* efficient**

*élastique* efficient gives you great time-stretching quality at a stunning workload efficiency. The algorithm is targeted at complex polyphonic signals like complete mixes etc. efficient uses specifically developed technologies to efficiently detect tonal and transient components with high accuracy in the frequency and time domain. It furthermore offers different mechanisms to improve performance even more: the processing can be split into several parts in order to avoid workload peaks at low latencies and the overall bandwidth can be reduced in order to save more processing power (at the price of a slightly decreased quality level).

#### ***élastique* SOLOIST**

*élastique* SOLOIST is targeted at monophonic input signals. Thanks to this restriction, it offers incredible quality for this type of input. It allows pitch shifting with formant preservation to leave the sound's timbre/formant characteristics untouched, and has a transient copying feature to preserve crisp attacks. SOLOIST also allows to split the analysis and the synthesis part of the processing to implement an incredibly efficient real-time synthesis when the analysis is done offline. *élastique* SOLOIST is especially suitable for use with vocals.

#### **What's new in *élastique* v2**

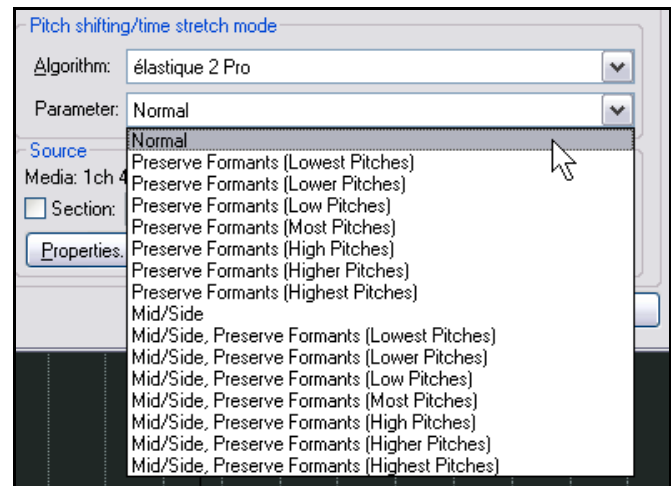
- quality improvements:
- better transient detection and preservation
- increased bass frequency resolution (bass transparency)
- improved stability of high tonal frequencies
- new API for easier and more powerful integration:
- better workload distribution, workload peak smooth-out
- equidistant settings of pitch and stretch factors every processing block
- performance improvements:
- internal algorithmic optimizations
- SSE3 support



Feature Comparison Table			
	Pro	Efficient	Soloist
Real-time time stretching	Yes	Yes	Yes
Real-time pitch shifting	Yes, formant preserving	Yes, non-formant preserving	Yes, formant preserving
Best quality for	Any	Polyphonic, general music input	Monophonic input
Phase coherence between channels	Yes	Yes	Yes
Absolute timing stability	Yes	Yes	Nearly
Separation of analysis and synthesis	No	No	Yes
Supported sample rates	32kHz .. 384kHz	32kHz .. 384kHz	32kHz .. 384kHz
Supported # channels	48	48	48
Optimizations	SSE, SSE2, SSE3, AltiVec	SSE, SSE2, SSE3, AltiVec	SSE, SSE2, SSE3, AltiVec
Workload	Medium	Low	Analysis:low, synthesis: negligible

### Some explanatory notes:

- A formant represents the character, resonance, and phonetic quality of a particular voice. Preserve Formant attempts to retain those elements even with severe pitch changes.
- The Preserve Formant option is very useful, allowing the shifted pitch of vocal material, particularly, to retain the character of the original sample, even with quite large shifts. In the case of instrumental audio it's a good idea to try processing both with and without formants preserved, as you can't always predict which will be better overall.
- if you want to make quite extreme changes to sensitive audio you do it in stages, processing by a lesser amount each time, to reach the desired shift or stretch. However, this does not always produce a better result. The best thing is to experiment, something that the uncluttered and simple interface encourages you to do.
- The Mid-Side microphone technique is a stereo recording technique that allows you to record two channels of audio while still allowing some flexibility of simulating changes to the microphone positioning during the editing and mixing process. The stereo picture is created by the loudness or intensity of each sound in the left or right channels, but not by a time delay. You can see that some of the élastique parameter options make use of this technique.



## 10.3 Using ReaPitch

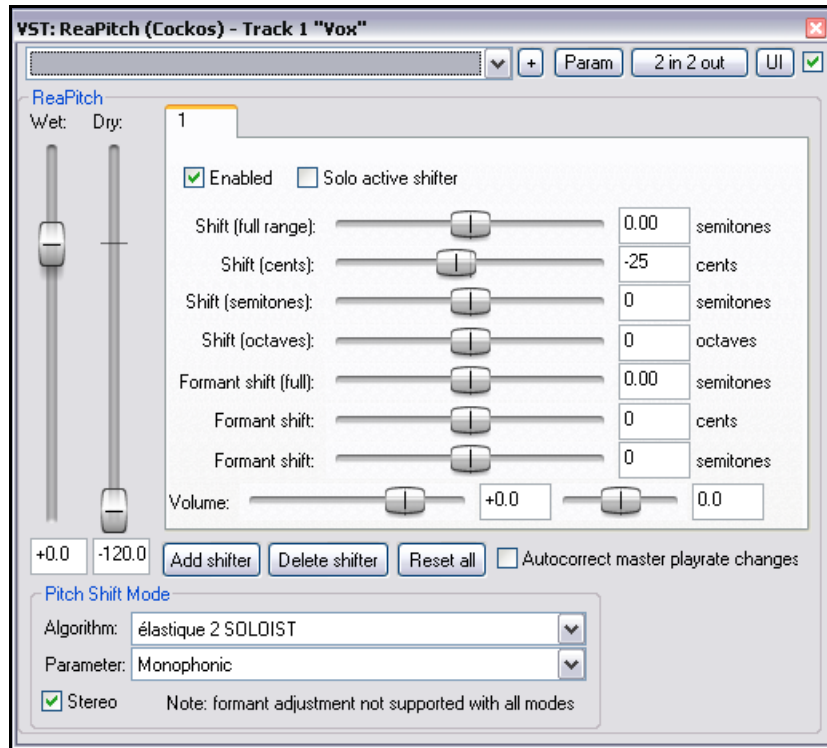
Simply insert the VST ReaPitch plug-in into a track's FX bin and you have a powerful pitch manipulation tool at your disposal.

For example, you can use ReaPitch to create vocal harmonies.

The first illustration (right) shows ReaPitch inserted into the FX chain for a vocal track. The Elastic Soloist algorithm has been selected, together with the Monophonic parameter. Notice that the pitch has been shifted down by 25 cents.

In the second illustration, you can see that we have added a second shifter, this time taking the pitch up by 25 cents, thus creating an extra harmony.

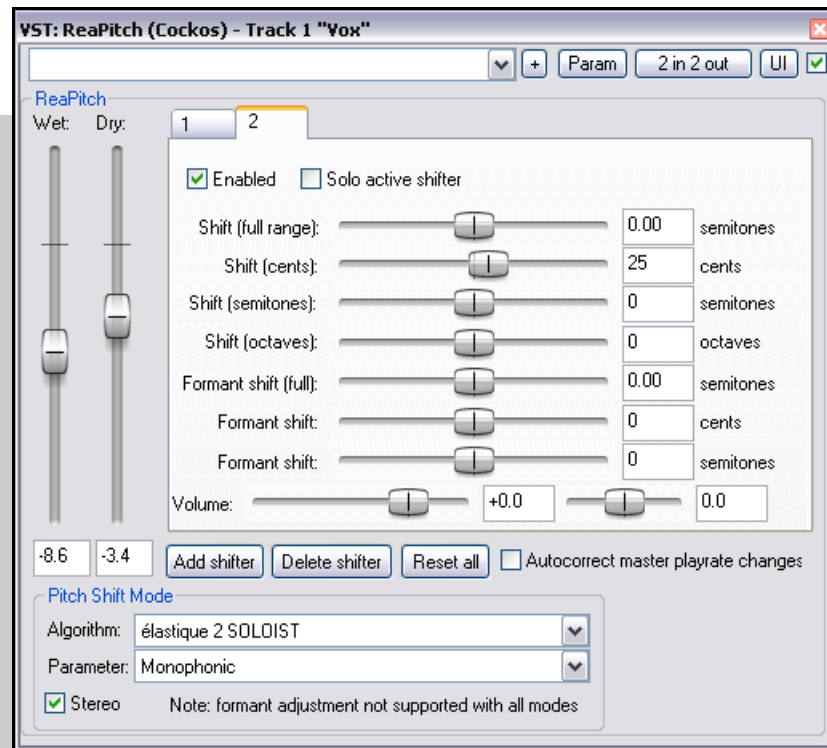
Notice also that in the second illustration we have also adjusted the panning and the mix of the wet and dry signals to produce a more pleasing overall effect.



### Pitch Shifting and Channel Splitting

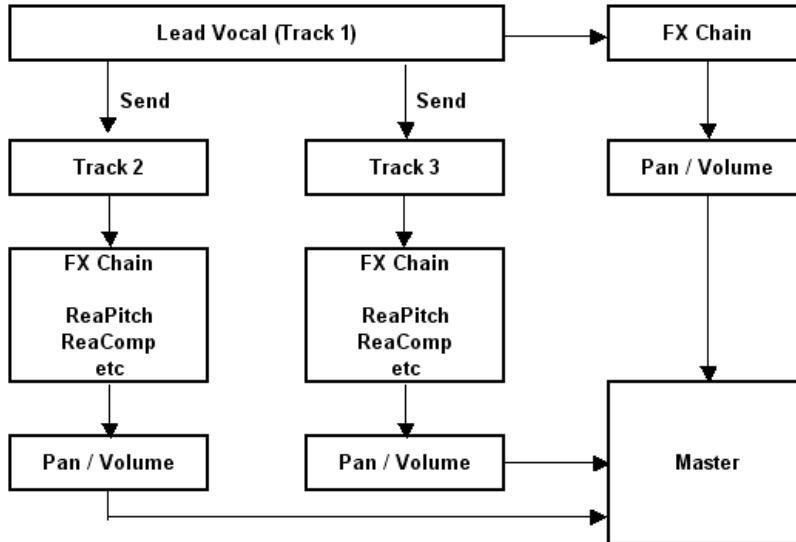
If you intend to do a lot of work in this area, you should definitely take the time to get on top of REAPER's channel splitting capabilities. These are explained in some detail in the section **More REAPER Routing Examples** (and elsewhere). Look especially at the example headed **Channel Splitting and Pitch Shifting**.

With channel splitting, you can, for example, not only create several vocal harmonies, but also apply different FX plug-ins or plug-in chains (such as Reverb or Delay) to each of your different harmonies.



### 10.4 Using ReaPitch with Multiple Tracks

We've already looked at how REAPER can send audio streams from one track to another. Let's now have a look at how this feature might be used with ReaPitch.



In the example shown on the left, sends are used to send a signal from a Lead Vocal Track to two other tracks.

Each of these other tracks has its own FX chain which includes ReaPitch, and of course the pan and volume faders for these tracks can be controlled independently of each other and of the lead vocal.

### 10.5 Instrument Tuning with ReaTune

ReaTune is a plug-in that can be used to help you correct the pitch on your recorded media items. This is commonly used with vocal tracks.

However, it can also be used to help you to tune an instrument – see illustration on right. The histogram indicates the following.

**Center column:** <+- 1 cent.

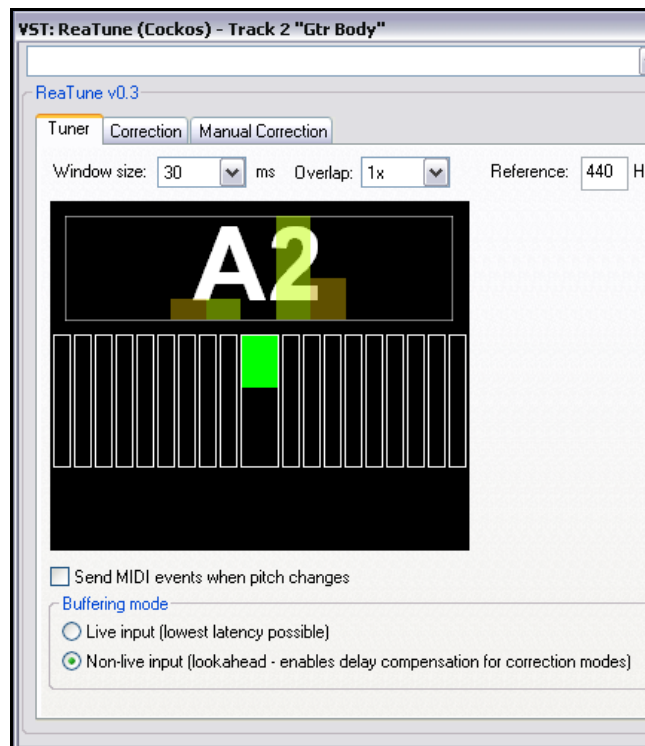
**First pair out:** +- 1 to 3 cents.

**Second pair out:** +- 3 to 7 cents.

**Third pair out:** +- 7 to 15 cents.

**Fourth pair out:** +- 15 to 30 cents.

**Last pair out:** +- > 30 cents



## 10.6 Pitch Correction with ReaTune

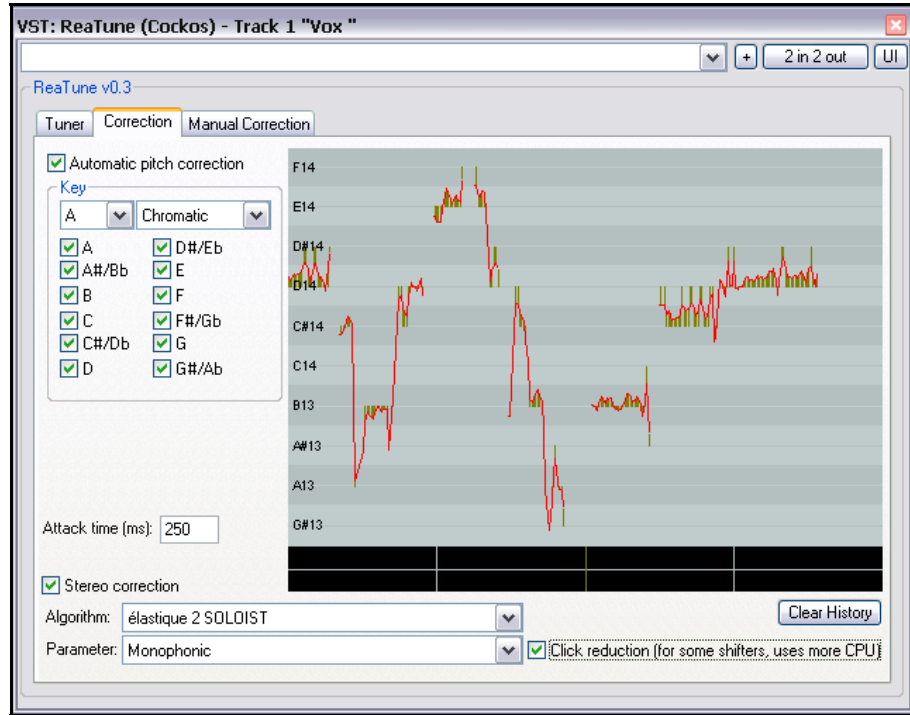
The plug-in **ReaTune** can be used for pitch correction. It can be used in either manual or automatic mode. In either mode, *élastique SOLOIST* is a suitable algorithm.

Automatic mode is illustrated right.

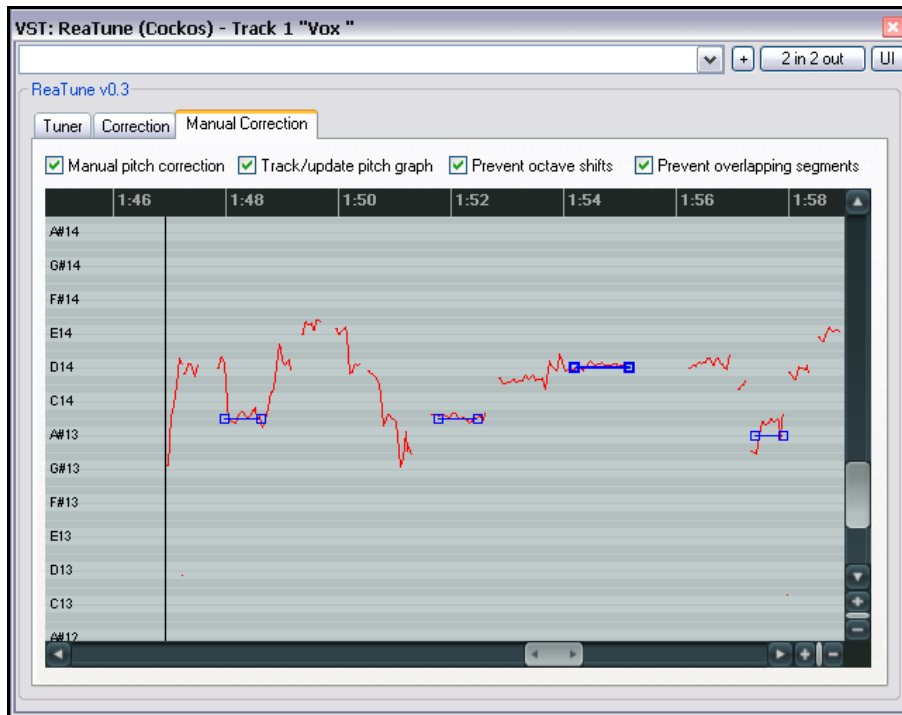
To apply it, first insert the **ReaTune** plug-in into a track's FX window.

You should then:

- Select the page headed **Correction**.
- Enable the **Automatic pitch correction** option.
- Select the required algorithm and parameter.
- Specify the correct key.



ReaTune will then do the rest for you!



Manual mode is illustrated left. Click and drag to mark your pitch corrections.

To apply it, first insert the **ReaTune** plug-in into a track's FX window.

You should then:

- Select the page headed **Manual Correction**.
- Enable the **Manual pitch correction** option, and other options as preferred.
- Use your mouse (click and drag) to draw in your corrections.

## 10.7 Time Stretching

The **Media Item Properties** dialog box (**F2**) can also be used to stretch or shrink the time for an item.

To do this, adjust the **Playback Rate**. In the example shown (right), playback rate is increased by 2% and the option to **Preserve Pitch** has been selected.

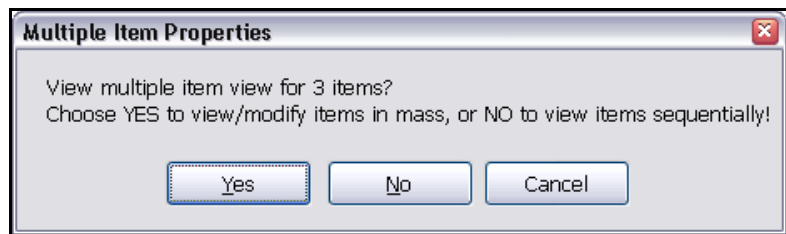
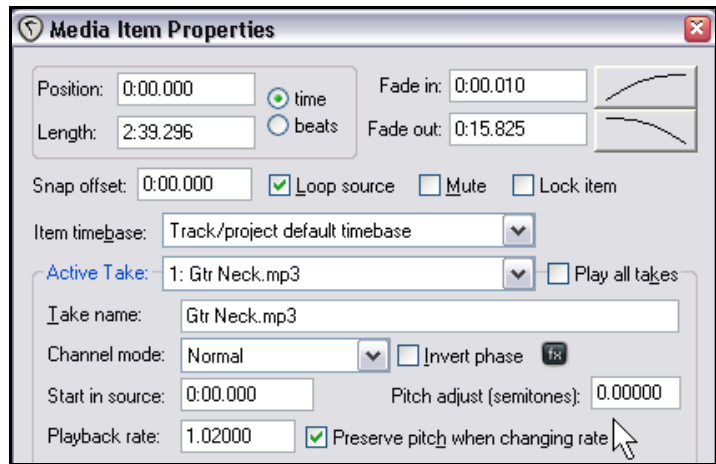
To open the Item Properties dialog box for any item, first select the item, then press **F2**.

To make the same change for a number of items, do this:

1. Select all of the required items.
2. Press **F2**.
3. When the **Multiple Item Properties** prompt appears (see right), choose **Yes**.
4. Make your changes.
5. Click on **OK**.

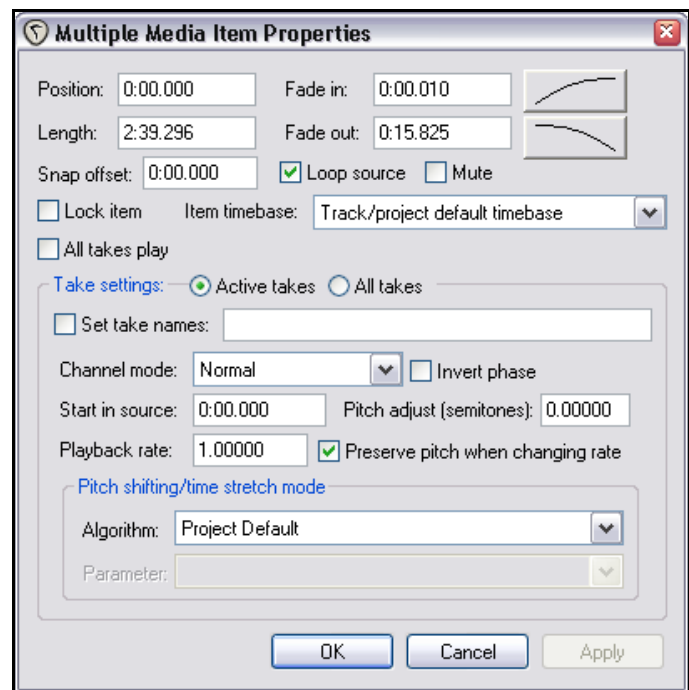
The Multiple Media Items Properties dialog box is shown here.

Notice that it contains many but not all of the options that you will find in the Item Properties dialog box.



Another method that you can use to adjust the playback rate of any media item (or selected group of media items) is this:

1. Select all the required items.
2. Hover the mouse over the end of one of then items until it turns to a double-headed arrow, as you would for slip-editing. Holding down the **Alt** key, click and drag the mouse, left to increase playback rate, right to slow it down.
3. Release the mouse when finished.



## Up and Running: A REAPER User Guide v 3.11

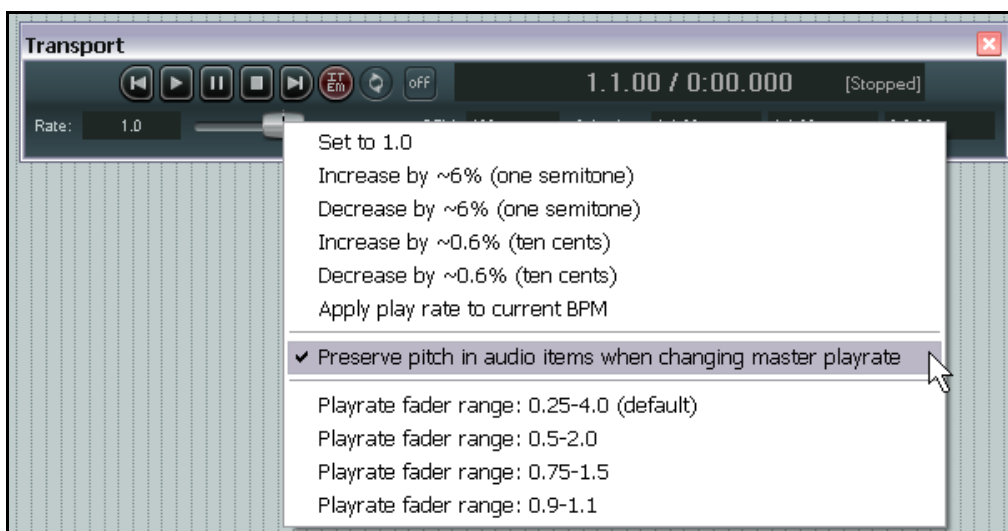
Notice that if you have enabled the option **Display media item pitch/playrate if set** (Preferences, Appearance, Media) any changes to Pitch or Playback Rate will be displayed on or above the Media Item(s) in Track View.



### 10.8 Changing the Project Playrate

You can adjust the play rate for the whole project, using the horizontal fader on the Transport Bar. The project's default pitch shift mode will be applied.

You can adjust the playback rate for the entire project by dragging the fader with your mouse, or you can right-click over the fader control and select one of the options from the menu.



Notice that from this menu you can:

- Reset the playrate to 1.0.
- Increase or decrease the playback rate by any of the values listed.
- Enable or disable the option to **Preserve pitch in audio items when changing the master playrate**.
- Apply play rate to the current BPM.
- Set the playrate fader range according to any of the available options.

**Note:** If the playrate fader is not visible in your transport bar, you can display it by right-clicking over any part of the Transport Bar background and selecting the option to **Show play rate control**.

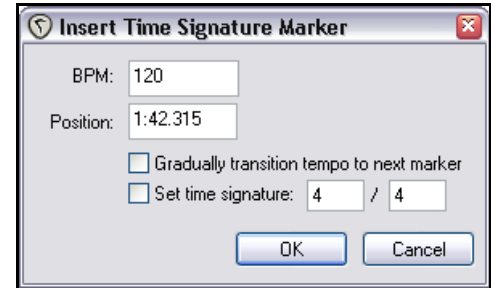
### 10.9 Changing the Time Signature Marker

The default project Beats per Minute and Time Signature for any project are determined by the values assigned to these items in the **Project Settings**.

However, you can change these at any point in a song, as appropriate by inserting a Time Signature Marker. This changes the beat after the marker position.

To change the Time Signature Marker at any point:

1. Position the edit cursor at the required place in the song.
2. From the menu, choose the **Insert** command, then **Time Signature/Tempo Change Marker**
3. Specify your requirements in the dialog box (right). Available choices include **BPM**, whether to **Gradually transition tempo to next marker** and **Set Time Signature**.
4. Click **OK**.



Changes to the time signature marker will impact on the metronome and MIDI items but not, of course, on recorded audio items.

**Tip:** This process can be automated using the **Tempo Map Envelope** – see **Chapter 13 – REAPER Automation**.





## 11 The REAPER Mixer and Master

### 11.1 Introduction

Up until now, most of the emphasis has been on working in Track View. This is hardly surprising, as that is the area where you will find yourself spending most of your time (at least with audio) and doing most of your work. As your mix progresses, however, you will find that the REAPER Mixer begins to assume more importance. The contents of this section should help you to familiarise yourself thoroughly with the REAPER Mixer and its various features and capabilities. You will also learn more about how to get the best out of the REAPER Master.

### 11.2 Mixer Layouts

The Mixer menu is displayed by right-clicking over a vacant area of the mixer window, or by choosing the Mixer command from this window's main menu - this is in fact the only command there! This menu offers you a great deal of flexibility as to how the mixer is displayed. Moreover, using screen sets you can easily save and recall at will different mixer layouts. **Ctrl M** toggles Mixer View open and closed. Your various mixer layout options are summarized below.

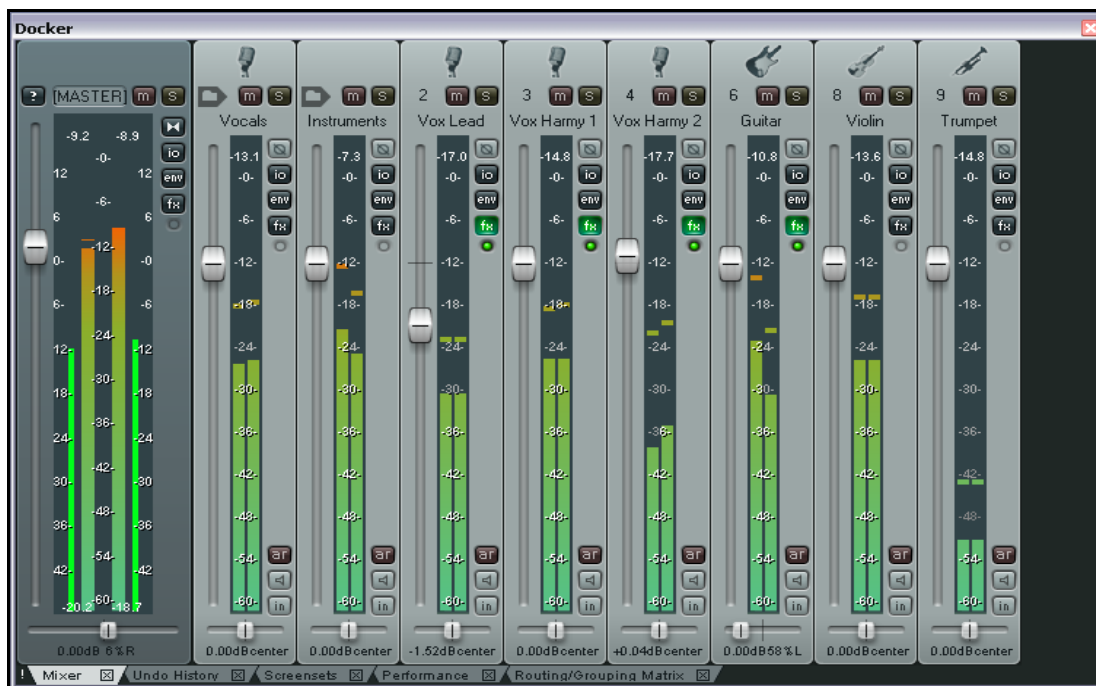
Command	Description
<b>Show folders</b>	Determines whether track folders are shown.
<b>Show normal top level tracks</b>	Determines whether tracks not in folders are shown.
<b>Show Tracks that are in folders</b>	Determines whether tracks in folders are shown.
<b>Show Tracks that have receives</b>	Determines whether tracks with receives are shown.
<b>Group folders to the left</b>	Places track folders to the left. This can be useful at times in bringing all your submix folders, but confusing at other times for separating folders from their child tracks.
<b>Group tracks that have receives to the left</b>	Places all tracks with receives to the left. Especially useful if the only tracks with receives are all buses.
<b>Scroll view when tracks activated</b>	Causes the view to be scrolled when tracks are activated.
<b>Show multiple rows of tracks where size permits</b>	Shows tracks displayed in up to three rows when tracks will not fit in one row and the mixer window has sufficient height.
<b>Show maximum rows even where tracks would fit in less rows</b>	Causes tracks to be displayed in as many rows as will fit in the track height, regardless of how few tracks there might be.
<b>Show master controls on right</b>	Moves the Master to the right of the mixer.
<b>Show pan controls on top</b>	Moves the pan controls to the top of each track.
<b>Show FX inserts when size permits</b>	Displays an FX bin above the track controls.
<b>Show sends when size permits</b>	Displays a Sends bin above the track controls.
<b>Show FX parameters when size permits</b>	Shows FX parameter controls where these have been specified.
<b>Show track icons in mixer</b>	Track icons (if used) will be shown in tracks in the mixer.
<b>Dock mixer in docker</b>	Docks the mixer in the REAPER docker.

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To help you understand how these options are applied, the table below and the illustrations that follow it represent three examples of possible mixer layouts.

Option	Mixer 1	Mixer 2	Mixer 3
Show folders	●	●	●
Show normal top level tracks	●	●	●
Show Tracks that are in folders	●	●	●
Show Tracks that have receives	●	●	●
Group folders to the left	●		
Group tracks that have receives to the left			
Scroll view when tracks activated	●	●	
Show multiple rows of tracks where size permits			●
Show max rows even where tracks would fit in less			●
Show master controls on right			●
Show pan controls on top		●	●
Show FX inserts when size permits		●	
Show sends when size permits		●	
Show FX parameters when size permits			●
Show track icons	●	●	

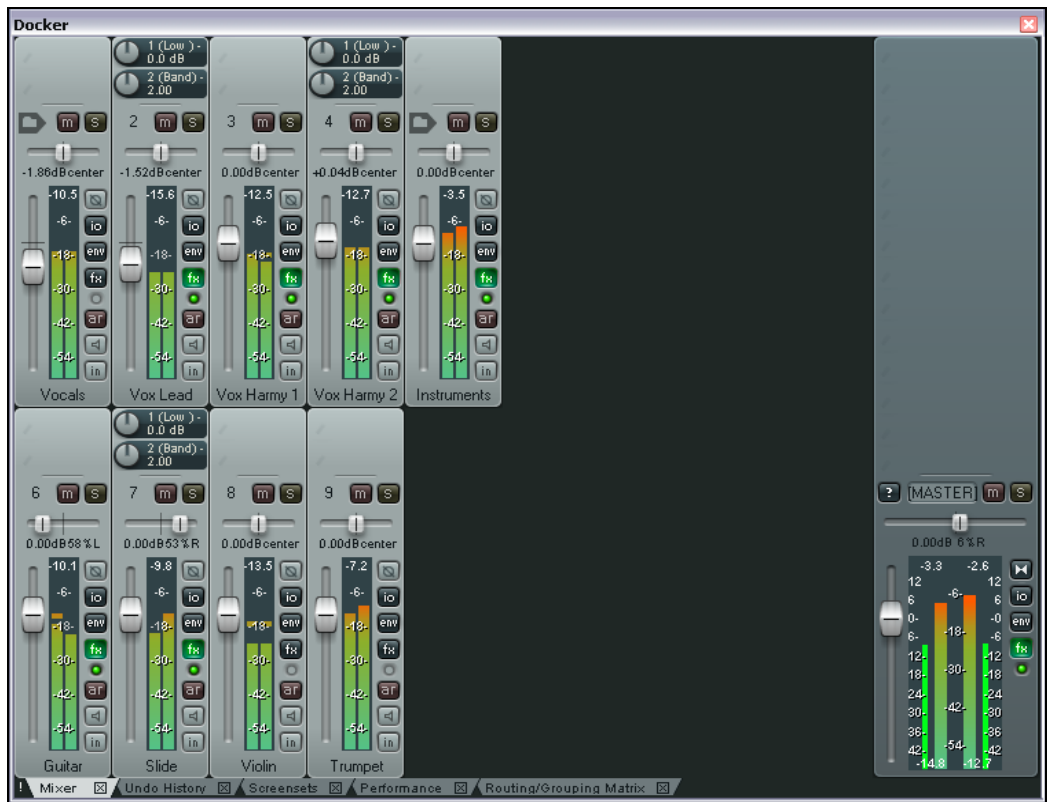
Mixer 1



Mixer 2



Mixer 3



## 11.3 Modifying Track Layout Elements

You can use your mouse to adjust for any track or selection of tracks the relative height within the Mixer of the various elements, such as the FX bin, the Sends bin, and the Track Control area. To do this, simply hover your mouse over the boundary between the two elements so that the mouse becomes a double-headed vertical arrow, then click and drag up or down. This action can be controlled by any of the following modifiers.

Action	Result
Click/Drag	Adjusts relative height of elements for the current track only.
Alt Click/Drag	Adjusts relative height of elements for all currently selected tracks.
Ctrl Click/Drag	Adjusts relative height of elements for all track.

### Example

The first illustration (top right) shows the mixer for a portion of a project.

The content for the various tracks is not really displayed very satisfactorily. For example, for the first and last tracks shown not all track FX are visible.

Of course, you could use the little arrow icons to scroll, but that does not really solve the problem.



In the second illustration (above) we have attempted to resolve this by adjusting the boundary between the sends and the VU meters for the two tracks in question. However, this produces different VU meter heights for different tracks, an effect that is not very pleasing.

As an alternative, we could hold **Ctrl** while adjusting the boundaries of any one track, with the result that the boundaries are adjusted for all tracks. This achieves a more satisfactory outcome (right).

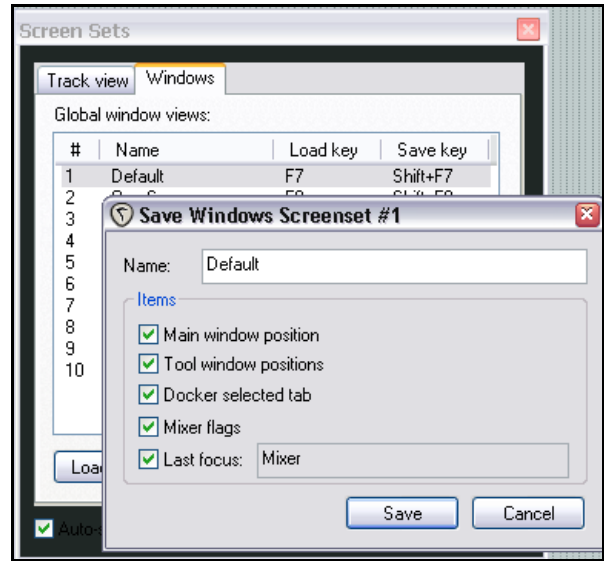


## 11.4 Using Windows Screen Sets

Windows Screen Sets have already been discussed in Chapter 9. Screen sets are also useful when you are working with the mixer, because they can be used to recall different mixer layouts.

This can be a great timesaver, because the more you use REAPER, the more you will find yourselves settling on perhaps three or four different layouts that you prefer for use in different circumstances. This will depend mainly on two factors:

- **Number of Tracks:** your preferred mixer layout is likely to be different for a project with only three or four tracks from what it would be for a project with perhaps 20 or 30 tracks.
- **Project Stage:** the information that you would like to see in your Mixer may vary according, for example, to whether you are at the recording, early mixing, or final tweaking stage of your project.



Windows screensets create layouts that are globally available to all projects. To do this:

- Display the Screen Sets window (**View, Screen Sets**) and select the **Windows** tab.
- Click on any available number, then **Save State**.
- Type a suitable name
- Select any or all of the other four items, but be sure to include including **Mixer Flags**.
- Press **Enter**.

**Tip:** If you give focus to the Mixer View immediately before saving your Screen Set and include the Mixer Flags and Last Focus items in your settings, then you will ensure that whenever that Screen Set is loaded the Mixer will have focus.

To retrieve a layout, simply double click on its name in the Screen Sets window. You can also, of course, assign shortcut keys to your various screen sets and use those.

## 11.5 Track Control Menus and Windows

By and large, the same functionality that is available in the track control panels of your track view is also available in the mixer. The main exception is that you cannot access a track's Envelopes window from the Mixer. These functions are covered in detail in Section 2 of this User Guide. For example:

- Right clicking over the background area or Track Number for any track panel in the mixer produces the track context menu (see right)
- Clicking on a track's I/O button displays the track's Routing Window. Right clicking on this button displays its routing menu.
- Clicking on a track's FX button displays the FX chain for that track. Right clicking on this button displays the Add FX window.
- Right clicking over a track's volume or pan fader causes the Volume Control or Pan Law window to be displayed.
- Similarly, the Record Arm, Record Monitoring and Select Record Mode buttons serve the same purposes as they do in Track View.

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### 11.6 Mixer Shortcuts

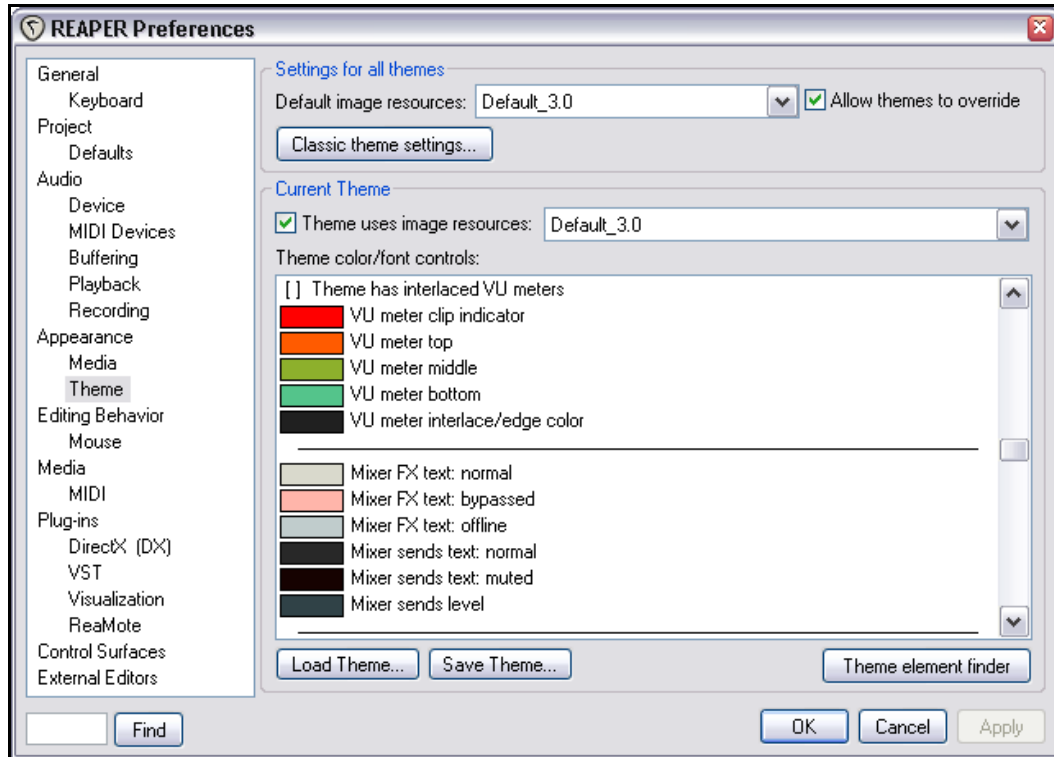
As well as all the functionality described above, the FX Bin and Sends Bin in mixer view (when visible) make available to you a few shortcuts of their own. These are described below:

FX Bin Mouse Shortcut	Description
<b>Click on any displayed plug-in name</b>	Opens and floats that plug-in's control window.
<b>Ctrl Click on any displayed plug-in name</b>	Displays the FX chain and the control window for that plug-in.
<b>Shift Click on any displayed plug-in name</b>	Toggles bypass state for that plug-in.
<b>Alt Click on any displayed plug-in name</b>	Remove that plug-in from FX Chain.
<b>Alt Click on track's FX Button</b>	Remove all plug-ins from that track's FX Chain.
<b>Ctrl Shift Click on displayed plug-in name</b>	Toggles offline status of that plug-in.
<b>Right click on any displayed plug-in name</b>	Displays a context menu including: Add FX ... Add FX Chain ByPass Chain Rename FX Instance
<b>Click in any vacant area of the FX Bin</b>	Displays the Add FX window.
<b>Right click on any vacant area of the FX Bin</b>	Displays a context menu whose commands include Add FX, Add FX Chain, Show Effect Chain and Bypass Chain.
<b>Drag and drop up or down</b>	Change the order of plug-ins in the FX Chain.
<b>Drag and drop FX to another track</b>	Copy FX from one Chain to another (similar to Track View).
<b>Hold Alt with drag and drop to another track.</b>	Move FX from one Chain to another.

Sends Bin Mouse Shortcut	Description
<b>Click on any displayed Send</b>	Opens the Control window for that send.
<b>Right Click on any displayed Send</b>	Displays a context menu e.g.: Show send parameters      Show track routing window Mute send Remove send                  Go to send destination track
<b>Click and drag on a Send's Control Knob</b>	Raise or lower the send volume level.
<b>Shift Click on any Send</b>	Toggle that send's mute status on or off.
<b>Alt Click on any Send</b>	Deletes the send.
<b>Ctrl Click on any Send</b>	Opens entire routing window for that track.
<b>Click in vacant area of Sends bin</b>	Opens entire routing window for that track.
<b>Drag / drop from one bin to another</b>	Creates a send from first track to second.
<b>Alt drag / drop from one bin to another</b>	Creates a send from first track to second and disables send from first track to the master.
<b>Ctrl drag / drop from one bin to another</b>	Creates a send from first bin to second and opens control window for that send.
<b>Drag and drop Send to another track</b>	Create a copy of the send on that track.

## 11.7 Mixer Color Themes

The topic of customising colors for your various screen elements is covered in detail in Section 15 of this User Guide. To define your custom colors, you must first display the **Appearance, Color Theme** page of your **Preferences** window.



Meanwhile, you might wish to note that the following mixer-specific items can be assigned your custom colors by displaying the **Options, Preferences** window and the selecting the **Appearance Theme** settings page:

- Mixer FX text normal
- Mixer FX text bypassed
- Mixer FX text offline
- Mixer sends text normal
- Mixer sends text muted.
- Mixer sends level

In addition, you can change the various settings for your VU meters:

- Whether you want the VU meters to be interlaced.
- VU meter clip indicator
- VU meter top
- VU meter middle
- VU meter bottom
- VU meter interlace/edge color

Click on any color shown that you wish to change to open the **Colors** window. Don't forget to **Apply** your changes when finished.

## 11.8 NEW! Showing FX Parameter Controls

The menu option **Show FX parameters when size permits** can be used to add to the mixer panels FX controls for those parameters specified in the Envelopes window (see Chapter 9). To select those parameters that you wish to have displayed, click on the track's **Envelope** button to open its Envelopes window, then check the **UI** box for each parameter that you want displayed.

In the example shown on the right, the plug-in **ReaEQ** has been added as an FX to a track called Vox.

As well as the plug-in itself appearing in the mixer panel (at the top) we have also decided to show controls for two of that plug-in's parameters, Band 2 Gain and Band 3 Gain.

To remove an individual control from the display, hold the **Alt** key while you click on it.



## 11.9 Mixer Appearance Settings

Under **Options, Preferences, Appearance** you will find a couple of options that you can use to customise your mixer appearance by the use of color coding. These are to **Set track label background to custom track color** and to **Tint track panel backgrounds**.

## 11.10 Master Track Options and Settings

The Master Track Control Strip in the mixer includes most of the functions that are found in the Master Track when it is displayed in Track View. Again, the main exception is that the Envelopes window cannot be opened directly from the Mixer.

Examples of the available functions and features are:

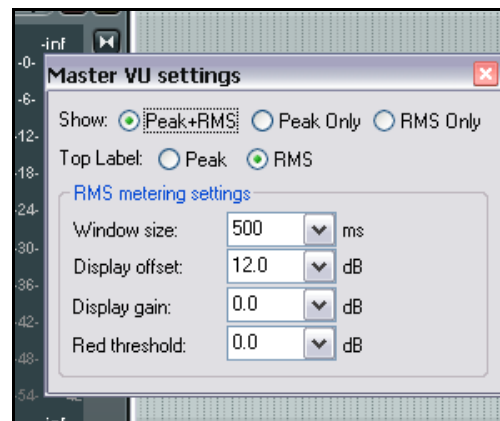
- Left click on the Output button to toggle between Stereo and Mono modes.
- Right click on the Output button to set any one of four available Mono options (see right) that can be used in Mono mode.
- Left click on the FX button to display the FX Chain for the Master.
- Right click on the FX button to open the Add FX window.
- If the FX Bin for the Master is displayed (as in the examples Mixer 2 and Mixer 3 that we looked at earlier), then you can use all and any of the Mixer Shortcuts detailed in section 6.5.
- Right click over the VU area to display the various settings that you can use to control what is displayed in the VU and how it is displayed (see right). Available options include:

Whether to show Peak plus RMS, or one or the other only.

Window size.

Display offset level and Display gain level

Red threshold level.





## 11.11 Master Hardware Outputs

Output from the Master can be directed to one or more of your available hardware outputs. The easiest way to select multiple hardware outputs is probably via the Routing Matrix. In addition to this, there are some very clever features available in the Master which will help you to manage and control your output, especially if you are using multiple hardware outputs.

The I/O button merits a special mention for the way it can be used to set up and manage your hardware output or outputs.

- Right click on the I/O button to display a menu of all available hardware output options. These can be toggled on and off in any permutation that you require.
- Left Click on the I/O button to display the Master Track Outputs window. This can be used to control the levels and panning of the signals that are being sent to the various output devices.

Notice (below) that for each output you can independently control any or all of the following:

- Toggle Mute on/off.
- Toggle phase invert.
- Set Volume level.
- Set panning level.
- Select channels. This will be explained in the section immediately following this one.



## 11.12 Master Track Channels

The topic of routing and channel splitting is an area which is about as big as it gets. It is a topic that recurs throughout this user guide. The concept itself starts as a relatively simple one, but from those simple beginnings it can grow into something as complex and as complicated as you like.

At its simplest, it means this. You can use channels to send two copies of the same signal to two different places. Then it starts to get interesting. That's because, for example, you can do separate things to each channel along the route and then join them up again.

Slow down! If that's already starting to make your head spin, let's work thru a relatively simple example. The example itself may or may not be something that you'll ever want to do, but that's not the point. The point is that it will help you to understand what channel splitting is about and how to do it.

Let's take an example of using multiple channels (two stereo pairs in fact) for our Master. We're going to use this to feed some reverb into our signal chain, then send the reverb (and only the reverb) out to our headphones (to enable us to assess it), while sending the overall final mix to our speakers. In order to work thru this example, you will need a sound card with at least four audio outputs. If your sound card provides only one pair of outputs, you can instead try some of the examples included in Chapter 17 of this User Guide.

### Example

The diagram below illustrates what we are going to achieve. It assumes that our audio signal flows from top to bottom and from left to right.

First we will create the necessary extra Channels for the Master Track.

The audio coming into our Master from the mix will be split between Channels 1/2 and Channels 3/4.

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The signal that is passed to Channels 3/4 will be fed thru a Reverb plug-in then directly out to our headphones. It will also be passed back into a Compressor plug-in, where it will be mixed back into the original incoming signal.

The final mix will then be fed to the speakers.

1. Open the file **All Through The Night.rpp** and save it as **All Through The Night MASTER.RPP**.

2. Pan the two guitar tracks roughly 40% left and 40% right respectively. Pan the Bouzouki about 15% left, the Vox around 10% right. Quickly adjust the volume levels for each track to suit, especially to avoid clipping in the Master. Save the file.

3. If this was one of your projects, then of course you would want to do more work on individual tracks to get them just right. This might include the use of EQ, some compression, perhaps a touch of delay, and so on. For the purpose of this example, we can just imagine that this has been done.

4. Create a layout for your Mixer that includes the option to **Show FX Inserts**.

5. Make sure that your Speakers and Headphones are each connected to separate paired sound card outputs.

6. Right click over the **I/O** button in the Master and make sure that output is directed both to your speakers and to your headphone amp.

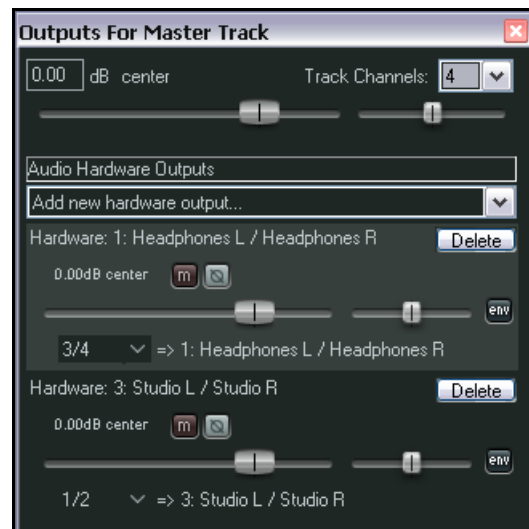
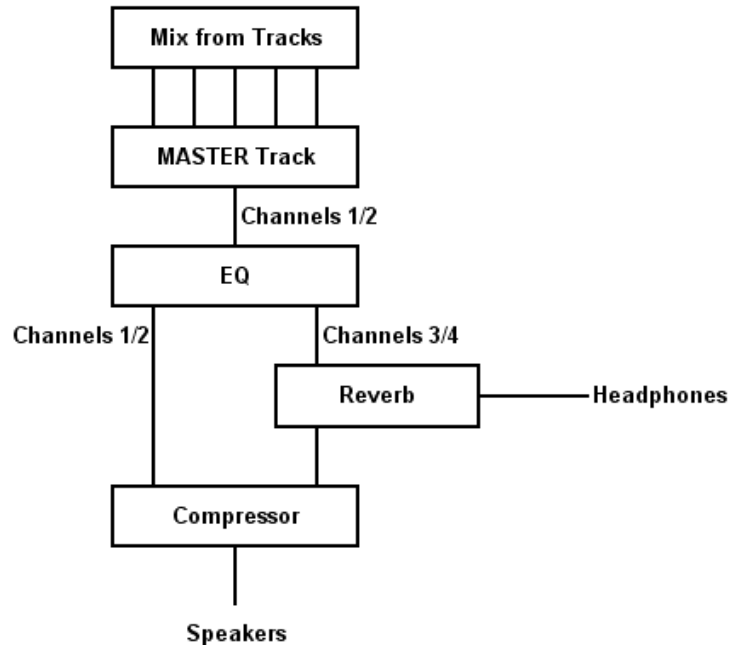
7. To create the required channels, left click on the **I/O** button for the **Master Track** and set the number of channels to 4 (as shown, right).

8. Assign the output of channels 3/4 to your headphones and channels 1/2 to your studio speakers. Your settings should appear similar, but of course not identical, to those shown on the right.

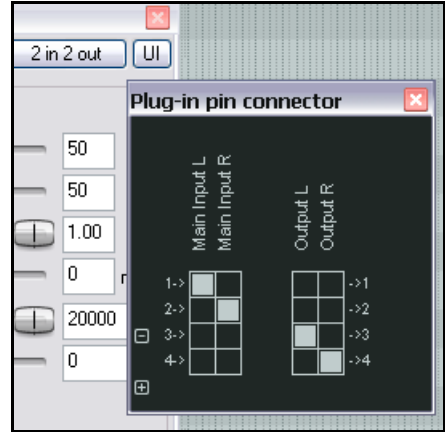
9. Play the song. For now, it should be heard over the speakers, but your headphones should still be silent.

10. Now click on the first row of the Master's FX Bin, add the plug-in **ReaEQ** and, for the purpose of this exercise, add a 2 dB gain on Band 2, a 1 dB drop on Band 3, and a 1dB gain on Band 4.

11. Now click on the second row of the Master's FX bin and add **ReaVerbate**. Leave the parameters at their default settings, but adjust the outputs from this plug-in so that they are directed left and right respectively to channels 3 and 4 only. The assignment for these outputs is illustrated (below).



12. Now play the song. The playback thru the speakers will include the effects of your **ReaEQ** settings but not the **ReaVerbate**. In contrast, if you listen thru the headphones, you will hear only the reverb.
13. Adjust the reverb settings until you are satisfied with the reverb effect.
14. Now click on the third row of the Master FX bin and add **ReaComp**. Adjust the Input Settings for this plug-in so that Channels 1 and 3 are the Main Input for the left, and channels 2 and 4 are the Main Input for the right. The assignment of inputs for the right is illustrated above.
15. Now play the song. You can adjust the amount of reverb that is fed into the mix by adjusting the vertical **Wet** and **Dry** faders in the **ReaVerbate** window. You can also adjust the Threshold (vertical fader on the left) and ratio settings for **ReaComp** if you wish.
16. Your speakers will now play the output signal from your Master Track's FX chain, including the reverb mixed in. Your headphones will still play only the direct output of the **ReaVerbate** plug-in.
17. Save this file.



### 11.13 Avoiding Channel Leakage

You need to be aware when you are using multiple channels for the Master Track that any signal routed along any channels between tracks will also be sent to the Master.

For example, you might be using Channels 3/4 elsewhere in your project for the purpose of audio ducking (an example of audio ducking is included in Chapter 18). In that case, if you also used Channels 3/4 for the purpose outlined in the above example, then the signal sent to your audio ducking compressor would also be leaked into the signal being fed to your reverb plug-in, over and above the main mix.

This channel leakage can be avoided simply by reserving for the Master a pair or pairs of channels not used elsewhere in the project – in this example, you might choose to use Channels 5/6 or Channels 11/12. Since you have up to 64 channels available to you, this should not normally present you with any problem.

Alternatively, there could be occasions when you might want to use this aspect of REAPER's channel routing to your advantage. An example of this is included in Chapter 18, under the heading *Double Ducking*.

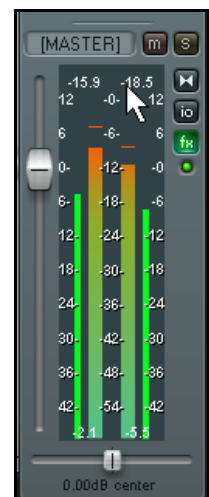
### 11.14 Reset VU Meter Peaks

Notice that during playback, your VU meters in both track view and mixer view will display the peak level recorded for each individual track (see right – in this example, the track has peaked at  $-11.6$ ).

To reset the peak reading for any individual track, click your mouse over the area where the peak value is displayed.

To reset the peak reading for all tracks, hold the Ctrl key while you click your mouse over the area where the peak value is displayed in any one track.

You can also if you wish disable the option under **Options, Preferences, Appearance** to **Reset meter peak indicators on play/seek**. If you do this, the current peak levels will be remembered even when you stop playback. When you resume playback, they will be retained as the peak levels until, of course, a louder passage is encountered.





## 12 NEW! Manipulating and Editing MIDI Items

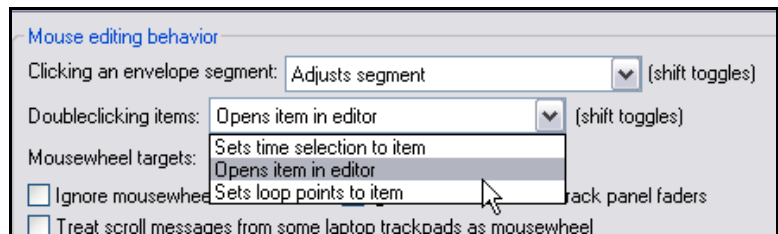
REAPER has a number of techniques which can be used for manipulating and editing your MIDI items. In brief these are:

- Many of the commands on the right-click media item context menu can be used with MIDI items as much as they can with audio items – for example you can create and manipulate multiple takes, add MIDI FX to a take’s FX chain, cut, copy and move items, and so on.
- In addition, there are commands on the right-click item context menu that are specific to MIDI items and only MIDI items. We’ll get to these later.
- You can open any MIDI items or selection of MIDI items in REAPER’s MIDI Editor for detailed editing. You can choose either to open a single item, several items together in the same single MIDI Editor window, or to use a separate window for each item.
- For quick MIDI editing, you can edit the track in-line. This makes the item’s content available for editing without needing to open a separate MIDI editing window. We’ll get to this later.

### 12.1 Accessing the MIDI Editor

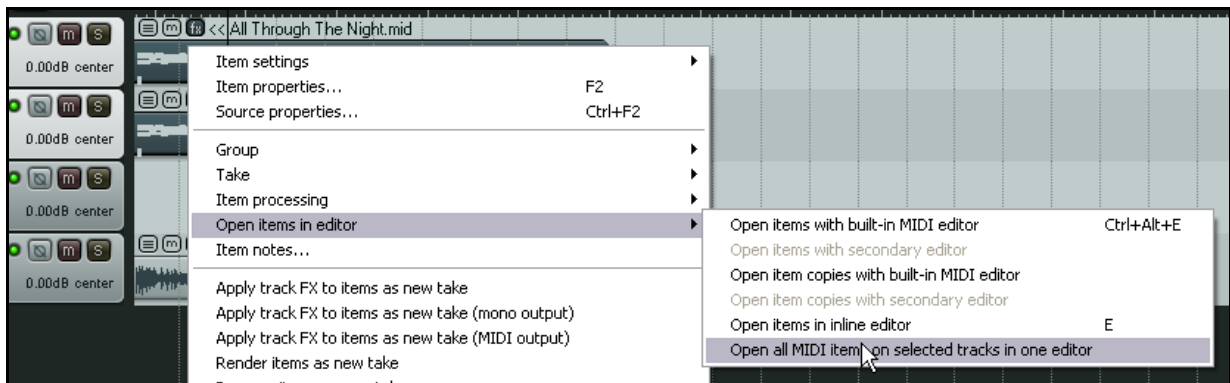
To open a single MIDI item in the MIDI Editor, you can use any of these methods:

- Depending on your preferences settings (see right), either double-click on the item or hold **Shift** while you double-click on the item, or
  - Select the item and press the default keyboard shortcut **Ctrl Alt E**, or
  - Right-click on the item and choose **Open Items in Editor**, then **Open Items with Built-in MIDI Editor** from the context menu.

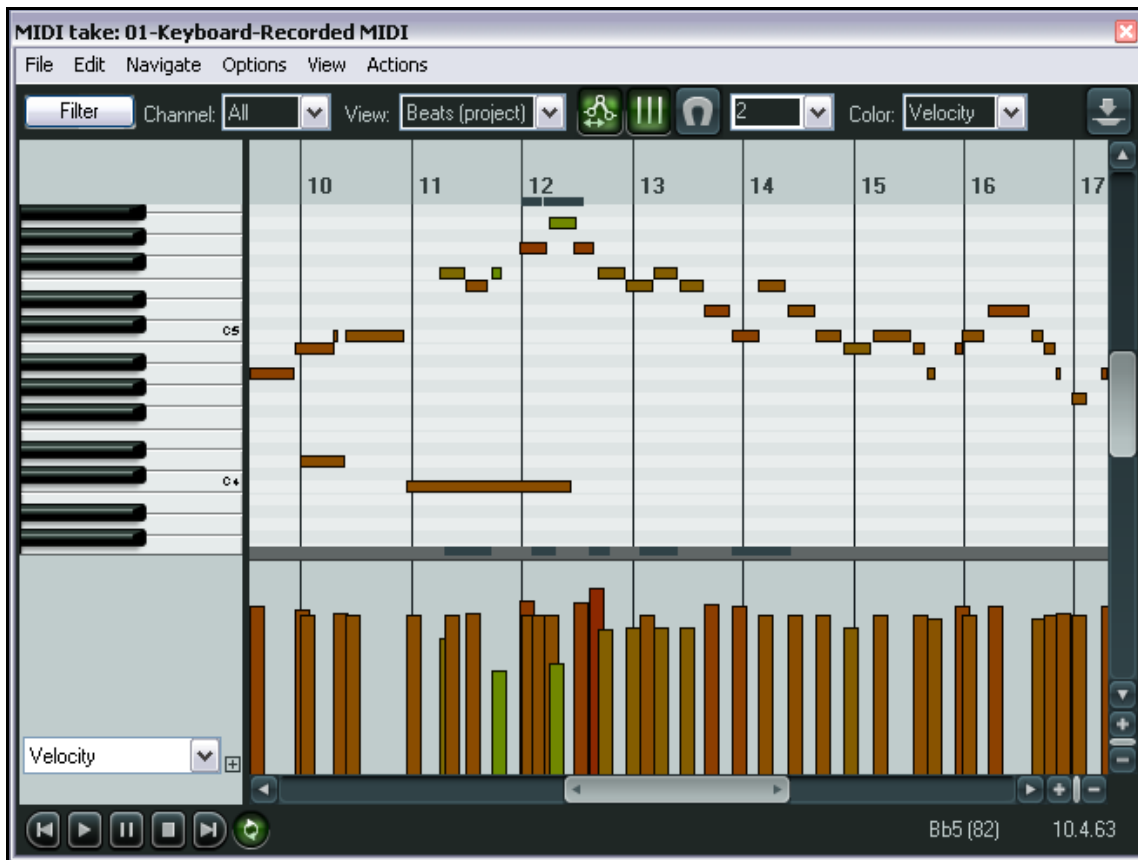


To open several MIDI items together in the same MIDI editor window, first select all of the items, then:

- Right-click on the item and choose **Open Items in Editor**, then **Open All MIDI Items on Selected Tracks in One Editor** from the context menu.



## 12.2 The MIDI Editor Window



When you open an item in the MIDI Editor you are initially greeted with a display similar to that shown above. Its main elements are:

### The Main Menu.

We'll take a detailed look at the main menu, its various commands and actions shortly, but first you need to understand the rest of the interface and how to navigate it.

### The Toolbar



From left to right, these are the various tools:

#### Filter Button

This opens up the Filter Events box which allows you a great deal of flexibility in deciding which information you want displayed in the MIDI Editor.

You can choose to display all channels, or any combination or permutation of channels.

The **Event Type** drop down list lets you select any type of event that you want filtered. The default is **All**, but you can change this to Notes, Poly Aftertouch, Control Change, Channel Aftertouch, Pitch or Sysx/Meta.

## 12 - NEW! Manipulating and Editing MIDI Items

The content of the **Parameter** drop down list will be determined by the type of event selected. For example, if you select Note, it will show a list of notes. If you select Program Change it will show a list of possible program numbers.

The two items **Low** and **High** can be used with some event types but not others. For example, if the event type is Note, you can enter two numbers between 0 and 127 to restrict the range of notes displayed. If, on the other hand, you choose Program Change, then low and high values have no meaning.

Notice that the filter box has an **Enable Filter** option which can be toggled on and off.

### Channel Box

The Channels filter controls allow you to quickly select a single channel to be displayed without needing to access the Filter Events box. You can also use this to restore the default setting, which is **All**.

### View Box

This determines how the timeline is measured and displayed. You can use the time or beats from the project file, or the beats from the source media item. For example, if your MIDI item begins, say, 20 beats into the project, choosing Beats (Project) would cause the timeline for this media item to start at 20. Choosing Beats (Source) would choose it to begin at 1.

MIDI data is always defined in beat-based terms, but in the time view mode the grid is adjusted to reflect any tempo changes in the project. If there are no tempo changes, the beat and time views will be identical. You also have the option to select **Synced**. This synchronizes not only the timeline of the project and MIDI item together, but also ensures that both windows are also synchronized during such actions as zooming and scrolling.

To the immediate right of this box are three icons, Move CCs with Events, Grid display, and Snap to grid.

### Move CCs with Events Toggle Button

This determines whether or not your CC messages will be moved when MIDI events are moved.

### Grid Display Toggle Button

This toggles on and off the display of vertical grid lines.

### Snap to Grid Toggle

This determines whether or not events will be snapped to grid settings.

### Grid Division Box

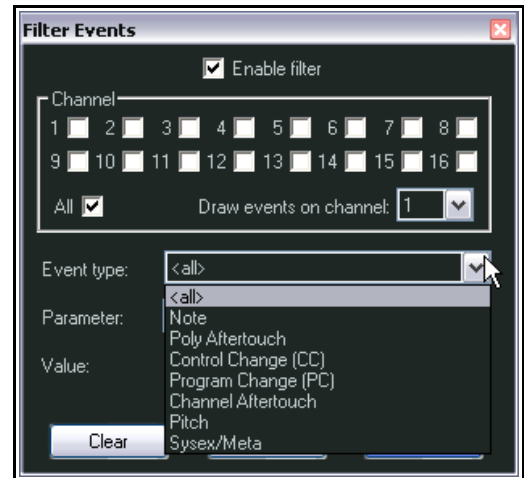
This is used to specify your required grid division unit. Note that the units is *Notes*, and that you can select from any of the values listed – 1/128, 1/64, 1/32, 1/16, 1/8, 1/4, 1/2, 1, 2 or 4.

### Color Box

This is used to specify which criteria you wish used to determine how the MIDI Editor uses color. Your options are Velocity, Channel Pitch and Source. For example, if you choose Velocity, the color used to display each note will vary along a graduated scale depending on its velocity. If you choose Channel, then a different color will be used to display events on each channel. When multiple items are open in the same editor, you can select Source to use different colors for events that belong to each item.

### Dock/Undock

The button shown at the far right of the MIDI toolbar can be used to dock and undock the MIDI Editor.



# Up and Running: A REAPER User Guide v 3.11

## The Main Window

The main window by default consists of two panels. The larger (top) panel displays your MIDI notes. It is where you do your editing. This example shows the default view, which is Piano Roll View. Clicking on any piano key will cause that note to be played. The smaller (bottom) panel is the CC lane, which can be used to display various types of information. In the example here, the velocity of each note is shown.

## The Scroll Bars

The MIDI Editor window includes vertical and horizontal scroll bars which can be used to navigate and zoom in and out of the contents of the MIDI item(s).

## The Transport Bar

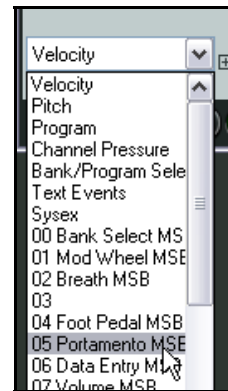


This can be used to start, stop and pause playback, rewind to start or jump to end, and to toggle repeat loop mode on and off. The area to be looped can be defined on the timeline in either the MIDI Editor or the main project window.

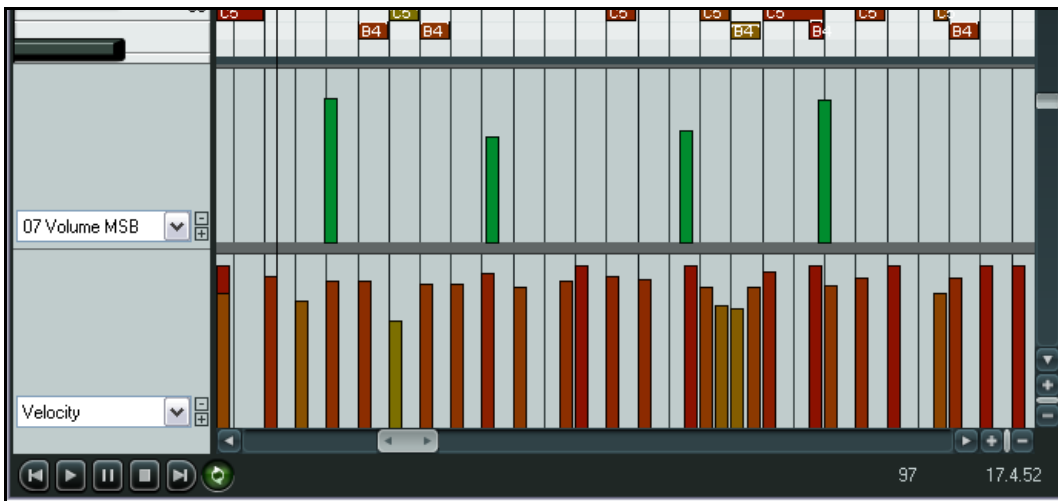
## The CC Lane(s)

By default, **Velocity** information is shown in the CC lanes. There are two main ways that you can change this:

- Click on the drop down arrow (right) to see a menu of items (including standard MIDI control messages) that you can choose to display in the CC Lane instead of velocity. A small selection of the available choices are shown on the right.
- Click on the small + button next to the drop down list arrow to add extra CC lanes. Select any item from the drop down list to display in the selected lane.



In the example shown below, two lanes are used, one to display Velocity, the other to display Volume changes.



To remove a lane from view, click on the small minus sign that appears to the immediate right of its drop down arrow.

Notice also that, provided the lane height is tall enough, the existence of CC messages can also be shown on the MIDI item in the main window (see right).





### 12.3 Control Change Messages

The role of control change messages is to bring about a change in the status of a MIDI parameter. If you are using an actual MIDI device, these messages can be used to physically control the foot pedals, volume sliders, modulation wheels, and other knobs and faders found on electronic instruments. Within REAPER, control change messages can simulate this effect when playing back your MIDI data thru a software synthesizer.

Controller data is used for various purposes. The different controller data streams are numbered from 0 to 127. Some of these controller numbers are industry standard. For example, controller 7 is generally used to control volume and controller 10 for panning.

A control change message has two parts. The first is the control change number, which determines which parameter is to be set. The second is the desired value for that parameter. For example, first, you might send a CC #7 message to specify that you want to adjust volume. Next, you send a value that sets the actual volume level required.

A control change message can act as either an *override* (setting the parameter to the exact value specified), or an *offset* (adjusting the parameter up or down by the amount specified).

#### MSB and LSB

MSB and LSB stand for *Most Significant Byte* and *Least Significant Byte* respectively. MSB control change messages typically act as coarse controls, while LSB messages generally allow fine adjustments. Some control change messages have both MSB and LSB versions. Most MIDI devices that contain sounds/patches respond to both Bank Select MSB and LSB control change messages.

Some of the more commonly used cc parameters are listed below. Don't worry if you don't understand them all. You should consult your MIDI device's documentation for more details.

Parameter	Description
<b>Velocity</b>	The measure of the speed with which a key on a keyboard is pressed.
<b>Bank Select MSB</b> <b>Bank Select LSB</b>	Many MIDI devices offer a total of more than 128 instruments, in which case these instruments are grouped into banks. Thus, depending on the device, a full program change message might consist of five parts – cc #0 (Bank Select), followed by the Sound Bank MSB value, then cc #32 (Bank Select LSB) followed by the Sound Bank LSB value, then finally the Program Change number. Program change numbers are discussed in more detail in the section immediately following this one.
<b>Mod Wheel</b>	This can add vibrato or other changes to a sound.
<b>Breath</b>	Varies from 0 (no force) up to 127 (high force).
<b>Portamento</b>	Determines the smoothness of the glide from note to note
<b>Balance</b>	Typically used to adjust the volume of stereo parts without affecting the panning.
<b>Expression</b>	Used to create relative volume changes.
<b>Sound Timbre</b>	The property of a sound that gives it its unique "color".
<b>Sound Release</b>	Determines how long it takes for a sound to fade out.
<b>Sound Attack</b>	Controls how long it takes for a sound to fade in.
<b>Sound Brightness</b>	This adjusts a sound's filter cutoff, allowing you to create filter "sweeps".

## 12.4 Control Channel Basics

MIDI Data Control Channel (CC) messages can be recorded during live performance, and edited or manually entered using the CC lane in the MIDI Editor.

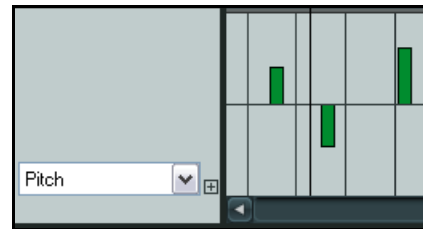
The CC Lane appears at the bottom of the MIDI Editor. Data is displayed horizontally according to its position on the Timeline, and vertically according to the value of the data.

The majority of CC data has a value of 0 at the bottom of the CC Lane, and 127 at the top of the CC Lane. The example (right) shows Velocity. Exceptions to this rule are Pitch, Pan and Pan Position, which are displayed as positive or negative variations from a centre line.

The information displayed in the CC Lane is selected from the drop-down list at the left of the screen.

CC Data is entered or edited by dragging the mouse to the required value.

- Hold down **Shift** while dragging to adjust a range of values (e.g. to draw a straight line).
- Hold down **Ctrl** while dragging to make fine adjustments.
- **Right Click** to delete values altogether.



## 12.5 Working with MIDI Editor Lanes

There are a few especially interesting items not included in the above table that you can display in your lane or lanes that are worth a special mention, because these might otherwise slip under your radar. These are Bank/Program Select, Sysex Events and Text Events.

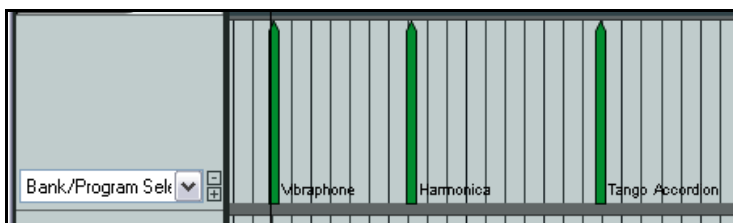
### 12.5.1 Bank Program/Select

When you choose the **Bank/Program Select** option for a CC lane, you can double click at any point to open the **Bank Program Select** dialog box.

Here you can select any instrument bank and program combination, and assign it to any channel. The bank/program combinations available to you will of course depend on what instruments you are using.(see example, right).

If you are using a synthesizer for which you have instrument definition files, you can load a file into the MIDI Editor by clicking on the **Load File** button, then navigating to its directory, then selecting it.

An example of the use of program changes is shown here.



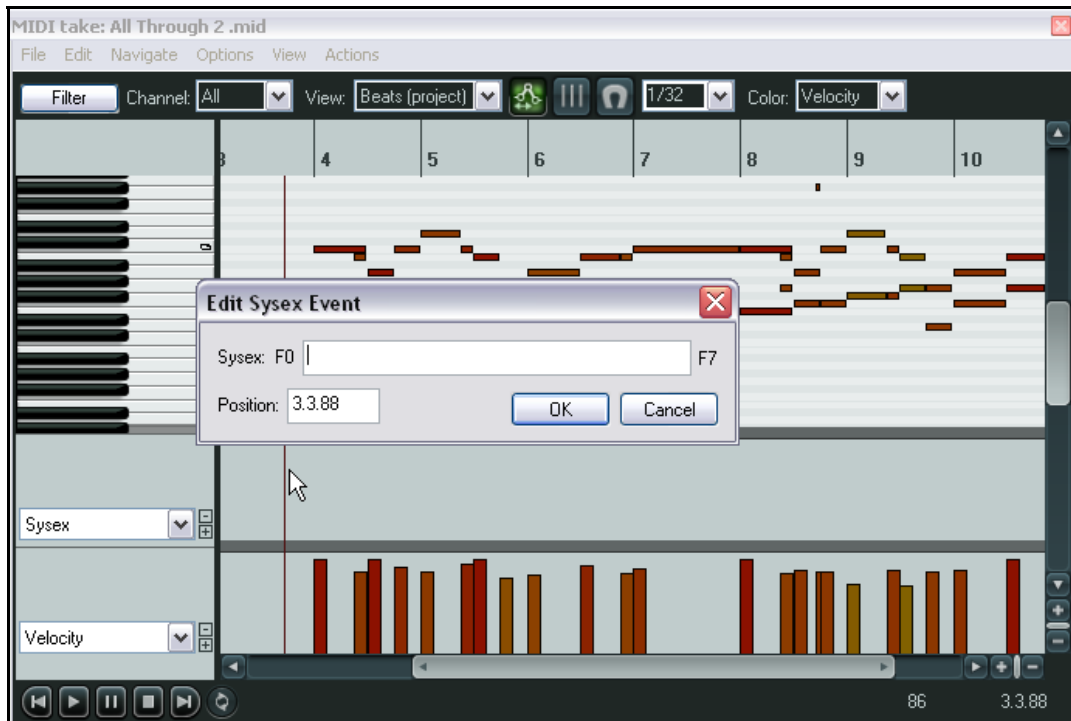
To edit any program change message, just double click on its CC Lane bar. This will open the Bank/Program Select window for you to make your changes.

To delete any program change message, simply right click over its CC Lane bar.

### 12.5.2 Sysex Events

System exclusive (Sysex) messages consist of MIDI data that can only be understood by the particular make and model of the device that created them. For example, all synthesizers should respond to CC messages such as Volume or Pan control, but system exclusive messages created by a Roland synthesizer would not be understood by, say, a Yamaha synthesizer.

You can also add a lane which can be used to manage system exclusive (Sysex) messages, as shown below. In this case, a Sysex lane is displayed in addition to a Velocity lane.



Some MIDI hardware, especially older devices, accept sysex messages as a way to initialize or change settings on the device. Sysex messages are raw MIDI data, represented as a list of hexadecimal bytes.

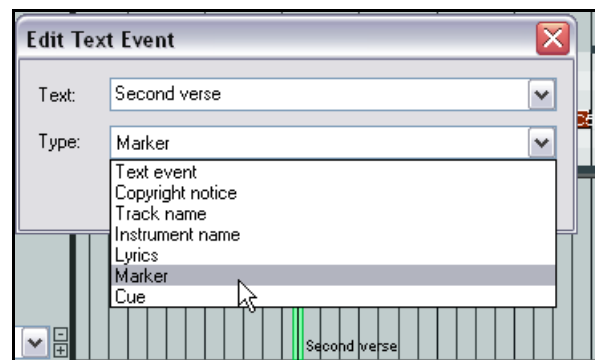
Sysex events may be added, edited, moved, or deleted in the same way as text events (below). Double click at any point in the lane to open the **Edit Sysex Event** dialog box, enter the message and click on **OK**. Click, hold and drag on any sysex event to move it. Double click on any existing sysex event to edit it, right click to delete it.

### 12.5.3 Text Events

The **Text Events** option lets you display a CC Lane which can be used to display text in a lane below your MIDI notes. These could be, for example, lyrics, or marker information or any of the other available text types.

Just double click at any point in the lane to open the **Edit Text Event** dialog box, type your text, specify its type, and click on **OK**.

Again, double click on any existing text event to edit it, right click to delete it.

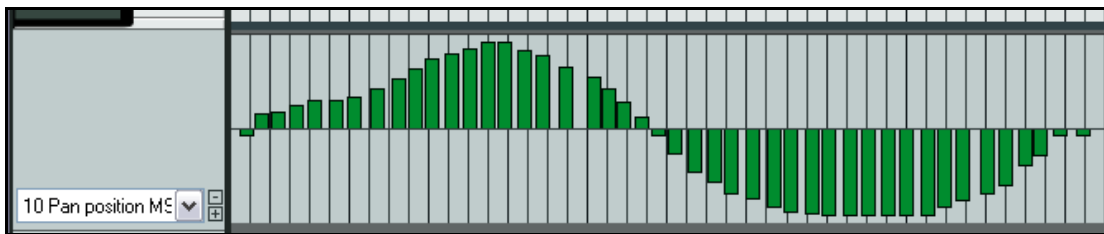


## 12.5.4 General CC Lane Editing Techniques

Many of the CC message types – such as Mod Wheel, Breath, Portamento, Pan, Volume etc – can be expressed as a continuous range of values, rather than as discrete items (in the way that text events, for example, are). For messages of this type there are a number of standard techniques you can use to enter, edit or delete them.

- To enter a single message, click in the appropriate CC lane at the required point. The nearer the top of the lane, the higher the value of the message.
- To change the value of an existing message, click above it or on it at the required point, or hover the mouse over the top of the message bar, then click and drag up or down.
- To delete a message, right click over it.

You can also click-hold-drag-sweep to insert a continuous sequence of messages. The example shown here causes the notes to be panned in increments first to the left, then to the center, then to the right, then back to the center again.



## 12.6 Viewing Multiple Items

We said at the beginning of this Chapter that as well as being able to open individual items in the MIDI Editor you can also open any selection of MIDI items together in one single editing window. To do this, follow this procedure:

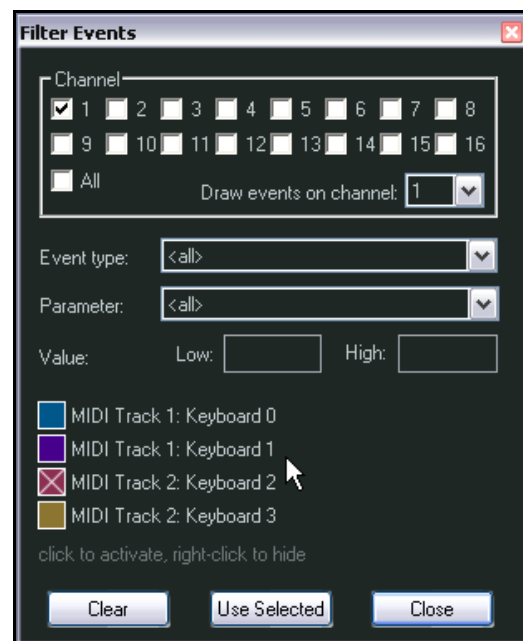
1. Select the tracks in REAPER's main view.
2. Right click over any MIDI item in the selected tracks and choose **Open Items in Editor** then **Open All MIDI Items on Selected Tracks in One Editor**.

When you load multiple MIDI events in one editor, you can switch the active events for editing by any of these methods:

- Click on a note.
- Clicking the item in REAPER's main view.
- Clicking the item in the MIDI filter window, which will display a list of all loaded MIDI items and their visibility.

In the example shown on the right, four MIDI items (on two tracks) have been opened in the MIDI Editor. The item called **Keyboard 2** on **Track 2** is currently selected.

This feature is typically used to arrange a number of MIDI instruments simultaneously.



### 12.7 Navigating the MIDI Editor Main Window

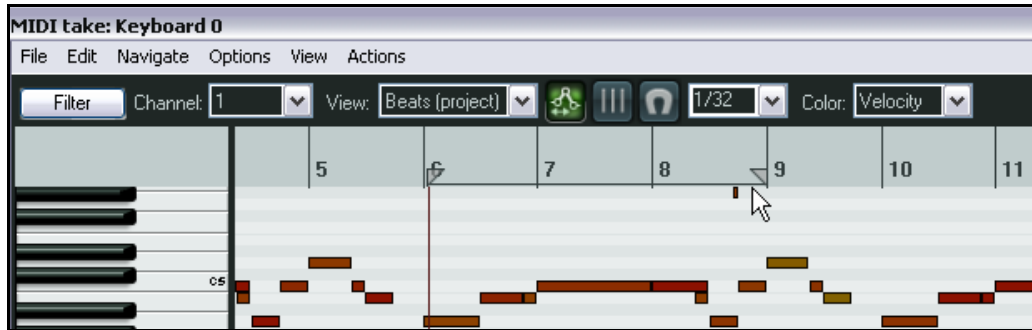
The MIDI Editor’s menus and action list contain any number of techniques that you can use for precision navigation: we’ll get to these shortly. First, you should familiarise yourself with the tools that you have available for “broad brush” navigation.

The horizontal and vertical scroll bars in the MIDI Editor window can be used for scrolling, and their respective plus and minus buttons can be used for vertical and horizontal zooming. You can also use your mousewheel. Mousewheel behavior can be customized in the Actions List Editor, but the default settings are:

<b>Mousewheel:</b>	Horizontal Zoom
<b>Ctrl Mousewheel</b>	Vertical Zoom
<b>Alt Mousewheel</b>	Horizontal Scroll
<b>Ctrl Alt Mousewheel</b>	Vertical Scroll

The keyboard shortcuts **PageUp** and **PageDown** can be used to zoom in/out vertically, and **+** and **-** to zoom in and out horizontally.

You can select an area to be looped, as in the main REAPER window, by clicking and dragging along the MIDI Editor timeline (see right). You can also use the timeline in the REAPER main window to define and modify loop areas if you wish.



Use the **Toggle Repeat** button on the Transport bar to enable or disable looping.

### 12.8 Basic Note Selection and Manipulation

The MIDI Editor’s menus and action list contain any number of techniques that you can use for precision editing and manipulation of your notes: we’ll get to these shortly. First, you should familiarise yourself with the most basic tools that you have available for quick and basic editing.

To do this ...	You need to do this ...
<b>Add a note</b>	Click and drag in the MIDI editing area.
<b>Delete a note</b>	Double-click on the note.
<b>Select a note for editing</b>	Click once on the note.
<b>Select a range of notes</b>	Right click and drag around the selection.
<b>Add to an existing selection</b>	Hold <b>Alt</b> and <b>Ctrl</b> while right clicking and dragging around notes.
<b>Change a note’s length</b>	Hover the mouse over vertical line that marks the start or end of the note, so that the mouse cursor becomes a double headed black arrow. Click and drag left or right , as required.
<b>Move a note</b>	Click and hold the mouse button down over the note, drag to new position and release.

### 12.9 The MIDI Editor Menus

This section contains an overview of the MIDI Editor and its main menu commands. When docked, the main menu is not displayed, but you can access these commands by right-clicking over the window's tab in the docker.

#### The File Menu

##### Rename MIDI take

Renames the MIDI Item.

##### Export to new MIDI file

Exports active MIDI track to a file. MIDI events are normally stored in the Project file itself.

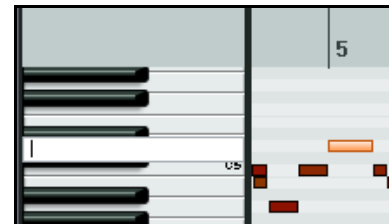
##### Load note names from file ...

##### Save note names to file

Enables you to load note names into your MIDI item from an existing file, or save the note names from your MIDI item into a file.

##### Rename current note

Allows you to rename the currently selected note. You are then able to enter the name for the selected note on the piano roll (see example, right).



##### Clear all note names

Clears all note names from the currently open MIDI item.

##### Load color map from file/Clear color map (restore defaults)

Used to import your own .PNG color map file or restore the REAPER defaults.

##### Close Editor

Closes the REAPER MIDI editor, and returns you to the main REAPER window.

#### The Edit Menu

##### Undo, Redo, Copy Events, Cut Events, Paste, Select All Events, Delete Events

These features work exactly as described on all selected MIDI notes.

##### Insert note at mouse cursor

A very quick way to insert notes. Inserts new notes (according to the current Snap values) wherever your mouse is hovering. Note that since this command takes the mouse cursor as its reference position, you should use the **Insert** key to execute it rather than actually display the menu.

##### Insert note at edit cursor

Similar to Insert Note at Mouse Cursor (using the I key), but positions new notes at the Edit Cursor.

##### Split notes

Splits selected notes (using the S key). If no notes are currently selected, all notes currently under the Edit Cursor are split.

##### Split note under mouse cursor

Splits any note currently located under the mouse cursor (based on snap settings). Disabling Snap allows you to make very accurate splits.

Note that since this command takes the current mouse cursor as its reference position, you should use the keyboard shortcut **Shift S** to execute it.

## 12 - NEW! Manipulating and Editing MIDI Items

### Quantize events

#### Quantize selected events using last settings

#### Quantize selected events to grid

#### Unquantize selected events

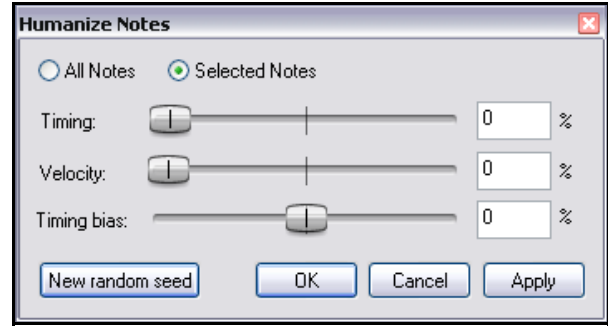
#### Freeze quantization for selected events

These commands as a group are used to quantize existing data. See the *Quantize* section and the MIDI Toolbox section for more information about this feature.

### Humanize notes ...

REAPER's MIDI Editor includes a **Humanize** command to make the exact timing of MIDI generated music sound more like it was being played by a human being.

It does so by allowing you to introduce random small and subtle imprecisions in timing and velocity. As well as being found on the **Edit** menu, this command is also available as an assignable action.



### Remove selected duplicate notes

Removes duplicate notes (i.e. duplicate notes of the same pitch and same starting position) from selection.

### Set selected note ends to start of next note

Adjusts the end point of all notes in selected range

### Reverse

Reverses the order of the MIDI events within the item currently being edited.

### The Navigate Menu

This menu presents a number of options for moving notes in any direction, either by grid or by note:

#### Move cursor left by grid

#### Move cursor right by grid

#### Move cursor up one note

#### Move cursor down one note

There are also a number of commands that can be used to jump to and select a note, either instead of or in addition to any current selection:

#### Select note nearest cursor

#### Add note nearest cursor to selection

#### Select previous note

#### Select next note

#### Select previous note with same note value

#### Select next note with same note value

#### Select all notes with same note value

#### Add previous note to selection

#### Add next note to selection

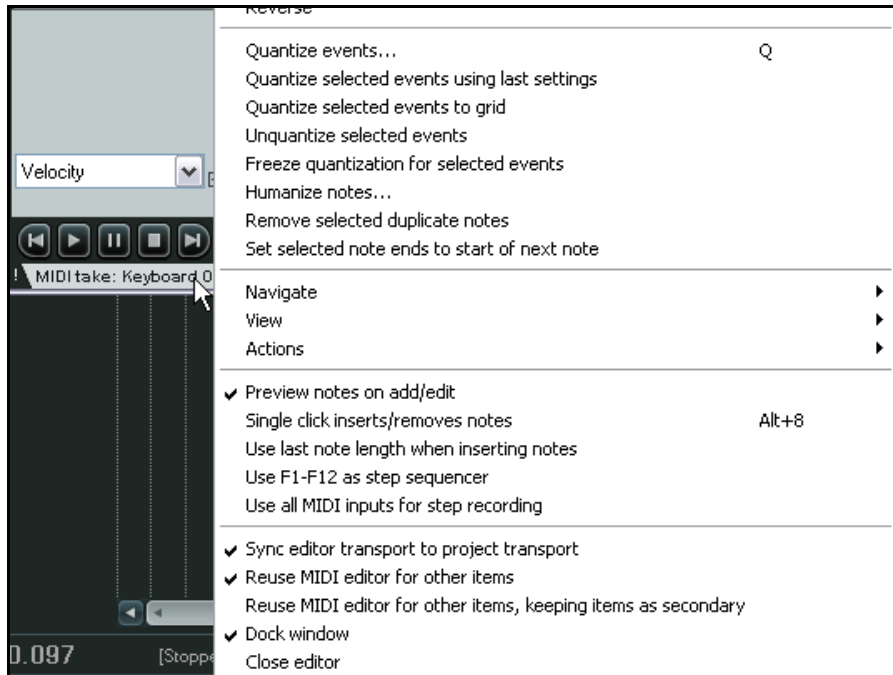
#### Move edit cursor to start of selection

Navigate	Options	View	Actions
Move cursor left by grid			Ctrl+Num 4
Move cursor right by grid			Ctrl+Num 6
Move cursor up one note			Shift+Up
Move cursor down one note			Shift+Down
Select note nearest cursor			
Add note nearest cursor to selection			
Select previous note			
Select next note			
Select previous note with same note value			
Select next note with same note value			
Select all notes with same note value			
Add previous note to selection			
Add next note to selection			
Move edit cursor to start of selection			

## The Options Menu

### Dock window

Positions the midi editor inside the Docker. Note that when you do this, the MIDI Editor's main menu will not be displayed. However, the commands on these menus can still be accessed by right-clicking over the window's tab in the docker (see illustration on the right).



### Reuse MIDI Editor for other items

Avoids having multiple MIDI Editor instances open at the same time. If you double-click on another MIDI item with this option enabled, it opens in the current MIDI Editor window in place of the current item.

### Sync editor transport to project transport

Synchronizes the transport of the MIDI Editor to REAPER's main Timeline.

### Preview notes on add/edit

This option is great for previewing single notes as you enter them. With this option enabled, REAPER plays whatever VSTi or MIDI instrument is assigned to that track thru the FX box or hardware routing (providing monitoring is on).

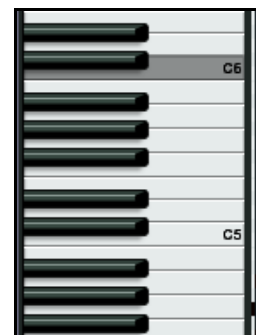
### Single click inserts/removes notes

Toggles on and off the use of a single mouse click to insert or remove a note.

### Use F1-F12 as step sequencer

When enabled, the function keys (F1 - F12) can be used to enter notes. These keys are mapped to the 12 Semitones of an Octave, with F1 having the lowest pitch and F12 having the highest pitch.

The starting pitch for F1 is determined by the location of the highlight bar. In the example shown, the starting pitch for F1 is C6. If F5 (for example) is then pressed, an E note will be created. By moving the position of the highlight bar and the Edit Cursor, and using the Function keys to enter notes, complete arrangements can be quickly created using the Keyboard alone.



Normally this mode will also advance the cursor according to the snap settings. You can bypass this and not advance the cursor by holding **Shift** while pressing the function key.



## 12 - NEW! Manipulating and Editing MIDI Items

### The View Menu

#### Mode: piano roll

Displays a standard, white/black piano key view.

#### Mode: named notes

Replaces the Piano Roll view with note names. Note: Only works when using a VSTi that reports note names, such as Expansion's BFD. Check the Reaper forum to see if a note namer plug-in has been posted for the VSTi you want to use. For example there are EZDrummer note namers available.

#### Mode: event list

Displays the event list. These three modes are discussed in more detail later.

#### Rectangles

#### Triangles (Drum mode)

#### Diamonds (Drum mode)

Allows you to choose to display notes as rectangles, triangles or diamonds.

#### Show velocity handles on events

This option tells REAPER to display a velocity control on each MIDI event. Useful for quickly comparing and adjusting event velocities.

#### Show velocity numbers on notes

This option tells REAPER to display velocity numbers on notes when space permits.

#### Show note names on events

This option tells REAPER to display the note name on each MIDI event.

#### Show note times relative to project

Displays note times relative to project rather than as absolute.

#### Show all note rows

#### Hide unused note rows

#### Hide unused and unnamed note rows

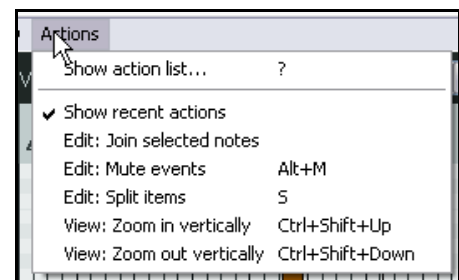
These three mutually exclusive commands let you determine which rows are shown.

### The Actions Menu

This menu has two default commands - **Show action list** and **Show recent actions**. **Show action list** opens the **Actions ...** window with the **MIDI Editor** section automatically selected. Custom actions and keyboard shortcuts play an important role in working within the MIDI Editor.

You can use this window to assign your own keyboard shortcuts to any MIDI action or sequence of actions. There are several examples of how you navigate and use the Actions window later in this chapter.

If you enable the **Show recent actions** option, the Actions menu will also list your most recent activities, as well as any custom actions or keyboard assignments that you have placed there. These commands can then be executed from this menu. An example of this is shown on the right.



There are some simple examples showing you how you can use the Actions List later in this chapter, and the **Actions List Editor** and how to use it will be covered in detail in Chapter 13.

Finally (on the subject of menus) remember that REAPER makes extensive use of right-click context menus. Knowing which commands are on the main menu is useful, but as you will shortly see, more often than not you'll use the right click menus and custom actions more than the main menu.

## 12.10 Note Creating and Editing

### Overview

The MIDI Editor uses as its default a Piano Roll interface to display and edit MIDI information. Notes are displayed vertically according to their corresponding value on a Piano Keyboard, and horizontally according to the duration of each note and their location within the MIDI Item or the Timeline.

### Preview Keyboard

The Preview Keyboard at the left of the screen provides a visual representation of the value of the notes on the Piano Roll, and allows you to audition a note without having to enter or edit it first. Clicking a key on the Preview Keyboard will send a MIDI note of the corresponding value to the MIDI Instrument that is connected to the Track. The Preview Keyboard can mimic a velocity sensitive keyboard. Clicking on the far left of a key will generate a soft note, while clicking on the far right of a key will generate a loud note.

### Entering / Editing Notes

MIDI notes can be recorded as part of a performance, imported from an existing MIDI file, or they can be manually entered using the MIDI Editor. This section describes the various methods for creating and editing notes using the MIDI editor.

#### Using the Mouse:

Notes can be entered by dragging your mouse from left to right across the Piano Roll. The duration of the note will increase as you drag the Note. If Snap is enabled, the duration will Snap to the nearest Grid Line (depending on the strength of your Snap settings). Notes can also be entered by double-clicking on the Piano Roll (in a space not already occupied by another note). In this case, the duration of the note is determined by the value of the Grid Setting.

Notes can be deleted by double-clicking on the Note.

The duration of an existing note can be altered by dragging the edge of the note. While holding it, you can drag the note out, move it up and down, etc. Then you can let go and double click notes in according to the snap setting. A note's velocity can be adjusted by clicking and dragging up or down from the top of the note, in similar fashion to that used for adjusting the Item Volume Handle in REAPER's main window.

Notes can be moved by dragging in any direction. Dragging left or right will change the location of the note in the Timeline, while dragging up or down will change the note value.

### The Right-Click Notes Menu

#### Insert note at mouse cursor

A very quick way to insert notes. It will insert notes according to the current snap values wherever your mouse floats over. Remember to use INSERT key otherwise you will have to move your mouse cursor!

#### Insert note at edit cursor

Similar to previous, but wherever the edit cursor is.

#### Copy/Cut/Paste

These are standard Windows editing commands which perform standard Windows functions.

#### Paste preserving position in measure

Pastes previously cut or copied notes so as to preserve their position relative to the measure.

Insert note at mouse cursor	Insert
Insert note at edit cursor	Shift+I
Copy notes	Ctrl+C
Cut notes	Ctrl+X
Paste	Ctrl+V
Paste preserving position in measure	Ctrl+Shift+V
Select all notes	Ctrl+A
Delete notes	Delete
Split notes	S
Split notes under mouse cursor	Shift+S
Join selected notes	J
Mute notes	Alt+M
Select previous note	
Select next note	
Select previous note with same note value	
Select next note with same note value	
Select all notes with same note value	
Note properties...	Ctrl+F2
Note channel	

## 12 - NEW! Manipulating and Editing MIDI Items

### Select all notes

Selects all notes in this MIDI Editor window

### Delete notes

Deletes all notes in current selection.

### Split notes

Notes can be split at the Edit Cursor by selecting **Split notes (S)** from the right-click menu. All notes that are under the Edit Cursor will be split.

### Split notes under mouse cursor

Notes can be split at the location of the Mouse Cursor by selecting **Split notes under mouse cursor (Shift S)** from the right-click menu.

### Join selected notes

Joins all notes in current selection to make one note per row.

### Mute notes

Mutes according to context the current note selection or the note under the mouse cursor.

### Select previous note

### Select next note

Selects previous or next note in place of current selection.

### Select previous note with same value

### Select next note with same value

### Select all notes with same value

In place of currently selected note, selects previous, next or all notes with the same value as the currently selected note.

### Note properties

This gives a way to alter the various values attributed to a midi note by entering the values into text boxes. You can change any of the following:

- note pitch
- velocity
- position
- length
- channel.

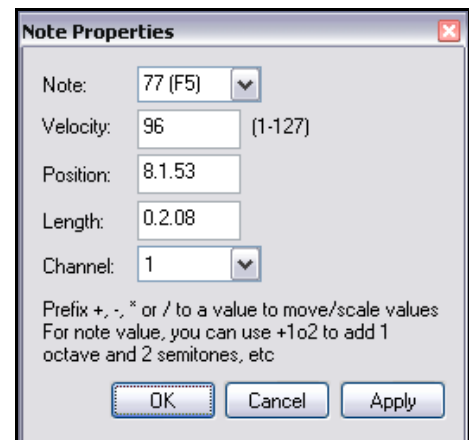
You can use + or - to make relative changes. For example, for note value, entering +1o2 will raise the pitch by one octave and two semitones.

### Note channel (1-16)

A quick way to change the channel for the current note selection. For example, choosing channel 8 will ensure that a note will use channel 8 -- and will send that note to the vsti or midi instruments channel 8.

A MIDI Item can contain data from up to 16 channels. The MIDI Editor can display and edit all 16 MIDI channels simultaneously, or you can use the Filter Events window or Channels drop down list to restrict which channels are displayed.

If you select Channel from the Color drop down list, each channel will be assigned an individual color, visible in both the Piano Roll and the CC lane.



### 12.11 Using the Keyboard

Looking at the right click Notes menu you can see that default keyboard shortcuts have been assigned to many of these commands. There are others that are not shown on the menus. Some of the most useful of these are listed here.

Notes can be entered at the position of the edit cursor by using the Keyboard Shortcut **I** or at the mouse cursor by pressing **Insert**. The duration of the note will be determined by the value of the grid setting (from the Grid Division box). The effect of this is shown in the two illustrations (right), before and after.

The **Edit Cursor** position on the Timeline is adjusted by using any of the following Keyboard Shortcuts.

Keyboard Shortcut	Result
<b>Right</b> <i>or</i> <b>Ctrl Num 6</b>	Move edit cursor right by one grid division.
<b>Left</b> <i>or</i> <b>Ctrl Num 4</b>	Move edit cursor left by one grid division.
<b>Shift Right</b> <i>or</i> <b>Ctrl Alt Num 6</b>	Move edit cursor right by one pixel.
<b>Shift Left</b> <i>or</i> <b>Ctrl Alt Num 4</b>	Move edit cursor left by one pixel.

**Notes** can be **moved** using any of the following Keyboard Shortcuts.

Keyboard Shortcut	Result
<b>Alt Num 2</b>	Move selected note(s) down one octave.
<b>Num 2</b>	Move selected note(s) down one semitone.
<b>Alt Num 8</b>	Move selected note(s) up one octave.
<b>Num 8</b>	Move selected note(s) up one semitone.
<b>Alt Num 4</b>	Move edit cursor left by one pixel.
<b>Num 4</b>	Move edit cursor left by one grid unit.
<b>Alt Num 6</b>	Move edit cursor right by one pixel.
<b>Num 6</b>	Move edit cursor right by one grid unit.

**Note display** can be **filtered** for channels 1 to 10 using any of the shortcuts **Shift 1** thru **Shift 0**. **Shift `** removes the note filter and restores all notes to view.

#### Use F1-F12 as step sequencer:

When **Use F1-F12 as step sequencer** is selected, the Function keys F1 thru F12 can be used to enter notes. The Function keys are mapped to the 12 Semitones of an Octave, with F1 having the lowest pitch and F12 having the highest pitch. The method for using this is the same as already described under the MIDI Editor's main **Options** menu.

#### Note Properties:

The keyboard shortcut **Ctrl F2** can be used to open the Note Properties box, as an alternative to choosing the command from the right-click menu.

#### Selecting / Editing multiple Notes:

Multiple notes can be selected by holding down the Ctrl or Shift keys while selecting notes with the mouse, by drawing a Marquee (Right-click+Drag) around a group of notes, or by using Select All (**Ctrl A**).

The value of all selected notes can be adjusted by dragging one of the selected notes.

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The duration of all selected notes can be adjusted by dragging the edge of one on the selected notes.

The note velocity of all selected notes can be adjusted by dragging the Velocity handle (when active) of one of the selected notes.

The default Velocity value for notes created in the MIDI Editor is taken from the last selected event - e.g. if the Velocity of the last selected event was 70, then the Velocity value for the next created note will be 70.

### Scaling Notes

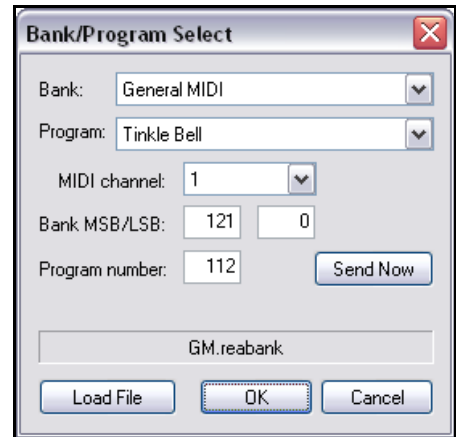
One very cool feature of the REAPER midi editor is to be able to move notes by scale! Simply select all the notes you want to scale by holding alt and left click dragging over the notes you want. Then after those notes are selected, simply hold down **Ctrl** and drag the edge out.

### 12.12 General MIDI Program Patches

We have already seen that you can use a Bank/Program Select lane to make program changes within an item. It's worth noting that REAPER includes a file GM.reabank (in the C:\Program Files\RAEPER\Data folder) which can be used to select standard General MIDI banks and patches.

An example is shown here.

If the General MIDI banks are not automatically available in the Bank drop down list, click on the **Load File** button, navigate to the RAEPER data directory and select the file **GM.reabank**.



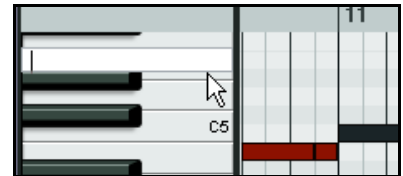
### 12.13 MIDI Editor Modes and Views

#### 12.13.1 Note Modes

The MIDI Editor has three modes, accessible from the **Views** menu. These are:

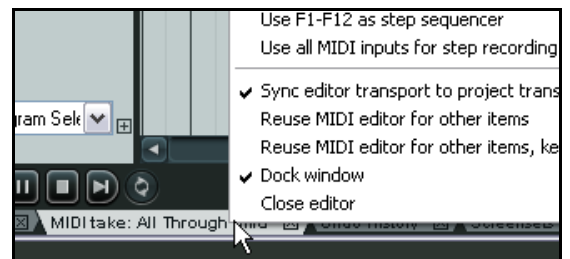
1. **Piano Roll View** – keyboard shortcut **Alt 1**.
2. **Named Notes** – keyboard shortcut **Alt 2**.
3. **Event List** – keyboard shortcut **Alt 3**.

Up until now, the only view used in this User Guide has been Piano Roll. Before moving on to examining the other two views, there's a couple of points that you might find interesting.



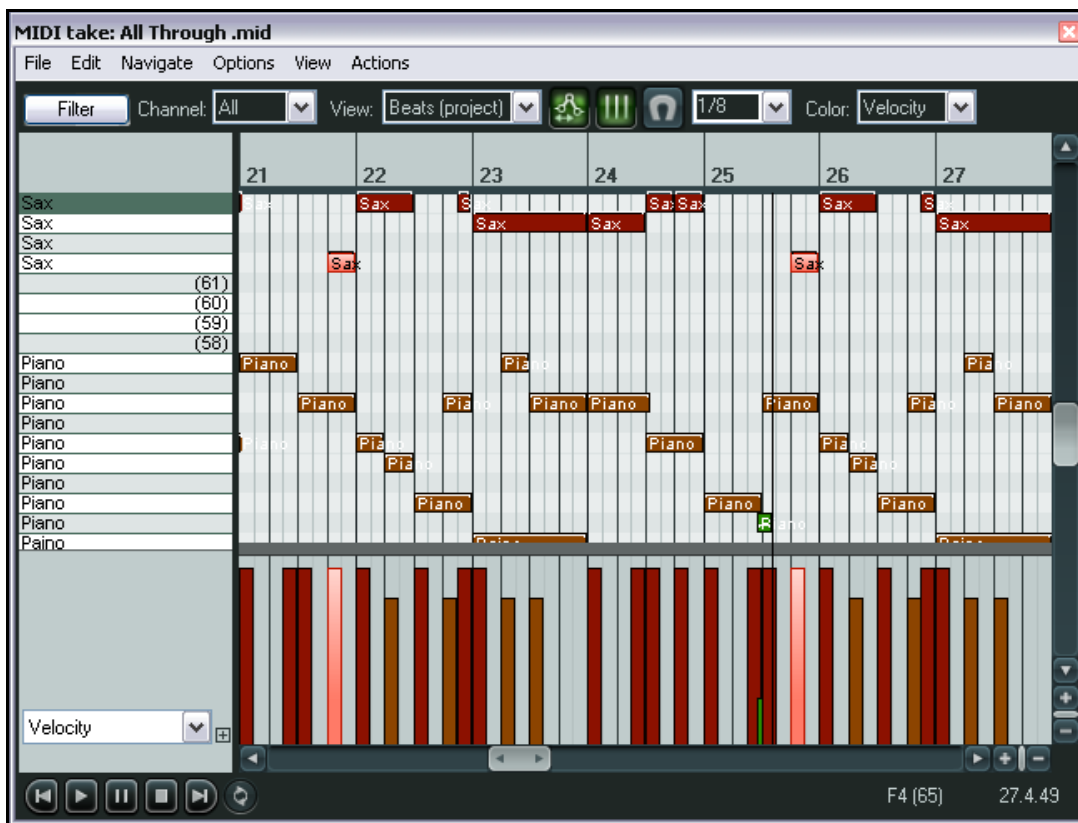
In **Piano Roll View** you can name any note. Simply double right click over the note (see above right) and enter the name in the edit box that is then displayed, then press **Enter**.

In any of the views, you can right click over the MIDI Editor's title bar to display a composite menu made up of all of the commands and options on all six of the items on the main menu bar. If the MIDI Editor window is docked, you can obtain this composite menu by right-clicking over the window's tab in the docker (see screen snapshot on the right).



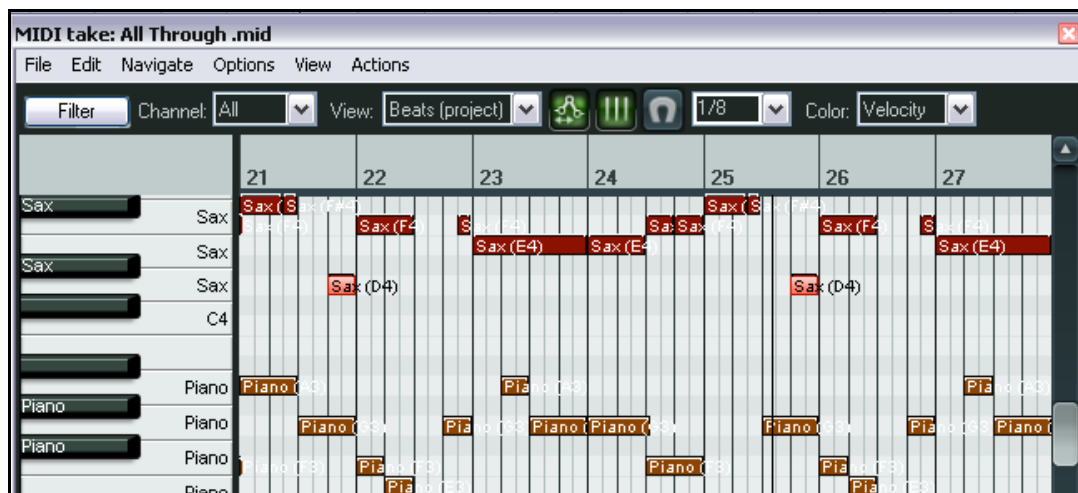
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## Named Notes Mode:



In this mode you can also double right click in the left pane to enter text, as shown. If you select the option on the View menu to **Show note names on events**, then the names will be shown on the actual notes themselves, as shown in the example above.

If you leave this option enabled, the names will also be displayed in **Piano Roll View** as shown below:



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In named note mode, you have the options (View menu) to **Show all note rows**, **Hide unused note rows** and **Hide unused and unnamed note rows**. The first of these options, which is the default is self-explanatory. Below are shown examples of the effect of each of the other two options.



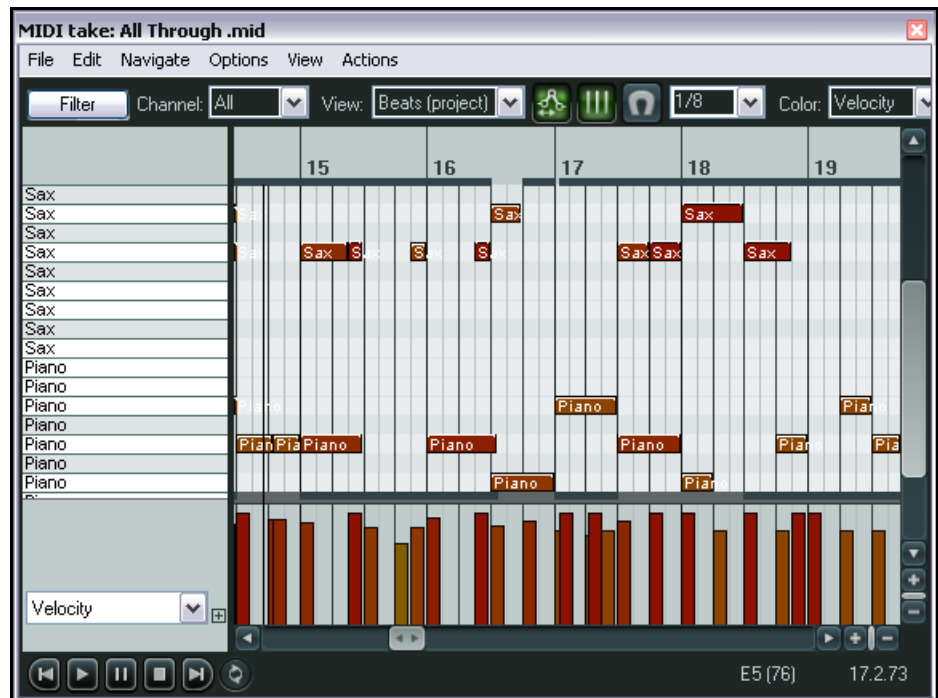
In this first example, the option to **Hide Unused Rows** has been selected.

Only those rows which contain notes are shown.

In this example (and typically) this includes rows which contain notes outside of the portion of the item that is currently displayed in the window.

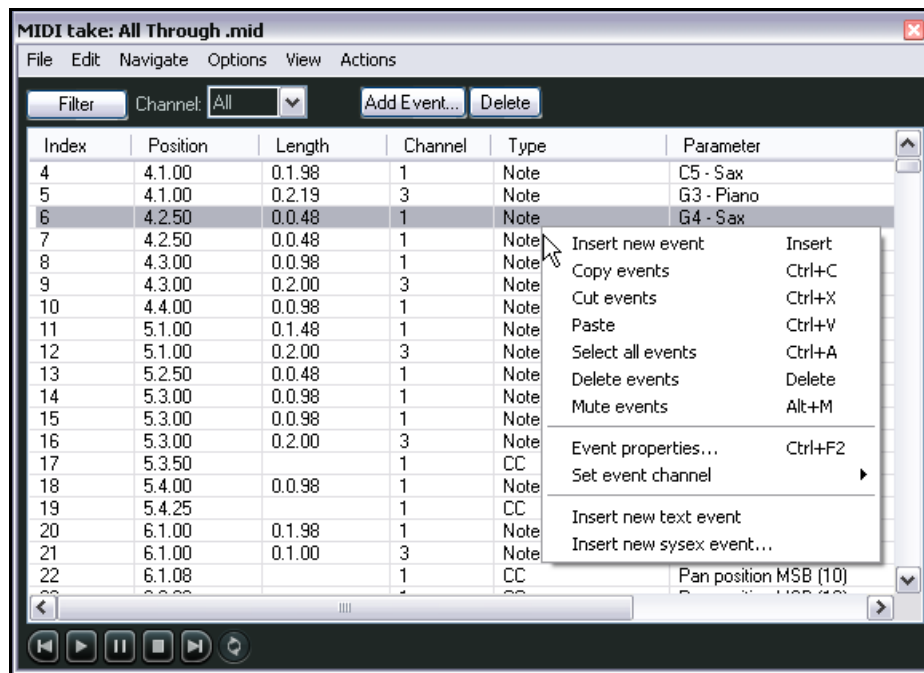
In this second example, the option to **Hide unused and unnamed note rows** has been selected.

This ensures that all named note rows are shown, even if they do not yet contain any notes.



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## Event List Mode:

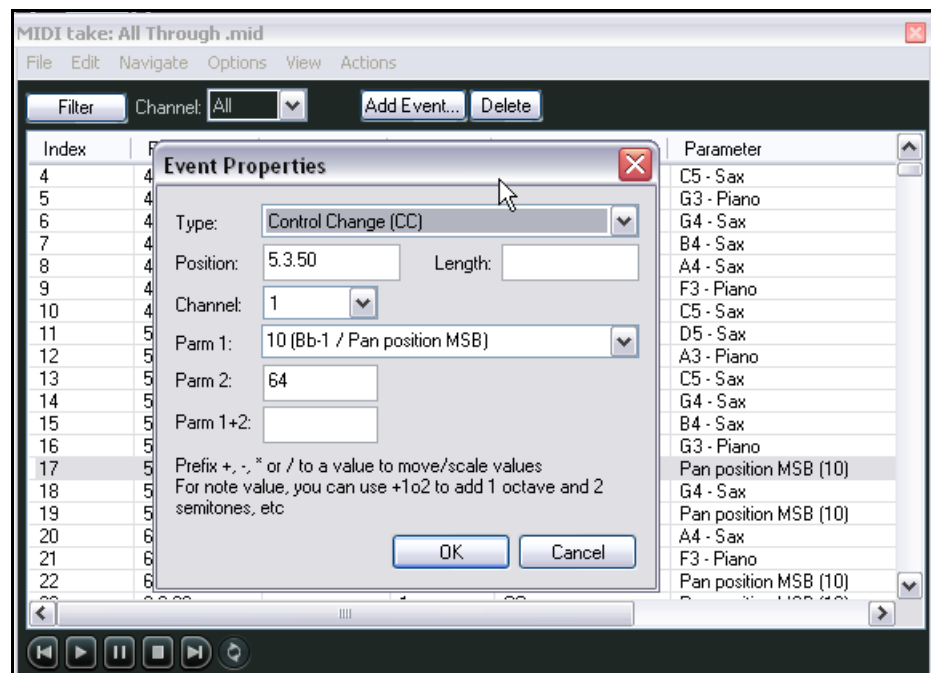


Event List mode displays the MIDI information as a list of events, in tabular form.

In this mode you can use the right click menu (shown left) to insert, copy, cut paste, delete or mute any events.

You can also double click on any event to modify that event's properties (see example right).

Of course, the information displayed in the Event Properties dialog box will in large measure depend on the event type of event.



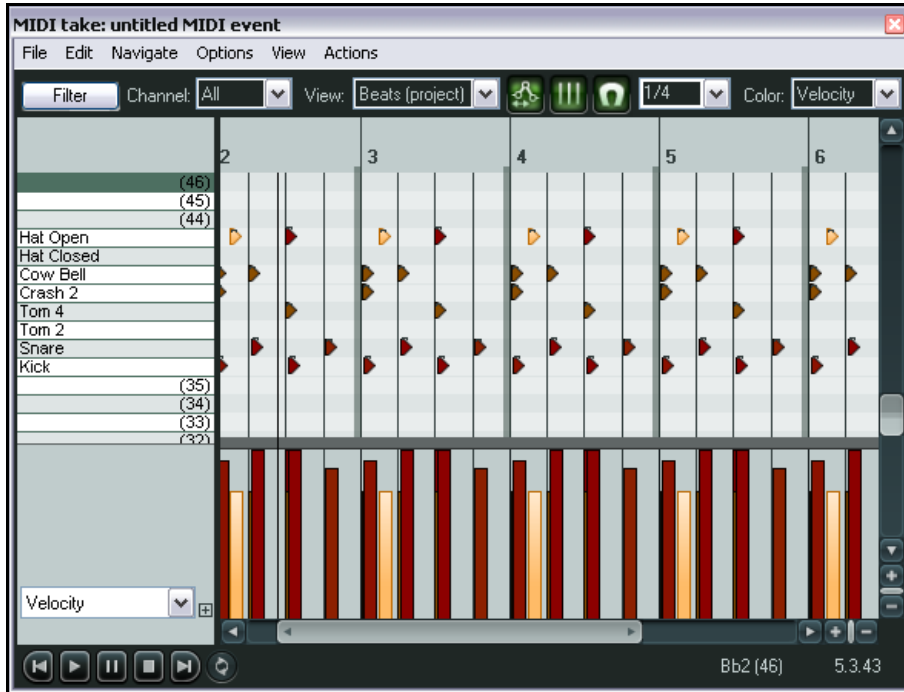
The Toolbar displayed in Event List view is simpler than that used in the other two views. The **Filter** button and drop down **Channel** list are used exactly as in the other two view to filter only those events that you want displayed. The purpose of the **Add Event** and **Delete** buttons should be self-explanatory.



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### 12.13.2 Note Styles

The default display note style used by the MIDI Editor is rectangular. This is the style that has been displayed in all of the Piano Roll View and Named Note View examples up to now. However, two further options are available, specifically for use with drum sounds. These are triangle and diamond modes. To choose a note style, use the **View, Note Style** command and select **Rectangle**, **Triangle** or **Diamond**.



An example which uses triangles instead of the default rectangles is shown on the left.

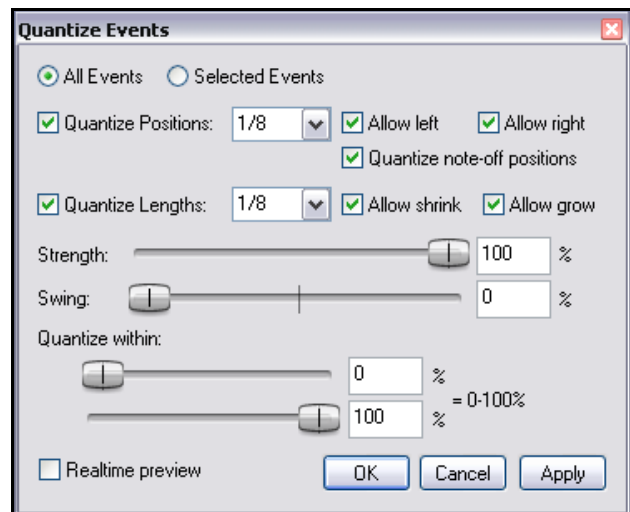
### 12.14 Quantizing MIDI Data

The term **Quantize** refers to the process of aligning a set of musical notes to a precise setting. This results in notes being set on notes and on exact fractions of notes. When you instruct the music application to quantize a certain group of MIDI notes in a song, the program moves each note to the closest point on the timing grid.

The purpose of quantization is to provide a more uniform timing of sounds. Quantization is frequently applied to a record of MIDI notes created by the use of a musical keyboard or drum machine.

Quantize is available by choosing the **Edit, Quantize events** command from the MIDI Editor menu. This command causes the dialog box shown on the right to be displayed.

The various quantize options and settings are explained below.



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**All Events** or **Selected Events**. The top pair of radio buttons allow us to quantize selected events or the whole sequence (all events). This can certainly come in handy if you just need to quantize a certain off section, or perhaps just a certain instrument, such as the hihats of a drum section.

Notice straightaway the **Realtime preview** option. This is the last option in the dialog box, but probably one of the first that you will wish to enable. **Realtime Preview** lets you test the result of your quantize options before you commit yourself by clicking on **OK**. This is useful for letting you experiment with different settings. It also makes you less likely to make a mistake, such as leaving the All Events option enabled when you really mean to choose Selected Events.

When enabled, the **Quantize Positions** checkbox tells REAPER to move the start position of the midi events to align to the value you set. A setting of 1/12 refers to one-twelfth of a note. You can select from the drop down list, or enter a value of your own (e.g. 1/24). This feature includes a number of options such as **Allow left** and **Allow right**. Enabling both these will ensure that notes are individually quantized to the start or end of the specified note fraction, whichever is nearest. Allow left only will quantize all notes to the start, allow right only will quantize all notes to the end.

When enabled, the **Quantize Length** checkbox tells REAPER to extend or shorten notes by moving the end position of each note. You can select from the drop down list, or enter a value of your own (e.g. 1/24). You can choose to enable or disable **Allow shrink** and **Allow grow**.

The **Quantize Strength** setting adjusts how strictly notes are quantized. The lower you set the strength, the less 'magnetism' the grid has to the midi notes. This introduces subtle imprecisions to the quantizing which can make the outcome seem less clinical.

The **Swing** control can also be set at any value between 0% and 100%. Used well, this control can result in a more musically pleasing output. In essence, you define a percentage delay to be applied on the upbeat. For example, if you apply swing to 1/4 notes then those which coincide with the 1/2 note divisions will be unaffected by the swing, those that fall between these divisions will be delayed by the amount specified. Small amounts of swing (even 5% or less) can help to prevent a part from sounding too rigid.

The **Quantize within** settings allow you to specify a percentage range for quantizing. This is another tool available to you to help you preserve the human element of your MIDI items.

In REAPER, quantize is non-destructive – that is to say, the process can be reversed at any time.

The various other commands on the **Edit** menu are used with quantizing are:

### Quantize selected events using last settings

This bypasses the **Quantize Events** dialog box, making it quicker and easier for you to apply the same quantization settings to various disparate selections.

### Quantize selected events to grid

This quantises selected events according to your grid settings.

### Unquantize selected events

Removes quantization from the selected events and returns the notes to their previous state.

### Freeze quantization for selected events

Freezes the quantization for all currently selected events.

Shown (right) is an example. The top picture shows two unquantized notes selected.

In the second picture they have been quantized by moving them left.

In the third picture, they have been quantized by moving them to the right.



### 12.15 Input Quantization

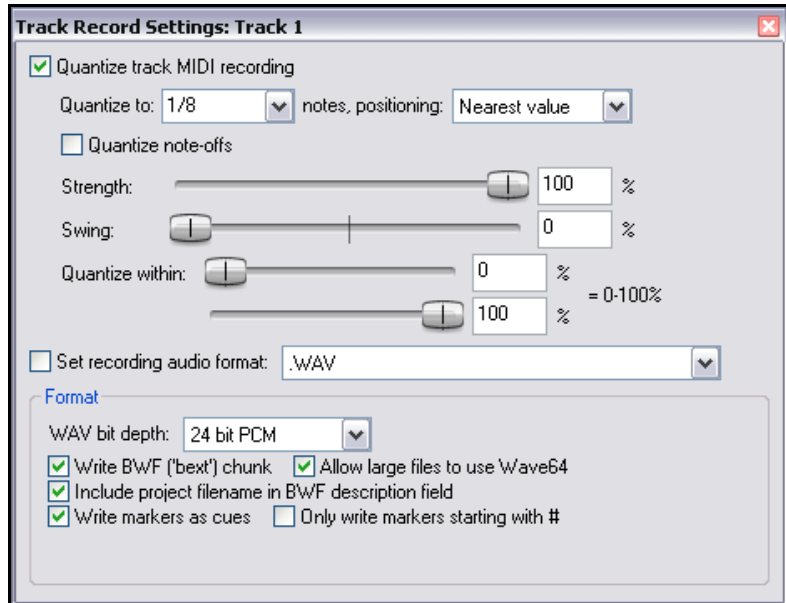
The term **Input Quantize** refers to a process by which MIDI notes are automatically quantized as they are entered. This could be, for example, by playing your MIDI keyboard, or even the REAPER Virtual Keyboard.

Input quantize is applied in REAPER on a per track basis. Simply right click over the track's VU Meter and choose **Track Recording Settings** from the context menu.

This causes the dialog box shown on the right to be displayed.

You should then select the option to **Quantize track MIDI recording**. Options then available include:

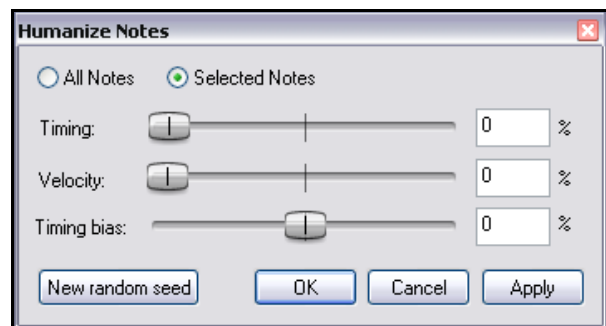
- The note length to be used for quantization (e.g. 1/8).
- Your quantize positioning preference. Options are **Nearest value**, **Previous value** and **Next value**.
- Whether to quantize note-offs.
- Quantization strength. A lower setting will allow more subtle variation, creating a more "human" effect by allowing minor variations in how strictly the quantization is applied.
- Swing setting. This can be between 0% and 100%. You can use this setting to add a touch of delay to those notes that do not fall on the upbeat. The best way to understand how these settings affect how your notes sound is to try a few examples.
- Quantize within % range. This is another way in which you can adjust your quantize settings to preserve the human performance element.



### 12.16 Humanize Notes

Humanize Notes (from the Edit menu) can be used to introduce subtle variations – some might say imperfections! – to a MIDI item that is just too exact, too perfect. Consider a piano piece, for example. No human pianist will ever complete an entire live performance on an acoustic piano with every key being struck with exact precision and perfect timing. Therefore, you might not want your MIDI items to be too perfect.

The **Humanize Notes** dialog box (right) can be used to introduced random variations in timing and velocity to an existing MIDI item to make it sound ... well, more human!



## 12.17 Using the MIDI Editor: an Exercise

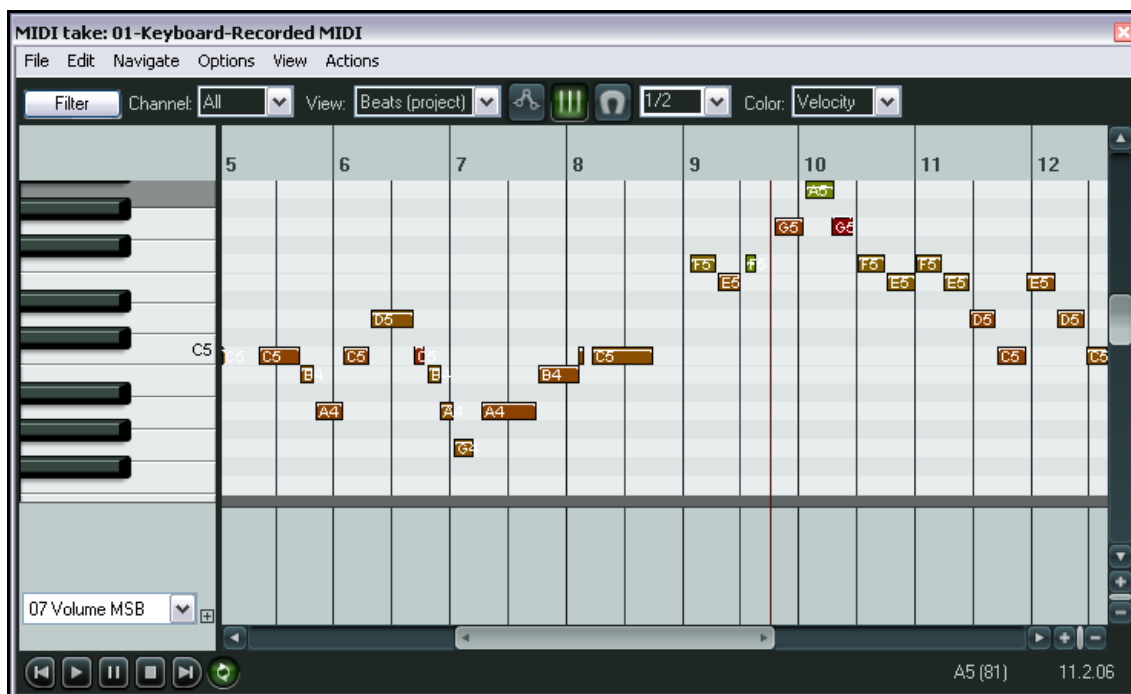
In this example, you will be introduced to some simple examples which involve working with the REAPER MIDI Editor. The objective of this is not to produce a stunningly brilliant piece of music, but to help you to become familiar with the MIDI Editor.

### Example

1. Create a new project file. Add one track to it. Arm this track for recording and set its input to your MIDI keyboard if you have one, or to the virtual keyboard if you do not.
2. Record about 20 or 20 seconds of a very simple tune on Channel 1. This might be part of a nursery rhyme or some other song with which you are familiar. Your Track and Item will look something like this:

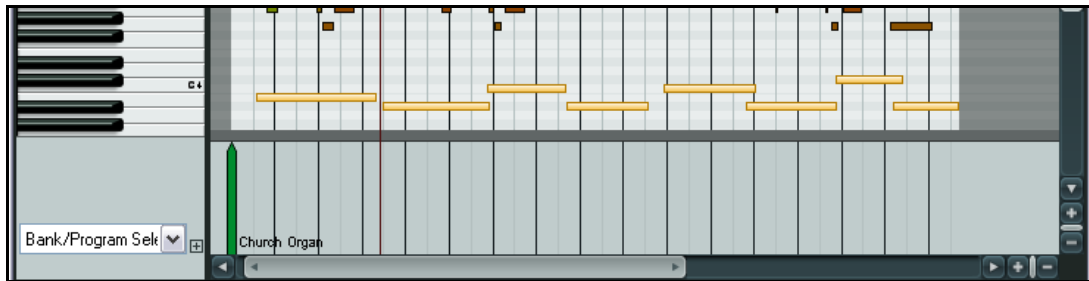


3. Display the track's **I/O** (Routing) window and add a MIDI Hardware Output to **Microsoft GS Wavetable SW Synth**.
4. Play the tune. It should play with a piano sound.
5. Double click on the item to open it with the MIDI Editor.
6. Display the drop down note-length list and set it to 1/2.
7. Scroll your mousewheel up or down until you are satisfied with the horizontal zoom setting. Use **Ctrl** with the mousewheel to find an acceptable vertical zoom setting. You should now see something like this.

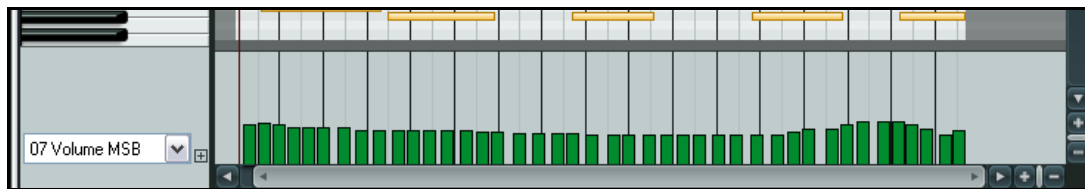


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- Just for fun, draw in a few more notes by clicking and dragging in the edit window. Experiment with using your mouse to move them about and change their length (by clicking and holding over a note's right edge and dragging left or right). Delete any that you do not want to keep.
- Now Zoom out horizontally to see the entire length of the item.
- Display the **CC Lane List** and choose **Bank/Program Select** (as shown right).
- At the very start of the song, double click in the CC Lane. Select the bank **General MIDI** and the program **Church Organ**.
- Return to the start of the timeline and play the tune, It should sound like a church organ.
- Draw in a number of long "dronish" notes as shown below. Marquee them (right click drag) to select them all (but only your new notes).



- Right click over any of the selected items, choose **Note Channel** from the menu, then channel 2.
- Double click in the CC Lane, next to where you clicked before. Select General MIDI, Choir Aahs and Channel 2 (see right).
- Play the song from the start. You should hear an organ with a choir. The choir may seem too loud.
- Change the CC lane to display **07 Volume MSB**.
- Click on the Channel Filter List (on the toolbar) and choose Channel 2. Now only your Aahs are displayed.
- Click, hold and drag your mouse as you sweep along the CC Lane with a fairly low volume setting, as shown below.



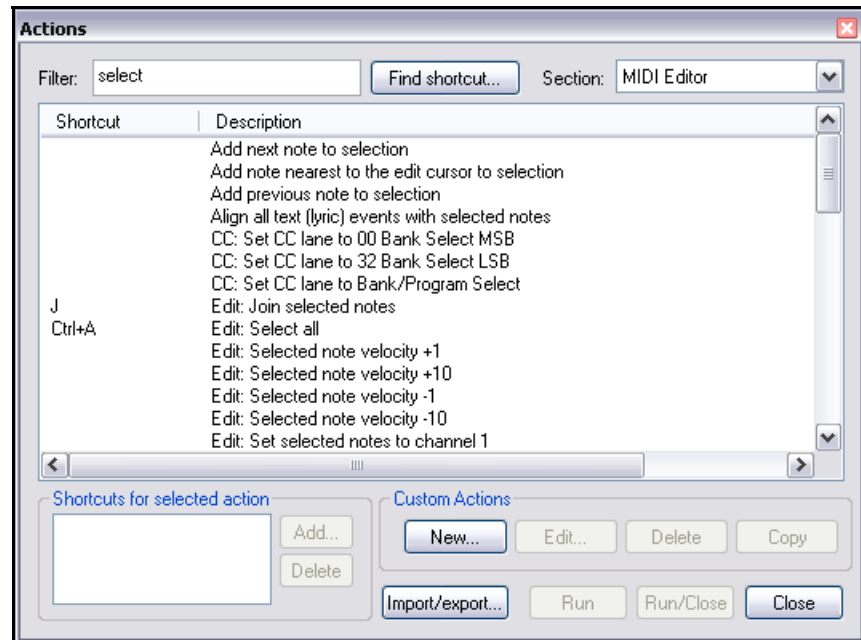
- Remove the channel filter and restore all channels to view. Close the MIDI Editor and save the file.
- Play it. The choir should now sound a lot quieter.
- Continue if you wish to further explore the MIDI Editor on your own.

### 12.18 MIDI Actions

REAPER's Action List Editor lets you assign your own keyboard shortcuts to any command or action, or sequence of actions. Chapter 13 will show you in detail how to use the Action List editor, but it's worth spending a little time to get familiar with at least some of its basic features while you're working in the MIDI Editor.

The Action list is displayed by choosing **Show actions list** from the **Actions** menu. One of the first things you should notice about it is that it contains a whole load of assignable actions beyond those that are shown on REAPER's menus. This means that you are able to create your own keyboard shortcuts for any of these actions, and even for sequences of actions.

Notice also (right) that when you display the Action List from within the MIDI Editor, you are able to assign MIDI commands and actions to keystrokes so that they will behave differently in the MIDI Editor from the way they behave in the main REAPER environment.



Let's take a simple example. Being able to select notes quickly and easily is important when you are working with the MIDI editor. If in the Action List filter box you type **select** then only those actions which included this word will be displayed (see above). You can see that there's quite a few, and that some – such as **Edit: Select all** – already have keys assigned to them.

One of these is **Add next note to selection**. You can assign a shortcut to this action – perhaps the letter N.

#### Example

1. With any MIDI item open in the MIDI Editor, choose the **Actions, Show actions list** command.
2. Click on the action **Add next note to selection**.
3. Click on the **Add...** button. This causes the **Keyboard or MIDI Input** window to be displayed.
4. Press the letter **N**.
5. Click on **OK**. You can see that this keystroke has now been assigned to this action.
6. **Close** the Actions List.
7. Click on any note to select it. Now press **N** several times. Each time you do so, the selection will be extended by one note.

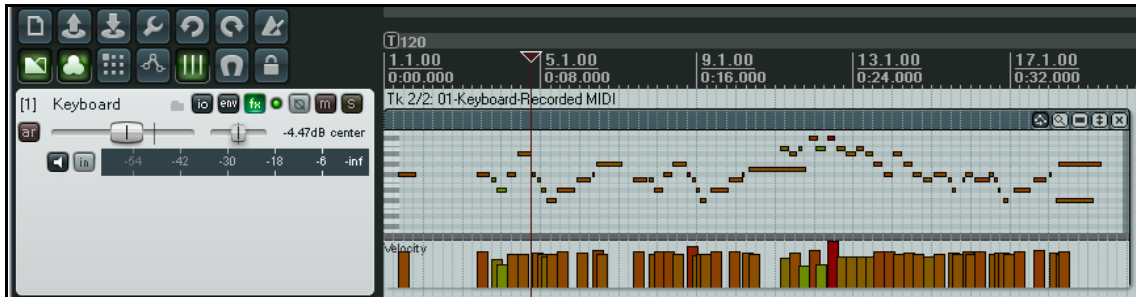
That's about as simple as it gets. As you'll see in Chapter 13, the Actions List Editor lets you do much more than just this. For example, you can:

- Add selected actions to the Actions menu.
  - Chain together any sequence of actions so that the entire sequence can be executed with just a single keystroke.

### 12.19 In-Line MIDI Editing

REAPER's main MIDI Editor is recommended for serious and in-depth editing of your MIDI items. However, many common tasks can be carried out using the in-line editor if you prefer. This allows you to edit the MIDI item without leaving the main window.

To use the in-line editor on any MIDI item, first select the item then either use the default shortcut key **E** or right click and from the menu choose **Open items in Editor** then **Open items in In-line Editor**. The in-line editor will only be displayed if there is sufficient track height.



The in-line editor displays piano roll view only, and the contents of CC lanes will be determined by whichever lanes were selected last time the item was opened in the MIDI Editor. If it has never been opened in the MIDI Editor, the Velocity lane will be selected by default. You can adjust the boundary between the editing area and the CC lane with the mouse to adjust its height, just as in the MIDI Editor.

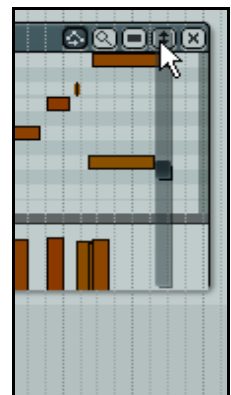
Right-clicking over the editing area will display a menu that will show you which editing tasks can be carried out with the in-line editor. These are listed in detail in Chapter 20, but in summary, the following types of commands and actions are supported within the in-line MIDI editor:

- Note editing mouse actions, including change length, change velocity, marquee, move, delete, insert, etc.
- Most commands on the MIDI Editor's Edit and View menus, including quantize and humanize.

When you are working with the in-line editor, any keyboard shortcuts and custom actions that you have defined in the main MIDI Editor will apply, along with any defaults. For example, **PageUp** and **PageDown** will zoom vertically in and out within the in-line editor.

The in-line editor displays a small toolbar in its top right corner. From left to right, the function of these tools is:

- Move CC with events toggle tool. This serves the same purpose as its equivalent tool in the MIDI Editor window.
- The Show/Hide tool (magnifying glass). This toggles between the functions Show all note rows, Hide unused note rows and Hide unused and unnamed note rows.
- The Item Style tool. This toggles between rectangle, triangle and diamond style for displaying notes.
- The vertical zoom tool. Click and hold on this and drag vertically up or down to zoom vertically in or out (see example, right).
- The X tool. This closes the in-line editor and restores normal media item display.



## 12.20 Ghost Copying

Ghost copying is a feature that lets you create multiple copies of a MIDI item in such a way that it is possible to edit all copies at the same time. Changes made to any single instance will be made to all instances.

Perhaps you have a melody, a bass line, or a drum pattern that you wish to repeat several times throughout a project. You're still working on the line, and you may need at some future time to make changes to these items, but you wish to do this in such a way that when you make these changes they will automatically be applied to all of the items. You can achieve this using the command **Item processing, Convert active take MIDI to file (ghost copyable)** before copying it. Any MIDI editing changes you make to any one of these items will now be applied to all of them.

If you later wish to convert any of your copies (or the original item) back into a stand-alone MIDI item that can be independently edited, you can do so using the command **Item processing, Convert active take MIDI to in-project event**.

### Example

1. In the example (right) we have a single MIDI item, labelled **MIDI Riff**.
2. Let's now suppose that we make a couple of copies of this item (see below).



3. Now suppose we wish to make some changes to our riff. We might use the in-line editor to add some more notes to the first event, as shown below.



4. Notice that only the first item has changed. Of course, that could be what we want, but if this was a riff repeated several times in a song we might want all three items to be changed. This is where ghost copying comes in. Let's go back to the beginning – where we had just the one item – and start again.
5. Right click over the single item and from the menu choose **Item processing then Convert active take MIDI to file (ghost copyable)**. Notice that its name is now preceded by an asterisk.



6. Once again, make a couple of copies of this item. This time because you are now working with a MIDI file you will need to use the main MIDI Editor, not the in-line editor. When you close the MIDI Editor you will be asked to confirm that you wish to save the changes.



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7. You should now see that all of the copied items have also been changed.



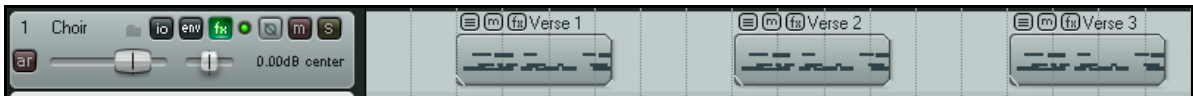
**Note:** To convert a ghost copyable file back into an ordinary MIDI item, right click and choose the command **Item processing** then **Convert active take MIDI to in-project event**.

### 12.21 Joining MIDI Items

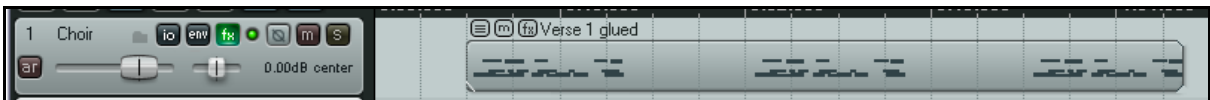
There may be times when you wish to join a number of MIDI items together. This might be simply so that you can edit them as one item, or perhaps to be able to export your MIDI data as a single MIDI file. Within the MIDI Editor you can do this using the **File, Export to new MIDI file...** command.

It is important also to remember that outside the MIDI Editor, REAPER's normal media item editing facilities are available to you. Many of these facilities and techniques have been covered in the earlier part of this User Guide. Get to know them, and take the trouble to explore how they can be of benefit to you.

For example, you might have several MIDI items that you wish to export together as a single file. The track shown below might be an example of this. It's no use opening the MIDI Editor with just one of the items. You want all three together. At first you might think that this is not possible. If so, think again!

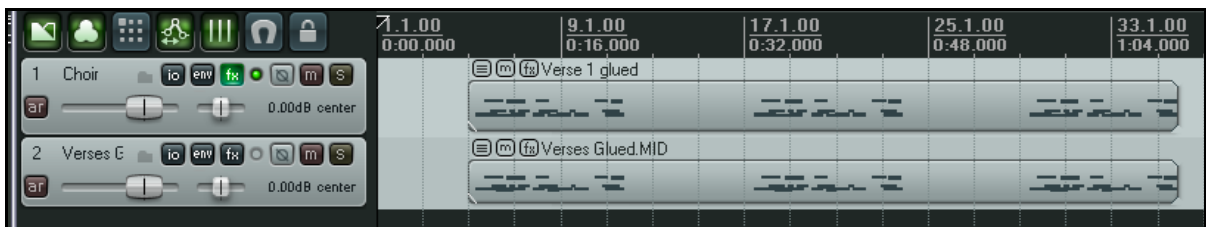


If you wish to export these as a single file, simply glue the items together first, then open the glued item in the MIDI Editor and export from there.



Above you can see what happens when you select all of the items (the easiest way to do this is to double-click in the Track Control Panel) then right click over any of the items and choose the **Glue selected items** command.

We can then double-click on the glued item to open the MIDI Editor and export the glued MIDI item as a single file. Just to show how this works, below you can see the glued items directly above the exported MIDI file, which has been imported back in as a separate track:

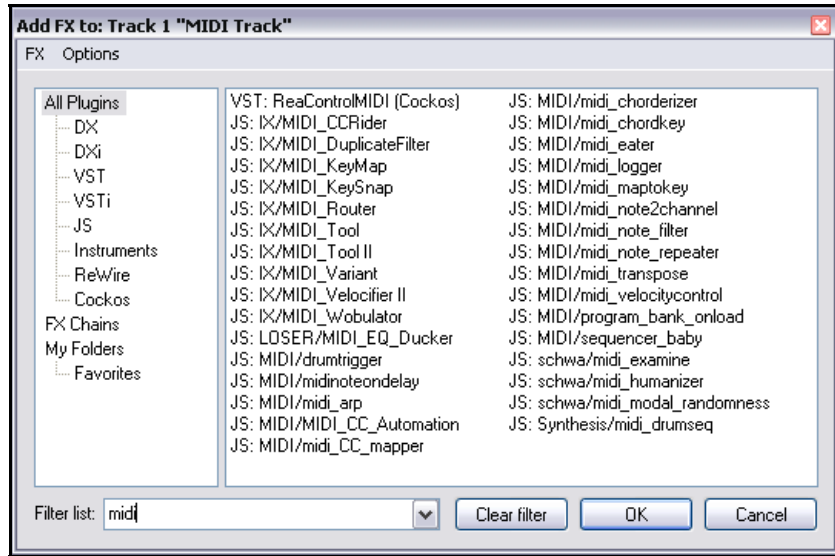


## 12.22 Some MIDI Plug-ins

REAPER includes a good selection of plug-ins that can be placed into the FX window of any of your MIDI tracks, or directly into any MIDI item. Many of these (the IX series) have been written and developed by Philip Consadine. These are not really part of the MIDI Editor, but now is a good time to look at them.

The basic steps involved in inserting and using Track FX are covered in the section Track FX Basics. If you are unfamiliar with these steps, you should review that section before proceeding.

If you display the **Add FX** window and type *midi* into the filter list box (as shown on the right), you will see a list of those MIDI FX that are currently available. Below are listed some of the JS MIDI FX supplied with REAPER.



FX Name	Comments
<b>MIDI_Tool</b> and <b>MIDI Tool II</b>	These do interesting and fun things to MIDI note events.
<b>MIDI_CCRider</b>	A LFO Controlled CC generator.
<b>MIDI_Wobulator</b>	A LFO Controlled automatic pitch wobulator.
<b>MIDI_Router</b>	Routes events from one channel to another.
<b>MIDI_DuplicateFilter</b>	Blocks duplicate notes.
<b>MIDI_Velocifier II</b>	This is a pattern based velocity modifier.
<b>MIDI_Variant</b>	A pattern based, musically aware, randomification monster.
<b>MIDI_KeySnap</b>	This is a good cheat for bad pianists.
<b>MIDI_KeyMap</b>	A MIDI key mapping utility.
<b>midi_transpose</b>	Transposes a note or a range of note.
<b>midi_velocitycontrol</b>	Used to vary and control velocity on a MIDI track.
<b>sequencer_baby</b>	An awesome pattern sequencer.
<b>Synthesis/midi_drumseq</b>	Use this drum sequencer with your favourite patch set.

These plug-ins can be made even more powerful by the use of automation envelopes, which can be applied to any of their parameters. How to create, manage and apply automation envelopes will be covered in Chapter 14.

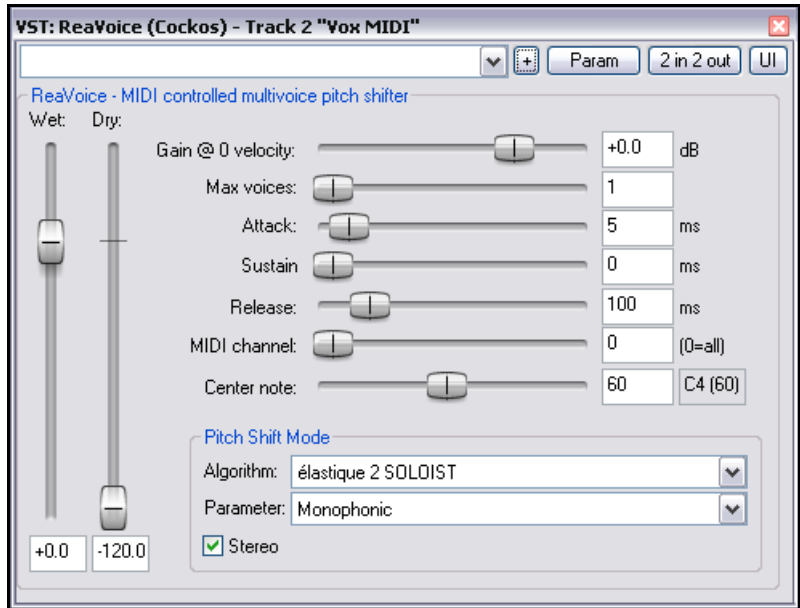
For more information about how to use these and other MIDI plug-ins, visit the Cockos web site, and in particular [http://www.cockos.com/wiki/index.php/Jesusonic\\_Effects\\_Documentation#MIDI](http://www.cockos.com/wiki/index.php/Jesusonic_Effects_Documentation#MIDI)

### 12.23 MIDI Controlled Pitch Shift with ReaVoice

The **ReaVoice** plug-in (supplied with REAPER) can be used in conjunction with a recorded vocal track to create interesting pitch shift harmonies. As with many other plug-ins, **ReaVoice** can be used in a number of ways. In this section we will take you thru just one example. After completing this example you should have the confidence to experiment with this plug-in's capabilities for yourself.

The procedure for using ReaVoice is as follows:

- Record the Vocal Track.
- Insert a new track immediately below the Vocal Track.
- Create a send from the Vocal Track to the new track. Initially at least, this should be Pre FX.
- Insert ReaVoice into the FX Window of the new track.
- Arm this track for recording. Select your MIDI keyboard as the Input Device and turn Input Monitoring on.
- Mute all tracks other than these two.
- Play the song. As you do so, play the keyboard, experimenting until you find an appropriate range of notes.
- When you have worked out what you want to play, press **W** to return to the beginning, then **Ctrl R** to record. Stop recording when finished.
- If you do not have a MIDI keyboard, you can either use REAPER's Virtual keyboard, or you can enter the notes by hand using the MIDI Editor.
- If you wish, you can record more than one harmony, selecting the Play All Takes option for the MIDI track items.
- After you have finished recording, you can use the MIDI Editor to polish up your work.



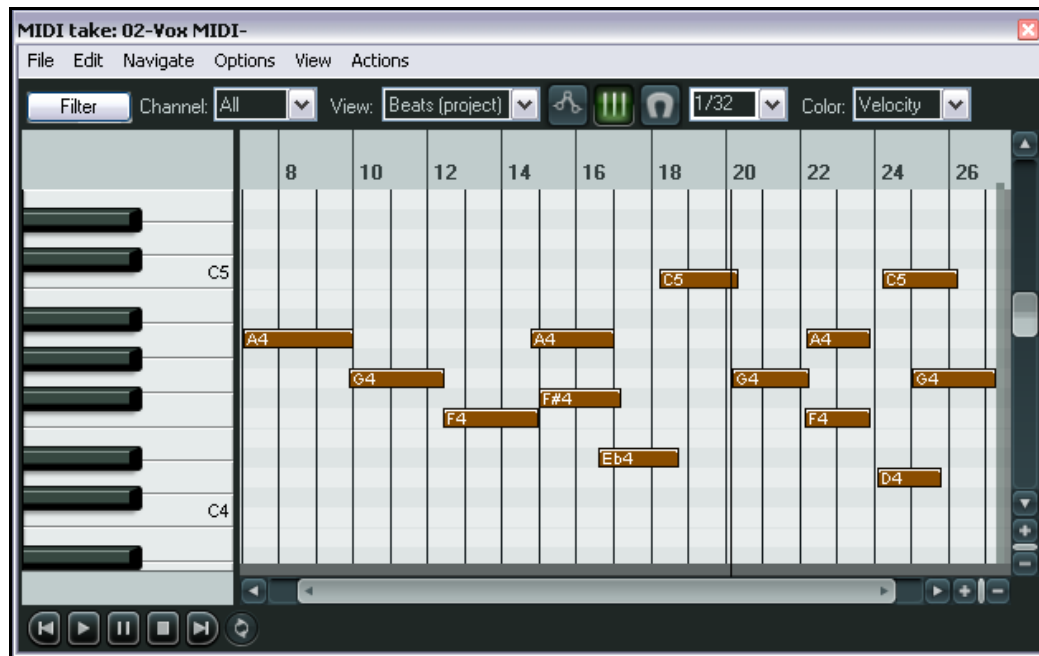
#### Example

In this example, you'll have some fun and find out how ReaVoice works at the same time.

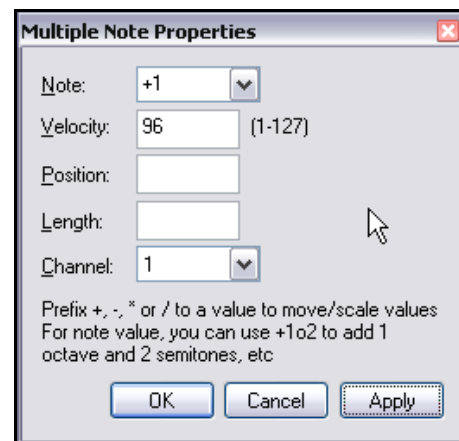
1. Open the file **All Through The Night.rpp** and save it as **All Through The Night REAVOICE.rpp**.
2. Mute all tracks except the Vox track.
3. Move the Vox track to the top, select it and press **Ctrl T** to insert a new track. Your Vox track is now track 1 and the new track is track 2.
4. Name the new track **Vox MIDI**.
5. Display the **I/O** window for the **Vox MIDI** track and add a new **Pre FX Receive** from the Vox track.

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6. Insert the **ReaVoice** plug-in into the FX Window for this track. For now you can accept its default settings, as shown above.
7. In the **Vox MIDI** track, insert an empty MIDI item from about the 13 second mark to about the 50 second mark. This should coincide with the first vocal passage on the Vox track.
8. Double click on this to open it in the MIDI Editor.
9. Create a pattern of notes similar to that shown below. You don't need to follow this precise pattern, be prepared to experiment.



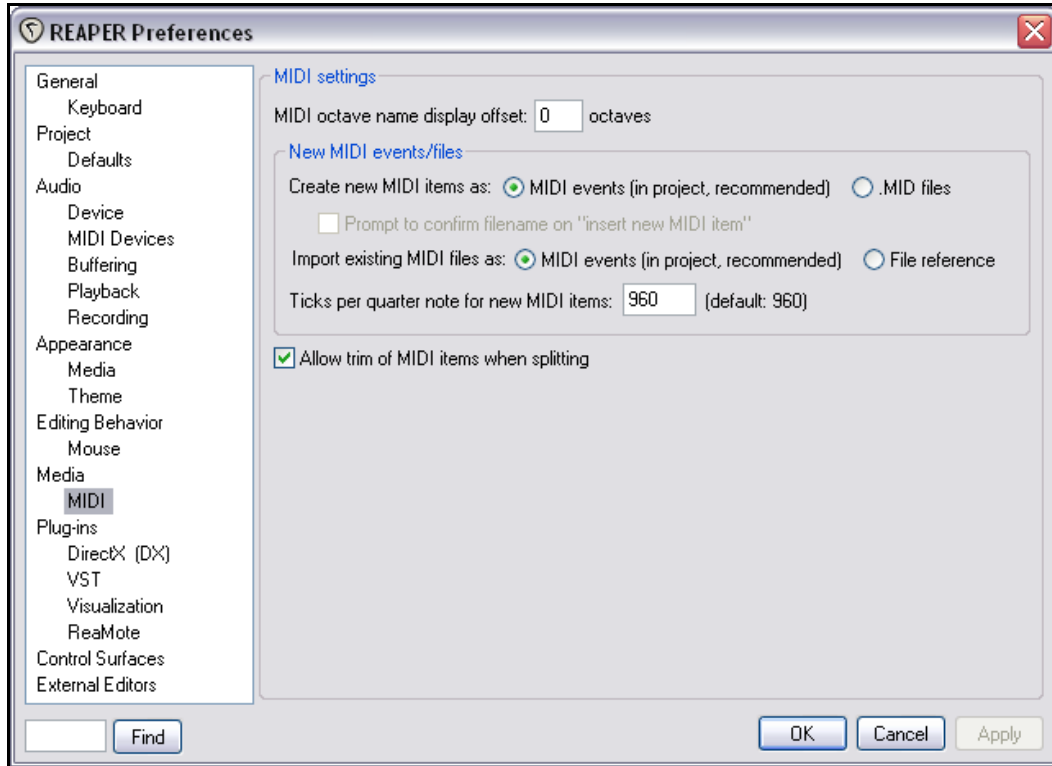
10. As you play the song, you can of course edit any individual note or notes, for example, by moving them up or down, by lengthening them or shortening them, or by changing their pitch. Here are some more possibilities, just for fun and to give you some ideas.
11. Within the MIDI Editor window, press **Ctrl A** to select all events.
12. Press **Ctrl F2** to display the **Note Properties** dialog box.
13. In the **Note** box, type **+1** (as shown) then click on **OK**. This raises the entire selection by one semitone.
14. Experiment with other settings as you wish.
15. Save the file when finished.
16. Now experiment with adjusting some of the ReaVoice parameter settings.



## 12 - NEW! Manipulating and Editing MIDI Items

### 12.24 MIDI Preferences Settings

To specify your MIDI preferences, choose the **Options, Preferences** command (**Ctrl P**) and then select the **Media, MIDI** page. This causes the following window to be displayed:



Options available include:

Option	Comments
<b>MIDI octave name display offset</b>	Specifies keyboard position relative to MIDI note number.
<b>Create new MIDI items as MIDI events in project</b>	Your new MIDI items are created as individual items within the current project.
<b>Create new MIDI items as .MID files</b>	Each MIDI item that you create is stored as a separate .MID file.
<b>Import existing MIDI files as MIDI events in project</b>	Imported MIDI files are merged into the current project but as separate items.
<b>Import existing MIDI files as file reference</b>	Imported MIDI items are still stored as separate MIDI files, referenced via the Item Properties.
<b>Ticks per quarter note for new MIDI items</b>	Sets the number of ticks per quarter note assigned for new MIDI items.



## 13 The Action List and Keyboard Shortcuts

### 13.1 Introduction

You'll already have seen that REAPER includes very many keyboard shortcuts. Indeed, by now you have used many of them. Some of these are common to many Windows applications, such as **Ctrl S** (File, Save) and **Ctrl O** (File, Open). Many others, however are REAPER specific, such as **PageUp** (Zoom out vertically) and **PageDown** (Zoom in vertically).

REAPER's Action List and Action List Editor serves two important functions. These should help you to get the most out of using keyboard shortcuts in REAPER. These are:

- You can browse and search the Action List to find out which tasks already have shortcuts assigned to them, and what those shortcuts are, and
- You can create keyboard shortcuts of your own for those actions you consider most useful. You can even assign a single keyboard shortcut to a whole sequence of actions.

### 13.2 Browsing the Action List

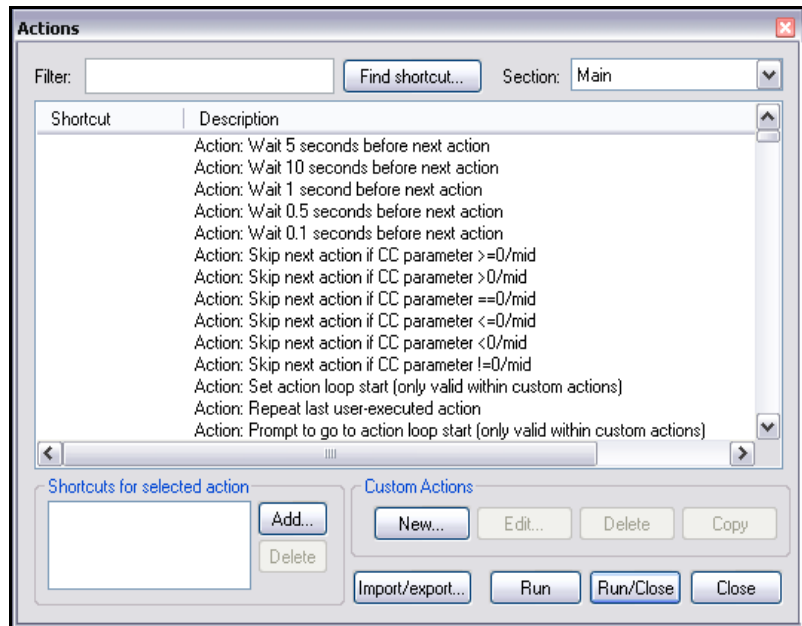
The REAPER Action List is opened either by choosing the command **Actions, Show action list ...** from the main menu, or by using the **?** shortcut key.

This causes the window shown on the right to be opened.

The number of actions for which you can create keyboard shortcuts is huge.

In this chapter we will introduce you to just a selection of some of the useful ways in which you can assign your own keyboard shortcuts and create your own custom actions. After that, it's up to you to explore more for yourself.

Let's start by having a look at some of the ways in which you can make use of this window.



To do this ...	You need to do this ...
Browse the list	Either use the <b>PageDown</b> and <b>PageUp</b> keys or use your mouse with the vertical scrollbar on the right.
Sort the list	Click on the header <b>Shortcut</b> to sort in keyboard shortcut order, or on the header <b>Description</b> to sort by action.
Resize the window	Position your mouse over any of the windows edges or corners so that the mouse cursor changes to a double-headed black arrow. Click and drag to resize.
Move the window	Click and drag the window by its title bar to the required position.

## 13.3 Searching the List

You can search the Action List to find the current assignment (if any) for any possible keyboard shortcut combination (such as **K** or **Shift K** or **Ctrl Shift K**). You can also search the list to see if any actions (such as *Lock selected item* already has a keyboard shortcut assigned to it.

### Example

1. From the REAPER main menu choose the **Actions, Show action List ...** command.

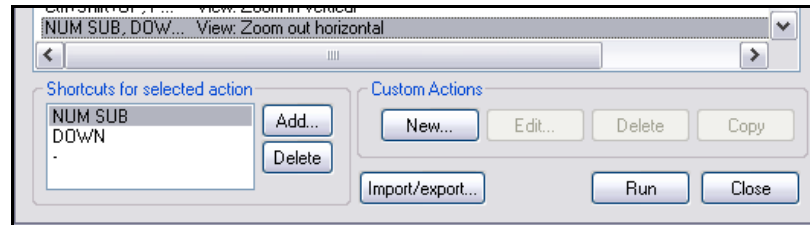
2. Let's find out if the **Down** arrow has an existing assignment.



3. Click on the **Find shortcut ...** button to open the **Keyboard or MIDI Input** window. Press the **Down** arrow key on your keyboard.

4. The Keyboard Input window will close and you can see that this key has been assigned to the action **View:Zoom out horizontal**.

5. Next we want to see if the action to lock the currently selected media item has a current keyboard assignment.

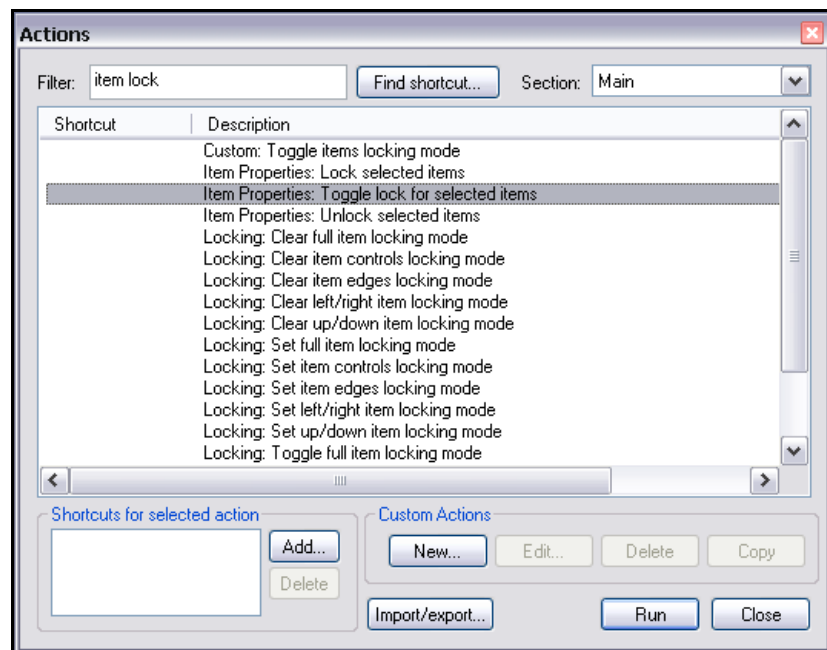


6. Click your mouse in the **Filter** box (near the top left corner of the **Actions** window) and type **item**. Notice that now only those actions which include the word *item* are listed. The list however is a long one.

7. After the word **item** type **lock** (as shown below). Notice that list is now filtered to show only those actions which include both of the words.

Notice that actions are included if they have a derivative word (such as *locking*) and regardless of the order in which the two words appear.

8. We can see (for example) that the action **Item properties: Toggle lock selected item** does not have a shortcut key assigned.



9. Now backspace the text out from the **Filter** box. All the actions will again be listed.

**Tip:** You can also browse the Actions List in your web browser (but not edit it). To do this, choose the command **All Actions** from REAPER's **Help** menu.



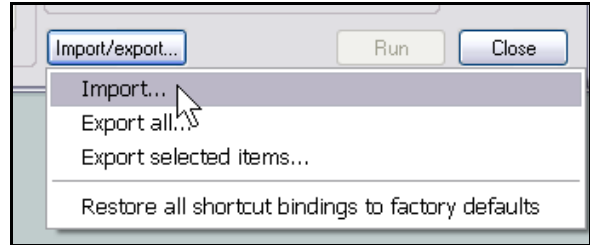
### 13.4 Importing Existing Keyboard Shortcuts

The Action list editor was introduced with version 2.42 of REAPER. Previously, you might have used an earlier version of REAPER to create a keymap file to save your earlier keybindings. This would have been done within what was the Keyboard/Control page of the Options, Preferences window.

You can import this file into the Actions list editor using the **Import/export** button.

Select **Import** from the menu, then select your KeyMap file and click on **Open**.

Similarly, you can use the **Export all** command to save your key bindings to a file. This is recommended as a precaution, along with backing up your files regularly.



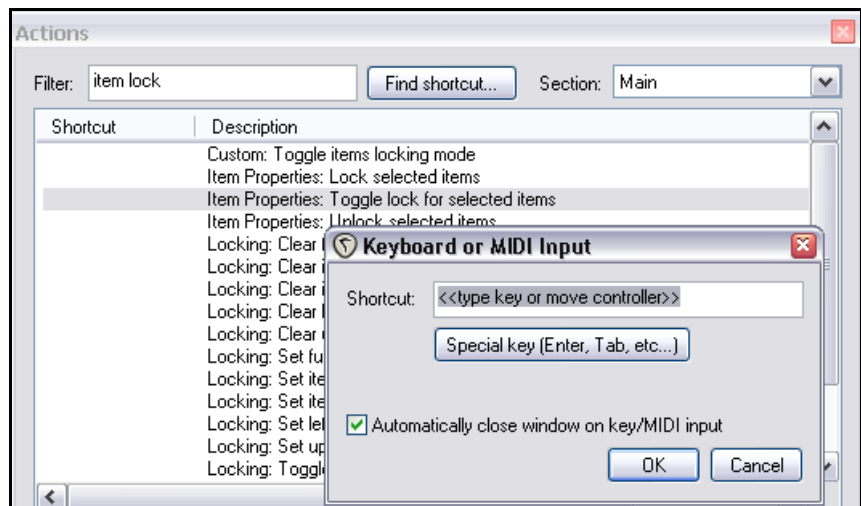
### 13.5 Creating a New Shortcut

In this next example, we will create a new shortcut. Let's take the example of item locking, which we have discovered does not yet have any shortcut key assigned to it.

When you are creating a new shortcut, you need to be careful not to accidentally overwrite one that is already assigned to something else. We'll see shortly that you can do this if you wish, but as a general rule it's preferable to use for new actions keystrokes that are currently unassigned. We will therefore be checking on the availability of our preferred choice of shortcut key before assigning it.

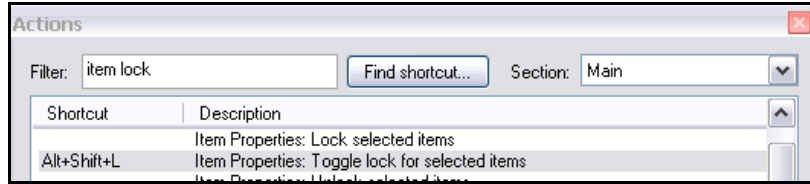
#### Example

1. From the **Actions** menu, open the **Actions** window (**Show action list ...**)
2. Let's see if we can use **L** for item locking. Click in the **Find shortcut ...** window. Type **L** and observe the response.
3. We can see that this key is already assigned to another command. We do not want to over-write that, so let's try again.
4. Click in the **Find shortcut ...** window. Press **Alt Shift L** and observe the response.
5. This time you should see a message **Shortcut not found**. We therefore know that this keystroke combination is available.
6. Click **OK** to close this message box.
7. In the **Filter** box type **item lock** then select from the list of actions *Item Properties: Toggle lock for selected items*.
8. Click on the **Add** button to open the **Keyboard or MIDI Input** box. When it appears, untick the option **Automatically close window on key/MIDI input**. This makes it less likely that you will assign a wrong key by mistake.



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9. Press **Alt Shift L** – you will see this key combination displayed in the **Keyboard or MIDI Input** box.
10. Click on **OK**. You can see that this keyboard shortcut has now been assigned.
11. Close the **Actions** window.
12. If you now select any item – or number of items – you can now use the shortcut keys **Alt Shift L** to toggle their item lock status on and off.



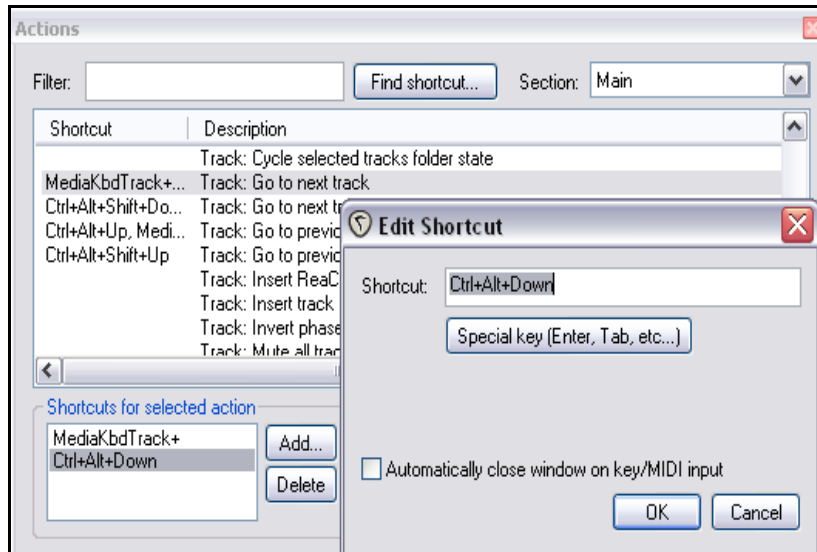
### 13.6 Changing an Existing Key Assignment

The procedure for changing an existing key assignment is similar to that for creating a new one. You simply need to find the action that you want assigned, assign the shortcut key and confirm that you do want to overwrite the previous assignment.

#### Example

The **Up** and **Down** arrow keys by default duplicate the functions of the **+** (plus) and **-** (minus) keys. We might wish to change this so that in the Track Control Panel we can use the **Up** and **Down** arrow keys to move to the previous or next track instead of **Ctrl Alt Up** and **Ctrl Alt Down**.

1. Open the **Actions** window.
2. In the **Filter** window type **track next**. That will filter the list to show just a few items.
3. Select the action *Track: Go to next track*.
4. In the section headed **Shortcuts for selected section** double click on the text *Ctrl+ Alt+DOWN*.
5. The **Edit Shortcut** box is displayed (see above). Press the **Down** arrow then **OK**. A message will be displayed stating **Key is already mapped to View: Zoom out horizontal, override?**
6. Click on **OK**. The **Down** arrow key is now assigned to *Track: Go to next track*.
7. Now repeat the procedure outlined in steps 2. to 6. to assign the **Up** arrow to the action *Track: Go to previous track*.
8. When finished, click on **Import/Export** then select **Export all**. Type a name (such as **MyKeys** and click on the **Save** button.



**Note:** If you wished to assign **Down** as your shortcut key *as well as* (rather than instead of) **Ctrl Alt Down** then at step 4. you would click on the **Add** button instead of double-clicking on the text.

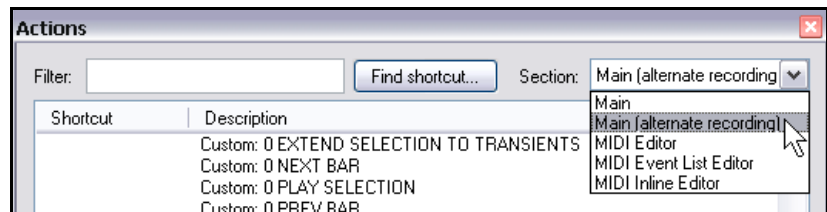
### 13.7 Using Keyboard Shortcuts when Recording

REAPER makes extensive use of keyboard shortcuts in many, many areas. In this section you will be introduced to how you can create your own keyboard shortcuts to make your recording sessions flow more smoothly. Here is a simple example in which you will create two keyboard shortcuts specifically for use when you are recording. As you become more experienced, you may well find further examples that you will wish to explore.

You will have noticed that when you stop recording, REAPER by default displays a prompt similar to that shown on the right. This gives you the opportunity to **Save All**, **Delete All**, or select which items you would like to be deleted. You can make this process simpler by assigning keyboard shortcuts for those options that you use most often – **Save All** and **Delete All**. These can then be used to stop recording and accept your choice in one action, thus by-passing the prompt. In this case we will assign **S** to **Save All** and **D** to **Delete All**. Moreover, we will do so in such a way that these key bindings will only apply when recording is in progress.

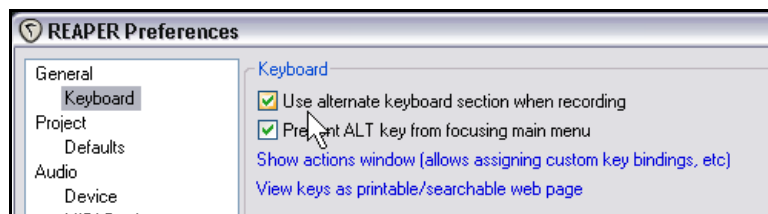
Note that these assignments will only be applied when recording. For example, the key **S** will still be able to be used to split items when you are editing.

1. Create a new project file and add three tracks. Arm all three tracks for recording. Now we will create the key bindings.
2. Choose the **Actions**, **Show action List** command (or press **?**) to display the **Actions** window.
3. Select the Section **Main (alternate recording)** (see right).



4. In the filter box type **stop save**.
5. Select the action *Transport Stop (save all recorded media)*.
6. Click on **Add ...** and type **S**
7. Click on **OK**.
8. Remove the contents of the filter box (click after the last letter there and use the **Backspace** key).
9. In the **Filter** box type: **stop del**
10. Select the action *Transport: Stop (DELETE all recorded media)*.
11. Click on the **Add** button then type **D** to assign this shortcut to the letter D. Click on **OK**.
12. Clear the filter box again.
13. Click on the header **Shortcut** to sort your list of actions. You should see your custom keyboard assignments at the top of the list.
14. Click on the **Import/export** button and follow the same method as previously to save your key bindings.
15. Close the **Actions** window.

16. Make sure that the option to **Use alternate keyboard section when recording** is enabled. You'll find this under **Options, Preferences, Keyboard**. Close the Preferences window.



17. With all three tracks armed for recording, press **Ctrl R** to start recording three empty tracks.

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18. After a few seconds, press **D**. This will stop the recording and delete all three unwanted items.
19. With all three tracks still armed for recording, press **Ctrl R** to again start recording three empty tracks.
20. After a few seconds, press **S**. This will stop the recording and save the three media items. If you now wish to delete these three items, press **Ctrl Z** (Undo) and they will be removed.

**Tip:** If you wish, you can assign macros such as these to an external device such as a keyboard pedal.

### 13.8 Creating Custom Actions

You can assign a sequence of actions to a single keyboard shortcut if you wish. In fact, there is no preset limit to the number of actions that you can assign to a single keystroke or keystroke combination. The process of assigning more than one action to a keystroke is known as creating a macro.

In this next simple example, we will assign the letter **M** to stop recording, save the recorded media, and drop a marker at the point where the newly recorded media items start.

The procedure varies from what we have done previously in two main respects:

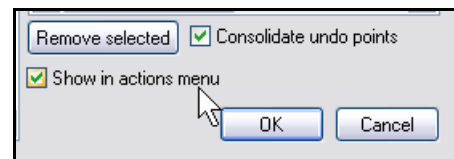
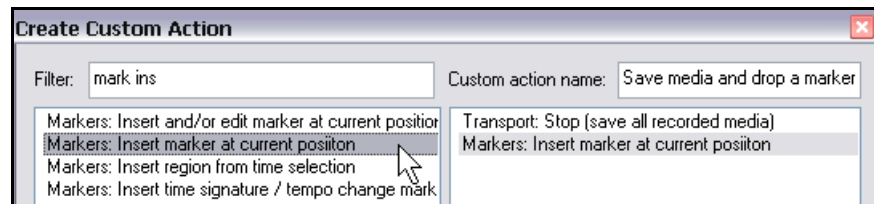
- You will need to give your macro a name.
- You can use drag and drop to create your list of actions that are to be assigned to that macro.

#### Example

1. Choose the **Actions, Show action List** command (or press **?**) to display the **Actions** window.
2. Select and display the section **Main (alternate recording)**.
3. Identify the section near the bottom of this window that is labelled **Custom Actions** (shown here on the right).
4. Click on the **New ...** button. This causes the **Create Custom Action** window to be displayed.
5. In the **Custom action name** box type: **Save media and drop a marker**
6. In the **Filter** box type: **stop sav**

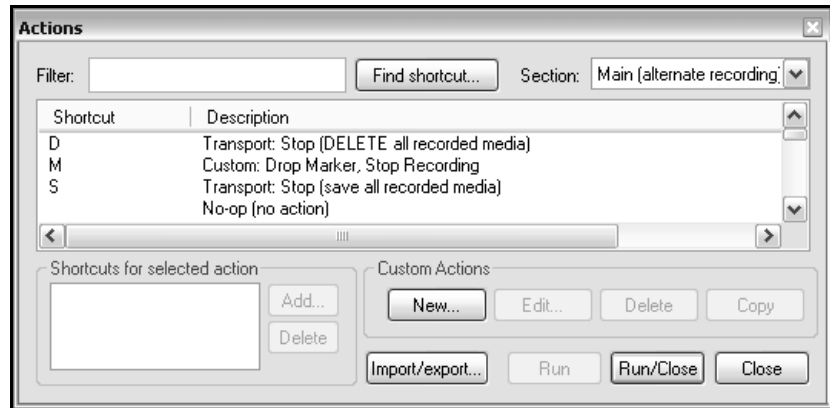


7. Drag the action *Transport: Stop (save all recorded media)* into the right hand window (or double-click on the action).
8. Delete the text from the **Filter** box and type: **mark ins**
9. Double-click on the action *Markers: Insert marker at current position*.
10. Select the options to **Show in actions menu** and **Consolidate undo points**. This will ensure that when you are recording this macro will be available from the Actions menu, and that the entire macro will appear as only one item in your undo history.
11. Click on **OK** to close the **Create Custom Action** window.
12. Click on the **Add** button to define your shortcut key.



## 13 - The Action List and Keyboard Shortcuts

13. Press **M**.
14. You can see that your custom macro is included in the list.
15. Use the **Import/Export** button to save your work, using the same file name as before.
16. Close the **Actions** window.
17. Try recording a track or two, then pressing **M** to stop the recording.



### 13.9 Keyboard Shortcuts for Track Control Panel Functions

Many power users believe that keyboard shortcuts are the fastest, most efficient and most productive way of working with REAPER. This is especially the case for frequently repeated activities that might otherwise involve a lot of time fiddling around with the mouse. Keyboard Shortcuts are an extremely important feature of REAPER. As you work your way thru this User Guide, and as you get to know REAPER better, you will find that there are all sorts of actions that you can assign to keyboard shortcuts, *including hundreds that do not appear on any menus*. Here are some examples of some tasks for which you might consider it worth assigning shortcut keys in the Main section, together with suggested keys that you may wish to use.

Task	Possible Shortcut Key
Track: Toggle bypass FX for currently selected track(s)	<b>B</b>
Track: Toggle bypass FX for all tracks	<b>Y</b>
Track: View I/O for current track	<b>I</b>
Track: View envelopes for current track	<b>E</b>
Track: View FX chain for current track	<b>F</b>

### 13.10 Using a Control Surface with REAPER

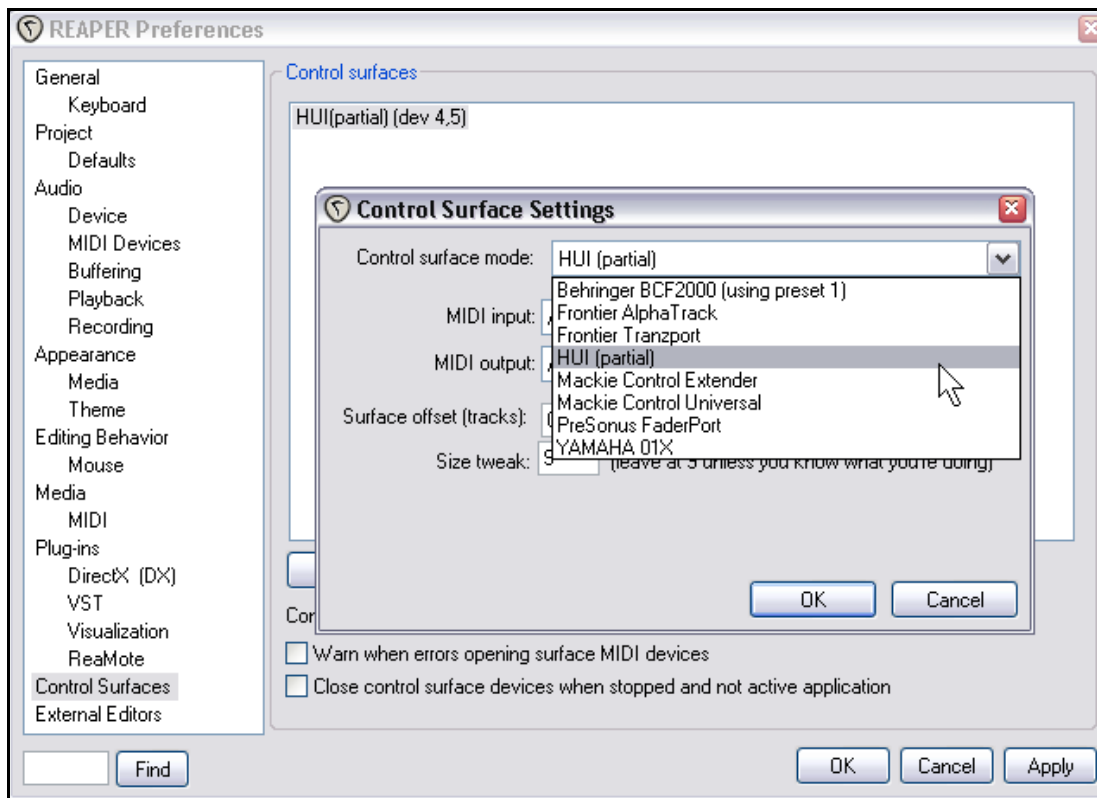
If you have a control surface such as a Behringer BCR2000 or a Novation Nocturn then you can use it to control some of REAPER's actions. These might include track panning and volume, mute and solo status, arming and starting/stopping recording, and possibly to physically map REAPER's transport bar for functions such as Play, Stop, Pause, Rewind, etc. Of course, you will need to know the specific characteristics of your particular device, including how to install it, set it up and so on. That is obviously outside the scope of this User Guide.

You should also be aware that different control devices have different capabilities and different applications. Not all control surfaces can be used to control all actions, even those that are listed as midi CC capable. Obviously it is also beyond the scope of this user guide to present a detailed analysis and comparison of all these. In overview, however, they fall into two broad categories:

- Devices which are or can be recognised by REAPER as a specific and individually named control surface.
- Generic devices which although not specifically and individually recognised can nonetheless be used as a control surface.

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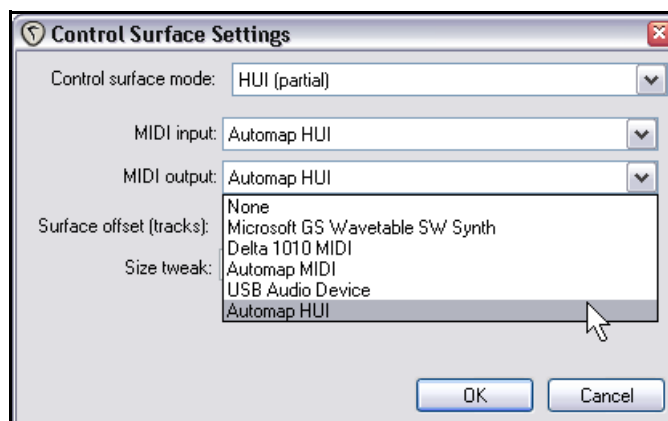
If you are using any of the devices listed in the illustration on the right, you should be able to install it on the **Control Surfaces** page of REAPER's Options Preferences settings. Of course, you should consult the manufacturer's documentation and/or web site for further information. You may also be able to find further information on one of REAPER's on-line forums.



Even if your device is not shown on this list, you might still be able to install and use it as shown here if it is capable of emulating one of the devices that is listed. For example, the Novation Nocturn can be installed as a **Hui** because it is capable of emulating this product. Again, check the various documentation and web sites that are available to you.

In every case, make sure that you choose the options that are correct for your device from the various **Control Surface Settings** options. Shown on the right is one example of such settings - it is not intended as a model that can be used with any particular product.

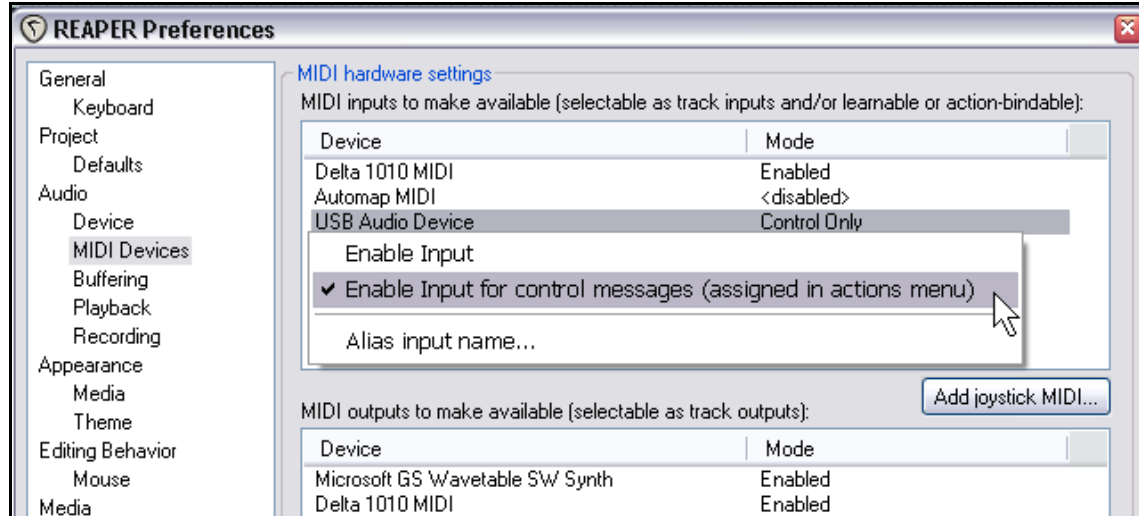
Of course, it is perfectly possible for you to install several devices in this way. For example, you might wish to use both a Frontier AlphaTrack and a Frontier Tranzport. This is perfectly possible, so long as each device is installed correctly.



You will need to consult the product documentation to ascertain how then your control surface(s) can be used with REAPER.

## 13 - The Action List and Keyboard Shortcuts

If your device is not on the list of recognised control surfaces and cannot emulate any of the items on that list, you can still use it with REAPER. An example of such a product is the Behringer BCR2000. Once it has been physically set up and installed on your computer, it will appear on the list of REAPER's MIDI Devices. Depending on the actual product and which drivers you are using, it might appear on this list with its own name or merely as a **USB Audio Device**.



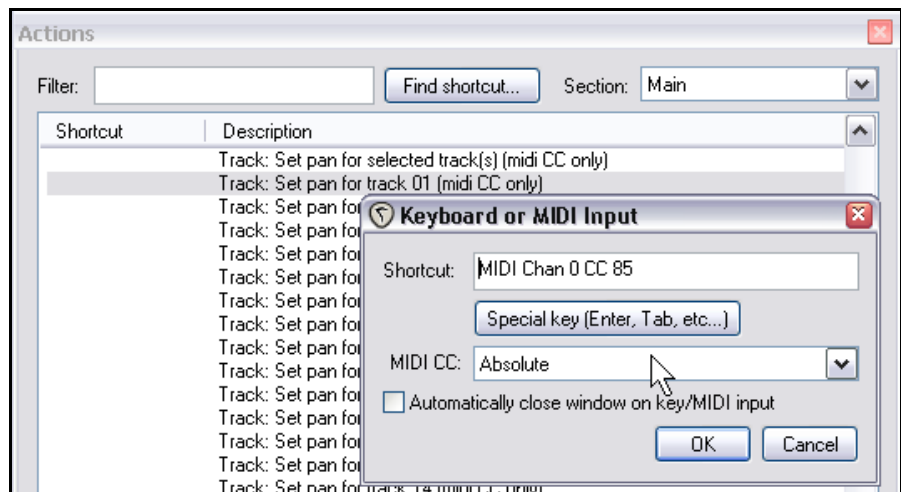
Install it as a MIDI Device, most likely Input Only and in most cases Control Only. An example of this is shown above. If you wish, you can assign it a more recognisable name than that listed by selecting the **Alias input name** option.

You can then assign any action listed as supporting midi CC control to one of the knobs, faders, buttons or rotaries on your control device.

The procedure is similar to assigning an action to a key on your PC keyboard. First select the action, click on **Add** then instead of pressing a key on the keyboard, tweak the control surface control and click on **OK**.

An example is shown on the right - in this case we are assigning a rotary control to be used to adjust the panning of track 1.

Of course, for further information you should consult the documentation supplied with your device, the manufacturer's web site, or one of the REAPER forums.



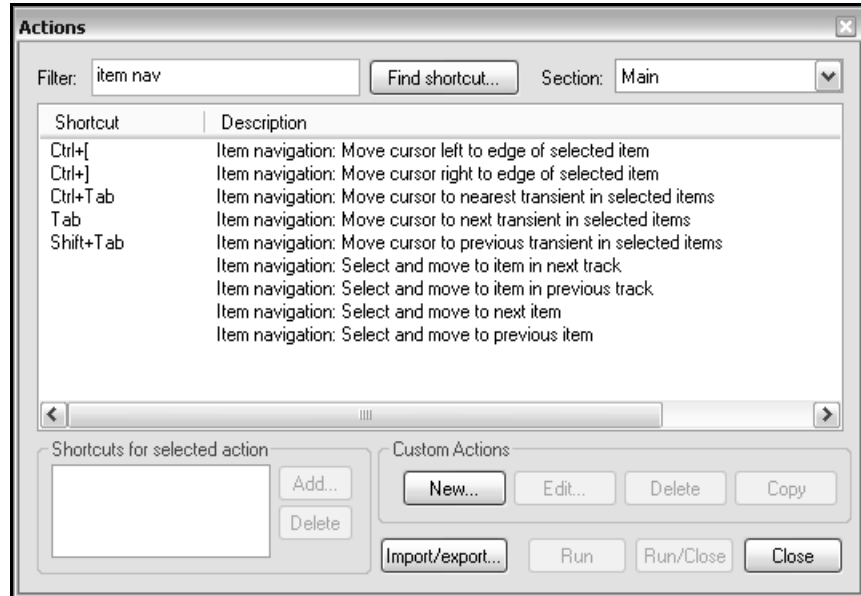
## 13.11 Keyboard Shortcuts for Navigation

Many people like to use keyboard shortcuts, for example, for navigating between items, when editing and/or arranging a project. We've already introduced how you can create your own keyboard shortcuts.

There are a number of tasks to which you can assign your own keyboard shortcuts to make navigation easier. Choose the **Actions** command from the main menu, then **Show Action List**. Select the section **Main**. Use the method explained earlier to add your own shortcuts.

A selection of some of the tasks that can be key-bound in this way is shown on the right. These include:

- Select and move to item in next track.
- Select and move to item in previous track.
- Select and move to next item.
- Select and move to previous item.
- Move cursor to next transient in selected items.
- Move cursor to previous transient in selected items.



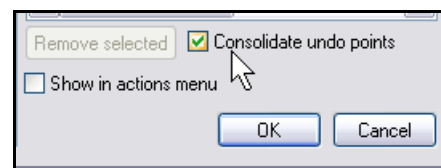
## 13.12 Assigning a Shortcut to an Editing Sequence

We have already seen that you can assign more than one action to a single keystroke or keystroke combination. In this section we will introduce you to some relatively simple examples of how you can create useful macros that will make your life easier when you are editing, just by chaining sequences of three or four commands together. Keep in mind that they are intended primarily to serve as examples to help you learn how to create your own macros.

For example, you will likely find that there will be numerous occasions when you will wish to mute a time selection for a specific track, or perhaps a number of specific tracks. In this next example, you will learn how to be able to achieve this each time with just a single keystroke.

### Example

1. Open the **Actions** window, either from the **Actions** menu or by pressing the ? key. Make sure the **Main** section is selected and displayed.
2. Click on the **New ...** button and name your new action **Mute selected area**.
3. Using the filter techniques that you have learnt from the previous examples in this chapter, find each of the four actions shown below and drag them across to the right hand window (or double-click on the action). You can find and select these in any order you wish, then drag and drop them up or down the list to change the order.
4. You should select **Consolidate undo points** if you wish the macro to appear as a single event in your undo history. Because this macro uses the mouse cursor position, however, you probably won't want to add it to the actions menu.

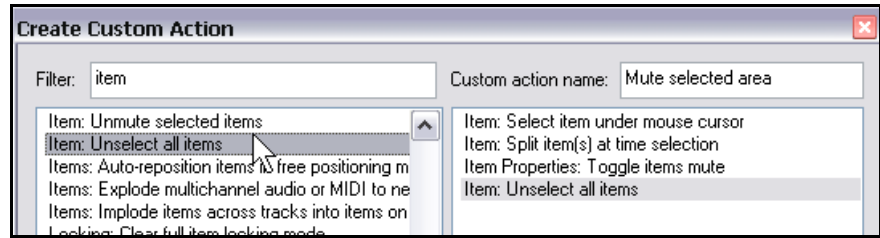




## 13 - The Action List and Keyboard Shortcuts

5. Click on **OK** to close the **Create Custom Action** window.
6. Click on **Add** to select a shortcut key.
7. Type **K** and click **OK**.

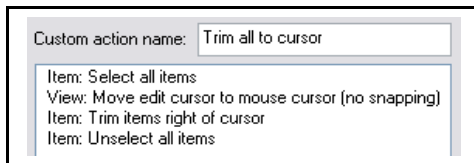
8. Click on **Import/export** and save your work, as before.
9. Click on **Close** to close the **Actions** window.



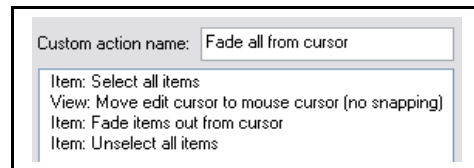
10. You should now find that you can make any time selection, then hover your mouse over any track and press **K** to mute the selected area for that track. You can repeat this, hovering your mouse and pressing **K** for as many tracks as you wish.

### 13.13 Managing Item Trims and Fades

Here are two more examples of very simple but potentially useful macros, in this case to first trim and then fade all your tracks from the end of your project. This is often required because as a rule you will usually find that you have recorded a period of silence (or strange noises!) after the end of the actual song. Shown below are the actions that you need to assign to each macro to achieve this.



Trim to cursor macro – **Alt T**



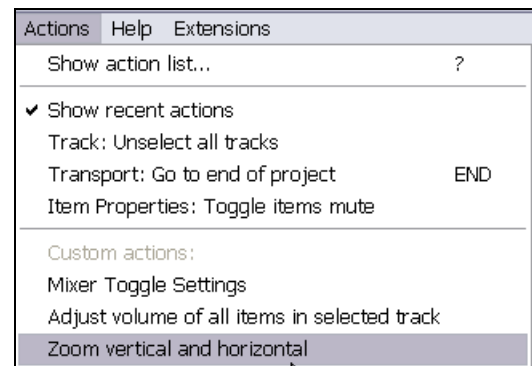
Fade to cursor macro – **Alt A**

You can create both these macros using the same method as in the example immediately above this one. Of course, the keystroke assignments shown above are only suggestions – you can use whichever keys you wish.

### 13.14 Running Actions/Macros

You can run any listed action from the **Actions** window by either double-clicking on the action or by selecting the action and clicking on either the **Run** button (to run the action and keep the Actions List window open) or the **Run/Close** button (to run the action and close the window).

Notice that recently executed actions and macros will also be shown on the **Actions** menu (along with any custom macros that you have placed there) and can be executed from this menu. In this example (right), we have added three custom macros to the Actions menu. Remember also that you can add macros and custom actions to the main REAPER toolbar.



### 13.15 Interactive Macros

We've already seen how keyboard shortcuts can be created and used to execute REAPER commands and actions, and even to chain a sequence of commands or actions together. Taking this idea further, you can also create interactive macros – that is, where at various steps during the execution of the commands, REAPER will pause and wait for some input or information from you. The example below demonstrates this idea in action.

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### Example

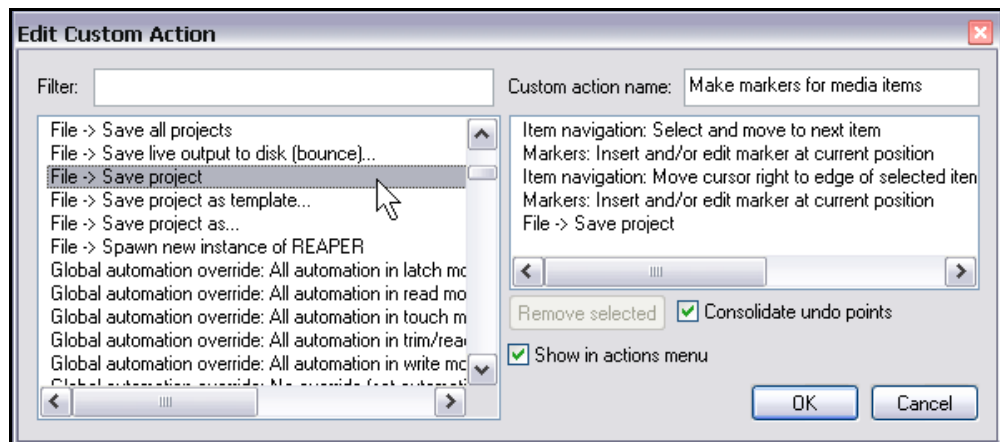
In this example we will create a macro that will:

- Create a marker at the start of any selected media item in any file.
- Wait for you to name it.
- Create a marker at the end of any selected media item in any file.
- Wait for you to name it.
- Save the file.

Take look at the project file shown here. The vocal track is made up of three items.



1. Open one of your **All Through The Night** project files and save it as **All Thru the Night MACRO.rpp**.
2. Make sure that the Vocal track is split into three items, as shown, with the silent passages between the items deleted.
3. Choose the **Actions, Show action list ...** command and select the **Main** section.
4. Click on the **New** button then name the macro **Make markers for media item**.
5. Define the five actions shown (right).
6. If you wish, select the options to add this macro to the Actions menu and to consolidate its undo points.
7. Click on **OK**.
8. Click on **Add ...** and press your preferred Shortcut Key(s) – in the example shown we have used **Shift Q**. Close the Actions window.
9. In the Track Control Panel, select the Vox track and position the cursor near the start of the song.
10. Press the shortcut keys for this macro, e.g. **Shift Q**. When prompted for a marker name, type **V1 Start** and press **Enter**.
11. When prompted again, type **V1 End** and press **Enter**.



## 13 - The Action List and Keyboard Shortcuts

- Your screen will now resemble that shown below:



- Press the keyboard shortcut for your macro again. Notice that the cursor moves to the start of the next item and you are again prompted to enter a name. Type **V2 Start** and press **Enter**.
- You will again be prompted. Type **V2 End** and press **Enter**.
- Now run the macro again, entering when prompted marker names for the start and end of your third media item.
- Your screen should now look like this:



### 13.16 Some More Macro Suggestions

#### 13.16.1 Mixer Layout Macros

By default, **Ctrl M** can be used as a shortcut key to open and close the Mixer view. In addition, the commands on the Mixer's right-click menu can be assigned keyboard shortcuts of your own. Any of the mixer actions shown in the Actions List can be assigned to your own shortcuts.

For example, you could make a macro which would toggle various mixer display/layout options, such as Show Sends and Show FX. One state might be preferred when recording, the other when playing back and mixing. By creating such a macro, you are able to toggle between the two states at will, easily and without having to change the entire screen set.

#### 13.16.2 Assigning Shortcut Keys to Screensets

By default, a number of shortcut keys are assigned to loading and saving screensets.

**F4**, **F5** and **F6** will load Track Views 1, 2 and 3 respectively. **Shift** with any of these keys will save the screenset, For example, **Shift F4** will save track screenset 1.

**F7**, **F8** and **F9** will load Window Sets 1, 2 and 3 respectively. **Shift** with any of these keys will save the screenset. For example, **Shift F7** will save window screenset 1.

You can use the Actions List editor to change any of these, or to define shortcut keys for your other screensets.

#### 13.16.3 Assigning Shortcuts to Locking Actions

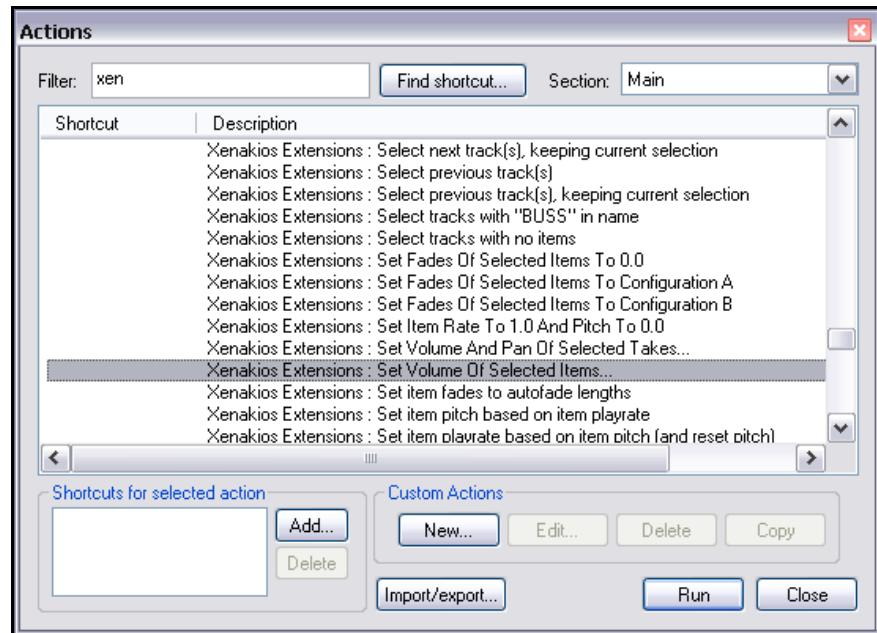
If you use locking a lot, you should consider assigning shortcuts for setting the lock status of those items that are most useful to you. For example, you could use keyboard shortcuts to toggle the locked status of item controls or time selection.

### 13.17 Xenakios and SWS Extensions

In an earlier chapter you were introduced to some of the Xenakios and SWS extensions. Any of these commands can also be assigned to a keyboard shortcut or macro, either on its own or in combination with any other REAPER assignable actions.

You can of course filter the Actions List to obtain a full listing of all the available extension commands.

In this next example, we will create a simple macro that will enable us to set the volume of all of the media items in a selected track all at the same time.

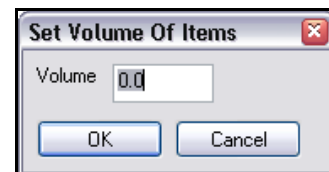


#### Example

1. Display the **Actions** window, either from the **Actions** menu or by pressing the **?** key.
2. Click on the **Add...** button to create a new custom action. Name this action *Adjust volume of all items in selected track*. Find and drag across to the right hand window the following three actions:

*Item: Select all items in selected tracks, and  
Xenakios Extensions: Set volume of selected items, and  
Item: Unselect all items.*

3. If you wish, select the options to add this macro to the Actions menu and to consolidate its undo points. Click on **OK** to close the **Create Custom Action** window.
4. Click on **Add** and press **Shift V**
5. Click on **OK** to close this box.
6. Close the **Actions** window.
7. Select any track which consists of multiple items, then press **Shift V**
8. When the **Set Volume of Items** dialog box is displayed, type a number, such as **3** or **-3** and press **Enter**.
9. The volume of all items on that track will be set to the new level.



### 13.18 Removing an Assigned Keyboard Shortcut

To remove any current keyboard shortcut assignment, simply select the action or custom item in the Action List and click on the **Delete** button.

To remove all of your changes and restore the REAPER default assignments, click on the Import/export button and select Restore all shortcut bindings to factory defaults.

### 13.19 Meta Actions

Meta actions are special actions that take your custom action macros a step further, for example to be able to repeat the same macro as many times as is required without you having to keep pressing the same shortcut keys. This technique can be useful in an example such as if you need to drop a marker at the start of each verse of a song. Some songs might have two or three verses, others five or six. This is a perfect example of when you might wish to use a meta action.

REAPER includes two meta action commands:

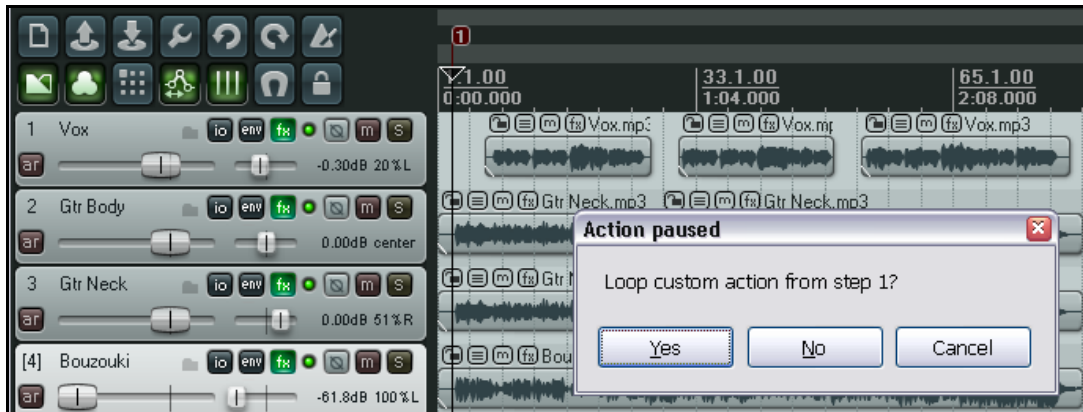
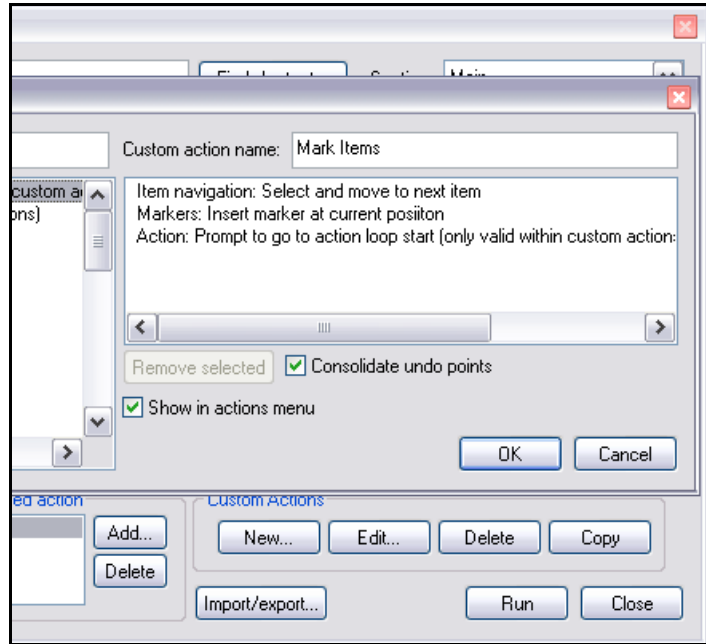
*Action: prompt to continue, and*  
*Action: prompt to go to action loop start*

#### Example

Take a look at the example on the right. If you create this custom action macro and assign it a keyboard shortcut (such as **Ctrl Shift K**), then you can use it in this way.

Select any track which is made up of multiple items and position the play cursor at the start of the timeline.

You can then activate this macro. The cursor will move to the start of the first item in the selected track and drop a marker at that point. You will then be asked if you wish to continue (see illustration below).



If you press **Enter** or click on **Yes**, the play cursor will move to the start of the next item, insert a marker there, and ask the question again. If you click on **No**, then the execution of the custom action macro will stop.

### 13.20 Editing a Custom Action Macro

If you wish to edit a custom action macro, simply find that macro in the Actions list, select it and click on the **Edit...** button.

This opens the **Edit Custom Action window**, which has the same functionality as the Add Custom Actions window. You can remove or add items, change their order, change the custom action's name, or change any of the options (such as **Show in actions menu** or **Consolidate undo points**).

## 13.21 Assigning Actions to the Mousewheel

You can change the REAPER default mousewheel assignments. This can be useful, for example, if you wish the default behavior of the mousewheel to be to scroll rather than to zoom. You might wish to do that if your primary use of the mousewheel is for scrolling rather than zooming.

### Example

In this example, we will first change the primary behavior of the mousewheel from *Zoom horizontal* to *Scroll vertical*. We will then change the other mousewheel actions accordingly.

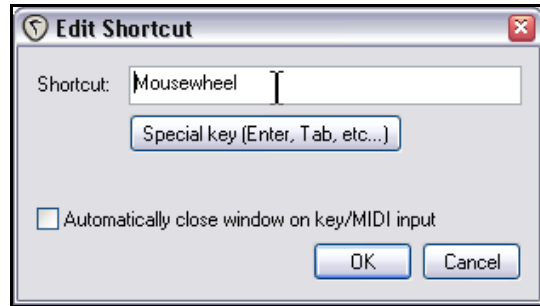
6. Open the **Actions List**, either from the main menu or by pressing **?**.

7. In the **Filter** window type: **wheel** to display a list which includes all current mousewheel assignments.

Alt+Mousewheel	View: scroll horizontally (midi CC relative / mousewheel)
Ctrl+Alt+Mousewheel	View: scroll vertically (midi CC relative / mousewheel)
Mousewheel	View: zoom horizontally (midi CC relative / mousewheel)
Ctrl+Mousewheel	View: zoom vertically (midi CC relative / mousewheel)

8. Select **View: scroll vertically** and double-click on the text *Ctrl + Alt + Mousewheel* in the **Shortcuts for selected action** box.

9. This opens up the **Edit Shortcut** window. Scroll the mousewheel. The text will change to display just **Mousewheel**.



10. Click on **OK**.

11. When asked if you wish to over-ride the existing assignment, click on **OK**.

12. Now select the action **View: Scroll horizontally** and double click on the text displayed in the **Shortcuts for selected action** box.

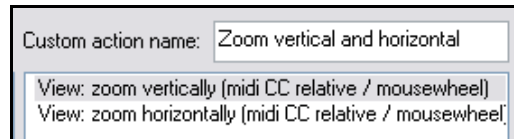
13. When the **Edit Shortcut** window opens, hold the **Shift** key while you scroll the mousewheel. Click on **OK**, then **OK** again to over-ride the previous assignment.

14. Repeat this procedure for the remaining two mousewheel scroll assignments, so that when you have finished the assignments will be as shown on the right.

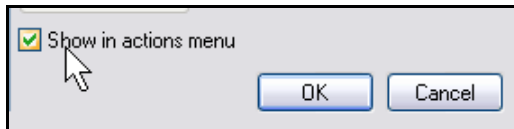
Shift+Mousewheel	View: scroll horizontally (midi CC relative / mousewheel)
Mousewheel	View: scroll vertically (midi CC relative / mousewheel)
Ctrl+Mousewheel	View: zoom horizontally (midi CC relative / mousewheel)
Alt+Mousewheel	View: zoom vertically (midi CC relative / mousewheel)

15. Click on the **Import/export...** button to save your work.

16. If you really want to have some fun, add a custom action of your own that will zoom both vertically and horizontally (see right). Make sure it is added to the **actions menu** and assign **Ctrl Alt Mousewheel** to this action.



17. You can now execute this action either from the menu or by holding down **Ctrl** and **Alt** while zooming.



### 13.22 MIDI Editor Actions and Macros

REAPER's **Action List** includes special sections for the **MIDI Editor** and the **MIDI Event List Editor**. You will substantially improve your workflow together with your ability to achieve better outcomes if you take the time and trouble to get to know the assignable actions that are available and how you can use them.

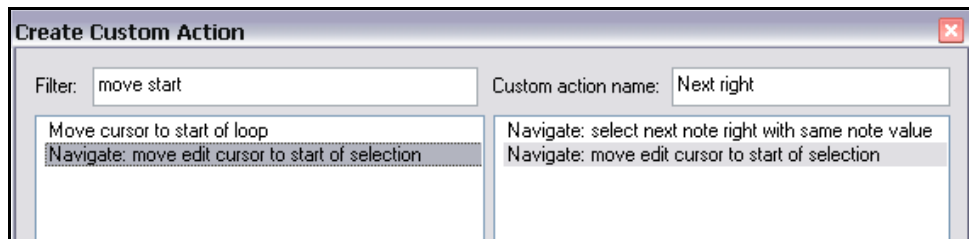
The number of assignable actions is huge, and their possible permutations offer tremendous scope for helping you with your MIDI editing. In this section, we will introduce to some very simple examples, just to get you started. The rest is up to you!

#### Examples (1)

This first set of four simple macros (supplied by Bevosss) will help you when you are navigating within the MIDI Editor. They will allow you to move by selected MIDI note and have the edit cursor follow your actions.

1. Open any REAPER project file that contains at least one MIDI item.
2. Double-click on a MIDI item to take it into the MIDI Editor.
3. From the main menu, choose the **Actions** command, then **Show action list...**
4. Make sure that the section **MIDI Editor** is selected.
5. Click on **New...** to create a new custom action.
6. When the

**Create Custom Action** window opens, name the action **Next right**. Find and drag and drop (or double-click) to copy each of the two actions shown into the right hand pane:



*Navigate: select next note right with same note value*  
*Navigate: move edit cursor to start of selection*

7. Select the options to **Show in actions menu** and **Consolidate undo points**.
8. Click on **OK** then on **Add** to define your keystrokes.
9. Press **Ctrl Alt RightArrow**
10. Click on **OK**.

You can now use this same technique to create three more custom action macros:

#### **Control Alt LeftArrow:**

*Navigate: Select next note left with same note value*  
*Navigate: Move edit cursor to start of selection*

#### **Control Alt UpArrow:**

*Navigate: Select next note right*  
*Navigate: Move edit cursor to start of selection*

#### **Control Alt DownArrow:**

*Navigate: Select next note left*  
*Navigate: Move edit cursor to start of selection*

#### **Note:**

In these examples, the **Ctrl Alt Left** and **Ctrl Alt Right** will move along to the next or previous note of the same value as the currently selected note.

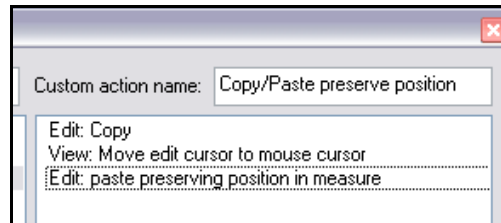
The **Ctrl Alt Up** and **Ctrl Alt Down** movements will find the next or previous note of any value.

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### Example (2)

This second example (also supplied by Bevosss) is particularly useful when you are editing MIDI drum parts. It enables you to copy a selected note to another position whilst preserving its position in measure. The technique is especially useful if the note being copied does not fall on the bar line. It avoids the need to be zooming in and out and tweaking the note's position to ensure that it is placed accurately.

1. Open the MIDI Editor with any item and choose the **Actions, Show actions list...** command.
2. Click on **New...** to create a new custom action macro.
3. Give the macro a suitable name. Find and add the three actions shown.
4. If you wish, select the option to **Consolidate undo points**.
5. Click on **OK** to close the Create Custom Action window, then on **Add** to display the **Keyboard or MIDI Input** box.
6. Press **Shift V** to define your keyboard shortcut, then **OK** to close this box.
7. Close the Actions window.
8. Now select any note that you wish to copy.
9. Hover the mouse at the position that you wish to insert the note. You do not need to be exactly on a bar line – anywhere within the target measure will do.
10. Press **Shift V** – the copy of the note will be pasted in at precisely the right position.



### Example (3)

A macro with this command sequence will automatically remove all duplicate events from the item currently open in the MIDI Editor. You can create it using the same method as in the previous examples.

Edit: Select all  
Remove selected duplicate events  
Edit: Unselect all

## 13.23 MIDI Editing Macros – Some More Ideas

The deeper you dig into the MIDI Editor Actions List, the more ideas for useful macros you will come up with. Here are just a few more ideas, kindly supplied by Alex Stone.

### Insert Note Macros

This chain of actions ...	... does this!
Grid: Set grid division to 1 Edit: Insert note at edit cursor Edit: Unselect all	Creates and inserts a semibreve (or whole note). The grid sets the duration, insert note is self explanatory, and unselect all, ensures we don't keep adding active notes as we go.
Grid: Set grid division to 1/2 Edit: Insert note at edit cursor Edit: Unselect all	Creates and inserts a minim, or half note.
Grid: Set grid division to 1/4 Edit: Insert note at edit cursor Edit: Unselect all	Creates and inserts a crotchet, or quarter note.



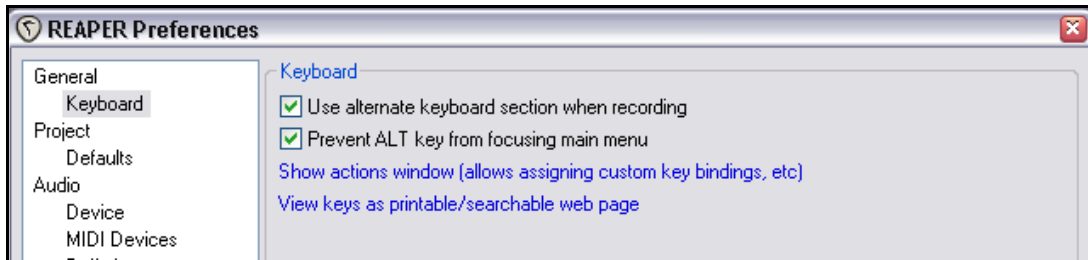
## 13 - The Action List and Keyboard Shortcuts

This chain of actions ...	... does this!
Grid: Set grid division to 1 Edit: Move edit cursor right by grid Edit: Unselect all	Inserts a rest.  It does so By mapping the equivalent grid lengths and forwarding the edit cursor, without inserting a note.

### 13.24 NEW! Opening the Actions List

The **Help, All Actions** command (from the main REAPER menu) can be used to open your default web browser and display a searchable and printable list of all assignable REAPER actions. You'll find there are around 1,000 of them. In this chapter we've given you a range of examples to get you started. The rest is up to you!

### 13.25 Keyboard Preferences



The **Options, Preferences, Keyboard** section can be used to:

- Specify that your alternate keyboard shortcuts are to be used when recording.
- Stop the **Alt** key from bringing up the main menu when it is pressed.
- Open the Actions window.
- Display your keyboard assignments as a printable and searchable HTML document in your default browser window.



## 14 NEW! REAPER Automation

### 14.1 What is Automation?

Automation enables you to ensure that when your project is played back, changes in such things as volume level or panning for different tracks can be remembered and played back in real time, with the project. At its simplest, for example, you can use automation to lift the volume of a lead instrument during a particular break or passage, or to add a little presence or warmth to the odd phrase here or there on a vocal track, to make it stand out in the mix a touch more.

An example of a simple envelope (for Volume) is shown here. The envelope is in this case displayed below the media item. When the track is played, the volume of the track will rise and fall, following the shape of the envelope.



In this second example (below) the same envelope is displayed this time not in its own lane but on top of the media item. Both methods have their advantages and disadvantages. The first makes it easier to work with the envelope, but uses more screen real estate. The second takes up less space, but makes tasks such as editing that much trickier. Whether your envelopes are initially created in separate lanes or over the media item will depend on your Editing Behavior Preference Settings.

REAPER features two main types of automation – one method uses *envelopes* alone, whilst the other uses a rather more complex (and powerful) technique known as *parameter modulation*.



This chapter will deal with only the first of these automation methods, creating and using envelopes. Parameter modulation is a more advanced concept and will be covered in a later chapter.

### 14.2 Automation Envelope Methods

REAPER makes available to you two ways of using envelopes for automating your projects. Both have their advantages and you can use either method in your projects or a combination of both, as you prefer.

- **Writing Automation:** When writing automation, you are able to instruct REAPER to remember your actions – such as fading the volume control up and down for any track or tracks – as your project is played. These actions are used to create an envelope which is then reproduced when you play back or mix down the track.

There are actually three different methods that you can use to write your envelopes – write, touch and latch. We'll get round to explaining the differences shortly.

- **Drawing Envelopes:** As an alternative to using your faders to create envelopes, you can shape them manually. This gives you a very fine degree of control over your project. You can draw your envelopes freehand, add points to them at will, and use your mouse to manually move these points up or down. Envelopes created in this way will behave in exactly the same way as if actual fader movements had been recorded.

With all types of envelope automation, it is perfectly possible (and quite easy) to edit the automation instructions afterwards, or to remove them altogether if that's what you want to do.

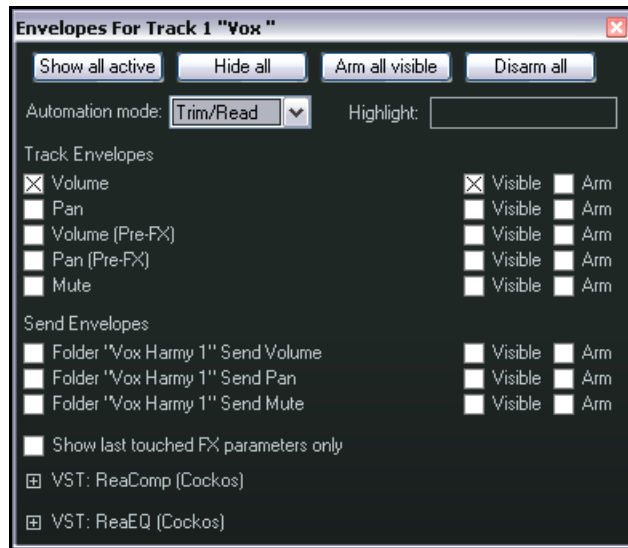
## 14.3 Managing Envelopes

Any track's envelopes can be managed by displaying the **Envelopes Window** for that track. This is opened by clicking on the track's **Envelope** button in either the TCP or MCP. You use this window, for example to:

- Set the **Automation mode** for the track.
- Create an envelope (e.g. for Volume, Pan or Mute for a track or send).
- To show or hide an envelope from view.
- To Arm an envelope or Disarm it.

In addition, this envelopes window includes buttons that can be used for such global options as showing or hiding all envelopes on that track. These issues will be explained and explored in the pages that follow.

The **Highlight** box can be used to help you find what you are looking for more easily. For example, type *volume* in the highlight box and all items whose name includes *volume* will be highlighted.



Notice also that any plug-ins that have been placed in the track's FX chain will also be listed in this window. In this example, we have ReaEQ and ReaComp. By clicking on the small + symbols to the left of the plug-in's name you are able to open up a list of plug-in parameters for which you can also create envelopes. We'll see some examples of this shortly.

Checking the option to **Show last touched FX parameters only** can help prevent screen clutter.

## 14.4 Available Track and Send Envelopes

The following are the automation envelopes that by default are available for all tracks and sends. The question of envelopes for plug-ins and FX will be discussed later in this chapter.

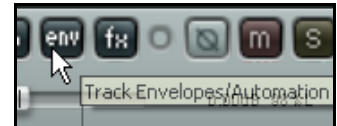
Track Envelope	Description
<b>Volume (Pre FX)</b>	Adjusts the volume of the track signal that is fed to the track's FX chain. This is generally equivalent to the Gain control that you can find on some desks and mixers.
<b>Volume</b>	Adjusts the volume of the Track's Output, after, for example, any FX and panning has been applied. This determines the level of the signal that is sent to the Master Track.
<b>Pan (Pre FX)</b>	Pans more towards the left, right, or dead centre the signal that is sent to the track's FX chain.
<b>Pan</b>	Pans more towards the left, right, or dead centre the signal that is sent from the track to the Master Track.
<b>Mute</b>	This envelope has effectively only two states – On and Off. It is used to mute passages of a track.

Send Envelope	Description
<b>Send Volume</b>	Adjusts the volume of the track signal that is sent to the destination track. Exactly how this is applied will in part be determined by whether the Send itself is defined as Post Fader (Post Pan), Post FX or Pre FX.
<b>Send Pan</b>	Adjusts the panning of the track signal that is sent to the destination track. Exactly how this is applied will in part be determined by whether the Send itself is defined as Post Fader (Post Pan), Post FX or Pre FX.
<b>Mute</b>	This envelope has effectively only two states – On and Off. It is used to mute passages on a send.

## 14.5 Writing Automation

To create automation envelopes using the **Write** feature, use this method:

- In the Mixer Control Panel or Track Control Panel, click on the **Envelopes** button (shown right) to display the list of parameters that can be automated.
- Select the item you wish to automate, and make sure to also select the options **Visible** and **Arm**.
- Set Automation mode to **Write**.
- Close the Envelopes window.
- Position the Edit Cursor where you wish to start.
- Play the song. As you do so, adjust the on screen control which controls the parameter that you are automating.
- Stop play when finished.
- Right click over the Envelope button for that track and select **Automation Read**.
  - Play the song. Listen and look!



### Automation Write Example

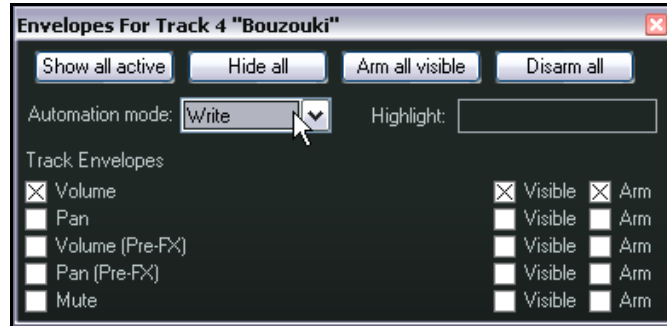
1. Open your file **All Through The Night.RPP**. Save it as **All Through The Night AUTO.RPP**. We are going to add an automation envelope to the Bouzouki track to fade this track up a little in the passage between the first and second verses of this song.
2. Use your mouse to increase the height of the Bouzouki track. This isn't absolutely necessary, but makes it easier to see what you are doing.
3. Insert the JS: Utility/Limiter plug-in to the master track and set its threshold to  $-2.0$ . This is a precaution against clipping. Position the play cursor just before the end of the first vocal passage at about the 40 second mark.



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4. Now click on the **Envelopes/Automation** button for the Bouzouki Track. Select **Volume** and make it both **Visible** and **Armed**. Select the automation mode **Write** for this track (see below).

5. Close the Envelopes window. Notice that the Volume fader for this track is now colored red and a Volume envelope has been created. The Envelope button now reads **Wr**.



6. Play the song from the 40 sec mark.

7. As the instrumental passage starts, use your mouse to raise the fader for the Bouzouki Volume by about a decibel. Hold it there, then at the end of the instrumental break lower the fader to its original position. Stop play.

8. Right click over the Envelope button for the Bouzouki track and choose **Automation Mode: Read** from the context menu.

9. The fader for the Volume control from this track will now be green, and your automation envelope should be clearly visible (see below).

10. Play the song. The volume fader for your bouzouki will automatically move up and then down in accordance with the movements that you recorded.



11. Save this file.

**Note:** You do not need to select Automation Read Mode in order for the automation to take effect. You only need to do this if you wish to see the effect of the automation thru the on-screen movement of the faders during playback. You'll find a more detailed explanation of the various automation modes later in this chapter.

### Modifying the Envelope

It's very likely that you won't get the exact settings for your automated faders 100% correct first time. If this happens, you have two ways of fixing the problem. You can either use Automation **Touch** mode to write changes to your envelope, or (probably easier) edit the envelope by hand.

### 14.6 Writing Mute Automation

One rather special way of using automation is in conjunction with a track's **Mute** button to automatically mute unwanted passages of a track. The procedure for doing this is outlined below:

- Click on the track's **Envelopes/Automation** button to display the Envelopes window.
- Select the **Mute** envelope and set the required mode to **Write** (see right). Then close the Envelopes window.
- The Envelopes/Automation button will read **Wr** and the Mute button will be highlighted in red, to indicate that it is armed. Notice (right) how these items are displayed in Track 3 (armed) compared to Track 2 (not armed).



- Now play the track. As you do so, click on the track's Mute button at the start and end of any passages that you require to be muted.
- When finished, stop the playback. Right click over the Envelope/Automation button and set the Automation Mode for this track to either Trim/Read or Read, as you prefer.

In the example shown here, this method has been used to mute a vocal track during all the passages when it is not intended to be heard, **Read** mode has been selected. When the track is played back, those passages selected for muting will be muted, and the appearance of the Mute button changes for the duration of those passages.



### 14.7 Automation Modes

Automation mode can be set as already shown from the Envelopes/Automation window. In fact, there are a number of ways that this can be done:

- Select the required mode from the Envelopes window.
- Right-click on the Envelopes/Automation button and select the required mode from the context menu.
- In the TCP, right click over any automation lane and select the required mode from the context menu.
- From the main menu, choose **Track, Set Automation Mode for Selected Track(s)**.

The following table summarizes the five available automation modes.

Automation Mode	Description
<b>Trim/Read</b>	Any existing envelopes are applied, but the on-screen controls do not move. Trim/Read mode might seem strange at first, but it does bring you a useful benefit. In this mode, envelopes are applied but you can also use a track's controls in trim mode. For example, adjusting the track's Volume fader in this mode will essentially raise or lower the whole Volume automation envelope for that track.
<b>Read</b>	Applies envelopes and moves controls for armed items, but does not write or remember any changes that you make to them.
<b>Latch</b>	Writes and remembers any changes that you make to settings, and creates new points to track envelopes. Changes commence when you first adjust a setting, and continue to be remembered until playback stops.
<b>Touch</b>	This is similar to Latch, but stops making changes to envelope points when you stop adjusting them.
<b>Write</b>	Writes and remembers current settings as edit points along with any changes that you make to settings for armed items as soon as playback starts. <i>In this mode, previously written envelopes for armed items will be over written.</i>

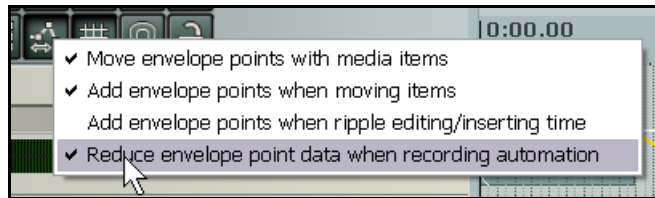
Note that when you are in Latch, Touch or Write mode, an envelope can also be armed by clicking on the **AR** button in its automation lane (where one exists). Remember also after using Write, Latch or Touch mode to change to Read or Trim/Read mode, to prevent further automation from being accidentally recorded.

## 14.8 Reducing the Number of Envelope Points

Especially when you use Write mode to record your automation, you may find that REAPER creates more points on the envelope than you would like. This can make editing the envelope an onerous task. There are two possible solutions to this problem.

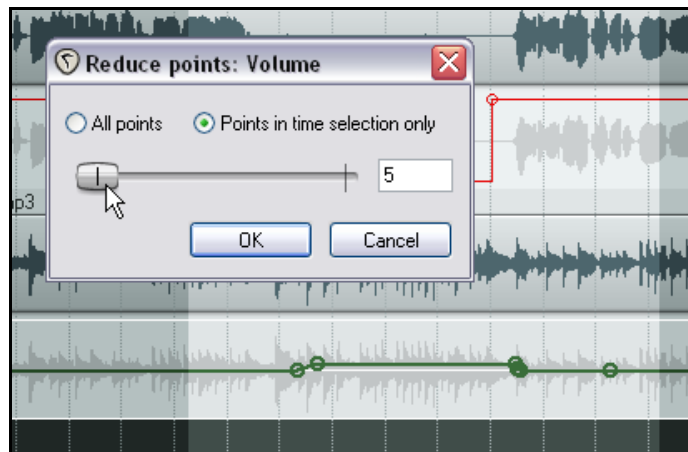
**To ensure before you start recording that fewer points will be recorded:**

1. Right click over the Envelope Button on the toolbar and select the option to **Reduce envelope point data when recording automation**.
2. If necessary, click on this button to make it active.



**To reduce the number of points on an existing envelope that has already been recorded:**

1. Define the time selection which contains the envelope points.
2. Right-click over the envelope.
3. From the context menu, choose **Reduce Number of Envelope Points**.
4. Select (probably) **Points in time selection only** or (possibly) **All Points**.
5. Adjust the fader until the number of points shown looks about right. An example of this is shown on the right.
6. Click on **OK**.



## 14.9 Manually Adjusting Envelopes

As an alternative to writing automation to define and shape your envelopes, you can use your mouse directly within the envelope lane. This is especially useful, for example, when you can see from observing the waveform that there is a peak that needs adjusting. The actions that you will commonly use for this are:

- **Shift Click** for adding points to an envelope.
- **Ctrl Click Drag** for freehand drawing of envelope points and curves.
- **Click Drag** for moving envelope segments up or down.

The first of these actions is executed by holding **Shift** while clicking on the envelope, the third by simply clicking. These can be swapped in your Mouse Editing Behavior preferences settings. In this example, we will assume that **Click Drag** is used to adjust segments, and **Shift Click** to add points.

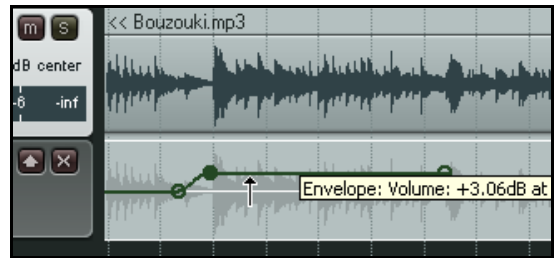
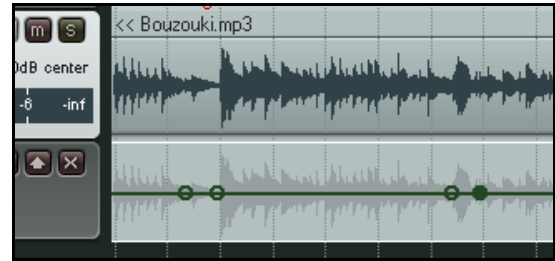
In the example that follows, you will use the mouse to raise the volume of your Bouzouki volume envelope a little for the duration of the short instrumental break that occurs between the second and third verses. This example assumes that the default mouse editing behavior settings are as shown above.

### Example

1. Hover your mouse over the envelope, just before the start of the second instrumental break. This will be at or near 1 min 36 seconds. The mouse will change to a vertical black arrow.



2. Hold **Shift** while you click the mouse on the envelope to create a point.
3. Repeat this three times as shown (below), so that you have two points just before the instrumental break and two points just after it.
4. Now hover the mouse anywhere between the second and third point. Click and hold down the mouse, then drag upwards to raise the volume of this envelope a little, as shown in the second illustration.
5. Save this file.
6. Display the Envelope Window for the track and make sure that automation mode for this track is set to **Read** and that the **Volume** envelope is selected and set to **Visible** and **Arm**.
7. Play back the song.
8. Notice that the Bouzouki volume will now be faded up for both instrumental passages in this song and down after them.
9. Save the file.



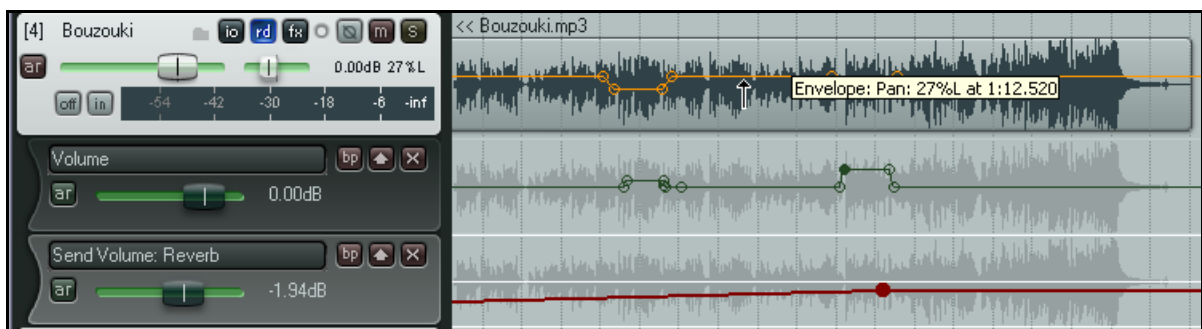
### 14.10 Managing Automation Envelope Display

REAPER offers you a flexible range of options to determine how you display your automation envelopes. For any track or track you can choose to:

- Display all automation envelopes in separate lanes, or
- Display all automation envelopes over the media items, or
- Display some envelopes in lanes and others over the media items, or
- Display some envelopes and hide others, or
- Hide all automation envelopes.

In the example shown here, a track is displaying three envelopes. – one each for Pan, Track Volume and the volume of a Send to another track.

One of these – Pan – is displayed on top of the actual media items. The other two each have their own lanes. The Editing Behavior preferences option to **Draw faint peaks in lanes** has been enabled.



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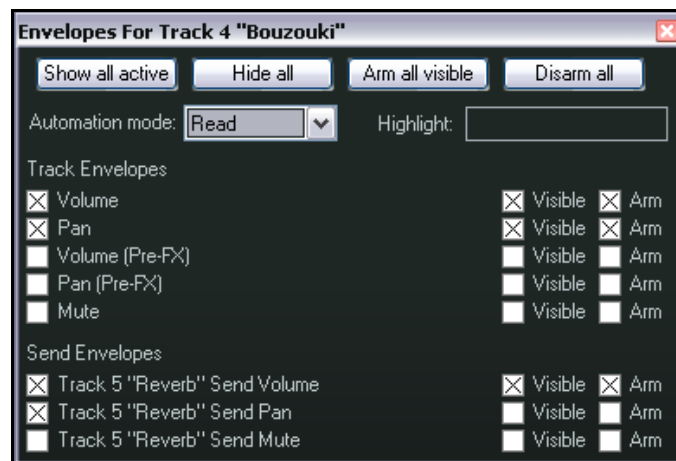
This summary table explains how you use these options.

In order to do this ...	... you need to do this
<b>Hide an individual envelope</b>	Right click over the envelope and choose <b>Hide Envelope</b> from the menu, or ... In the TCP, click on the <b>X</b> button for the envelope lane and choose <b>Hide Envelope</b> .
<b>Display a currently hidden envelope</b>	Click on the <b>Envelopes/Automation</b> button in the TCP and check the <b>Visible</b> box for that envelope.
<b>Move an envelope from its own lane to over the media item(s)</b>	Right click over the envelope and disable the <b>Show envelope in lane</b> option, or ... Click on the up arrow button in the envelope lane.
<b>Move an envelope from over the media item to its own lane</b>	Right click over the envelope and enable the <b>Show envelope in lane</b> option
<b>Move all visible envelopes to individual lanes</b>	In the TCP, right click over any envelope lane and choose <b>Move all visible track envelopes to envelope lanes</b> from the menu.
<b>Move all visible envelopes to over the media item(s)</b>	In the TCP, right click over any envelope lane and choose <b>Move all visible track envelopes to media lane</b> from the menu.
<b>Show all active envelopes</b>	In the TCP, right click over any envelope lane and choose <b>Show all active envelopes</b> , or ... Open the <b>Envelopes/Automation window</b> and click on <b>Show all active</b> .
<b>Hide all envelopes</b>	In the TCP, right click over any envelope lane and choose <b>Hide all envelopes</b> , or ... Open the <b>Envelopes/Automation window</b> and click on <b>Hide all</b> .

When you open the Envelopes window, all *potential* envelopes for that track are listed. The *active* envelopes are those displayed with a check mark against their name. You can think of a *potential* envelope as being one that is lurking invisibly in the background but has not been activated, whereas an *active* envelope is one that you have chosen to use.

In the example shown on the right, this track could have up to eight envelopes, one for each of the items listed. However, it actually contains only four *active* envelopes, one each for Volume, Pan, Track 5 Send Volume and Track 5 Send Pan. Of these, we have chosen to make only the first three visible.

Of course, if we were to add some plug-ins (such as Delay, EQ or compression) to this track we would immediately create more potential envelopes.



### 14.11 Some Envelope Editing Techniques

An envelope's behavior and characteristics can be modified both from the envelope lane (where one exists) and from the right click menu. In addition to the functions already explained, within the TCP in any envelope lane you can:

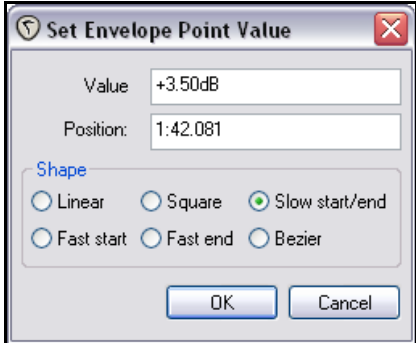
- In **Trim/Read** mode, use the horizontal fader to raise or lower the whole envelope. For example, raising a pan envelope would cause panning for the entire track to be moved further to the left, whilst maintaining the relative movement between points.

As another example, lowering a volume envelope would cause the volume to be lowered for the entire track, again maintaining the changes in volume brought about by individual points.


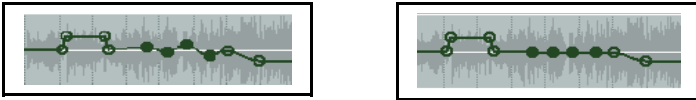
- Use the **BP** button to toggle bypass on and off for individual envelopes.

Right clicking over an envelope produces an envelope menu which includes several editing commands. Right clicking over any point on an envelope produces a similar menu, but with additional options for editing that particular point.

Here is a summary table of your main options.

Command	Explanation
<b>Set point value</b>	<p>Displays the <b>Set Envelope Point Value</b> dialog box.</p> <p>Can be used to changes the value, position, and/or shape of the current point.</p> 
<b>Set point shape</b>	<p>Changes the shape of the current point.</p> <p>The six available shapes are Linear, Square, Smooth, Fast Start, Fast End and Bezier. These are explained in more detail shortly.</p>
<b>Select all points</b>	Selects all points in current envelope.
<b>Unselect all points</b>	Unselects all points in current envelope.
<b>Select all points in time selection</b>	If a time selection is currently active, all points on this envelope that fall within the time selection will be selected.
<b>Copy selected envelope points</b>	<p>Copies all points in current selection into clipboard.</p> <p><b>Note:</b> To apply a command to an existing selection of envelope points, you should hold <b>Shift</b> while you right click over the envelope.</p> <p>This ensures that the selected points remain selected when the context menu is displayed.</p>
<b>Cut selected envelope points</b>	Cuts all points in current selection into clipboard.

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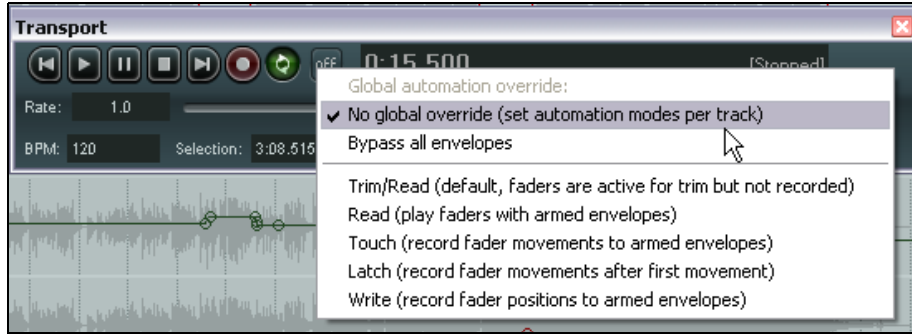
Command	Explanation
<b>Set shape for all selected points</b>	Allows you to choose a shape for multiple envelope points. The six available shapes are Linear, Square, Smooth, Fast Start, Fast End and Bezier. These are explained in more detail shortly.
<b>Set envelope default point shape</b>	Sets shape for future points. The six available shapes are Linear, Smooth, Fast Start, Fast End, Square and Bezier. These are explained in more detail shortly.
<b>Delete envelope point (or Alt Click)</b>	Deletes the envelope point.
<b>Delete selected envelope points</b>	Deletes all envelope points in current selection.
<b>Delete envelope points in time selection</b>	If a time selection is currently active, all points that fall within the time selection will be deleted. Shown here is a selection of points before and after using this command. 
<b>Invert selected points</b>	Causes all selected points to be inverted relative to their neutral position. For example, a point on a Pan envelope set at 50% left would be changed to 50% right. With items such as Volume which use a logarithmic scale, the calculation is less obvious.
<b>Reset select points to zero/center</b>	Sets all selected points back to a neutral position. Shown here is a selection of points before and after using this command. 
<b>Reduce number of envelope points ...</b>	Allows you to reduce the number of envelope points within a time selection or for the whole envelope. This has already been explained in detail.
<b>Arm envelope for recording</b>	Toggles armed status of envelope on and off.
<b>Show envelope in lane</b>	A toggle command which moves the envelope into or out from its own envelope lane.
<b>Hide envelope</b>	Hides the envelope but keeps it active.
<b>Bypass envelope</b>	Toggles an envelope's bypass status.
<b>Clear or remove envelope</b>	Clears all points on an envelope, restores it to a straight horizontal line. You will be asked if you wish also to remove the envelope.

## Global Automation Override

The Global Automation Override button on the transport bar can be used to set certain options for your envelopes globally.

Right click on this button to display the menu shown on the right.

This can be used for two main purposes. These are:



- To toggle bypass on and off for all envelopes.
- To select a single automation mode (such as Trim/Read or Read) for all tracks.

These global options can be removed by returning to this menu and choosing the **No global override** command. When you do this, tracks will be returned to their former state, with their previous individual automation mode and bypass settings restored.

## Mouse Tricks with Envelopes

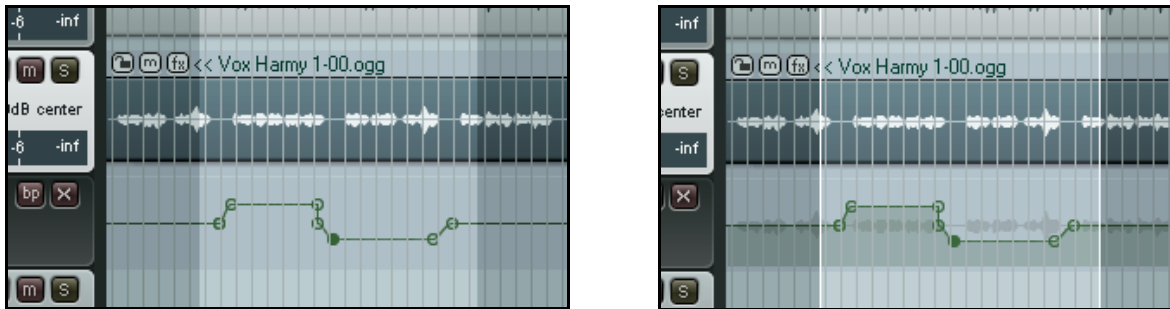
There are a number of techniques and mouse tricks that can be used when you are manipulating and managing envelopes and their nodes.

Method	Description
<b>Ctrl Drag anywhere on, above or below the envelope</b>	Draws and shapes envelope in freehand mode.
<b>Alt Click on any envelope point</b>	Deletes envelope point.
<b>Hold Ctrl while clicking on envelope points one at a time</b>	Selects multiple envelope points.
<b>Click on any point in an envelope, then press Ctrl A</b>	Selects all points in that envelope.
<b>Click on a point, then use the Right-Click-Drag mouse method to lasso a portion of an envelope. Release mouse.</b>	Select all points within the lasso area.
<b>When you have several points selected, right click over any selected point</b>	Displays menu and keeps selection. You can apply a command such as <i>Delete Selected Envelope Points</i> to the entire selection.
<b>Click and drag any envelope point in any direction</b>	Moves the envelope point vertically and/or horizontally at the same time.
<b>Ctrl Alt Drag on any envelope point</b>	Fine adjustment of that point's position.
<b>Click and hold mouse on any envelope point, hold both the Ctrl and Shift keys while then dragging any envelope point either vertically or horizontally.</b>	Allows the envelope point to be moved vertically or horizontally only.

### 14.12 NEW! Envelope Appearance Preferences

The **Appearances** page of your **Options, Preferences** window includes a number of useful options for determining how your envelopes are presented on screen. Turning these options on can improve clarity. In particular, pay attention to these options:

- Solid edge on time selection highlight
- Show guide lines when editing
- Draw faint peaks in automation lanes
- Filled automation envelopes



The two screen shots above show the effects of working with all these options off (left) and on (right). Notice that in the second screen shot you can see faint media peaks behind the envelope, solid edges on the time selection, and the area below the envelope (in the automation lane) is shaded.

The effect of the other option (Show guide lines when editing) will be apparent in the next paragraph.

### 14.13 NEW! Copying Envelopes with Items

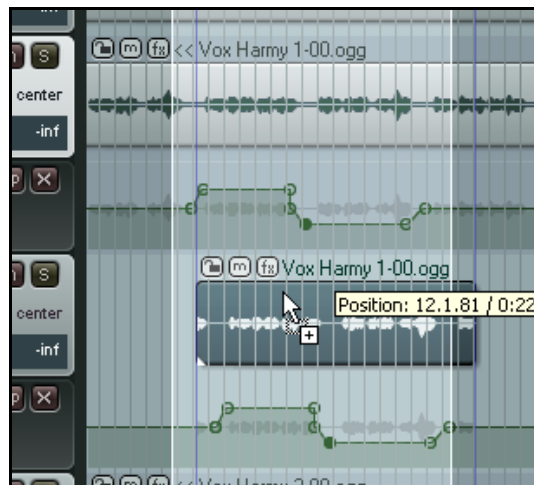
You can choose whether or not to copy automation envelopes with your media items when they are copied. It depends on whether you have set the option to **Move envelope points with media items** on or off. This option is accessed by right clicking on the Envelope tool on the main REAPER toolbar. You can also use the Actions editor to assign a shortcut key to toggle this action on and off.

- If this option is turned off, then envelopes will *not* be copied with the media items.
- If this option is turned on, then the envelopes *will* be copied with the media items.

An example of this is illustrated on the right.

A selected portion of the media item on the top track (Vox Harmy 1-00.ogg) is being copied to the track below it using the **Ctrl** drag and drop method.

Notice that not only is the envelope copied with it, but also there are guide lines displayed which can help you when positioning the item that you are copying.



### 14.14 Automation With Grouped Track Parameters

If you have created track groupings in which you have defined relationships between various parameters, you can ensure that those relationships are maintained (or not, as you wish) when automation envelopes are being written. This is done using the group **Automation Mode** column on the Track Grouping Matrix.

As when the various track parameters themselves are grouped, the automation mode status for each track in the group can be set to master, slave, or both master and slave. Let's look at some examples. In each case, the same project file, **All Through The Night TGROUPTS.RPP**, is used as was used when we examined track grouping. If you completed those examples it might help you to open that file now.

#### Example 1

In this first example, both tracks 3 and 4 are set to act as both master and slave in automation mode and both volume envelopes are armed. You can set either track to write, touch or (as in this example) latch mode and the other will change with it. Any automation movements will then be written to both tracks. The effect of this is shown below.

	Volume	Pan	Mute	Solo	Record Arm	Polarity/Phase	Automation M	Flag: Volume	Flag: Pan	Flag: No Slave
Master Track										
1. Vox										
2. Instruments										
3. Gtr Neck	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			
4. Gtr Body	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
5. Bouzouki	<input checked="" type="checkbox"/>									<input checked="" type="checkbox"/>



#### Example 2

In this second example, the Volume envelope on track 3 is armed, but the envelope on track 4 is not. Therefore, when we record our automation, it is written to track 3 only, despite the fact that the two items are grouped.

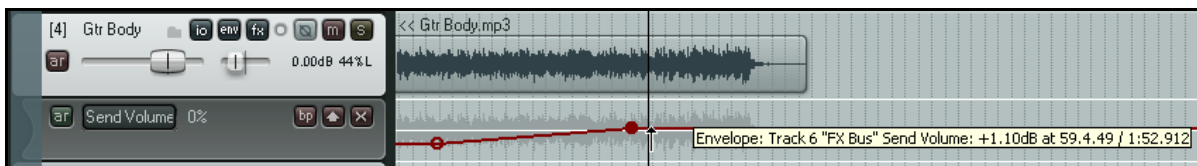
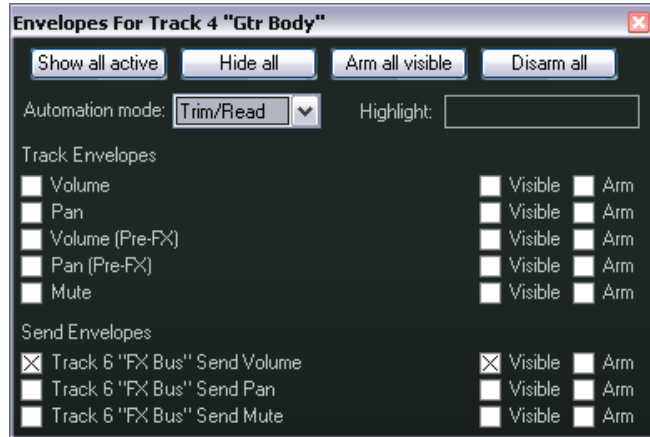
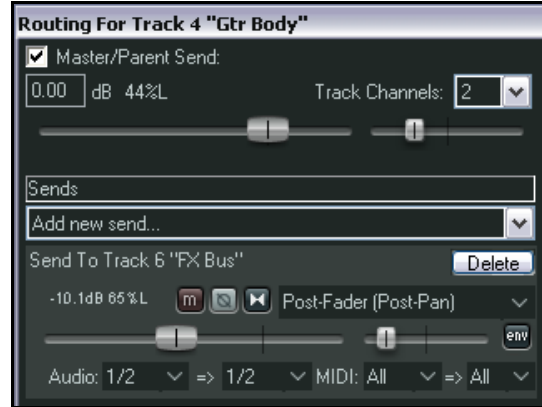


## 14.15 Automation with Track Sends

Automation can be applied to other controls beside Volume and Pan, such as Sends and FX parameters. In this example, we will create a Send, then use an envelope to control it.

### Example

1. First, we are going to create an FX Bus Track, then we will use an envelope to vary the level sent to that FX Bus Track from each of the guitar tracks.
2. Create a new track and name it **FX Bus**. Display the FX Chain for this track, and add the FX JS Guitar/chorus. Close the FX window.
3. Select the track **Gtr Body** and display the **I/O** routing for this track. Specify the Guitar FX Bus as a send and set Send Volume and Pan levels as shown (right).
4. Select the track **Gtr Neck** and display the **I/O** routing for this track. Specify the Guitar FX Bus as a send and set Send Volume to  $-10\text{dB}$  and Pan to 65% Right.
5. Now display the Envelopes window for the **Gtr Body** Track. Set the mode to Trim/Read. Notice that envelopes are available for your sends. Make sure that **FX Bus Send Volume** is selected and visible.
6. Close this window. An envelope lane for this send should now be visible on the **Gtr Body** track.
7. Hover the mouse over any part of the envelope, click and drag down until the envelope is set to about  $-5\text{dB}$ .
8. We are now going to increase the chorus effect, starting just before the second verse.
9. Add a point at about the 60 second mark.
10. Hover the mouse over the envelope just after this last point. Click hold and drag up until the envelope is set to about  $-0\text{dB}$ . Release the mouse. This is shown below.

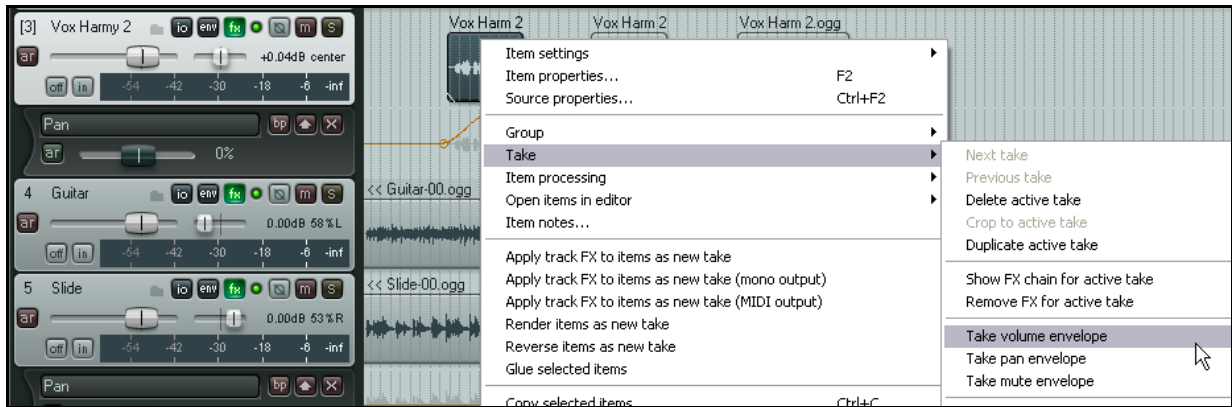


11. Set automation mode for this track to **Read**. Play the song. If you think the Chorus effect is too much, hover the mouse over the envelope, round about 1 minute 30 secs, hold down **Shift**, then click, hold and drag the envelope back down a little.
12. Now repeat steps 5 to 10 for the track **Gtr Neck**.
13. Don't forget to save the file.



### 14.16 Automation with Items and Takes

Individual media items and takes can be assigned their own Volume, Pan and Mute envelopes. To do this, select and right click over the item then choose the **Take** command followed by whichever item you want. In the example shown below, a Volume envelope is being added to the first media item on Track 3.

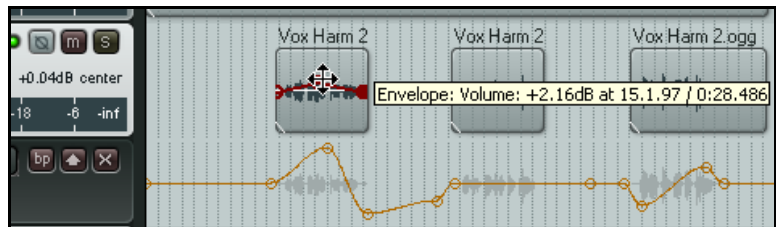


Notice in this example that the track itself already has a pan envelope. There is no problem with using track envelopes and take envelopes on the same track.

#### Envelopes with Media Items

In the example shown on the right, the volume envelope has been added to our media item, using the **Take, Take volume envelope** command (above).

The envelope can be edited with points added, moved, edited and so on just like any other.



You can also create different envelopes for different takes of the same passage of the song.

#### Envelopes with Multiple Takes

In the example shown below, separate Pan envelopes have been added to the both takes for the last verse of the song. The combination of the different panning and the touch of ReaDelay added to the takes can make for an interesting vocal effect when the **Play all takes** option is enabled for this item. A volume envelope has also been added to the track to compensate for the extra volume generated by playing both takes.

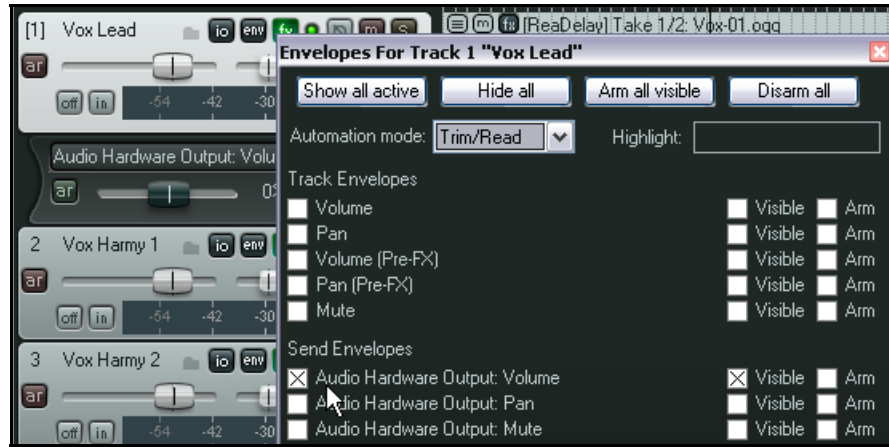


## 14.17 Automation with Hardware Output Sends

If you are using hardware output sends with any of your tracks, you will find that you can automate the Volume, Pan and Mute parameters for these tracks.

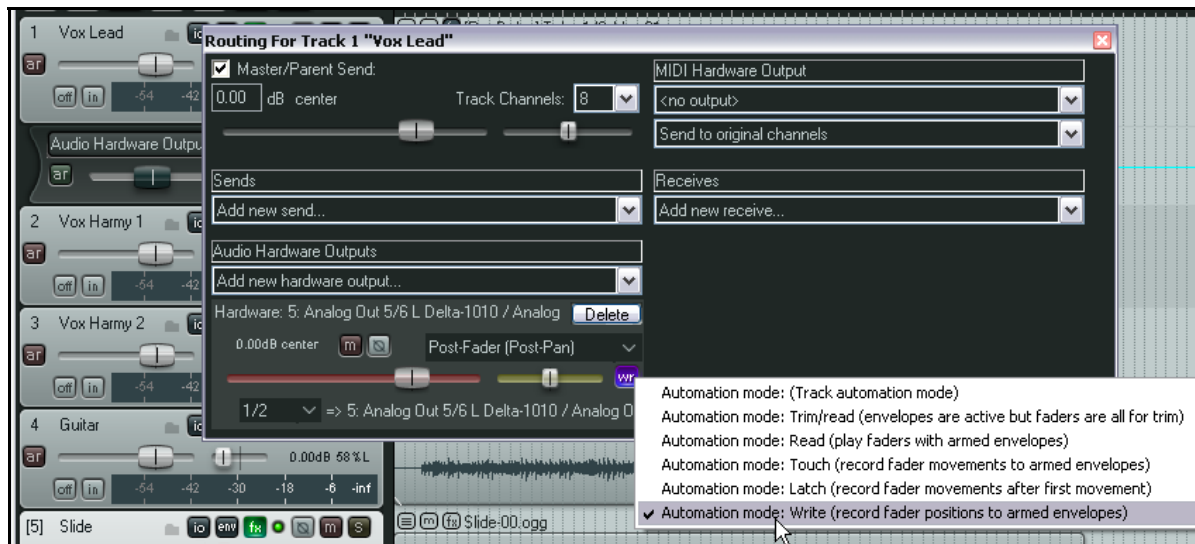
These items will appear in the track's Envelopes window as shown on the right.

In the example shown, we have already created a send from Track 1 to an Audio Hardware Output. We can now create an envelope to control the volume of this send.



However, we can go one better than this. Suppose that we wish to use fader movements to shape this envelope, but without using Write mode for any other envelopes that we may also have created. This can be done from within the Track's I/O (Routing) Window.

Take a look at the screen shot below. You can see that the Automation mode has been set to Write from within the Routing Window, just for that one envelope.



You could now play your track, adjusting the audio hardware output send fader in the window shown above to adjust the send volume level and create your envelope.

You can, of course, also do this with Track Send envelopes (see previous section).

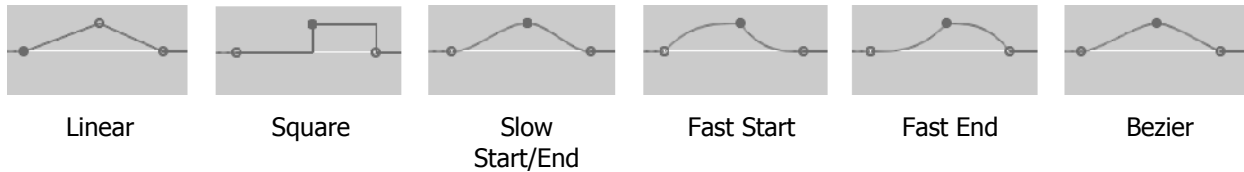
**Tip:** You can customize the colors used for your envelope by opening the Options, Preferences dialog box and going to the **Appearance, Theme** settings page. How to do this is explained in more detail in Chapter 19.

### 14.18 Envelope Shapes

Envelopes can be any of five shapes – **Linear**, **Square**, **Slow Start/End**, **Fast Start**, **Fast End** or **Bezier**.

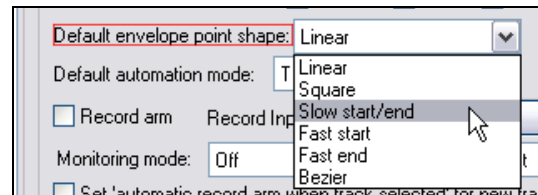
To change the shape of an existing curve, right click over the envelope point, then choose **Set Point Shape**, then the required shape from the menu.

The table below illustrates the different shapes:



Shapes other than Square are usually best used for graduated parameters, such as volume and pan. Square envelopes are best used for items with on/off parameters (such as bypass or mute), to ensure an exact transition at the required point.

You can specify your preferred default envelope point shape type from the **Options, Preferences, Project, Defaults** window, as shown on the right.



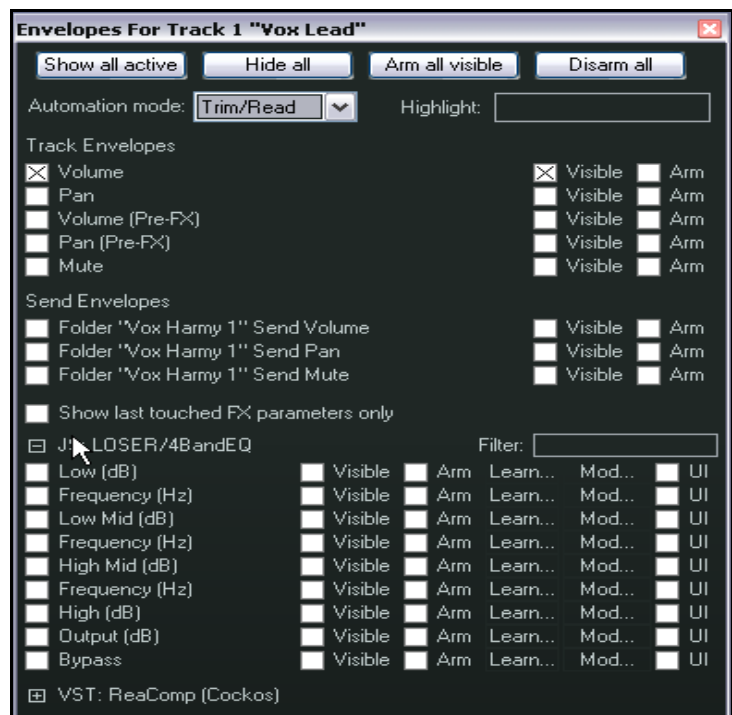
### 14.19 Using Envelopes with FX Parameters

You can create automation envelopes for any parameters for almost any JS, VST, VSTi, DX or DXi plug-in that has been added to any track's FX chain. For example, you can use automation envelopes to vary the level of compression applied to a drum track here, or to add more warmth to a vocal take at those times when it is needed.

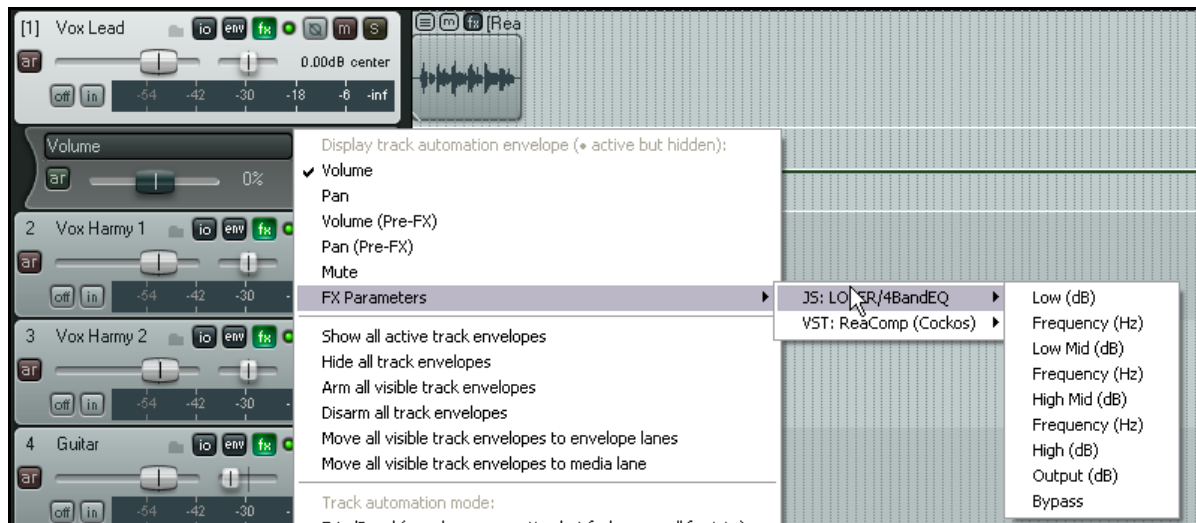
There are two main ways of creating envelopes for your FX parameters:

- Select those parameters for which you wish to add envelopes from the Envelopes window (see right). You may need to click on the small + button next to a plug-in's name to display a list of all automatable parameters for that plug-in.
- Right click over background area of any existing envelope lane in the TCP and select the required item from the FX parameters window. All automatable parameters for all plug-ins in the track's FX chain will automatically be added to the menu (see below).

Most FX can be automated in this way, but be warned that with some very old plug-ins this might not be possible. In these cases, the development of the FX predates automation techniques.

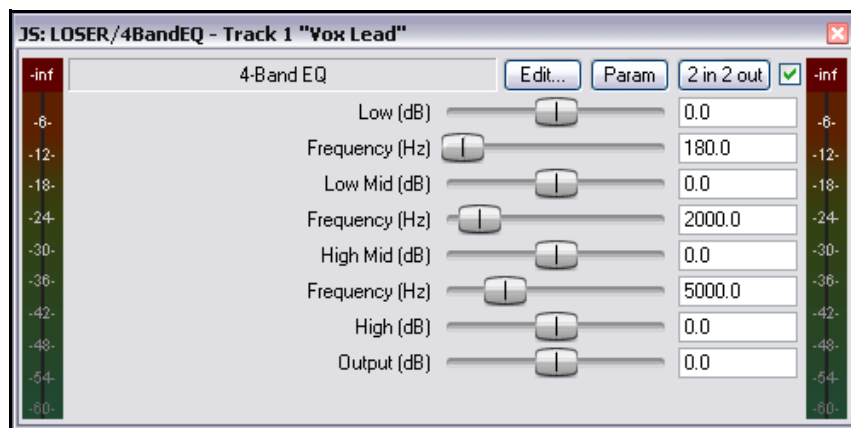


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### Example

1. Open the **FX Chain** window for the track **Vox**.
2. Add the **JS LOSER/4BandEQ** to this chain. Set the first Frequency level to 180 (as shown).
3. Solo the Vox track and play the song.
4. As you do so, hold down the Alt key as you slowly and gently increase the Low volume level (the top fader). Notice how the sound changes and becomes warmer. Release the mouse, and the level will snap back to 0.0.
5. We are going to add an automation envelope to increase this level for the phrase *All Thru The Night* at the end of the first vocal passage. This will warm up that phrase, but also make it louder. Therefore, we will need to add another envelope to lower volume to compensate.
6. Adjust the horizontal and vertical zooms of the Vox track, so that you can clearly see the area that you are working with.
7. Display the **Envelopes** window for the Vox track. Notice that envelopes are now available, if required, for any of our EQ parameters.
8. Make sure that the first item – **Low (db)** – is selected and set to visible and armed. Close the window, and the envelope should be visible on your track.
9. Starting around the 1 min 33 sec mark, add points as shown below, then raise the level between points 2 and 3 to about +5 or +6 dB.





10. Display the **Envelopes** window again for the **Vox** track. Make sure that **Volume** is selected, visible and armed. Set Automation Mode to **Read**. Close this window.
11. Add points to the Volume envelope as shown below.



12. Now play the song with the Vox track set to Solo. If necessary, raise or lower the level of the volume envelope for that passage shown until it sounds about right.
13. Now unsolo the track and play the song again. You might need to make some further minor adjustments to your envelopes.
14. Notice that if automation mode is set to Read, when you playback that the faders for Vox Volume in your Track Control Panel, and for Low in its FX Bin (JS LOSER/4BandEQ) will automatically move up and down.

**Tip:** The keyboard shortcuts **V** and **P** can be used as toggles to show and hide the Volume and Pan envelopes.

### 14.20 Creating Envelopes from the FX Parameter Window

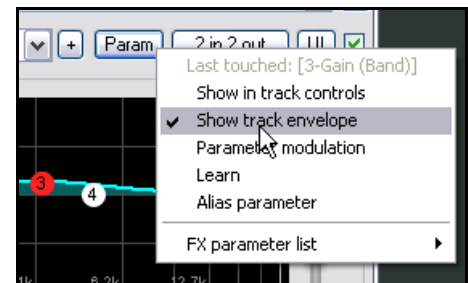
You can also create envelopes for any FX parameters directly from within the plug-in's own window by clicking on the parameter then the **Param** button, then **Show track envelope** (see also Chapter 9).

Moreover, if you are using REAPER with a correctly installed control surface, such as a Behringer BCR2000, you can create envelopes on the fly to automate FX parameters for any track in Write, Latch or Touch mode. You can use any of the device's rotaries, faders or buttons (as appropriate) to automate your FX parameters. The exact steps will depend on which device you are using, but in overview:

1. Within the plug-in window, click on the parameter, then on **Param** then on **Learn**.
2. When the **MIDI Learn** dialog box is shown, tweak the control on the external device, select the option **Arm envelope for selected parameter** and click on **OK**.

You can now use the control device to write your parameter changes to the envelope during playback.

You can also select **FX Parameter List** from the above menu and then **Show Track Envelopes** to add envelopes for other parameters for this plug-in.

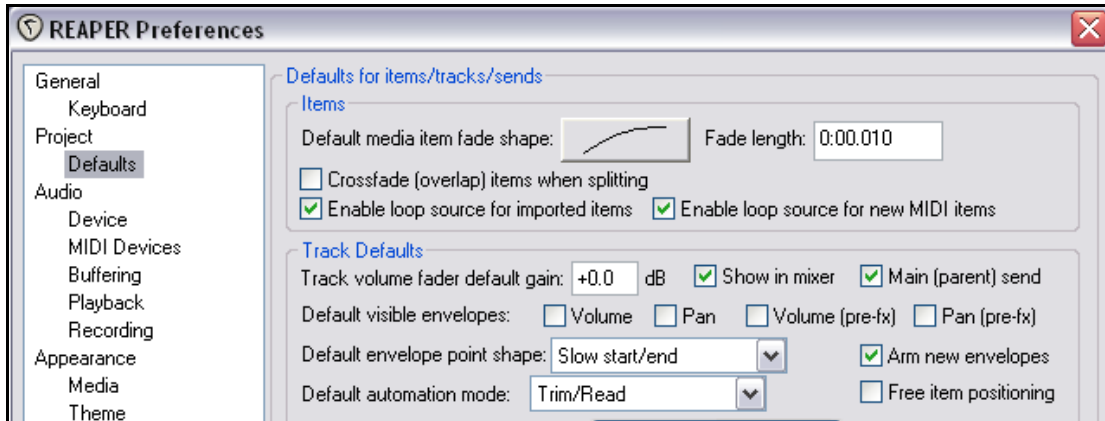


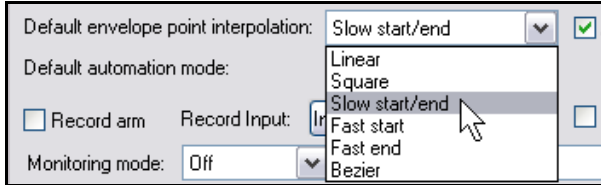
## 14.21 Automation and Envelope Defaults

Before exploring any more of REAPER's automation features, it's worth taking note of where your other default Automation settings are stored.

They are in the **Preferences** window, on the **Project Defaults** page, shown on the right.

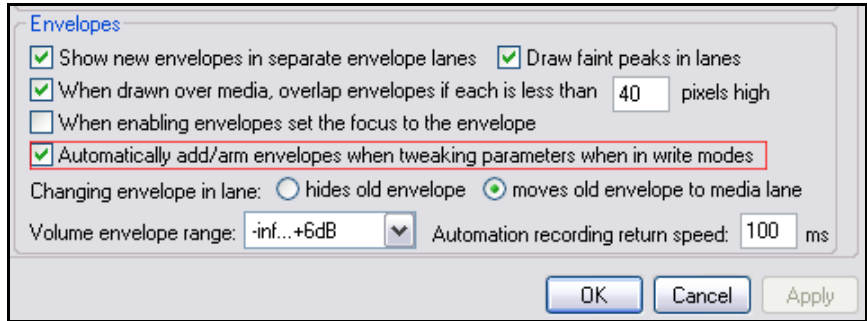
The main options are explained in the table below.



Option	Description
<b>Envelopes enabled by default</b>	Envelopes for Volume, Pan, Volume (pre FX) and Pan (pre FX) can automatically be created for new tracks if you wish.  If you tick any items here and then click <b>Apply</b> , the specified envelopes will be automatically created, enabled and displayed for each new track that you subsequently create.
<b>Default envelope point</b>	This option enables you to specify your preferred default shape for each new envelope point subsequently created.  
<b>Default automation Mode</b>	This option sets the default automation mode that will be applied for all new tracks subsequently created.  The available modes are Trim/Read, Read, Touch, Write and Latch. These are all explained in detail earlier in this chapter.
<b>Arm new envelopes</b>	This option determines whether or not new envelopes are armed by default.

### 14.22 Automating FX Parameters on the Fly

If you turn on the Editing Behavior preferences option to automatically add and arm envelopes when parameters are tweaked in write mode, then REAPER will automatically create automation envelopes for you as you tweak the parameter settings during playback.



This will of course apply to any changes made on the screen

with your mouse as it will to any changes made using faders, rotaries or buttons on an external control surface. Be careful how you use this, or you could end up creating a whole heap of unwanted envelopes!

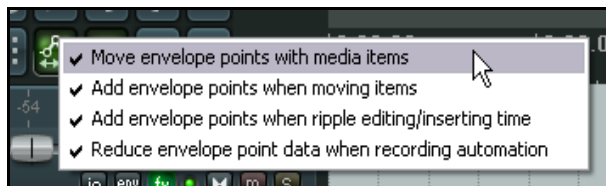
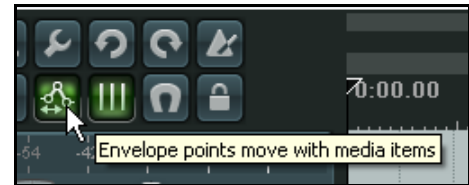
**Note:** It is important when you finish recording your automation envelopes in this way that you change Automation mode from Write, otherwise every parameter you tweak will create and/or modify an envelope, whether you want it to or not.

**Note:** Don't forget that when automating FX parameters, you can check the **UI** button in the Envelopes window to add a visible control for that parameter to the track in the TCP and/or MCP. This topic is covered elsewhere in this guide, in particular in Chapters 2, 9 and 11.

### 14.23 Moving Envelope Points With Media Items

The Envelope button on the REAPER toolbar is used to determine whether or not you wish to have envelope points moved when you move media items. Clicking this button toggles its status on and off.

The series of three illustrations below demonstrate the result of moving a media item, first with this option turned off and secondly with it turned on.



When turned on, any of the four options attached to this tool that you have clicked will be enabled.

We have already mentioned the option **Reduce envelope point data when recording automation**.

The other options are as follows:

**Move envelope points with media items.** Enable this if you want envelope points to be moved with media items when they are moved. Disable it if you want the points to remain in their original position along the track's timeline when the media item is moved.

The options to **Add envelope points when moving items** and **Add envelope points when ripple editing/inserting** items can be used to prevent unexpected changes being made to your envelope curves as can sometimes occur when you move media items under certain circumstances.

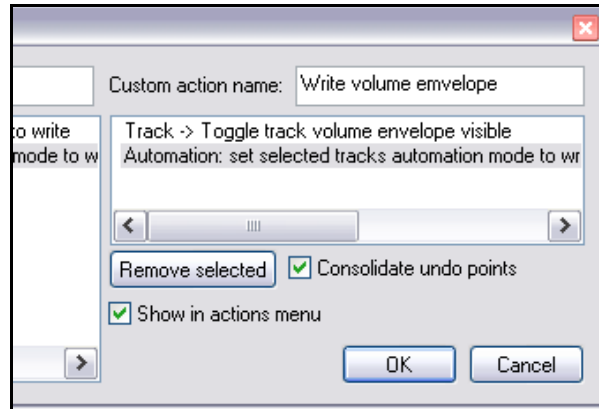
The underlying principle for both these options is the same. In essence, enabling these options will help preserve the original effect of your envelopes when items are moved or when ripple editing occurs. If in doubt, you should leave both these options enabled.

## 14.24 Automating Automation

Don't forget that REAPER's **Action List** capabilities really do put a lot of power and control at your fingertips. For example, if there's an automation task or sequence of tasks that you use frequently, you can allocate a keyboard shortcut to that sequence.

For example, suppose that you often need for the current track to display and select, ready for automation, a volume envelope, and then select Write automation mode for that track.

You could use the **Actions, Show action list...** command to open the Actions window and create a key-binding similar to that shown.



With one keystroke this custom action would display the volume envelope for a selected track and automatically set the track to Write mode.

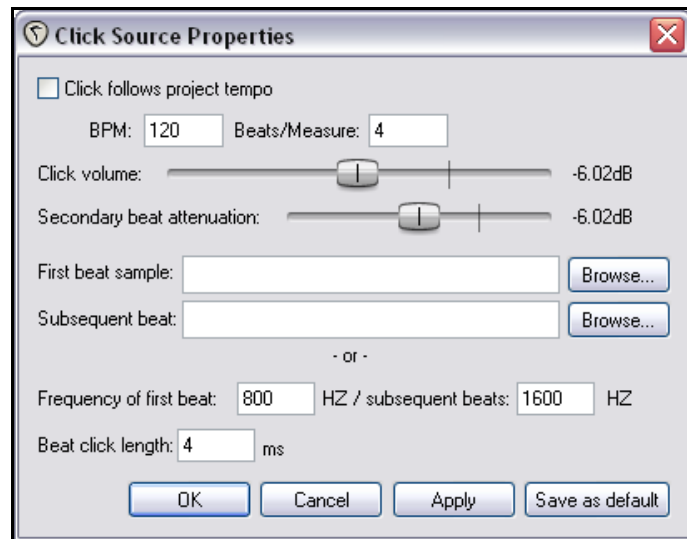
## 14.25 Automating the Metronome

You can automate the Metronome behavior – for example, to get it to play only at the exact times that you require. To do this, simply create a new track and use the command **Insert, Click Source** to insert a media item into your file.

You can then treat this click track like any other track – for example, add a Volume envelope, a mute envelope to mute certain passages, and so on.

An example is shown here.

To modify any of the click track properties, right click over the track and choose **Source Properties** from the menu (see illustration, right).



For example, you can change the BPM setting, or use your own sample files to create the beats.

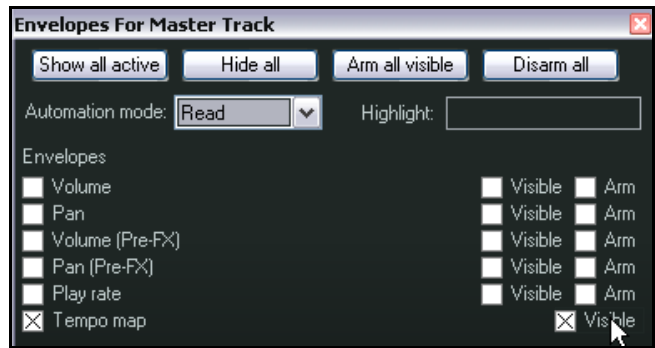




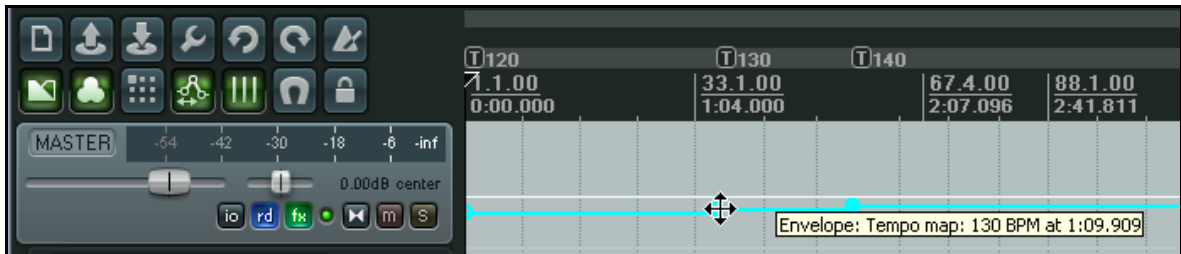
## 14.26 Using the Tempo Map and Play Speed Envelopes

In Chapter 10, you learnt how to change the Time Signature within a project. Another (and perhaps more intuitive) way of doing this is to use the Tempo Map Envelope. To display the Tempo Map Envelope in the main REAPER window:

1. Make sure that the Master is displayed – **Ctrl Alt M** toggles this on and off.
2. Click on the Envelopes button in the Track Master. This displays the Envelopes window for the Master. Now tick the item **Tempo Map** and make it **Visible**.
3. Set the Automation mode for the Master Track to **Read**. Close this window.



When you make the Tempo Map visible, an envelope is displayed on the Master Track. This envelope can be modified in the same way as any other – you can add points, move them, delete them, adjust them, etc. Time signature markers are also inserted on the timeline - editing their values has the same effect as editing the envelope points, and if you move them, then envelope points move with them (and vice versa).



Similarly, you can also add to the Master a Play Rate envelope, which can be used to automatically speed up or slow down the playback of your project. This envelope is applied to all tracks, audio and MIDI. To do this:

1. Click on the Envelopes button in the Track Master. This displays the Envelopes window for the Master. Now tick the item **Play Speed**. Make sure this item is marked as both Visible and Armed.
2. Close this window.



Notice that you can also apply standard Volume and Pan envelopes (post or pre FX) to the Master Track, as well as automation envelopes for any FX parameters.

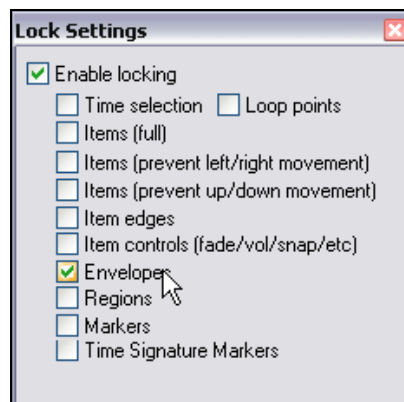
### 14.27 Locking Envelopes

When you are satisfied that your envelopes have been finalised, you can lock them in order to prevent any accidental changes or deletions from taking place.

Pressing **Shift L** will cause the **Lock Settings** window to be displayed (see right).

You should then select the **Envelopes** option, along with any other aspects that you also require to be locked.

Note that even with the **Envelopes** option selected, locking will only be applied if you also select the **Enable locking** option.



## 15 Mixing Down and Rendering

### 15.1 Consolidating and Exporting

You might be collaborating on a project with someone else, or with other people. Perhaps, for example, you want to send your project to a friend who will add some vocal harmonies to your song. What if that friend lives a long way away? You could send her your .RPP file together with all the media item files, and she could do it there.

But what if she doesn't use REAPER? Perhaps she uses a different software program, or perhaps she doesn't have a DAW herself and will need to use a commercial studio for this purpose.

In this case, it should first be consolidated and exported. Take a look at this example here:

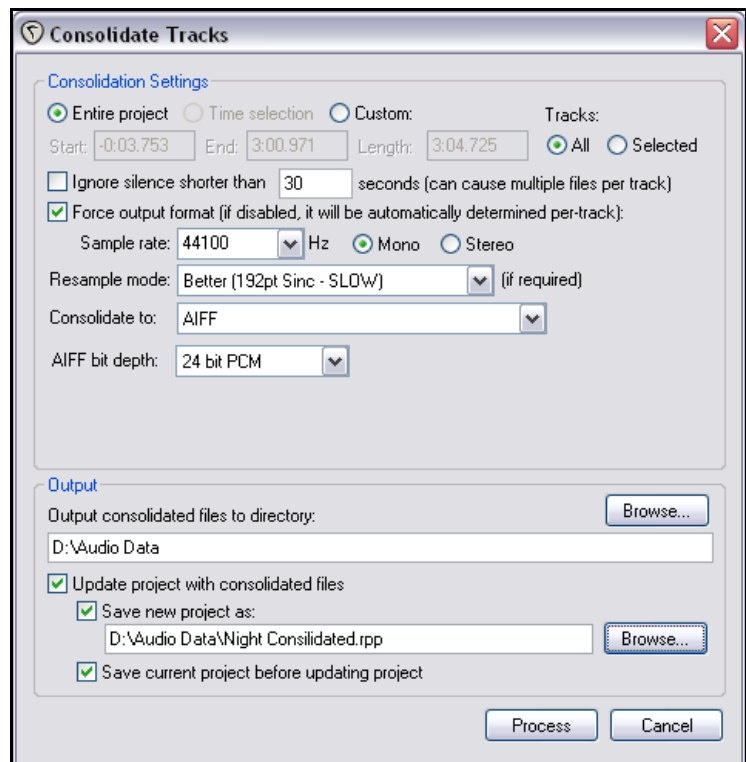


In the example shown here, the Vox track is made up of three separate items, each covering only part of the total song.

If we were to hand over a copy of these media files (six in all) to someone else, then even with a simple recording project like this, it would be quite a job for that person to line everything up.

That's where consolidate and export comes to our rescue. It creates new audio files, one per track, based on the items in the project, the files they refer to, and their position in the project. Once these new files are inserted in another DAW, each starting at zero time, one per track, then everything will be in the right place for further mixing.

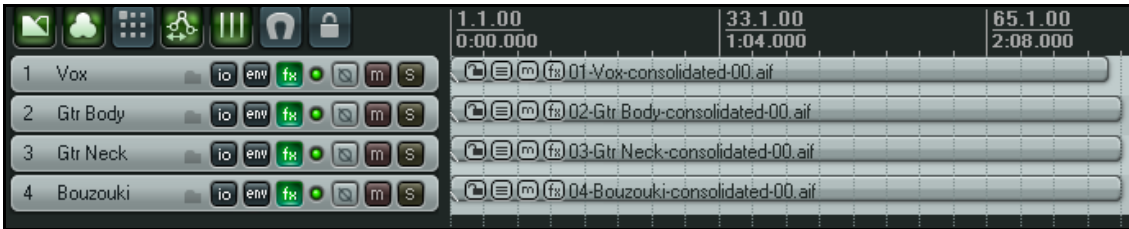
1. From the main menu, choose **File, Consolidate/Export Tracks**.
2. Choose either the **Entire Project** or a **Custom** loop selection, then **All** or **Selected Tracks**.
3. Decide if you want to **Force Output Format** to a single standard (as shown here) or maintain all current media item formats.
4. Select a **Resample Mode**.
5. Specify required format – WAV, AIFF, FLAC, MP3, OGG Vorbis, Monkey's Audio or WavPack. In the example shown, AIFF has been selected.



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6. Select your required specifications for your chosen format. For example, for AIFF files you need to select a bit depth, for MP3 a mode and quality. If in doubt, speak to the person who will be doing the work.
7. Specify your Output directory (where the files will be written to). Specify whether you wish to update the project with the newly consolidated files.
8. Specify a name for the new project file (or accept the default).

Below is shown how the project file looks after consolidation, with one media item per track. To make this more obvious, the preferences option to **Display peaks for media items** has been disabled.



It would clearly be an easy task for an audio engineer to import these four media items into any DAW program, then overdub the vocal harmonies.

**Note:** To consolidate in MP3 format you will need to have a copy of the free Lame encoder file **lame\_enc.dll** placed in your **C:\Program Files\REAPER** folder. It will take you only a few moments to use Google to find a suitable download location.

### 15.2 Rendering A Project

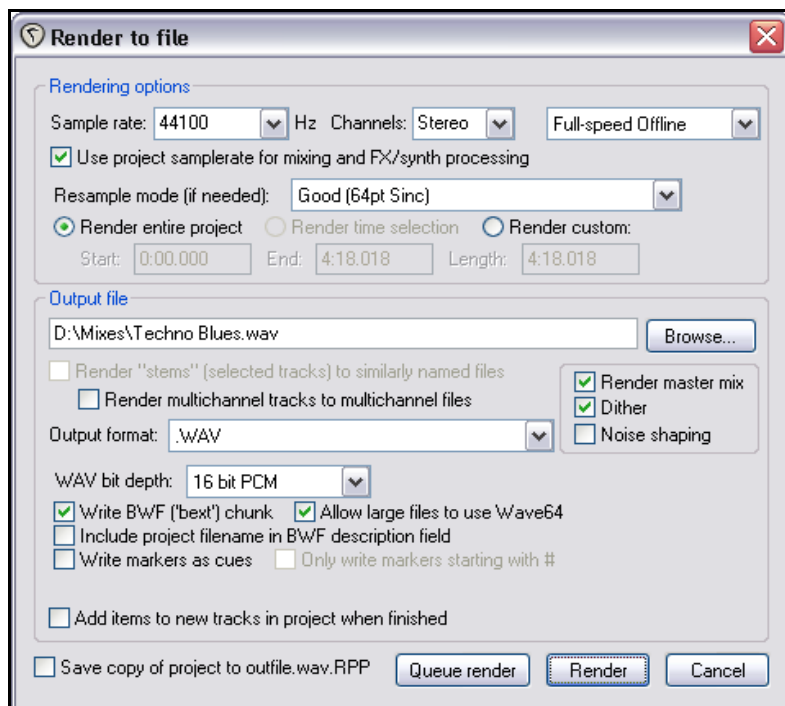
Let's say you've reached the point where you've finished your recording, completed your edits, added all your FX and automation, arranged all your tracks .... and now you're ready to mix down your work to produce an end product.

Usually that end product will be a stereo file. If it's going on to an audio CD, this will be a 16 bit stereo wave file. If it's going on to the web, it will most likely be a stereo MP3 file. But whatever format you're using, your project will ultimately need to be rendered down to one file.

To do this, we use the **File, Render** command.

The dialog box shown on the right shows your various options. Your choices will depend on the ultimate destination of your material.

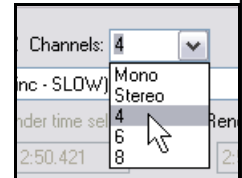
Some examples are listed on the following page.



## 15 - Mixing Down and Rendering

### Project Rendering Examples

Output Destination	Specification
<b>DVD Audio Soundtrack</b>	Sample Rate 48000 HZ, Stereo, Higher Quality WAV format, 24 bit
<b>CD Audio</b>	Sample Rate 44100 HZ, Stereo, Higher Quality WAV format, 16 bit
<b>Web Site / Web Audio</b>	Sample Rate 44100 HZ, Stereo, Higher Quality MP3 format Other options may vary as you trade off files size and download time against audio quality, but a typical selection might be: CBR (Constant Bit Rate) 96 or 128, Joint Stereo, Quality High
<b>Monkey's Audio</b>	Use this format for lossless compression at 16 or 24 bit, sample rate as preferred.
<b>Apple Mac</b>	AIFF Format. Consult the engineer who will be working with the file for advice on preferred settings.
<b>Audio CD Image (Cue/Bin) format</b>	Specifications as for CD Audio. This option can be used to burn your rendered output directly to CD, or to create an image file on your hard drive for use with other CD burning software. You can specify how markers or regions should be used to define tracks. This includes the option only to use markers whose name begins with "#", in which case these become track markers. Further information about how to do this can be found later in this chapter.
<b>Multichannel Tracks</b>	<p>We'll look at channel splitting and creating multichannel tracks in detail elsewhere in this User Guide, and especially in Chapter 18. You might have such tracks that you wish to export in multichannel format, perhaps for use with another program. First select the tracks in the track control panel, then open the <b>Render to file</b> dialog box and include the following options:</p> <p>Channels - Select the number of channels, e.g. 4</p> <p>Select <b>Render stems (selected tracks) to similarly named files.</b></p> <p>Select <b>Render multichannel tracks to multichannel files.</b></p> <p>Optionally, <b>Add items to new tracks in project when finished.</b></p>



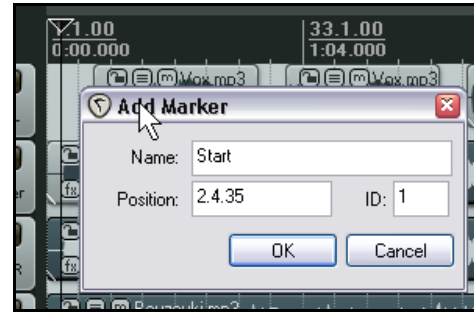
Shown here (right) is a four channel track (Track 1) rendered in multichannel format (Track 2).



## 15.3 Rendering a Finished Song

As indicated in the above table, when rendering a finished song you will be likely to make different output format choices depending upon whether your final destination is and audio CD or the web. However, there are a few tips that you may wish to keep in mind which are equally applicable to both.

Very often your recording will have a few seconds of silence before the song starts. Usually you will not wish to include this period of silence with your rendered material. Before you render your project, you should follow these steps:



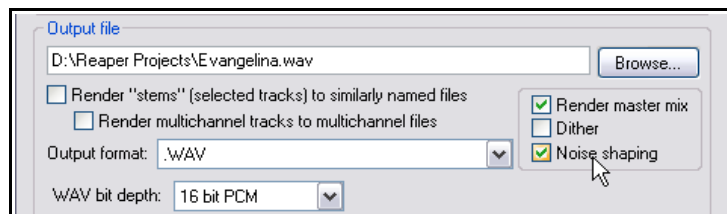
1. Position the play cursor at the point where you actually wish the rendering to commence. Press **Shift M** to create a marker at this point. Name this marker **Start**.
2. Position the play cursor at the point where you wish the rendering to stop. Press **Shift M** to create a marker at this point. Name this marker **End**.
3. With loop points linked to time selection, double click just above the timeline anywhere between the two markers. This selects the entire area between them.



4. From the REAPER menu, choose the **File, Render** command.
5. Select the required output format and other options as required, but be sure to include the option **Render time selection** (as shown on the right).
6. When you are ready, click the **Render** button in this dialog box to create your rendered file.

### Dither and Noise Shaping

Depending on your chosen output format, REAPER may also make available either or both the options to enable **Dither** and **Noise Shaping** (as shown right).



These are mathematically fairly complex issues, but in layman's terms, these options can be used to ensure a smoother transition when you are mixing down from a higher bit rate to a lower one. This would be the case, for example, when you have recorded in 24 bit and are rendering down to 16 bit. If you're unsure how to use these, a safer choice would be to enable noise shaping but not dithering. For further information about dithering and noise shaping, you can consult Wikipedia. Note too that you should *not* enable dither or noise shaping in the **Render to file** settings if your Master Chain already includes a dithering plug-in such as Michael Gruhn's VST Dither.

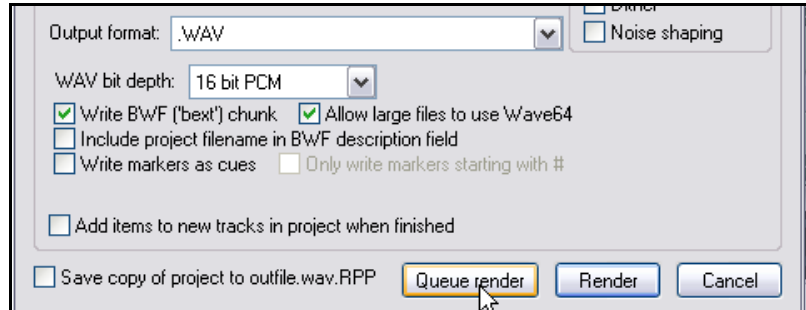
### 15.4 NEW! Batch Rendering

It's possible that you might have a whole collection of songs (perhaps to go together on a CD), and that you may wish to render all of the songs together when the project is finished.

The procedure is as follows.

#### For Each Project to be Rendered:

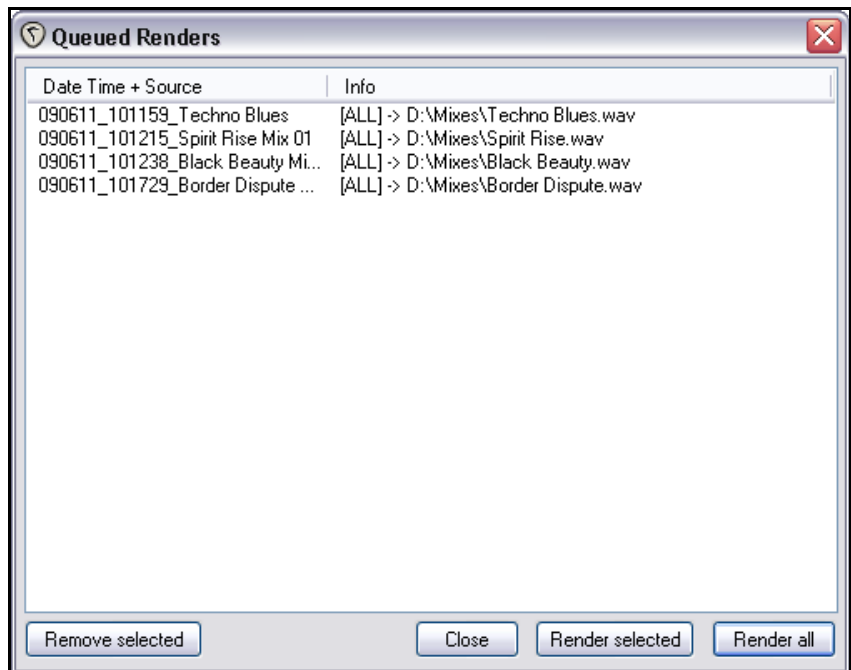
1. Open the project and choose the **File, Render** command.
2. Choose your various settings and options, as explained in the previous sections. You will probably want to select the same folder (directory) for all of the projects that will be included in the batch to be rendered.
3. Do *not* click the Render button. Instead, click the **Queue Render** button (see right).
4. The dialog box will be closed, and nothing will appear to happen.
5. Save and close the file.



#### To Render the Queued Batch of Projects:

When you render the files in the queue, each will be rendered to a separate file according to the settings and options that you made for each file individually when you set up the batch.

1. From the main REAPER menu, choose the **File, Show Render Queue** command.
2. This causes the dialog box shown on the right to be opened. All files in the render queue (in this example four) will be listed.
3. If you need to remove any item from the list, select it and click on **Remove Selected**.
4. *Either* use **Ctrl Click** to build up a subset of items to be rendered and click on **Render Selected** *or* simply click on **Render All** to render all items in the queue, each of course to a separate file. The **Rendering to File** box will be shown as each file is rendered and removed from the queue.
5. **Close** the Queued Renders dialog box when finished.



## 15.5 Burning an Audio CD with REAPER

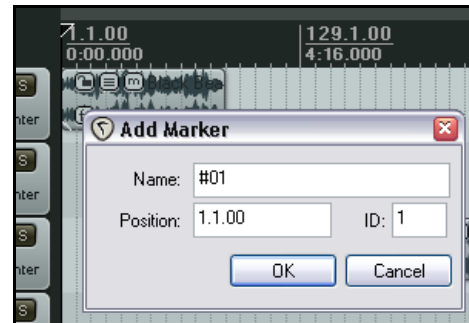
There are, for the most part, two circumstances in which you might wish to burn your material direct to an audio CD.

1. You have recorded a number of songs. Each has been mixed and rendered to its own stereo wave file. You now wish to burn all of these to audio CD, with one track for each song.
2. You have perhaps a live recording comprising one continuous track. You wish to split it up into individual tracks, and then burn to audio CDs.

In both cases, the procedure is similar. There are just some slight differences in how you set the project up at the beginning.

### Preparing to burn a CD from several mixed files

1. Start REAPER and create a new project file. Press **Ctrl Alt X** to display the **Media Explorer**, then navigate to the folder containing the rendered stereo wave files.
2. Double click in turn on each of the files that you wish to include in your CD program. REAPER will add each one to your project, lined up on separate tracks.
3. Notice that each media item is placed so as to begin immediately after the other, with no gap. It is not necessary to move any of these in order to create gaps on your CD. You will later be able to tell REAPER to do this automatically for you.
4. You will now need to insert a marker to indicate where each track is to start. To do this ...
5. First, make sure that Snapping is disabled. Place the cursor at the beginning of your project. Press **Shift M** to create and edit a marker at this point. Make sure the marker name begins with a **#** (as shown on the right).
6. Now move the cursor to the start of the next song. Again add a marker, and again make sure that the marker name begins with a **#**.
7. Repeat this until you have created a marker at the start of each song, as shown below:



8. Save the Project File.
9. Now follow the instructions below for **Burning the CD**.



### Preparing to burn a CD from one continuous recording

1. If the recording was made in REAPER, open the project file. Otherwise, create a new project file and use Media Explorer to import the recording, using the method explained before.
2. It is *not* necessary to split up the media item. REAPER will take care of this when it burns the CD. However, you will need to indicate where you want each track on the CD to start.
3. First, make sure that Snapping is disabled. Place the cursor at the very beginning of your project. Press **Shift M** to create and edit a marker at this point. Make sure the marker name begins with a **#** (as shown on the right).
4. Now move the cursor to the start of the next song. Again add a marker, and again make sure that the marker name begins with a **#**.
5. Repeat this until you have created a marker at the start of each song, as shown below:



6. Save the Project File.
7. Now follow the instructions below for **Burning the CD**.

### Burning the CD

1. Choose the **File, Render** command. You should now select the necessary options and settings for burning your CD:

**Sample rate:** 44100

**Stereo**

**Render entire project**

**Render Master Mix**

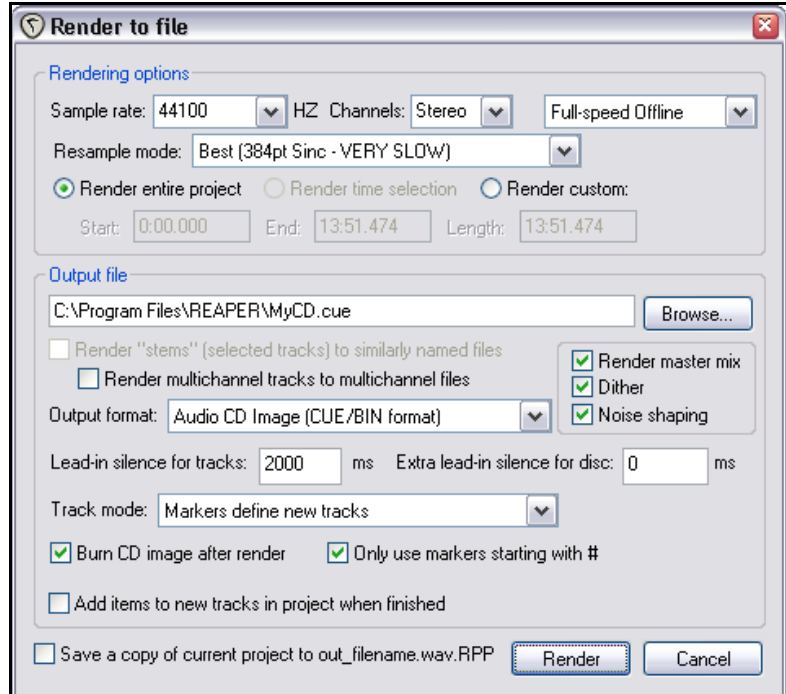
**Output format:** Audio CD Image (CUE/BIN Format)

**Markers define new tracks**

**Burn CD Image after render**

**Only use markers starting with #.**

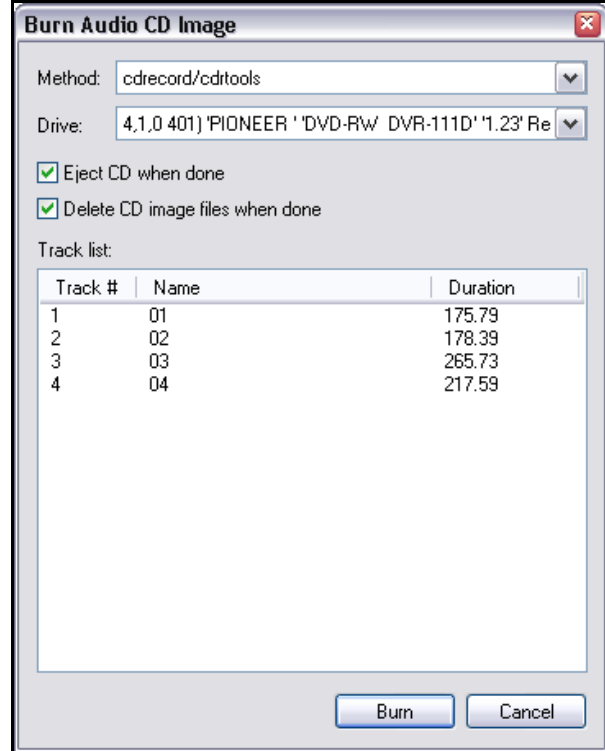
If you do not have any dithering plug-ins in your Master FX Chain, consider also enabling the **Dither** and **Noise Shape** options.



2. In the case of the first of our two examples (separate media items) you will probably also want to specify a **Lead in silence for tracks** of 2000 ms.

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- In the case of our second example (continuous live performance, you will probably wish to leave this setting at 0.
- Click the **Render** button and wait for the output file to be rendered. This might take a few minutes.
- When rendering has been completed, the **Burn Audio CD Image** settings screen will be displayed.
- Select your preferred method. This will depend on factors such as your PC set up and operating system. If in doubt, choose **cdrecord/cdrtools** as shown.
- Select **Eject CD when done**. Decide also whether or not you wish to keep or delete the CD image files when done.
- Insert a blank CD into your CD drive and wait for it to load.
- Click **Burn**.
- Wait while the **Burning in progress** message is displayed.
- When finished, the CD will be ejected. Click on **Close** to close any messages still displayed on the screen.



**Tip:** Before rendering direct to audio CD you should ensure that the media items that you are burning are in 16 bit 44100 Hz .WAV format.

There are a number of methods that you can use to convert them to this format. Probably the easiest is to set this under **Project Settings** as your **Media format for apply FX, glue, open, copy, etc.** Within the project you can then glue any existing media item(s), while any media items you then import will be automatically converted to this format.

### 15.6 Saving Live Output to Disk

Finally (for this chapter), you have the option to export your live output to disk, using the **File, Export Live Output to Disk** command. This is similar to **File, Render**, except that whereas the Render command works off line, Export Live to Disk works in real time. This means, for example, that you can actually make adjustments on the fly to your settings while your project is being mixed down.

This has other uses too, such as recording continuously a log of the sessions to a compact file format such as MP3, so that later you can hear everything that was said about each take even though the transport was stopped and nothing was being recorded on the tracks. However, if you do set it to run non-stop, remember to stop the recording when you no longer need it, to avoid creating an unnecessarily large file.

### 16 REAPER Plug-ins in Action

#### 16.1 What Are Plug-ins?

There's a wonderful assortment of plug-ins supplied with REAPER - nearly 200 of them! These include the Jesusonic and the VST Rea plug-ins from Cockos. In this section we will be introducing you to a selection of these. We will only be covering the very basics, just to give you a feel for what plug-ins are and how they work. Beyond this, you can explore for yourself.

Plug-ins are pieces of software that are used to control and shape the sound generated when you play back the media items in your tracks. Some simple examples of when and why you might want to use a plug-in are:

- To make a vocal recording sound nicer, more lifelike. Perhaps your dry recording sounds a bit thin, even verging on the feeble in places. Plug-ins can add body, warmth and sparkle to such a track, not by working magic, but by finding where those qualities are buried in the recording and bringing them out.
- To smooth off peaks and dips in the volume of a track, making the overall track sound more even.
- To add a "live" feel to a track or even a whole mix, making it sound more as if it were recorded in a church or a hall, rather than in a boring old studio.

#### 16.2 The Three Laws of Plug-ins

Before you start using plug-ins, study and memorise this mantra. There are no exceptions to these laws!

1. It is better not to use a plug-in at all than to use it badly. A badly used plug-in is likely to make your mix sound worse, not better. If in doubt, underdo the use of plug-ins, don't overdo them.
2. Never judge the quality of a plug-in by how much you like its presets alone. Presets just reflect someone else's idea of how something ought to sound, not the quality of the plug-in, nor its potential. Think of it this way – would you decide that Subaru cars were no good just because the sales guy showed you a red one and you don't like the color red? No, of course you wouldn't. At least, I hope not.
3. You can't judge the quality of a plug-in by its cost. No, really you can't. Some plug-ins are free. Some cost literally thousands of dollars. Some free ones are pretty awful, some are great. Some plug-ins costing hundreds of dollars are, to be polite, very, very ordinary. Others are excellent.

#### 16.3 The Five Types of Plug-in

Especially when you are new to using digital audio, the first feeling that you're likely to encounter when you start to explore the world of plug-ins is one of being overwhelmed, if not utterly confused. Why? Because there is so much choice. *Heaven help me, have I really got to understand all that lot to be able to use this recording caper?*

No, you don't. Because in essence there are essentially five types of plug-in (well, there's a major exception to that, which I'll get to shortly). These five types are:

- **Sound Shaping:** these plug-ins affect the frequency (pitch) of your track(s). An example is EQ.
- **Time-Based Effects:** these plug-ins manipulate how your track(s) interact with time. Examples include Delay, Chorus and Reverb.
- **Volume Changing:** these are plug-ins that determine the overall volume or perceived volume of your track(s). Examples are Compressors and Limiters.
- **Utility Plug-ins:** these do not shape the sound of your tracks as such, but are used for tasks as routing.
- **Analytical Plug-ins:** these display information, but don't in any way alter the sound of the track.

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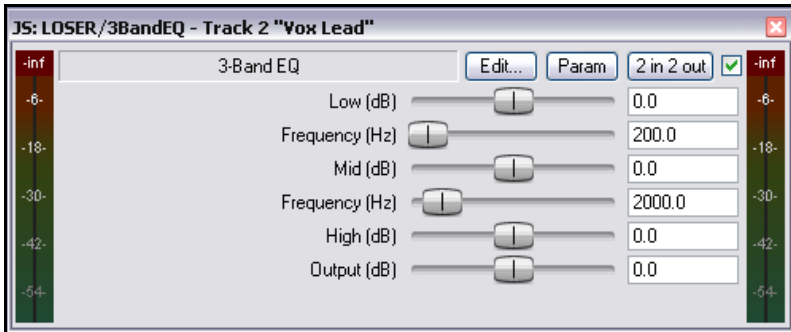
And that exception? Well, some plug-ins can cut across more than one of these categories at the same time, performing more than one job. One example of this is a Multiband Compressor, which displays the characteristics of both an EQ and a Compressor.

## 16.4 Sound Shaping Effects: EQ

Most sound shaping plug-ins fall (in one way or another) into the EQ category. EQ means "equalisation." This is rather strange, since they are used to emphasise (or de-emphasise) selected frequencies. Perhaps they should be called "UnEQ"!

A number of JS EQ plug-ins are supplied with REAPER, along with ReaEQ from Cockos. The best way to understand how these plug-ins work is to examine an example.

1. Open the supplied project file **All Through The Night.RPP** and save it as **All Through The Night EQ.RPP**
2. We will be working in this example only on the vocal track. The human voice is an excellent instrument for demonstrating the effects of EQ. **Solo** the **Vox** track.
3. Display the **FX window**, click on **Add** and add **JS Loser 3 Band EQ** (right).
4. Play the song. As you do so, fade the **High** fader towards the left, all the way, slowly. Notice how the voice becomes deeper.
5. Double click on the fader to return it to the centre.
6. Slide the **Low** fader all the way to the left. Now *slowly* move the **Low Mid Frequency** fader all the way to the left, then all the way to the right. Notice the effect it has on how the voice sounds.
7. Stop the song. Return all faders to their original positions (see above).



What has been happening is that you have been cutting different frequencies out of the song at different times. Let's look at this more closely. Exactly how you divide up the frequency spectrum is to some extent arbitrary. Here's one way that would make sense to most sound engineers:

<b>16 to 60 Hz</b>	<b>Very Low Bass.</b> These frequencies are felt rather than heard.
<b>60 to 250 Hz</b>	<b>Bass.</b> Herein dwell the fundamental notes of the rhythm section. A modest boost here can help make a sound fuller, but too much gain will make it boomy.
<b>250 to 2000 Hz</b>	<b>The Mid Range.</b> Too much gain here makes it sound like you've recorded from the other end of a telephone. If a take sounds muddy, try cutting it here.
<b>2000 to 4000 Hz</b>	<b>Upper Mid Range.</b> Often a problem area. Boost here can cause listening fatigue. Dropping this range slightly on the mix while boosting slightly on vocals can help a vocal stand out in the mix.
<b>4000 to 6000 Hz</b>	<b>Presence Range.</b> This is the key range for clarity and presence of instruments and vocals. Some gain here will bring the instrument or voice forward in the mix. A drop here can pull an instrument back.
<b>6000 to 16000 Hz</b>	<b>High Range.</b> This is where you find clarity and sparkle. Too much gain here produces a searing, glassy effect.

So .. we know that the frequency is measured is measured in Hz (and kHz), and that we can increase or decrease the volume at any level, to shape the sound. The sound level itself of course is measured in decibels.

We need to understand one more term – **Q**. Q refers to the band width. A high value of Q means that you will raise or lower a very small part of the spectrum relative to your selected frequency. A low value of Q means that you will be working on a much wider part of the spectrum. In the next example, you won't need to worry about this.

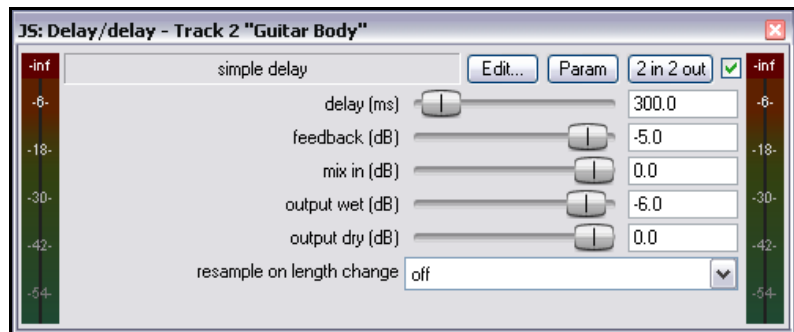
### Example

1. Remove from your Vox FX Bin the VST 3 Band Eq (LOSER). Insert in its place **JS:Loser/4BandEQ**
2. This EQ uses four bands. Notice that you set the frequencies yourself.
3. Play the song. Lower the last fader in this window (Output) to about –6dB. This helps prevent clipping.
4. Experiment with adjusting the frequency and levels for different bands to get the most pleasing sound.

**Tip:** Don't forget that you can create track parameter controls and/or automation envelopes for this or any other plug-in by clicking on the **Param** button in the plug-in window – see Chapter 9.

### 16.5 Time Based Effects: Delay

These include reverb, delay and chorus. Sound takes time to travel thru any distance, and surfaces like walls and ceilings create reflections which make the sound patterns even more complex, intricate – and alive. Time based FX use a number of tricks and techniques to artificially simulate this, thereby creating a more "live" sound. But be careful. Too much here can ruin an otherwise good sound.



Parameter	Description
<b>Delay (ms)</b>	Determines the amount of time that passes between the original sound and when the delayed sound is heard.
<b>Feedback</b>	Determines the amount of the signal that will be fed back into the delay line.
<b>Mix in (dB)</b>	Determines the overall output level.
<b>Output wet (dB)</b>	Determines the Output level of the Post FX signal.
<b>Output dry (dB)</b>	Determines the Output level of the Pre FX signal.

In this example, we will look at the **JS: Delay/Delay**. This has five user adjustable parameters.

### Example

In this example we are going to add some delay to the Bouzouki.

1. Unsolo your Vox track and solo the track **Gtr Body**.
2. Display the FX Window for this track and add the **JS:Delay/delay**.
3. Play the song. Experiment with adjusting the different parameters until you have found an effect to your liking. For very small delay settings, such as 0.2 ms, it is easier to type them in the box than to use the faders.
4. Unsolo the track, then continue to make any further adjustments until you are satisfied with the results.

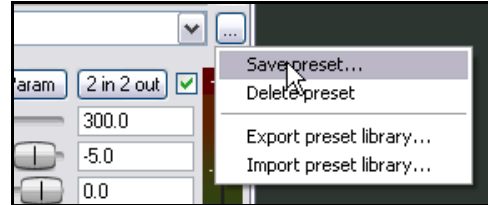
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5. Save the file.

## Creating Presets

When you are satisfied with your settings for any plug-in, you might wish to save them as a preset, so that you can apply them next time you record a guitar track:

1. Click on the little ... button just above the VU meter in the JS Delay/delay window.
2. Choose **Save preset** from the menu.
3. Type a name and click on **OK**.



To import an existing preset library (such as you might be able to download from the REAPER web site) you would choose **Import preset library...**

To apply an existing preset (from those previously imported or supplied with the plug-in), simply insert the plug-in into that track's FX window, display the drop down list of presets, then select the one that you want:



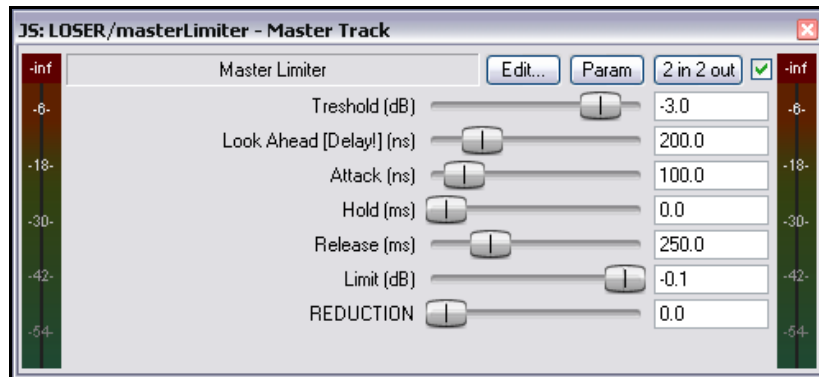
**Note:** For a more sophisticated and powerful example using another Delay plug-in, see the Section titled **Full and Fat Vocals with ReaDelay**

## 16.6 Volume Changing Plug-ins: the Limiter

In this example, we will look at an example of one volume changing effect, the JS:LOSER:masterLimiter.

This can be added to the FX Window for your MASTER to perform two functions. These may at first appear to be contradictory, but they are not:

- To raise the overall volume of the mix, but at the same time ...
- To prevent the mix from "clipping", i.e. getting too loud at any point.



We will be using the **JS:Loser/masterLimiter** which includes the following controls and parameters:

Parameter	Description
<b>Threshold</b>	This determines the level at which the other Limiter settings will be applied. It may seem paradoxical at first, but the lower the threshold, the higher will be the perceived overall volume. As you lower the threshold, more of the song will be lifted to the decibel limit that you specify.
<b>Look Ahead</b>	Determines how far ahead the Limiter looks – this helps smooth out sudden unexpected peaks.
<b>Attack</b>	Determines how quickly the Limiter kicks in as the signal increases.
<b>Release</b>	Determines how quickly the limiter recovers to the constant gain after a peak is encountered.
<b>Limit</b>	This determines the maximum volume that cannot be exceeded.

### Example

1. Display the FX Window for your MASTER and insert the **JS: LOSER/masterLimiter**.
2. Play the song, adjusting the controls.
3. As you lower the Threshold, notice that the volume appears to get louder, but the maximum (limit) volume is never exceeded,
4. As you lower the Limit, the song gets quieter.
5. The more you lower both Threshold and Limit, the more you squeeze the dynamics out of the song – volume remains almost constant, and there is little or no movement in the VU.

The trick to using a limiter well is to smooth out peaks and dips somewhat, but without adversely affecting the dynamics of the song.

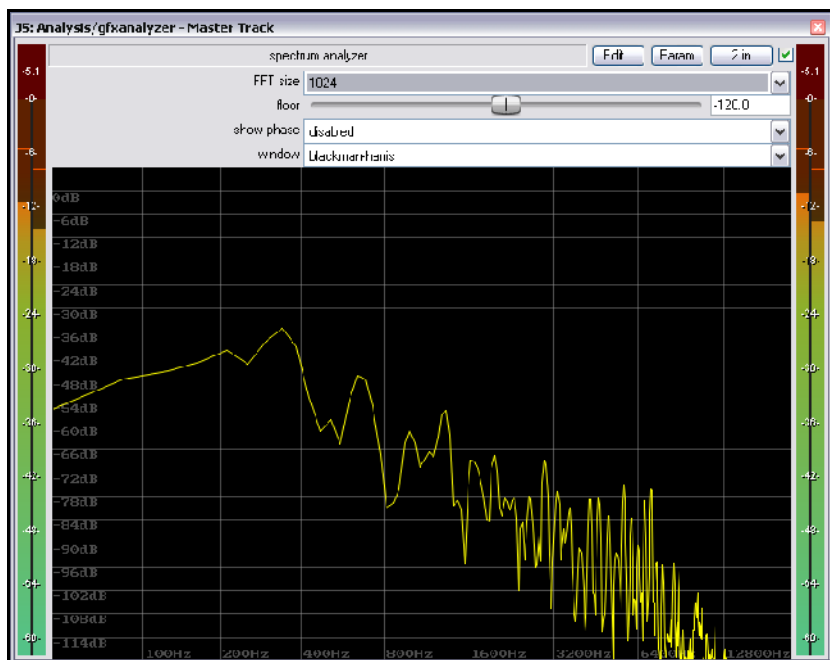
### 16.7 Analytical Plug-ins: the GFXAnalyzer

Shown on the right is a **JS: GFXAnalyzer** plug-in.

Insert this into any track's FX chain (or the master's FX chain) and as the project is played you are given visual feedback as to the level of output at different frequencies.

This can sometimes help, for example, in identifying which frequencies might be raised or lowered when using EQ.

Now that you've had a look at one example of each type of plug-in. let's go on and examine some more.



### 16.8 Time Based Effects: ReaVerb

ReaVerb is a VST plug-in that is supplied with REAPER. Reverb itself is a time-based effect, and ReaVerb uses a type of reverb known as **convolution reverb** to create the illusion of space. This section will introduce you to the basics of using ReaVerb. After that, it has more features that you can explore for yourself.

Most reverbs are an artificial attempt to recreate the effect that the acoustic environment of, say, a hall or a room would have on sound. However, the mathematical process required for this is highly complex, so that very few come close to sounding like real acoustic rooms. There are probably as many bad reverb plug-ins around as there are all other sorts of plug-in put together.

With convolution reverb though, we are able to get realistic reverb without breaking the bank. It uses impulse responses of real acoustic spaces. This is made possible by generating a signal in the required environment and then recording the result.

ReaVerb even takes this concept a step further, allowing you to not only use recorded impulses from real environments to create your reverb, but also to use something closer to more traditional reverb methods to then modify that sound further, should you wish to do so.

To be able to use convolution reverb, you will need to have a collection of impulse wave files. Search the net and you'll find all you want, many free. This example uses files downloaded from <http://www.voxengo.com/impulses/>

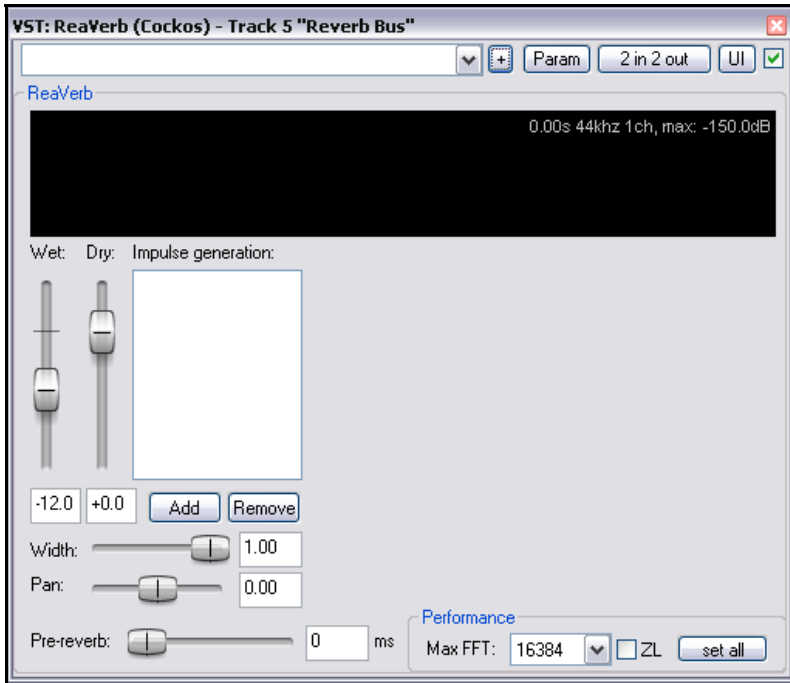
In the example that follows, these files have been downloaded and stored in a folder that we have created and named **C:\Program Files\REAPER\Reverb Impulses\Voxengo\**

#### Example

1. Open the file **All Through The Night.RPP** and save it as **All Through The Night REVERB.RPP**
2. Add a new track after the last track, and name it **Reverb Bus**
3. Create Receives into this track from all of the instrument tracks and the Vox track. This will later enable you to feed different levels of signal, panned as required, from different tracks into your Reverb Bus.
4. Display the **FX Window** for the **Reverb Bus**.
5. Add **ReaVerb** into this FX Window.
6. Fade the **Wet** level down to around **-60** and the **Dry** level down to about **-0.5**, as shown on the right.

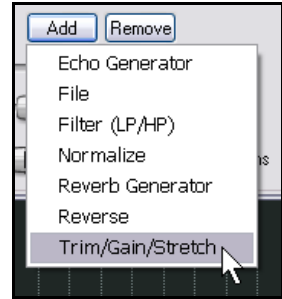
We will start by adding just a little reverb, then increase it as required.

7. Click on the **Add** button and then on **File**. This lets you add a file at the start of your Reverb chain. Navigate the file browser window to where your impulse files are stored and select one. In this case, we will be using **St Nicolaes Church.wav**





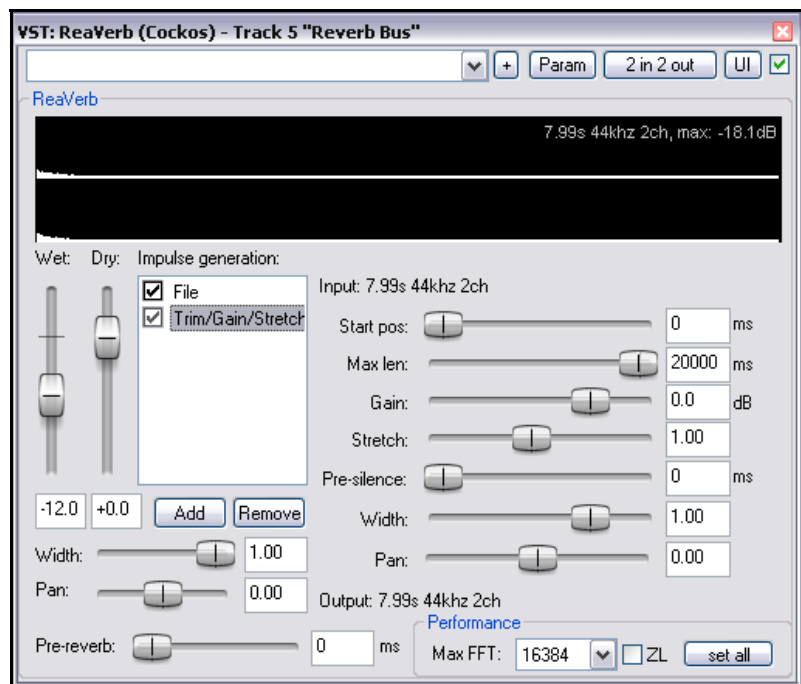
8. Click on **Open** to insert that file into ReaVerb.
9. **Play** the file. In the Track Window, lower the Volume fader for the Reverb Bus to about  $-10$ dB. Lower the fader on the Master to about  $-6$ dB. You can bring this up again later if you wish.
10. In the ReaVerb window, now raise the wet signal until you hear a pleasing amount of reverb. This will probably be at about  $-10$  dialog box. If you like, Solo the Reverb track for a while, so that you can discern the effect more clearly.
11. We can now use the ReaVerb controls to adjust the Reverb effect. The **Pre-reverb** fader offsets the reverb tail by delaying the signal that is sent to the reverb tail generator. Try it and see what happens.
12. To add more controls to the Reverb chain, click on **Add** and choose **Time/Gain/Stretch**. Your window suddenly has all these extra controls. These are used to stretch the impulse (make it longer), add in some graininess, or trim the impulse (make it shorter).



- The best way to find out is to experiment for yourself.
13. Now click on **Add** again and add a **Filter (LP/HP)**. This causes a High Pass Filter and a Low Pass Filter to be added.

This can be used to force the impulse not to work above or below whatever frequencies you specify.

14. When you have a sound that you like, you can save that set of parameters as a named preset that can be recalled for other projects. Click on the **...** button, choose **Save preset**, name the preset and click **OK**."



Notice that when you are experimenting with ReaVerb you can:

- Drag and drop to change the order in which modules are positioned in the reverb chain.
- Untick the box to the left of any module's name to bypass that module.

### ReaVerb Features Summary

**Echo generator** - generates an echo - useful for "filling in the gaps" of an impulse or creating echo-decay.

**High and low pass filter** - force the impulse not to work above or below a certain point.

**Normalize** - raise the gain of the impulse to 0dBFS.

**Reverse** - reverses the Reverb - a nifty effect for vocals, guitar solos and song intros/outros.

**Trim/Gain/Stretch** - stretch the impulse (make it longer), add in some graininess, or trim the impulse (make it shorter).

**File** - use this to insert an impulse file. You can insert as many files as you want!

## 16.9 Volume Control with Compression

Earlier in this chapter, we encountered a **Limitter**. You can think of a limiter as being like an artificial ceiling – it essentially just stops the volume of a signal from going above whatever level you set.

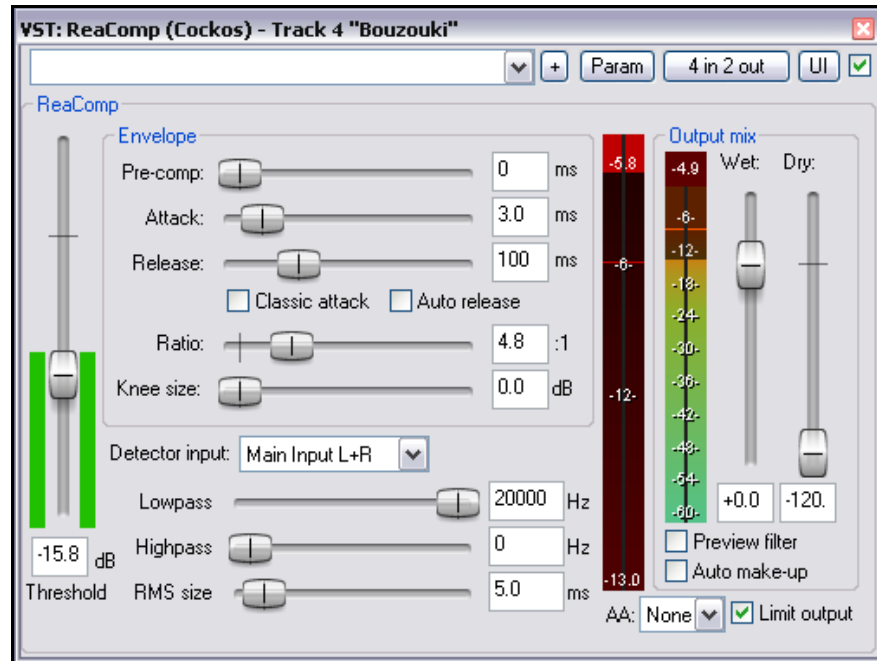
Because limiting can be harsh, it's often better to use a compressor on individual tracks. Think of it this way – a limiter cuts in suddenly and severely, whereas a compressor can be eased in much more gently. It might help to get a visual picture of what limiting can do to a recording compared to a well applied compressor. The three illustrations show the same waveform first as recorded, then how it might look with limiting (center), and with compression instead of limiting (right).



Notice that on the original waveform the volume varies quite considerably from time to time. Applying a limiter (near right) can lift the quieter passages, but may make the overall effect too loud. The dynamics have been largely squeezed out of the song. The illustration far right shows the same waveform after using a compressor instead of a limiter. The track no longer clips, and more of the dynamics of the recording have been preserved.

Software compressors vary from the simple to the complex. We're going to concentrate here on understanding just four main terms. These are essential to understanding how to use compression. There are other factors, but let's just focus on these five for now.

- **Threshold** - This is the volume at which the compressor will kick in. For example, if you set your threshold at, say, -10dB, then nothing below that threshold will be compressed at all.
- **Ratio** – This determines how gently or severely the compression is required. For example, a very gentle ratio like 2 to 1 would ensure that for every 2 decibels the volume of the recording goes above the threshold, the sound will be increased by only 1



decibel. A much more severe ratio of 12 to 1 would mean that for every 12 decibels the recording goes over the threshold, the sound will increase by only one decibel.

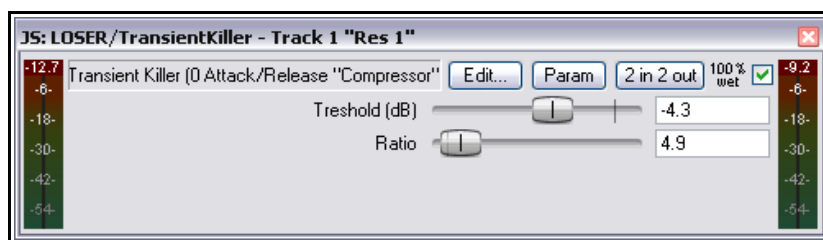
- **Gain** – This is how the volume of the track is adjusted after compression. Often you will want to raise the overall sound at least a little, to prevent the overall volume of the track from now being too quiet.
- **Limit Output** – Selecting this option will prevent the compressor output from exceeding 0 dB.
- **Bypass** – this is the small tick box in the top right corner, next to the UI button. You can use this to toggle bypass on and off, enabling you to assess what this plug-in is doing. You'll find one of these in all plug-in windows.

### Example

1. Open the file **All Through The Night.RPP** and save it as **All Through The Night COMP.RPP**
2. **Solo** the **Bouzouki** track. Look at its media peaks. You can see that it starts at a steady volume, but over the last 30 seconds or so of the song it gets rather loud.
3. Play the track from the 55 second mark for about 15 secs then stop it. Try applying some compression to kick in at about -12 or -13 dB.
4. Display the FX Window for this track.
5. Insert the **VST: ReaCom p (Cockos)**.
6. Create a loop to play over the last 20 secs or so of this instrument.
7. As you do so, experiment with setting the Threshold (vertical fader on the left) and the Ratio. Select the option to **Limit** Output. You'll probably end up with a setting of something like -5 on the Threshold and 3.0:1 ratio (see picture).
8. Now save this file.

### 16.10 LOSER's Transients Killer Clipper

Used well, a compressor most definitely can enrich a track or a mix, but used badly it can do more harm than good. If you're not yet very confident about your ability to use a compressor, then you could do worse than look at LOSER's Transients Killer. It's a delightfully simple compressor (more like a clipper really) with just two parameters for you to control – Threshold and Ratio. All other settings are fixed.



### 16.11 Volume Control with a Noise Gate

Just as a compressor controls sound at the loud end of the scale, so a Noise Gate controls sound at the quiet end.

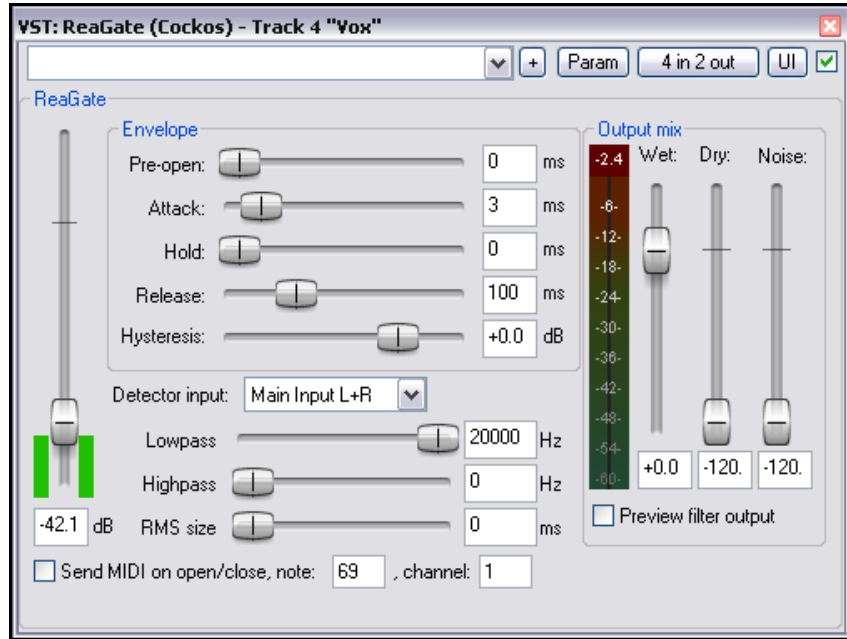
Often when you record a track such as a vocal there will be sections of silence, perhaps between verses. At least, you want them to be silence! However, you might notice on playback irritating sounds have been recorded at a low level during these periods. A noise gate can be set to detect these and filter them out. Like the compressor, the Noise Gate can be quite simple or more sophisticated. For now, we're going to focus on just the basic Noise Gate controls:

- **Threshold** – Used to specify a minimum sound level below which the Noise Gate will kick in.
- **Attack** – Specifies how quickly the gate should kick in. Too short an attack period can cause it cutting out the natural decay of a sound you want.
- **Hold** – This specifies how long the gate remains open after the signal falls below the Threshold
- **Release** – This determines the rate at which the gate closes, once the signal has fallen below the Threshold.

Let's take an example, using the project **All Through The Night COMP.RPP**

## Example

1. Solo the Vox track.
2. Play the song from just before the end of the first verse. If you listen carefully (especially thru headphones) you can hear some unwanted sounds during the otherwise silent passage. Certainly you can see this on the track's VU meter.



3. Open the FX Window for this track and add **Cockos VST ReaGate**.
4. Now play the song again. Adjust the **Threshold** fader (the first on the left, so that it is set at a level just above that at which the Threshold's VU meter is peaking during the quiet passages (see below). This will shut out the sound – visual confirmation is given by the VU meter on the right, which should now display no activity.
5. You will probably find that the default settings for Attack, Hold and Release work quite well, but experiment with adjusting them if you wish.
6. Now save this file again.

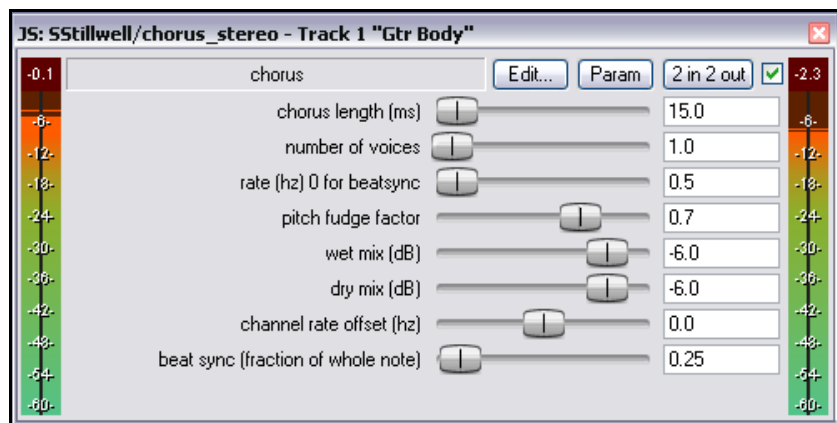
## 16.12 Time Based Effects: Chorus

Just about anybody who has ever owned an acoustic guitar will know what a chorus effect is. You've probably used a chorus pedal at some time or another to make your guitar sound fuller and richer, almost like two or more guitars.

REAPER includes a number of chorus effects. Shown here is **Stillwell's Chorus\_Stereo**.

This uses similar principles to the delay plug-in that we encountered earlier. It has a number of additional controls,

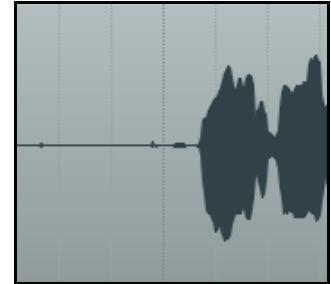
the most important of which is **Number of Voices**. Try it and see! This is another plug-in where you'll find the bypass toggle tick box (top right) can be very useful.



## 16.13 Noise Reduction with ReaFir

**ReaFir** is a multipurpose dynamics plug-in that almost defies categorisation or description. It can act as an EQ, a Compressor, a Noise Gate, and more. In this example, you will see how it can be used for noise reduction.

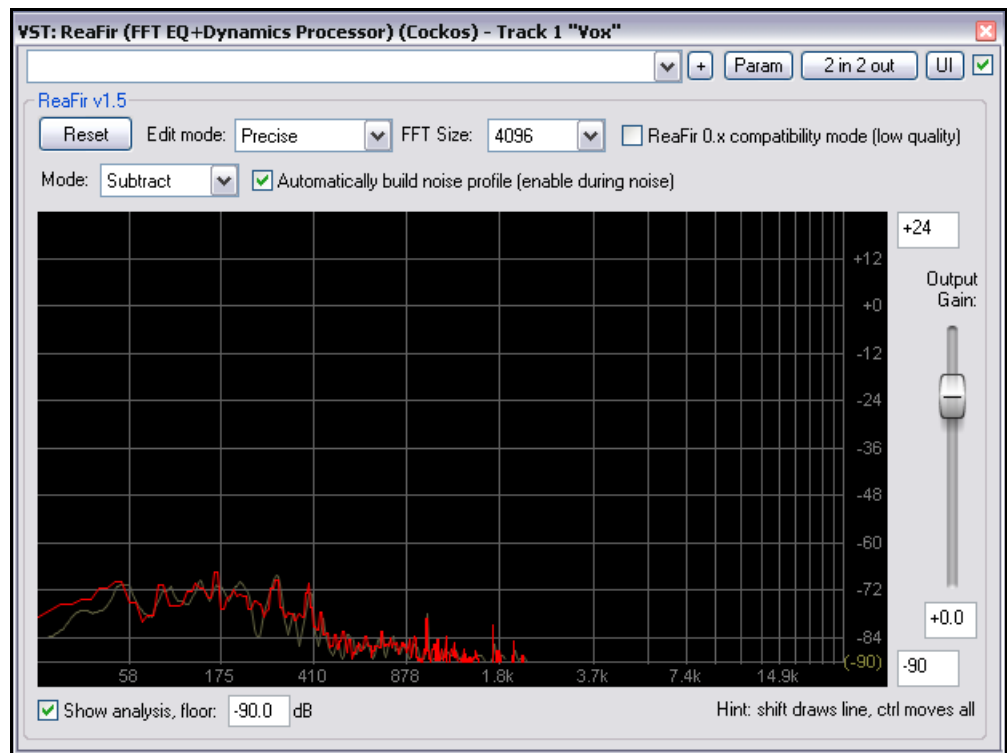
The need for a noise reduction plug-in can arise when an otherwise good track has some unwanted background noise on it. This might, for example, be hiss or rumble, or the sound of an air conditioner. ReaFir can be used to remove such sounds from your tracks in real time. In order to do this, you must first identify a passage on the track (perhaps a second or two) where you have recorded the unwanted noise by itself. This is likely to be at the very beginning of the track.



### Example and Procedure

In overview, the procedure is this:

1. Insert **ReaFir** in the FX window of the track containing the recorded items with the unwanted noise.
2. Position the play cursor at the start of a passage containing just the unwanted noise.
3. Set **ReaFir** to **Subtract** mode.
4. Set Edit Mode to **Precise**.
5. Select the Option to **Automatically build noise profile**.
6. Play the track only for the duration of the passage containing the noise, then stop the playback.
7. You should see that **ReaFir** has built a profile of the unwanted noise. This will be marked with a red line (see above right).
8. Now uncheck the box labelled **Automatically build noise profile**.
9. Return the play cursor to the start of the song and play it.
10. You should now find that as the song plays, the noise that you profiled by following steps 1. to 5. has now been removed.



## 16.14 Multiband Compression with ReaXComp

Applied to the Master, Multiband Compression can be a useful tool for adding body, warmth and volume to your final mix. It is outside the scope of this guide to suggest just how heavily or lightly you should apply your Multiband Compressor. Many audio engineers believe quite strongly that the contemporary trend being currently pursued by the major record companies takes multiband compression too far.

Be that as it may, a multiband compressor works by applying different rates of compression to different frequency bands. This lets you shape the sound much more precisely than is possible with a simple compressor.

The ReaXComp default settings include 4 bands. These are 0 to 200 Hz, 200 Hz to 1,000 Hz, 1,000 Hz to 5,000 Hz and above 5,000 Hz. However you can add extra bands or delete superfluous ones. You can also change the band frequencies as you wish. For example, if you increase the top frequency of Band 1 to, say, 250 Hz, then that automatically becomes also the starting frequency for Band 2.

If you have not used a Multiband Compressor before, then you are advised to start cautiously and become more adventurous as you gain in knowledge and confidence. You can experiment on any of the sample **All Through The Night** project files that you have used elsewhere in this User Guide.

### Example

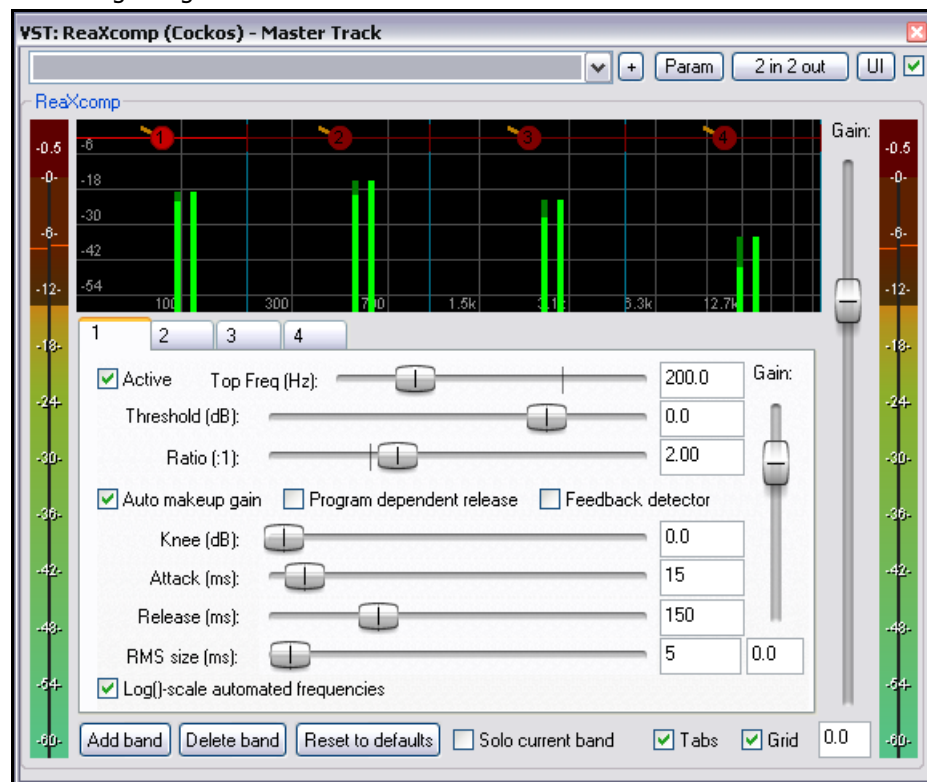
1. Open one of your sample project files.
2. Insert **ReaXComp** in the FX window for the Master.
3. Play your project from the beginning.

4. It is quite likely that at this stage ReaXComp will have no effect on the sound.

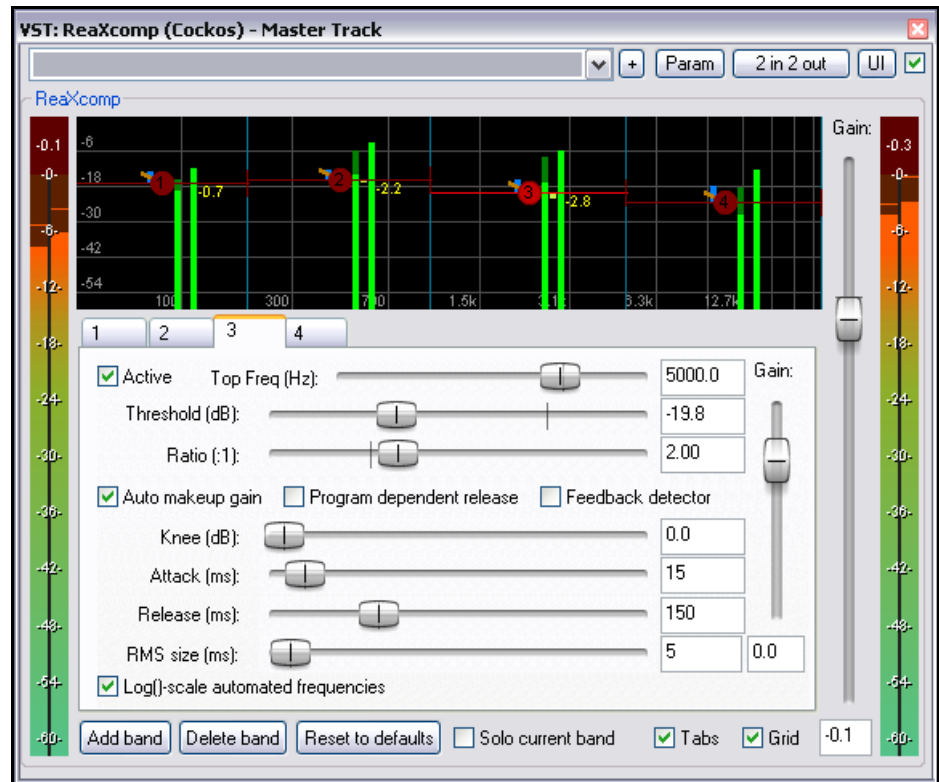
This will be the case if, as shown right, the peak levels (green vertical bars) fall short of the threshold settings (red horizontal lines) for each band.

But you can still learn something!

5. Enable the **Solo current band** feature.
6. As the song plays, select in turn each of the four tabs, 1, 2, 3 and 4. This will enable you to hear separately each of the frequency ranges that you are working on.
7. Now disable the **Solo Current Band** feature. Disable **Auto makeup gain**.



8. As the song plays, adjust the threshold for each of the band until they come just below the peaks for each band. An example of this is shown here.
9. The default Ratio setting of 2:1 is quite conservative. Try increasing the ratio for each of your thresholds up to around 4:1.
10. If you wish, you can experiment with the various other controls, especially the **Knee**. This setting determines how suddenly or gradually the compression is applied.
11. You can also experiment with the **Gain** controls if you wish, both for individual bands and for your overall mix.



### Using ReaXComp: Some Tips

- Don't create too many bands. Too many independently compressed bands can make your mix sound disjointed. Many of the best mastering engineers have produced much of their best work with as few as three bands.
- Listen closely to the changes in sound as you adjust the various settings. One affects the other, so it is important to take your time here.
- The Attack settings determine how much time passes after the signal rises above the threshold before the compressor kicks in.
- The Releases settings determine how much time passes after the signal falls back below the threshold before the compressor is released.
- Try to adjust the Attack and Release settings so as to make the compressor come in and out unnoticed.
- Especially when first using a Multiband Compressor in the Master, it is advisable to use the Gain settings only to compensate for loss of volume due to compression, not to pump the signal up. A notable exception here might be where one bandwidth needs to be lifted or lowered slightly relative to the others.
- It is often advisable to place a limiter (such as LOSER's Master Limiter) after the Multiband Compressor in your FX Chain.
- Another, and completely, separate use for a Multiband Compressor is to compress a very specific frequency within a track, for example as a de-esser or de-popper on a vocal track.

## 16.15 NEW! ReaControlMIDI

The Cockos ReaControlMIDI plug-in can be used with any MIDI track to set various MIDI parameters on that track. It can be inserted from the track's FX chain, or by right-clicking over the track name or number and choosing **Show ReaControlMIDI for Selected Tracks** from the menu.

An example of this plug-in in use is shown here.

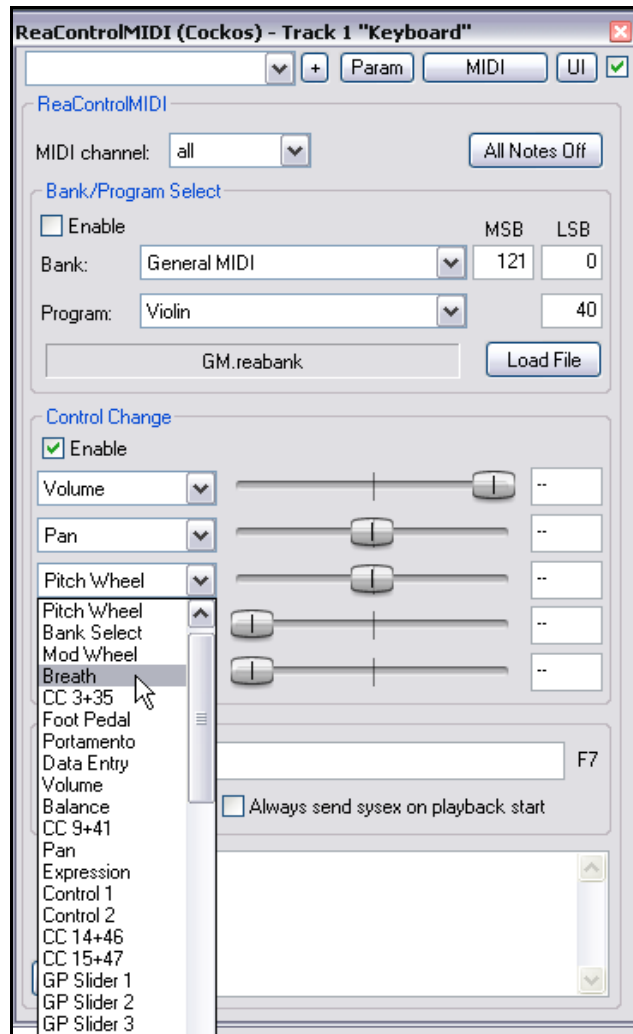
You can, of course, use several different instances of this plug-in on the one track to send different MIDI messages to different channels.

Many DAWs have MIDI tracks with MIDI-specific controls, like bank/program select, MIDI volume and pan, etc. REAPER instead uses ReaControlMIDI, which essentially provides a MIDI track TCP for any track.

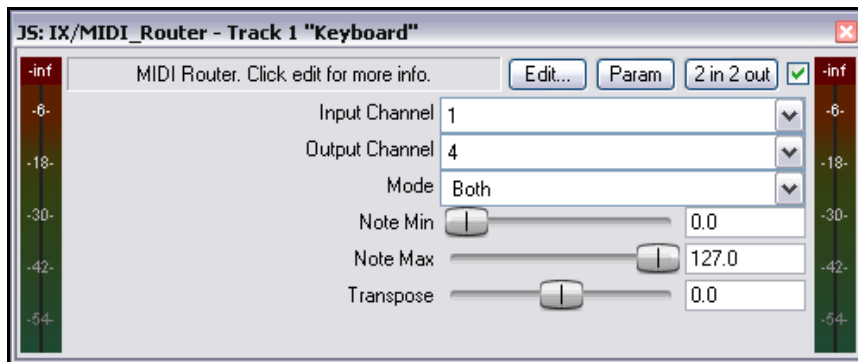
This provides you with additional flexibility, because you can insert multiple instances, or insert it at any point in an FX chain, either for the track as a whole or for individual items.

You can also assign track controls to the TCP and/or MCP to manage its parameters where you think it appropriate.

ReaControlMIDI also gives you a vehicle for creating MIDI CC track envelopes, by automating the plug-in's enabled CC sliders.



## 16.16 JS: IX/MIDI\_Router



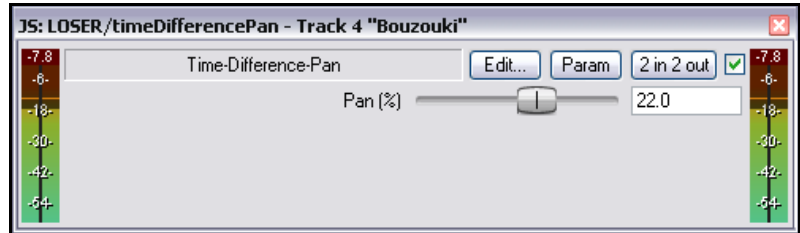
This plug-in is used to redirect MIDI data from one channel to another. You can choose whether to send notes, non-notes, or both.



## 16.17 LOSER's TimeDifference Pan

Of the many (and growing number of) Jesusonic plug-ins that are supplied with (or available for use with) REAPER, LOSER's TimeDifference Pan definitely merits a mention. It is delightfully simple to use, but very effective.

Sometimes you may feel that a track you have recorded sounds rather "thin" or "wimpish". You'll want to fill it out a bit, or fatten it up to make it sound richer, warmer, fuller. In this case, one old trick is to duplicate the track and run the duplicate track a few ms behind the original, panned differently. Fed back into the main mix, this can almost make the one instrument sound like two instruments at times.



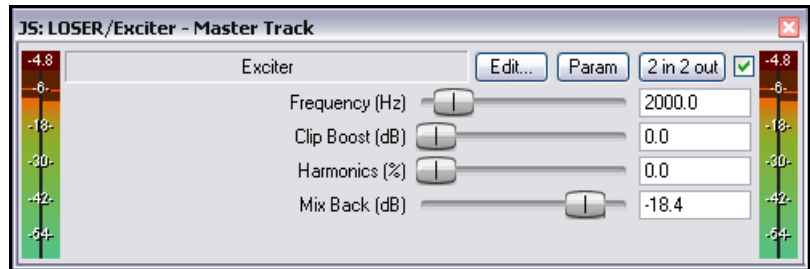
LOSER's TimeDifference Pan plug-in effectively does all this for you – with much less time and trouble on your part, and with very, very little CPU overhead.

If you want to experiment with this plug-in to try out the effect for itself, the **Bouzouki** track on **All Through The Night.RPP** lends itself to this quite well.

## 16.18 LOSER's Exciter

LOSER's Exciter plug-in is a great but simple way of putting some high end sparkle back into an otherwise muddy sounding mix

Of course, where possible, it is better to fix problems with individual instruments or tracks, but even after doing that you may still find that your mix lacks a certain vitality. Place the Exciter at or near the beginning of the Master FX chain and see for yourself. Note these settings:



**Frequency** – the frequency above which you want to add the sparkle. Try experimenting in a range of about 2000 Hz to 4500 Hz. Sometimes, you may need to go even higher for the best results.

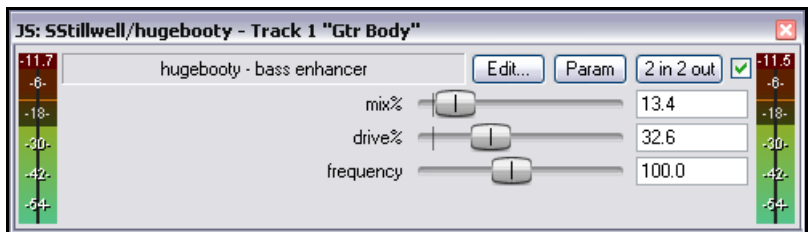
**Clip Boost** – the amount by which you wish to boost the volume above this frequency. Be gentle at first.

**Harmonics** – the amount of Harmonics you want to add to the mix (go easy on this one).

## 16.19 SStillwell's HugeBooty

This is a delightfully simple plug-in that can be used to enhance the bass frequencies on any track.

Try setting the required frequency first, then gradually increasing drive and mix until you like what you hear.



### 16.20 Some Guitar FX Plug-ins

There's a whole series of Jesusonic plug-ins especially designed to help you shape your guitar sounds. By and large, they work in much the same way as your guitar pedals do. Here is a selection:

Plug In	Description
<b>JS Guitar/amp-model</b>	Lets you select an amplifier to be simulated, such as a Fender or a Marshall. Lots of parameters for you to tweak!
<b>JS Guitar/chorus</b>	The waveform is fed thru a series of delays whose delay times are slowly modulated. The shape of the chorus sound is moulded primarily by the Length, Number of Voices, and Rate settings.
<b>JS Guitar/distortion</b>	This plug-in works by distorting the shape and frequency content of the waveform. The degree of distortion applied is determined principally by the Gain and Hardness settings.
<b>JS Guitar/flanger</b>	Flanging is an effect that occurs when a signal is mixed with a delayed copy of the signal, while the delay time continually changes. The flange effect is basically set by adjusting the Delay Length, Rate and Feedback parameters.
<b>JS Guitar/phaser</b>	This four allpass filter stereo phaser effect settings include Rate (Hz), Range (Min and Max), and Feedback.
<b>JS Guitar/wah</b>	The wah effect is also a filter effect, produced by the combination of the Position, Top Resonance, Bottom Resonance and Filter Distortion settings.
<b>JS Guitar/tremolo</b>	A tremelo effect is produced by a low-frequency variation in a sound's amplitude envelope. This is determined by setting the Frequency (Hz) and Amount (dB).

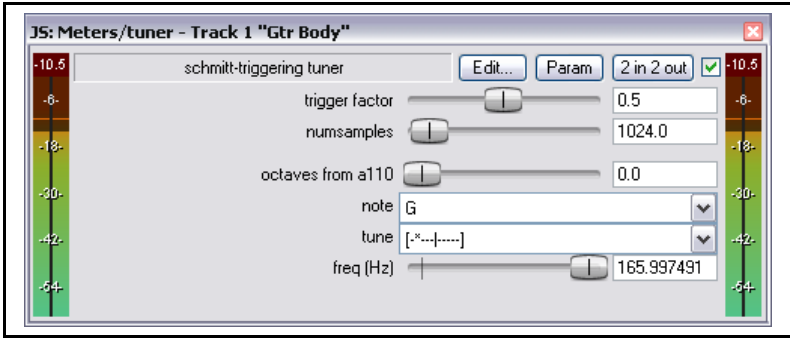
If you use more than one effect on a guitar, then the effect is of course cumulative, and the order in which you apply them will determine how good (or otherwise) the outcome is. As a starting point, a suggested order is:

- Filter** (such as Wah or Phaser)
- Compressor**
- Distortion**
- EQ**
- Pitch Change** (such as Vibrato)
- Modulator** (such as Flange or Chorus)
- Level Controller** (such as Tremelo or Limiter)
- Echo** (such as Reverb)

Of course, we are not suggesting that you will want to use all these effects at once! If you do use more than one effect, however, the above is a good starting order. This does not mean that you shouldn't hold back from experimenting with other FX ordering, to see what creative sounds you can produce!

16.21 Some Other REAPER JS Plug-ins

This last part of this chapter will give you an overview of some of the other wonderful Jesusonic plug-ins supplied with REAPER. It is only a small selection, and the fact that any plug-in isn't included in this table in no way implies that it is inferior to any of those that are included.

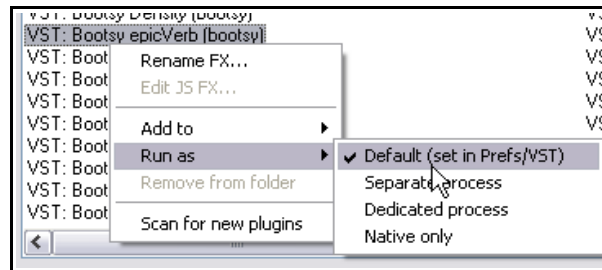
Plug In	Description
<b>JS Filters/dc_remove</b>	A DC offset removal plug-in.
<b>JS IX/StereoPhaseInverter</b>	Offers four choices, Normal Phase, Invert Left, Invert Right or Invert Both.
<b>JS IX/PhaseAdjustingRouter</b>	A stereo phase inverter with the addition of selectable input and output channels. This can be used, for example, to create a fuller, more vibrant sound from a single mono track.
<b>JS LOSER/DDC</b>	A custom designed compressor suitable for use with Digital Drums.
<b>JS LOSER/SPLimiter</b>	A simple peak limiter with a single control, Threshold. This can be used to prevent an individual track from clipping.
<b>JS LOSER/StereoEnhancer</b>	Used to create an enhanced stereo effect in a stereo track, folder, bus or Master.
<b>JS LOSER/Waveshaping Distortion</b>	A delightfully easy to use plug-in that adds distortion to a track.
<b>JS Meters/tuner</b>	Insert this into a new track and arm for recording, then tune your guitar. 
<b>JS Meters/vumeter</b>	Insert this into any particular track when you want monitor its VU levels closely.
<b>JS autopeakfilter</b>	A neat plug-in that lets you create autowah type effects.
<b>JS Misc/tonifier</b>	An interesting plug-in that creates sound effects by shifting pitch or frequency for audio blocks of a determined size.
<b>JS Pitch/superpitch</b>	One of a number of plug-ins that can be used to change pitch.
<b>JS SStillwell / ozzifier</b>	Especially good for fattening or doubling a vocal track.

Plug In	Description
<b>JS SStillwell/expander</b>	The opposite of a compressor! Can restore dynamics to a mix that sounds overcompressed. This works by <i>raising</i> the volume of the signal when it falls <i>below</i> a given threshold.
<b>JS SStillwell/hpflpf</b>	Adds a high pass filter and low pass filter to a track or Master. Useful, for example, for removing bottom end rumble. 
<b>JS SStillwell/badbussmojo</b>	A nonlinear waveshaper.
<b>JS SStillwell/louderizer</b>	A simple plug-in with two controls, used to make a track or mix louder.

## 16.22 NEW! Specifying VST Plug-in Run Mode

Within the FX Browser you can right click over any VST plug-in to specify your preferred mode for running that individual plug-in. Your options are natively, as a separate process, as a dedicated process, or as whichever of these has been specified as the default in your preferences.

This option can be used to help quarantine REAPER from the effects of any plug-in that you suspect may be causing performance problems.

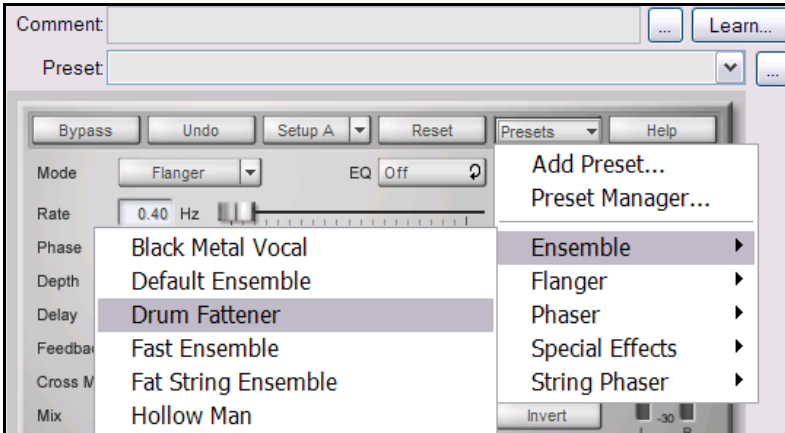


## 16.23 Third Party Plug-in Presets

You can use your favourite third party VST and DirectX plug-ins with REAPER, such as Sonitus, Wave Arts, Sony, and so on. Many of these plug-ins are supplied with a number of Presets. It's worth noting that the method of accessing these plug-ins will vary depending on such factors as the plug-in's native interface and the type of plug-in (for example, whether VST or DirectX).

In this section, we will look at three examples. Armed with this information, you should be able to figure out where to find the presets for any of your plug-ins.

**Example 1**



This example (left) is of a popular DirectX Sonitus plug-in, Modulator.

In this case, the plug-in interface includes its own native **Presets** section. Clicking on that (shown left) displays a menu of supplied presets.

You can also store your own presets here if you wish, as the Sonitus range of plug-ins includes its own preset manager.

Notice that you can also use REAPER's own Preset Library to store

your presets. This is accessed by clicking on the small button (with the three dots) shown just below the Learn button.

This is especially useful when you are working with plug-ins that might not have their own native Preset Manager.

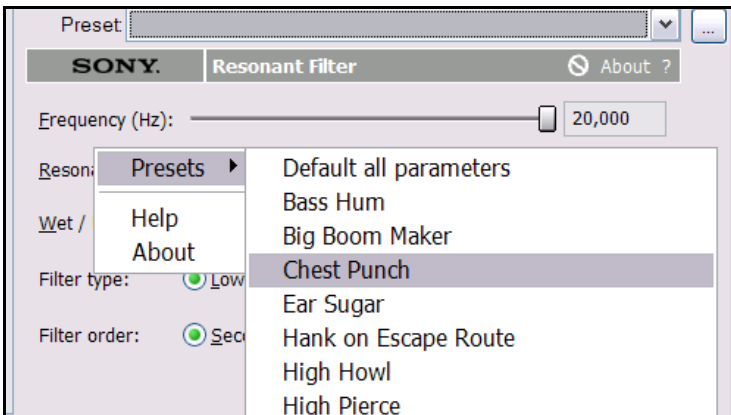
**Example 2**

This example (right) shows a TWest VST plug-in, STEADY Pro.

This plug-in does not have its own native preset manager. However, as with other plug-ins you can use the REAPER VST program interface to create your own presets.



**Example 3**



A Direct X plug-in this time, Sony's Resonant Filter.

In this case, native presets do not appear when clicking on the REAPER Preset drop down list arrow. This will only display any presets that you have created yourself.

In this example, right-click over any vacant area of the plug-in's GUI interface to display a list of factory presets.



# The Clever Stuff





### 17 More REAPER Routing Examples

This section is mainly intended for reasonably experienced users of DAW software, to show you some of the more clever aspects of REAPER's routing that are probably different from anything you've experienced before. But hey, even if you're a complete newb, have a look anyway if you like. You might find it interesting.

#### 17.1 Controlled Bleed

*Bleed* is a term used when material intended to be recorded on to one track manages to overflow onto others. This commonly happens:

- When more than one voice or instrument is recorded at the same time, each with its own microphone. For example, you might record a person singing and playing an acoustic guitar at the same time, perhaps one vocal mike, one guitar mike. However, you will find that some of the vocal will bleed thru on to the guitar mike, and vice versa.
- With layered recording, when the headphones are so loud, or ill-fitting, that the microphone being used for recording actually picks up some of the output of the headphones.



Headphone bleed is bad, period. If, for example, you have an artist who likes to hold one headphone to her ear while overdubbing a vocal, then make sure the mix is sent to that ear only. Happily, REAPER's flexible routing makes this simple.

In the example shown (right), output from the Master is directed to both Speakers, but only one headphone.

The other kind of bleed, which we will call *live recording bleed*, can actually have some benefits. If all microphones are positioned carefully and correctly, it can produce a warmer, fuller more natural sound than is often obtainable from layered recording. (Layered recording is where each track is recorded one at a time).

The trouble is, the "all at once" method of recording it also has negatives – serious ones. For example:

- It isn't possible to drop in and overdub a short passage to correct perhaps a vocal phrase or a couple of bars on the guitar. Basically, the whole track has to be recorded again each time. Everything.
- It isn't possible in mixing to get the best sound for each track. For example, if you need to add some presence or compression to the vocal track, then you will also be adding it to the guitar bleed in the same track.

This is where REAPER's routing capabilities can be so useful. They allow you have the best of both worlds – the richer, fuller sound that you can get from adding a small amount of controlled bleed, but without the disadvantages.

Here's how it works:

- Use layered recording, to ensure that each track is recorded cleanly.
- Use REAPER's routing capabilities to add a little bleed where you want it, after any FX in the FX chain.

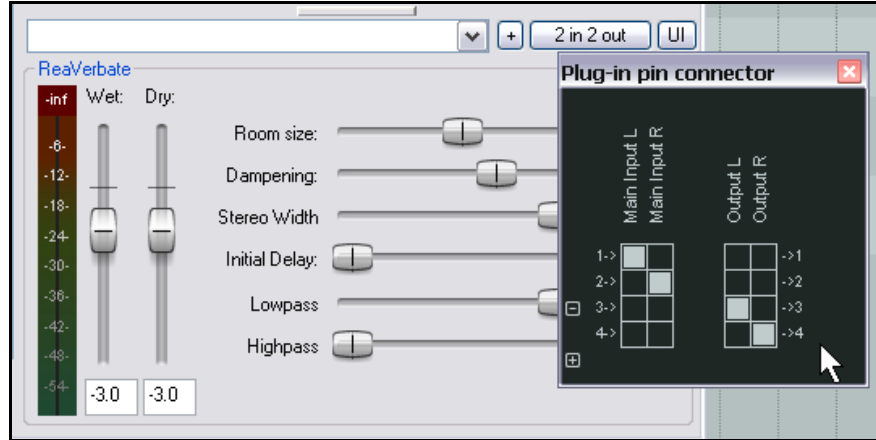
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## Example

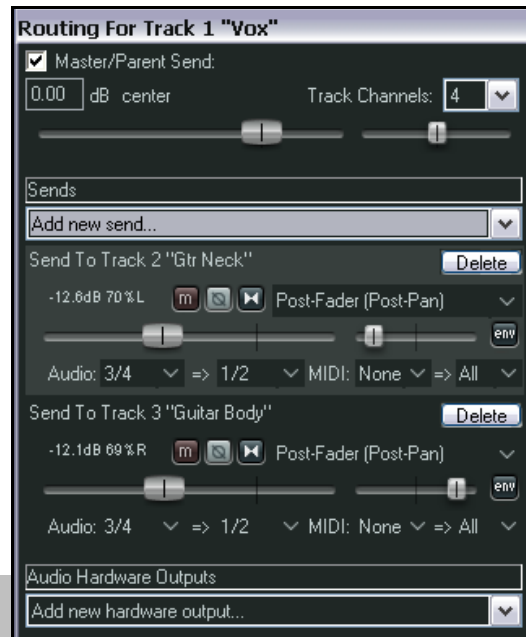
This example demonstrates a simple use of routing to create a *controlled bleed* effect.

1. Open the file **All Through The Night.RPP** and save it as **All Through The Night BLEED.RPP**
2. Mute the Bouzouki track. To keep this example simple, we won't be using it here.

3. Select the **Vox** track, right click over the Volume fader and set the number of track channels to 4. Display the **FX Window** for the **Vox** track. Add a Reverb FX of your choice. In this example, we are using **ReaVerbate** which is included with REAPER.



4. After inserting the ReaVerbate plug-in (or whatever you are using), adjust its settings to suit. Use its pin connector to direct output to Channels 3 and 4 only (see above).
5. Display the **I/O** Window for the Vox track.
6. Add **Sends** from the Vox (Channels 3/4) to both Guitar tracks, as shown. Pan these sends at about 70% left and right respectively, about -15dB, and Post FX (see illustration).
7. Play the song, with the Vox track Master/Parent send disabled. Adjust the Send levels of Vox to both Guitar Tracks so that the Vox can only just be discerned in the very background.
8. Enable the Master/Parent send on the Vox and play again. The Vox should sound fuller and richer than before.
9. Save the file.



## Now try this!

Remove the Reverb FX from the vocal track.

Remove the sends from the **Vocal** Track to the **Guitar** Tracks.

Create a new track called **Vox Reverb** and insert a Reverb FX of your choice.

Create a send from your **Vox** track to this **Vox Reverb** tracks.

Create sends from the **Vox Reverb** track to both **Guitar** tracks, Post FX.

Play the song, adjusting Send, Pan and Volume levels to suit.

### 17.2 Splitting Channels

This example will introduce you to a feature in REAPER that possibly delivers you more mixing power than any other single item: the ability to create and use multiple channels.

Doesn't sound very interesting or exciting does it?

It's not an easy concept to understand at first, so, just for fun, we'll take as simple an example as we can to introduce the concept.

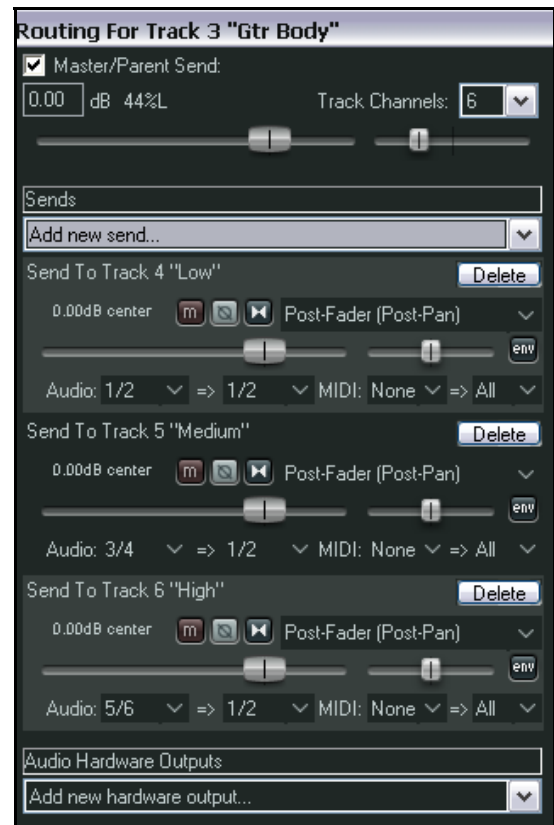
You have an acoustic guitar track recorded. You should by now have a general idea at least about how to shape its sound with EQ, or fatten it with a little delay. But in this example, we're going to take it to another level, so, for example, we can split the recorded track by different frequency bands into, say, three different paired channels, and perhaps pan different frequencies differently, or add some trailing delay just to one channel (i.e., one selected frequency range).

Why would you want to do this? With this particular example, maybe you would, maybe you wouldn't. But being able to create and use channels in this way opens up endless mixing and editing possibilities. We'll start with this example because it's a fairly simple one, and it will help you to understand how it's done. The later, we'll look at a more complex case.



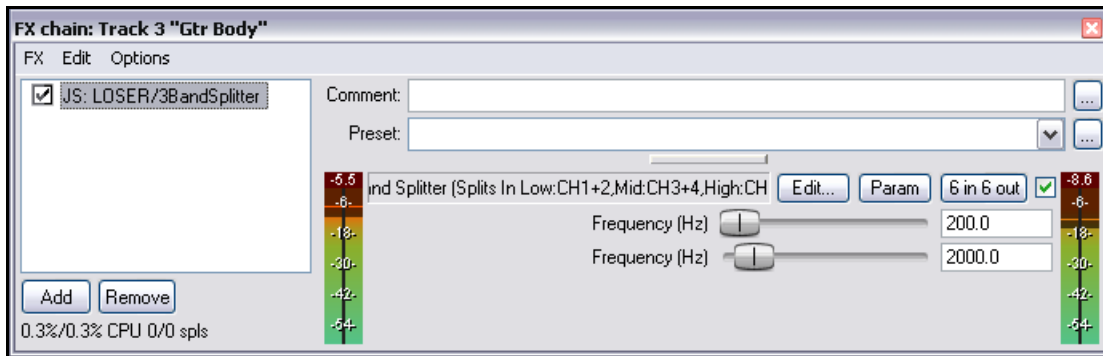
#### Example

1. Open the file **All Through The Night.RPP** and save it as **All Through The Night Channels.RPP**
2. We are (for the purpose of this example) going to work only with the track **Gtr Body**. **Mute** all other tracks except this. To do this, hold the **Alt** key and click on the **Mute** button for this track.
3. We now are going to create three tracks – let's call them *Ghost Tracks* – to mirror each of the three bands that we are going to split our **Gtr Body** track into. Create these three tracks and label them **Low**, **Medium**, and **High**. See illustration above right.
4. Display the **IO Window** for the **Gtr Body** track. Set the number of **Channels** (near the top) to **6**, and create sends to each of the three tracks that you have just created.
5. Send Audio from **Channels 1/2** to the **Low** track, **Channels 3/4** to the **Medium** track, and **Channels 5/6** to the **High** track. (see illustration right).
6. Getting complicated? Then make sure that your **Routing Matrix** is in view.
7. Now open the FX window for the **Gtr Body** track and insert the **JS LOSER/3BandSplitter**.

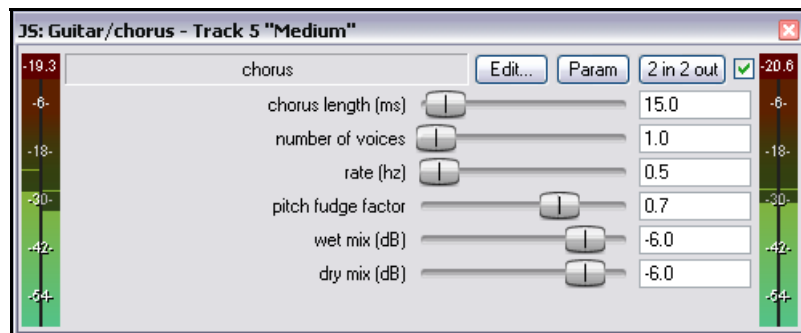


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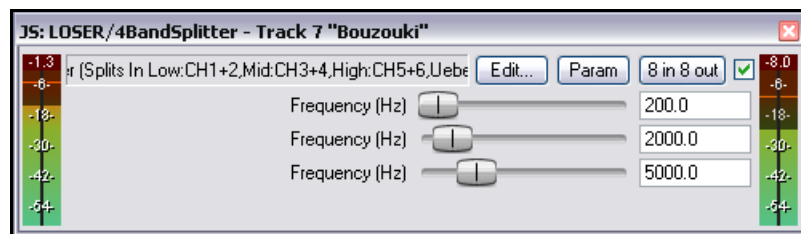
- Set the first frequency fader to about 200 Hz and the second to about 2000 Hz.



- Solo the **Low** track and play. Notice you hear only the Low frequencies.
- Unsolo the Low track, then Solo the **Medium** track and play. Notice you hear only the Medium frequencies.
- Unsolo the Medium track, then Solo the **High** track and play. Notice you hear only the High frequencies.
- Experiment adjusting the faders in the 3 Band Splitter and playing back, until you are satisfied with your settings.
- Now select the **Medium** track, open its FX bin and add **JS:Guitar/chorus**. Adjust the settings to suit.
- Now unsolo any solo tracks, unmute any muted tracks to restore all tracks to your mix. You'll probably want to fade down the original Gtr Body track somewhat.
- Make any further adjustments you want to your **Delay Chorus** settings . An example (but only an example) is shown above.
- Experiment with panning the three bands differently, to create a fuller sound.
- Save this file.



The plug-ins supplied with REAPER include several which can be used for channel manipulation, including a four band splitter (shown here).



### 17.3 Full and Fat Vocals with ReaDelay

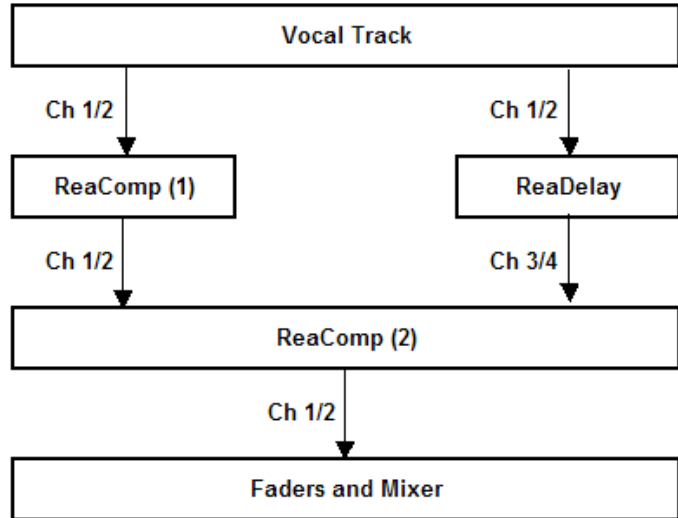
This next example shows how you can combine REAPER's channel splitting capabilities with the ReaDelay plug-in to create a simple effect for fattening up thin vocals.

The flow chart on the right illustrates how this can be done. The signal flow shown has this effect:

- It uses ReaComp to apply some compression to the main vocal.
- It creates a sidechain which is fed into the ReaDelay plug-in to fatten the original sound and to fill it out.
- The delayed signals are then mixed back in with the original signal, where further compression is then applied.

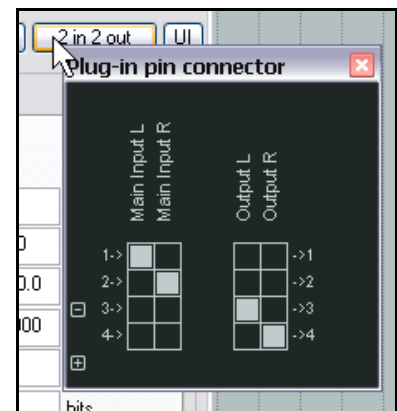
Of course, if you wish, you could apply more FX to any or all of:

- The original dry recording.
- The sidechained and delayed signal.
- The final mix of the dry and sidechained (delayed) signals together.



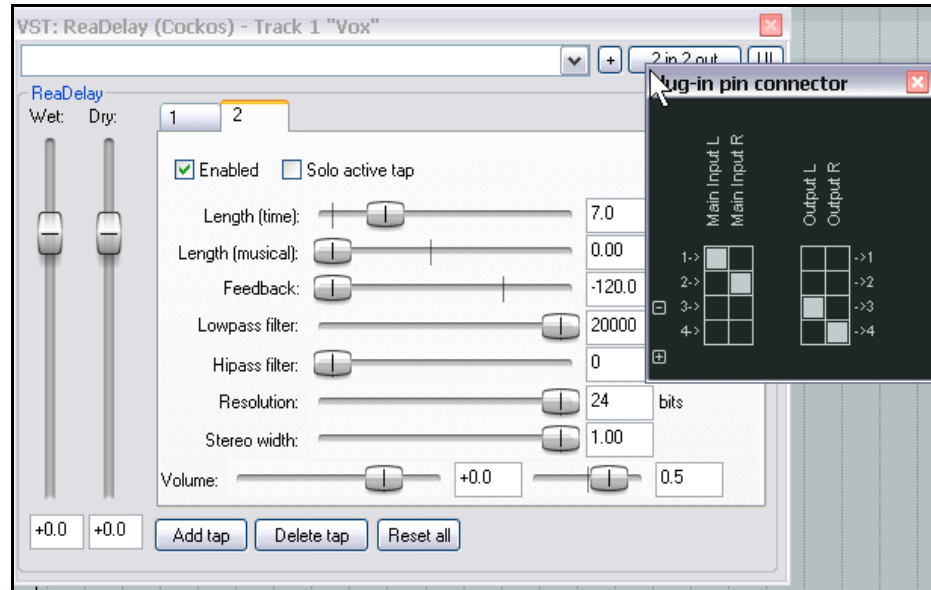
#### Example

1. Open the file **All Through The Night.RPP** and save it as **All Through The Night READELAY.rpp**.
2. Solo the **Vox** track. For the purpose of this example, we will be working with the vocal track alone.
3. Display the **I/O** window for this track and set the number of track channels to **4**.
4. Open the **FX Window** for this track. If there are already any -plug-ins already in the chain, remove them.
5. Now insert **ReaDelay** into the FX chain.
6. Click on the **2 In 2 Out** button to display the connector matrix. Leave the **Inputs** at their default (Channels 1 and 2), but adjust the **Outputs** so that they are **Channel 3** (Left) and **Channel 4** (Right), and *only* these two channels (as shown).
7. Click on the **Add Tap** button to add a second page.
8. Set Page 1 to a Delay Length (time) of about 14ms or 15 ms and musical length 0.
9. Set Page 1 Panning to about 50% Left. This shows on the fader as  $-0.5$ . See the illustration at the top of the next page.
10. Set Page 2 to a Delay Length (time) of about 6ms or 7 ms and musical length 0..
11. Set Page 2 Panning to about 50% Right. This shows on the fader as  $0.5$ .
12. Make sure that both pages are **Enabled** and that neither is soloed.



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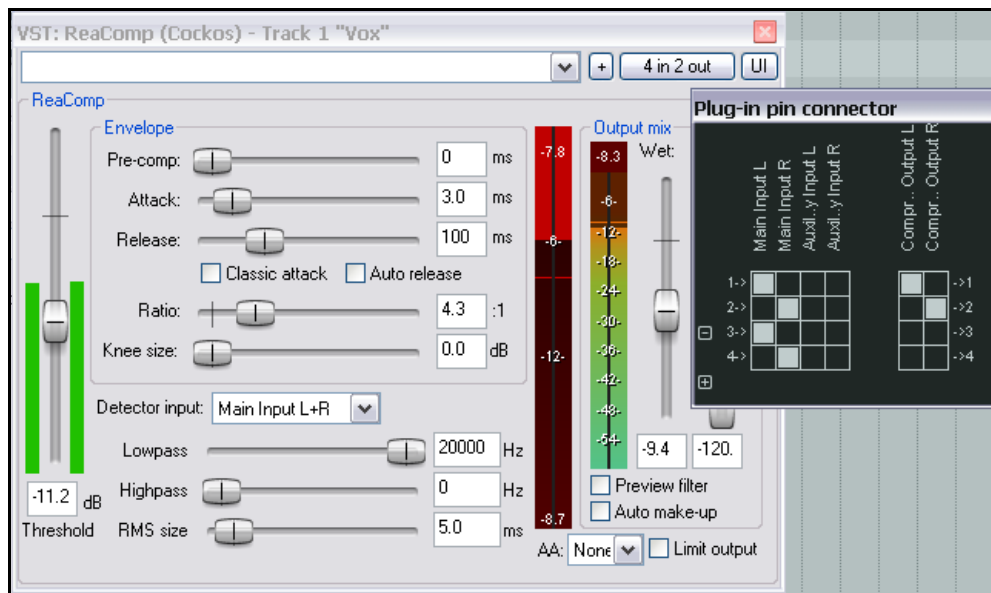
13. Insert **ReaComp** into the FX Chain. Leave the Main Inputs and Outputs both at their default settings, which are Channel 1 (Left) and Channel 2 (Right)
14. Set the **Ratio** control to about **6:1**. Adjust the **Threshold** control so that during the louder passages **Output** is reduced by about 6 or 7 dB.
15. Now insert another instance of **ReaComp** into the FX Window.
16. If you wish, you can rename your ReaComp instances to avoid confusion.
17. Click on the **4 In 2 Out** button to display the connector matrix. For the second ReaComp instance, set the Main Inputs to Channel 1 and Channel 3 (left) and Channel 2 and Channel 4 (Right).



18. Leave the Output at its default, which is Channel 1 (Left) and Channel 2 (Right).

19. Set the **Ratio** at about 4:1.

20. Play the vocal track. Adjust the **Wet** a **Dry** output levels from **ReaDelay** to suit.



21. Select the second **ReaComp** instance. Adjust the **Threshold** so that during the louder vocal passages the **Output** is reduced by about 5 dB to 6 dB. (see right).
22. When you have finished experimenting, save the file.

**Note:** In this example, the order in which the FX are applied is significant. With the order that we have used, the sidechained (delayed) signals do not go thru the first compressor, with the result that these signals retain more of their original dynamics.

## 17.4 Channel Splitting and Pitch Shifting

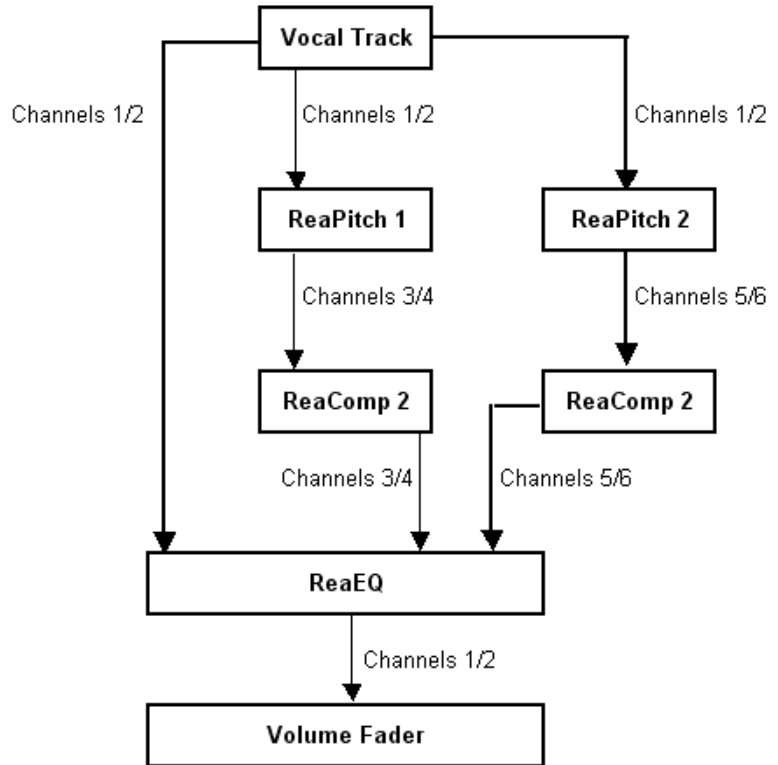
You've already seen how ReaPitch can be used, for example, to create vocal harmonies from a lead vocal track. In this example you will see how by splitting our vocal track into several channels you can create a whole vocal ensemble, with different FX and plug-ins being applied to different harmony parts.

This is especially useful, for example, if you want to compress your vocal harmonies before lowering them, to make them sit smoothly and subtly behind the lead vocal.

The illustration (right) demonstrates this concept.

In summary, this is what happens:

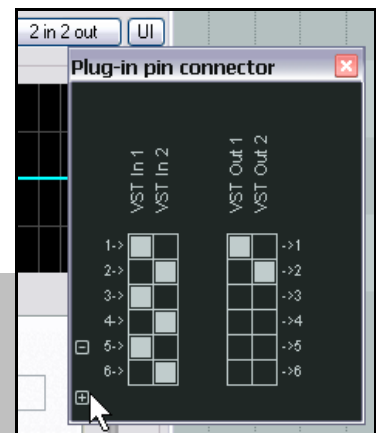
- The Vocal Track is assigned six channels.
- Two instances of ReaPitch are inserted, and the signal from channels 1 and 2 is fed to both of these.
- The output from the two ReaPitch instances are directed via channels 3 and 4 and 5 and 6 respectively to two separate instances of ReaComp.
- In each case, you will need to specify Channels 3 and 4 (ReaComp 1) and Channels 5 and 6 (ReaComp 2) as the input source for your compressors. Auxiliary Inputs should be set to nothing, and the Output channels should be the same as the Input Channels.
- The output of the two compressors is sent to a single instance of ReaEQ, as is the original signal on Channels 1 and 2. In order to do this, you should make Input 1 for ReaEQ Channels 1, 3 and 5 (see illustration right), and Input 2 should be Channels 2, 4 and 6.
- The three streams are joined back together at ReaEQ, from which they are fed to the volume fader.



Note: Set Auxilliary Inputs in both ReaComp instances to nothing. Use Main Inputs to drive both compressors.

**Tip:** If you forget to create your required track channels before loading your plug-ins into a track's FX chain, then you can still add them "on the fly".

To do this, just click on the small + button in the bottom left corner of the Plug-in Pin Connector window - see position of mouse cursor (right).



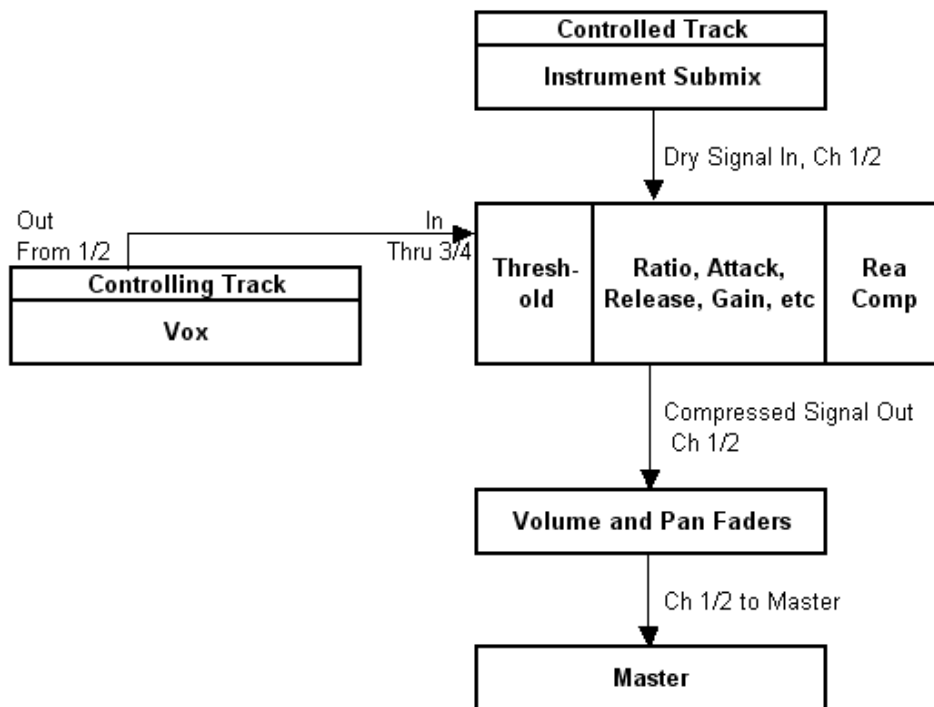
### 17.5 Audio Ducking

The next example in this section will show you how to use REAPER's routing capabilities to create an effect known as **ducking**. Put quite simply, this is a term which describes what happens when a compressor is set up to ensure that the volume on one track is automatically lowered whenever the volume on another track is raised.

You might want to do this, for example, when working with a kick and a bass. In this example, we'll use the Bouzouki, Guitar and Vocal tracks in our sample project, just to show you how it's done. We will use audio ducking to ensure that the overall volume of the instruments are automatically lowered slightly whenever there is a signal on the Vocal track. This helps lift the vocal track slightly above the mix. In order to do this, we use multi channel routing in conjunction with the ReaComp compressor.

The illustration below illustrates the concept of how we use sidechaining to achieve our ducking effect.

**Sidechaining Flowchart**



Let's take it step by step.

#### Example

1. Open the project **All Through The Night.RPP** and save it as **All Through The Night DUCK.RPP**.
2. If there are any tracks other than **Gtr Body**, **Gtr Neck**, **Vox** and **Bouzouki**, delete them, so that you are left with just these four tracks.
3. If necessary, rearrange track order so that **Vox** is Track 1, **Gtr Body** Track 2, **Gtr Neck** Track 3 and **Bouzouki** is Track 4.
4. In the Track Control Panel, select the **Vox** track and press **Ctrl T** to insert a new track after this. Name this new track **Instrument Submix**.



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- Click on the **Folder** icon to make this track a folder. Make the Bouzouki track the last track in the folder. See picture right.

- We need to add two more channels to the **Instrument Submix** track so that it can receive a sidechain signal from the Vox. Right click over the Volume fader for this tracks in turn, then set the number of channels to four. See picture below right.

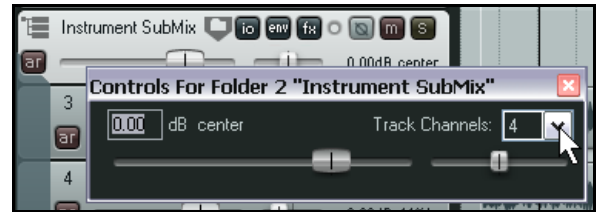


- We now need to create a sidechain to enable the various instrument and **Instrument Submix** track to detect the signal level of the Vox track.

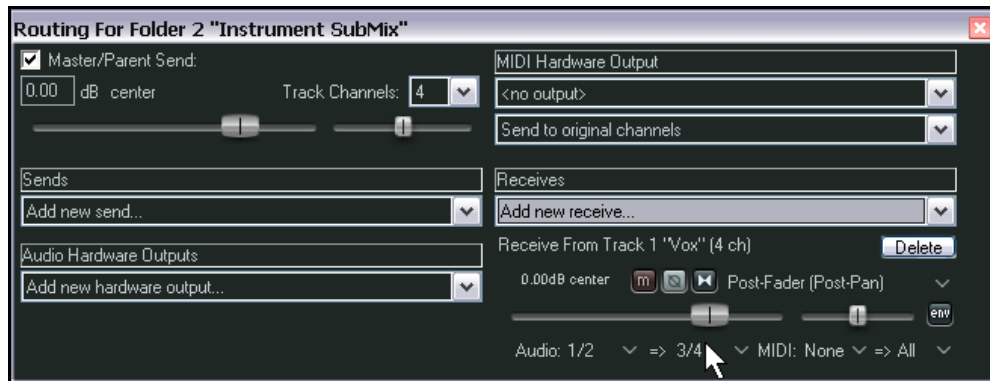
- Display the **I/O Routing Window** for the **Instrument Submix**, then create a **Receive** from the Vox track. Direct the signal in via Channel 3/4, as shown below.

- Next, display the FX window for the Instrument Submix Track. Add the **Cockos** plug-in **VST: ReaComp (Cockos)**

- Notice that this plug-in includes an item called **Detector input**. This is where we tell REAPER that we want the Vox level, not the Bouzouki level to control when the compressor kicks in. This Detector input offers two basic choices – **Main Input** and **Auxiliary Input**.

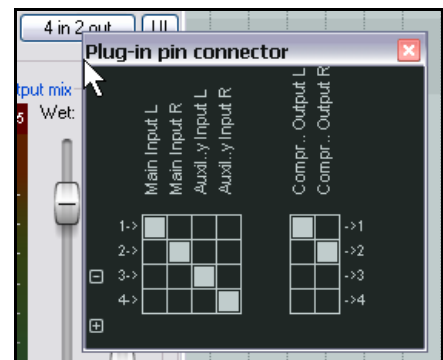


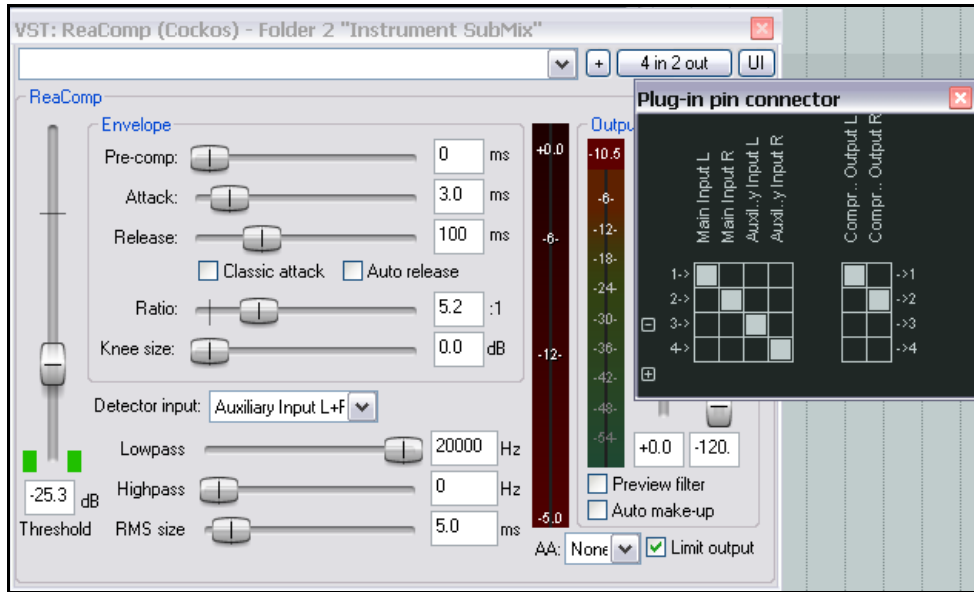
- We need to make sure that Main Input is defined as the media on the Submix track itself (Channels 1 and 2), and Auxiliary Input is defined as the stream coming from the Vox track on Channels 3 and 4.



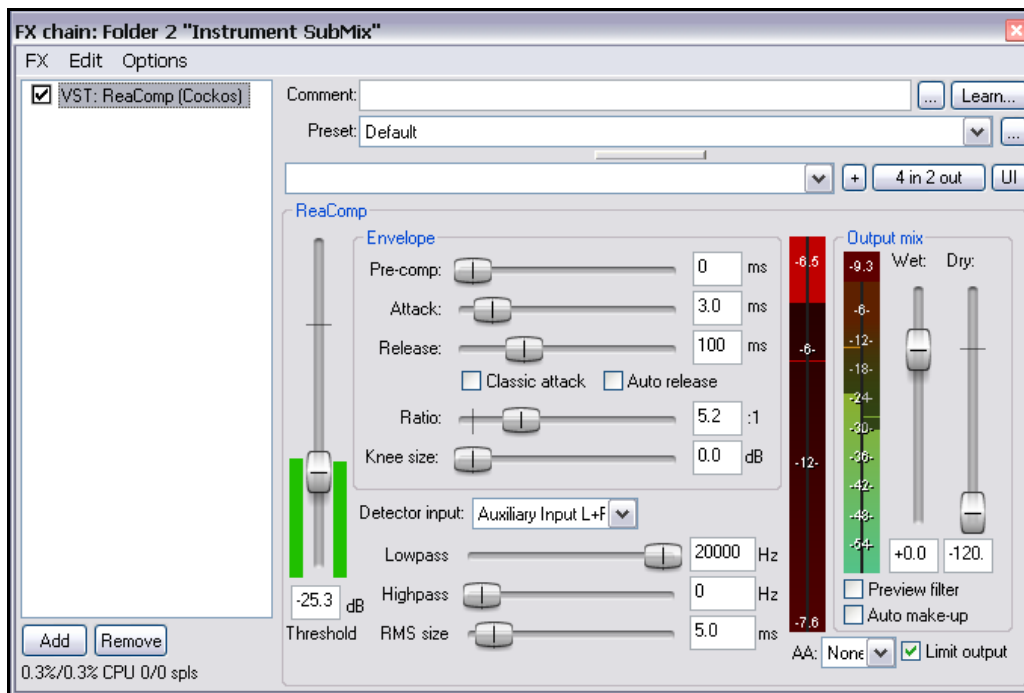
- Click on the **4 In 2 Out** button and if they are not already set, set the assignments as Main Input L- Receive from Channel 1, Main Input R - Receive from Channel 2,0 Auxiliary Input L – Receive from Channel 3, and Auxiliary Input 4 – Receive from Channel 4.

- Now display the **Detector Input** drop down list and select **Auxiliary Input L + R**. The settings should now be as shown below.





14. Now play the song. Adjust the **Threshold** (first vertical fader) downward, so that during Vocal passages the VU meter peaks above the fader level (see below), then slide the **Ratio** fader right until you are satisfied with the overall amount of reduction on the Instruments. This will probably be somewhere between 4:1 and 6:1. You should be able to see the flashing red bar to the left of the Output VU. This indicates the amount of reduction that is occurring on the submix track. In the example shown below, this is -5.7 db.



15. Save the file.

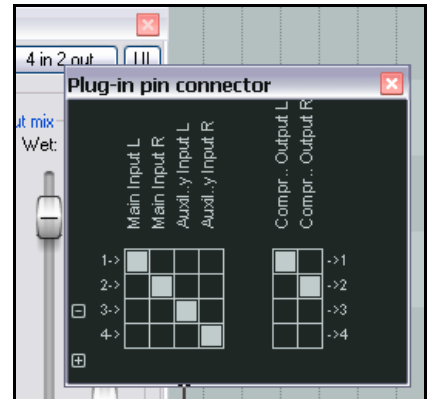
## 17.6 Double Ducking

This example should only be attempted *after* you have completed the example in the previous section **Audio Ducking**. It builds on the work you did there, to apply a further instance of sidechaining, this time to the Master. We will set up another instance of ReaComp, this time in the Master Track, to ensure that another layer of gentle compression is applied to the entire mix during the vocal passages. The same audio stream is used to apply ducking in two different ways – hence the term *double ducking*. As with many of the other examples included in this section, the main purpose of this example is to help you to understand how to use REAPER’s routing capabilities. The example itself is of secondary importance.

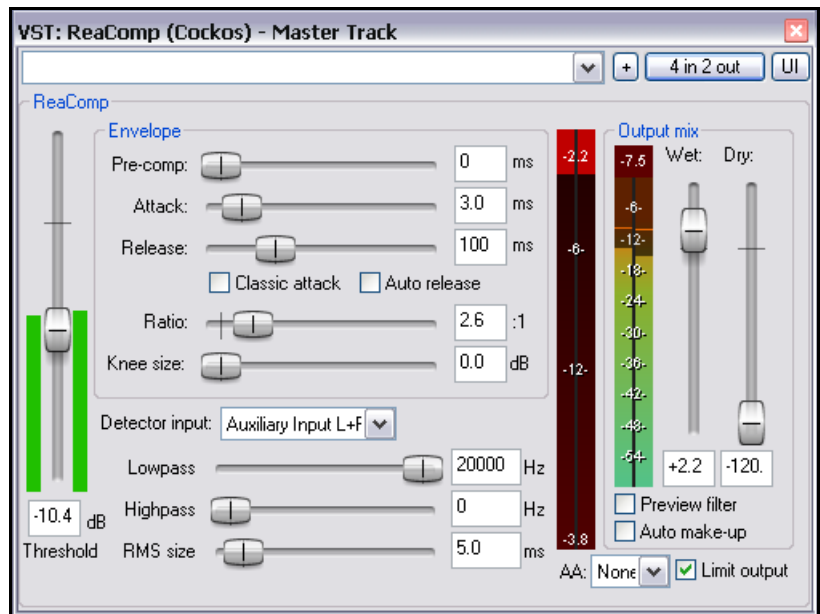
In the previous example, we used a send from the Vox track to Channels 3 and 4 on the Instrument Mix track and then used these as Auxiliary Inputs to gently compress the Instrument Mix. Because the Instrument Mix is itself being routed to the Master, that Vox track send will automatically also be sent to the Master on Channels 3 and 4.

### Example

1. Open the file **All Through The Night DUCK.rpp** and save it as **All Through The Night DOUBLE DUCK.RPP**.
2. Select the Master Track. Right-click on the **Volume** fader for the Master and ensure that the number of Channels is set to four. (In fact, it should automatically already be set to four). Close this window.
3. Display the **FX Window** for the Master Track and insert **ReaComp**.
4. Make sure that the Auxiliary Input L is set to Channel 3 (see right) and Auxiliary Input R is set to Channel 4. These should already be the default settings.
5. Set the **Ratio** to around 2.0 to 1. Display the **Detector Input** drop down list and select **Auxiliary Input L + R**.
6. Play the song. During the vocal passages, adjust the left hand vertical Threshold fader so that the compression kicks in gently. Raise the vertical **Wet** fader by about a decibel. Make sure that **Limit Output** is selected. An example of how your settings might look is shown. (right).
7. That’s it! You can now save your file.



You can use sidechaining in conjunction with a number of REAPER plug-ins, including ReaGate, ReaXComp, ReaComp and ReaFir.



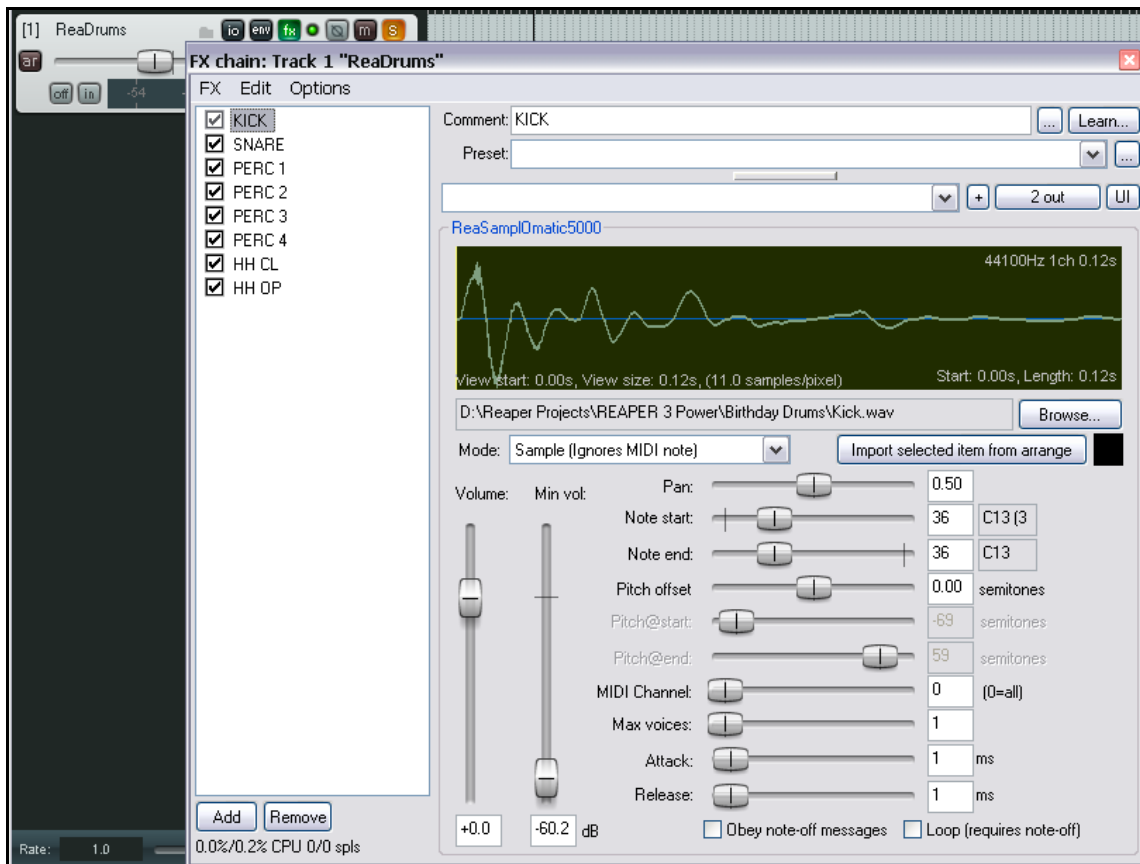
## 17.7 ReaSamplomatic and ReaDrums

This example uses the **ReaSamplomatic** plug-in provided with REAPER in conjunction with the **ReaDrums** track template created by **jamester**. You can download this template from the REAPER web site. To check the current address for this, visit the REAPER Forum and check jamester's signature. After downloading, it should be copied into your Track Templates folder, **C:\Documents and Settings\User Name\Application Data\REAPER\TrackTemplates**

In the example that follows, we will use the **MIDI Editor** for demonstration purposes, but of course if you have a keyboard, you can use that instead.

### Example

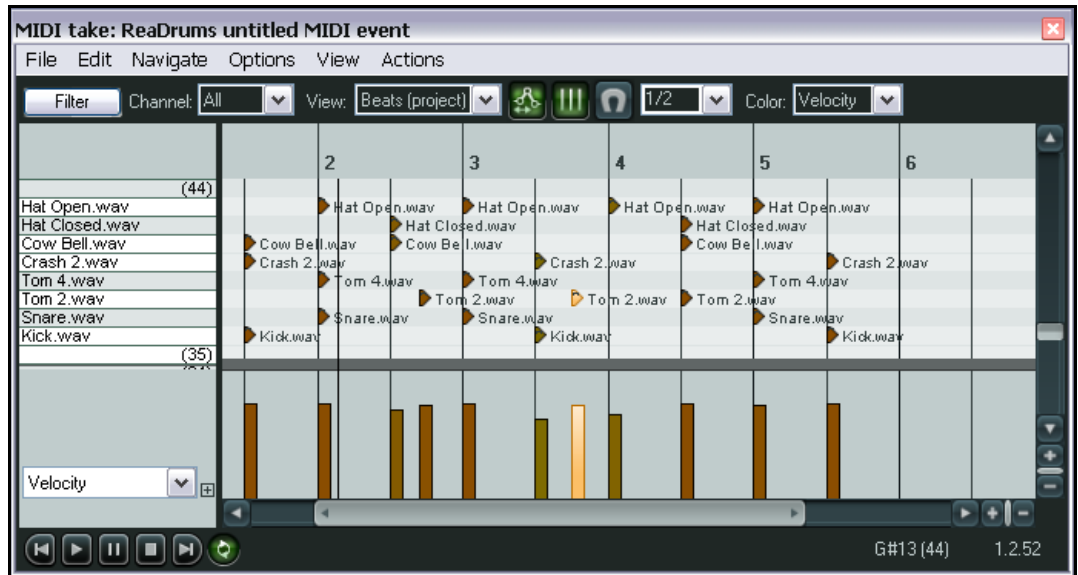
1. Create a new empty project file and save it as **ReaDrums Example.RPP**
2. Right click over the Track Panel Area and from the menu choose **Insert track from template** then your **ReaDrums** template. Notice that a track will be inserted, already armed for recording and with eight individual named instances of ReaSamplomatic inserted in its FX bin.
3. Notice that each instance of ReaSamplomatic is set up differently. From top to bottom, these are *Kick*, *Snare*, *Perc 1*, *Perc 2*, *Perc 3*, *Perc 4*, *HH Cl*, *HH Op*
4. Now display the Media Explorer – **Ctrl Alt X** – and select a folder where your samples are stored.
5. In the ReaDrums FX window select the item KICK. From the Media Explorer window, drag with your mouse the required sample file and drop it into the ReaSamp window, in the edit box just left of the Browse button.



6. Now repeat this process in the other seven ReaSamp instances, one at a time, for each of the other seven instruments, each time inserting a different appropriate sample.

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7. If the ReaDrums track is still armed, unarm it. Save the file.
8. Along the timeline select the first 10 seconds or so. With your ReaDrums track selected, choose the **Insert, New MIDI Item** command to insert a MIDI item.
9. Double click on this item to open the MIDI Editor. From the menu choose **View, Note style, Triangle** and **View, Mode, Named notes**.
10. Compose a few notes, similar to the concept shown below. Don't copy this pattern, make a simple composition of your own.



11. Close the MIDI Editor and save your file.
12. If you wish, you can also use REAPER's channel routing to send different parts to different tracks, where you can add FX, adjust panning, volume, etc. Let's suppose we wish to apply some FX to the kick and the snare individually. Right click over the Volume fader for the ReaDrums track and set the number of channels to four. We'll start with just one or two.
13. Press **Ctrl T** twice to add two more tracks.
14. Name the first of these tracks **Kick**, the second **Snare**.
15. In the **ReaDrums track** set the number of Channels to 4, and create a send to the new **Kick Track** (using channel 3) and the **Snare Track** (using channel 4).
16. Open the **FX Window** for the **ReaDrums track**.
17. Select the first ReaSamp instance, the **Kick**. Set both its VST Outs to Channel 3.
18. Select the second ReaSamp instance, the **Snare**, and set both its VST Outputs to Channel 4.
19. Now play the music. Notice that the Kick and the Snare have been rerouted to their respective tracks. Of course, you could now place any FX that you wish in the FX windows for those tracks.
20. Save the file.
21. If you add more channels to the original ReaDrums track, you can now repeat this effect for any other of your Drum parts.

**Note:** If you download the track template **ReaDrums Rack** from the REAPER forum, you will find that in this template all the individual tracks, along with their routing, have already been set up for you.

## 17.8 Multi Output VSTi Plug-ins

Reaper is capable of some very flexible routing; this flexibility can be used to great effect when you want to use multi-output VSTis in your projects. The examples that follow will outline two ways in which you can do this. I am indebted to **darkstar** for showing me how this is done.

You may well use these functions to set up multi output VSTis only once or twice but it's well worth taking the time and trouble. This will give you a much better understanding of the inner workings of Reaper compared with downloading a track template.

### Example 1: Using Paired Audio Tracks

1. Right click over the empty area of the Track Control Panel and from the menu choose **Insert virtual instrument on new track...**
2. When the FX browser window is shown, double-click on the required instrument. This example uses the 8-output version of **Grizzly** (4 stereo channels).
3. You will be asked to confirm whether you want the appropriate number of tracks built for the particular instrument that you have chosen (see right).
4. Click on **OK**.
5. REAPER will now insert the instrument into the FX chain for the original track, name it and arm it for recording. It will also create all the additional tracks for you.



6. You now have a single MIDI input track for the VSTi together with four output audio tracks. Notice that in this example:
  - Channels 1/2 from Track 1 are directed to Track 2, Channels 3/4 to Track 3, Channels 5/6 to Track 4 and Channels 7/8 to Track 5.
  - No output is sent directly from Track 1 to the Master.

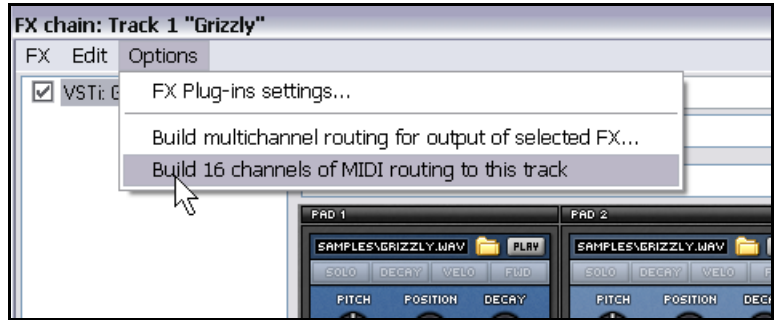
## 17 - More REAPER Routing Examples

7. You're now ready to load your instruments (in this example, select a drum kit) and to start playing.

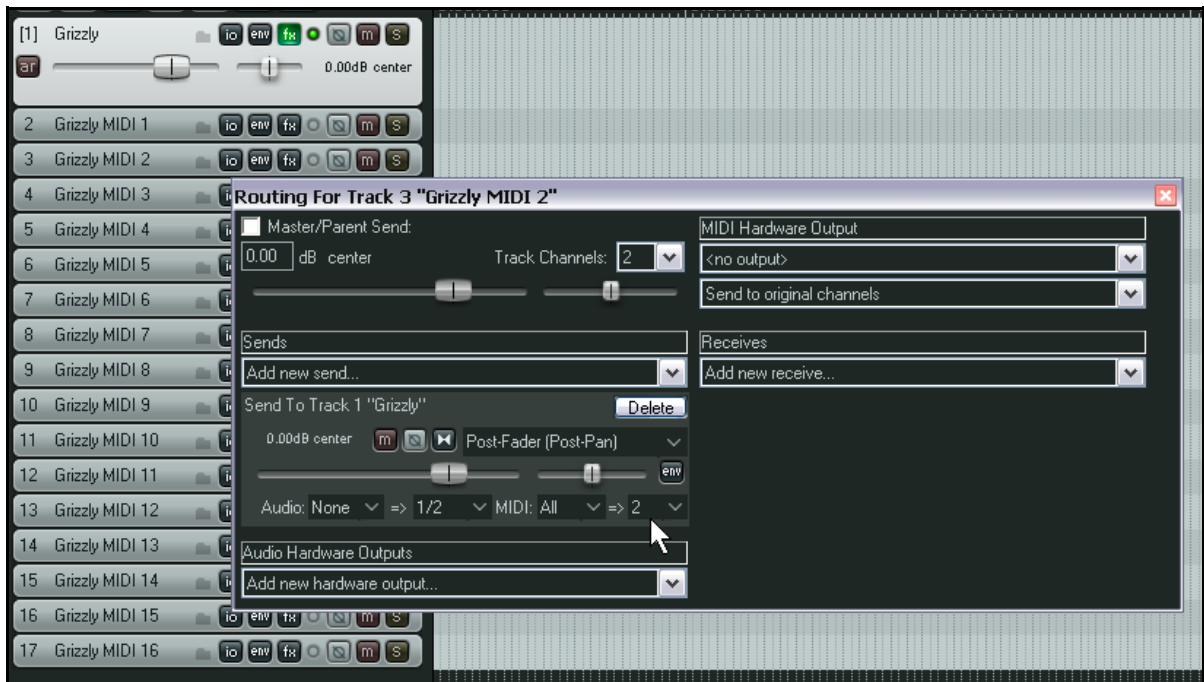
### Example 2: Using Separate MIDI Tracks

If you want a separate MIDI track for each VSTi output channel, you should use this method. Again, for the sake of the exercise, we'll use Grizzly, but you would use the same method for any other multi-output synth.

1. Create a new track and name it. Open the track's FX window and add the required VSTi to the track's FX chain.
2. From the FX chain **Options** menu choose the command **Build 16 channels of MIDI routing to this track**.
3. You now have a separate MIDI track for each channel. Notice from the routing that the MIDI output of each of these 16 tracks is sent to the track on which you originally inserted the VSTi.



You have a number of options for assisting you with managing this set of tracks. For example, you can put the MIDI Tracks in one folder, name the folder, color the tracks and hide them in the Mixer.



To enable keyboard input for the individual MIDI tracks:

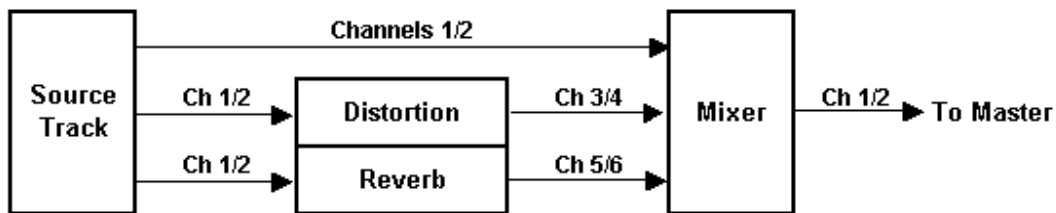
- make sure that the VSTi track is *not* armed for recording.
- select all 16 MIDI tracks.
- click the Record [R] button to expand them.
- click the Recording Monitoring button to turn on Input monitoring for all 16 tracks.
- for each track, set the MIDI input channel, from 01 to 16.
- click the Record [R] button again to collapse the tracks.

## 17.9 Parallel FX Processing: the IX Channel Mixer

Two great Jesusonic plug-ins are the **IX / Mixer 8xS** and the **IX / Mixer 8xM** which open up quite remarkable possibilities for how you can route your audio along different channels, then mix them back to produce some truly creative sounds and effects. The main difference between them is that one works with stereo paired channels, the other with mono channels. The example that follows is designed to show you how these mixers can be set up and used. After working thru it, you should be capable of using it for your own projects.

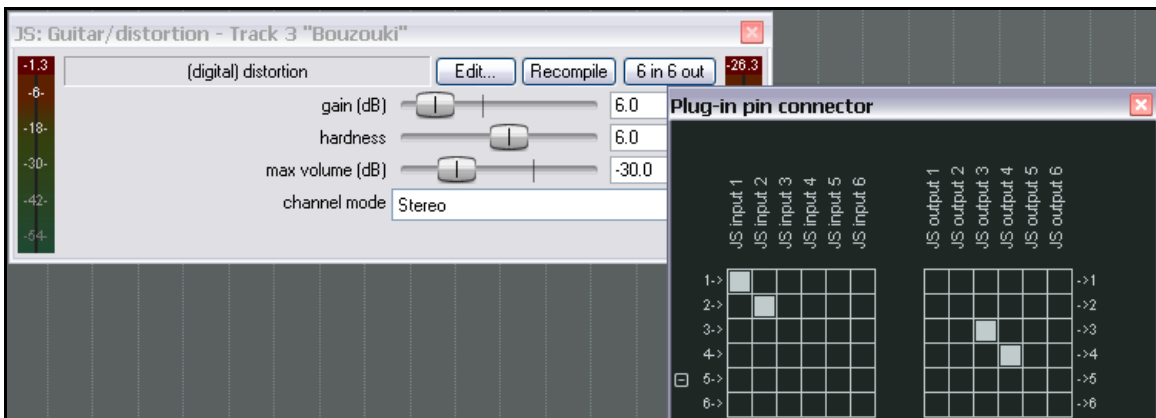
### Example

In this example, we will send output from one instrumental track separately to a Distortion FX and a Reverb FX, then mix the wet and dry signals back together, panning as required – all within one single track and without using any busses. To do this, we'll use the **IX Mixer 8xM** together with a couple of other plug-ins supplied with REAPER. The diagram below illustrates conceptually what we are going to achieve:



Notice that we will be running the signal *in parallel* to the two FX. By doing this, we ensure that each effect is processed separately before being mixed. This is different, of course from the normal FX chain, which processes effects sequentially.

1. Open the file **All Through The Night.RPP** and save it as **All Through The Night IX MIX.rpp**
2. For the purpose of this example, we are going to work on only the **Bouzouki** track. Solo this track.
3. Open the I/O window for the **Bouzouki** track. Set the number of track channels to 6 then close this window.
4. Open the FX window for this track. If any FX are already there, remove them.
5. Insert the FX **JS: Guitar Distortion**. To start with, make the various control settings similar to that shown here.



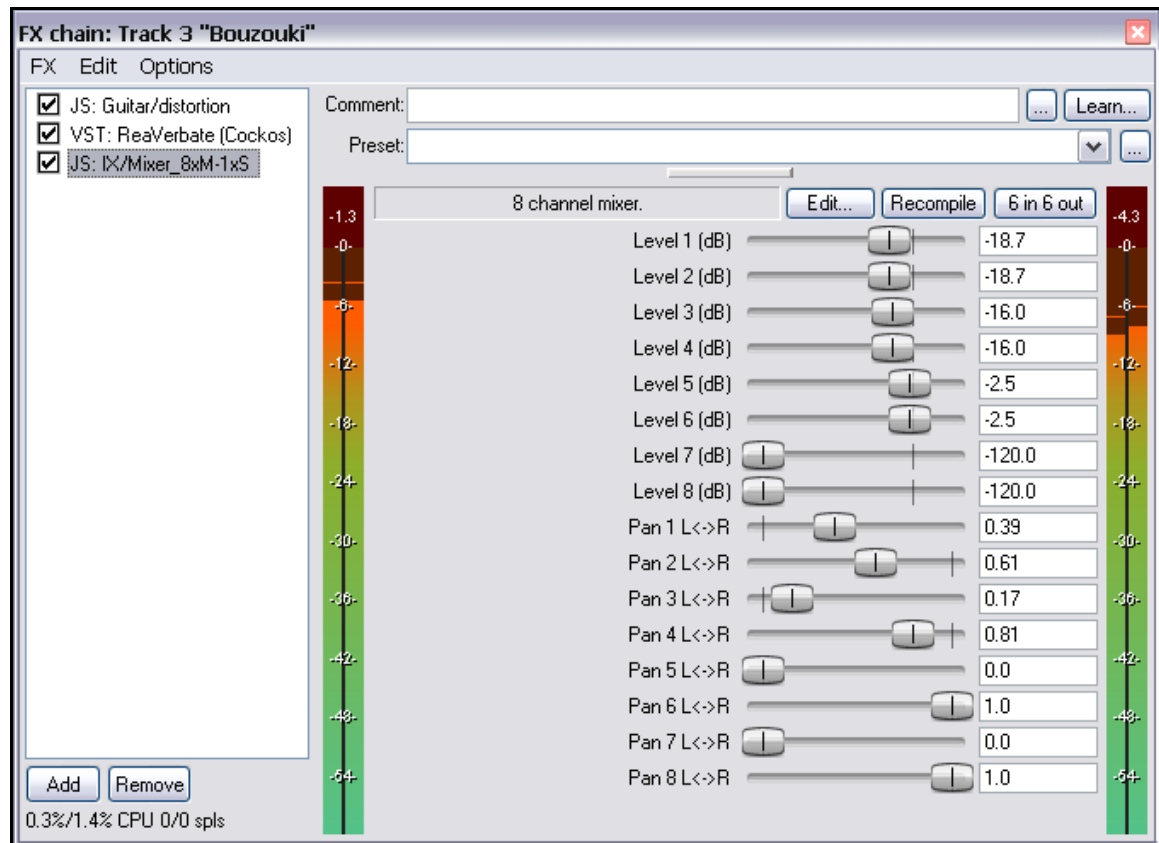
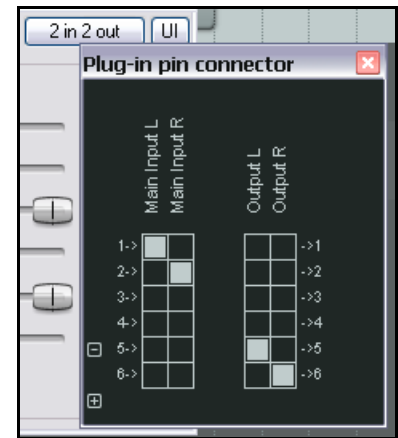
6. Make sure that input is from Channels 1 and 2 only and output is to Channels 3 and 4 only, as shown above.



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- Now add **ReaVerbate** to the FX Chain for the Bouzouki.
- Select a preset of your choice, then set the Output to Channels 5/6 as shown right.
- Now insert the **JS: IX/Mixer\_8xM-1xS** at the end of your FX chain for the Bouzouki track.
- Play the song and experiment with the volume levels and pan settings for your different channels. Experiment with changes also to the FX settings.
- Save the file when finished.

Of course, this is only a simple example. You could in effect have up to four separate FX chains running in parallel within this track. And it's very easy then to move an FX from one chain to another, just by changing its output channels.



The **IX** series of Jesusonic plug-ins have been developed by Philip S. Considine. I am indebted to Philip for his help in developing this example.

For more information about any plug-in, including Terms of Usage, insert the plug-in into any track FX window, then click on the **Edit** button. Be careful not to make any changes though!

### 17.10 More Parallel FX Processing

The example you have just considered demonstrates Parallel FX processing at its simplest. By experimenting with this feature, you can really contour your sounds exactly as you need to.

You could for example, add more plug-ins to your chains, and/or use more than 6 channels.

Channels 1 and 2: Dry – the original signal, unprocessed.

Channels 3 and 4: Distortion then Compression.

Channels 5 and 6: EQ then Reverb.

All three streams then get mixed back together using the Channel Mixer Plug-in.

### 17.11 Other Channel Routing Plug-ins (Overview)

The list of Jesusonic and Cockos plug-ins for REAPER is an impressive one, and one that is still steadily growing. The following table provides an overview of some of the other channel routing plug-ins that are currently available. You should always check the web sites and the forums for the latest information. This section introduces you to some plug-ins that are specifically designed for use in a multi-channel routing environment.

The information shown below has been extracted from the text files supplied with these plug-ins by their author, Philip S. Considine. Obviously, the plug-ins listed below can only be used on tracks which have more than one defined pair of channels.

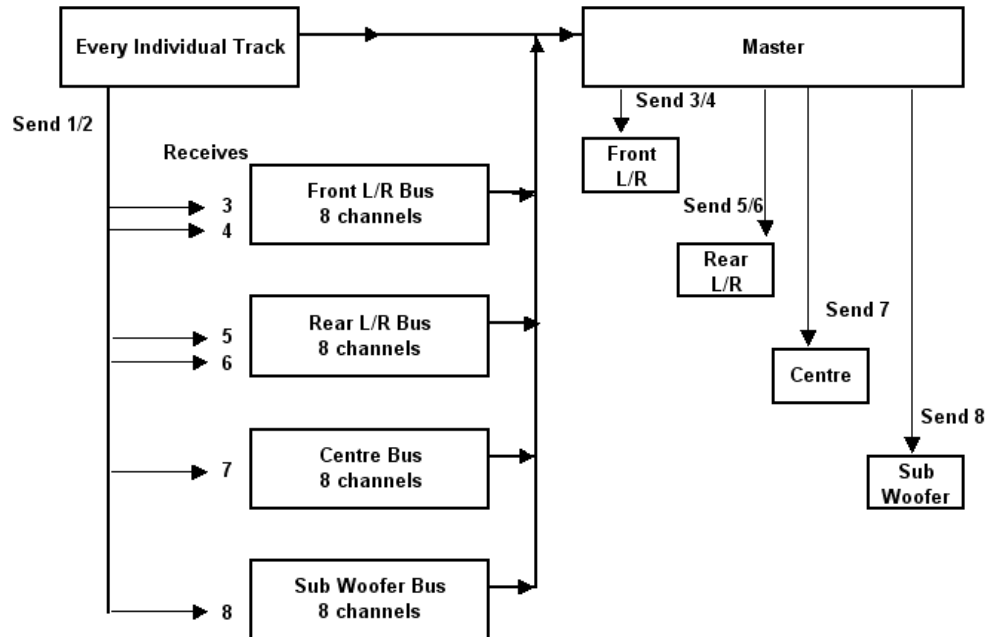
Plug-in	Description
<b>IX Mixer_8xS-1xS</b>	This channel mixing utility mixes up to four input pairs into a single stereo pair, output on channels 1+2. Each pair of inputs has a slider to control the amount of the input that will be mixed into the output.
<b>IX Switcher</b>	This is a channel switching utility. The Output Source parameter is used to select which one of up to four paired inputs channel is to be monitored. Useful for A/B comparisons.
<b>IX Switcher 2</b>	This is a variation of the Switcher switching utility. The Output Source parameter is used to select which one of up to four paired inputs channel is to be monitored, and the Level faders allow you to adjust the gain independently for each pair. Useful for A/B comparisons.
<b>IX SwitchMix</b>	This crossfade utility allows you to feed up to four input pairs to two busses then mix those busses to output channels 1+2. The destination for each of the four paired inputs can be set to Off, A, B, or A+B.
<b>IX PhaseAdjustingRouter</b>	Takes the signal from an input channel pair and modifies the phase according to the selected mode. The modified signal is then output on the selected output channels. Only the selected output channels will be modified so, for example, a signal received from inputs 1+2 and output on 3+4 will still be present in its original form at outputs 1+2. The Input parameter is used to select which paired channels are used for the input. The Phase Mode can be set to No Change, Invert Left Channel Only, Invert Right Channel Only or Invert Both Channels. The output parameter selects the output channels.

## 17.12 Surround Mixing

REAPER's flexible channel routing opens any number of avenues for you. The diagram below illustrates one way that you could set up a project template ready for Surround Mixing, in this case using 5.1.

This diagram represents the following setup:

- Four special tracks have been set up to act as Surround Busses. Each of these tracks is defined as having 8 channels.
- Sends are established from every other track (or perhaps folder) to each of these busses. All receives to the Front L/R bus are thru channels 3/4, all receives to the Rear L/R bus are thru channels 5/6, and so on.
- All tracks and the four special busses have their output directed to the Master Track.
- Assuming that you have a soundcard with sufficient audio outputs, all six speakers are physically connected to one each of six of your audio outputs.
- The Master is set up as an eight channel Master, with outputs routed to the various speakers as shown right.
- Mixes for the various output can be controlled using the Routing windows of the four special bus tracks.
- Relative overall output levels to each and all of the speakers can be controlled from the Master Track's output window, shown right.
- FX and plug-ins within the Master Track can now be assigned to any or all of your various hardware outputs. This is one example of where being able to rename the FX instance can be helpful.
- You can still create a separate stereo mix if you wish, in this example using Channels 1 and 2 for this purpose.



## 17.13 REAPER's Routing Interface

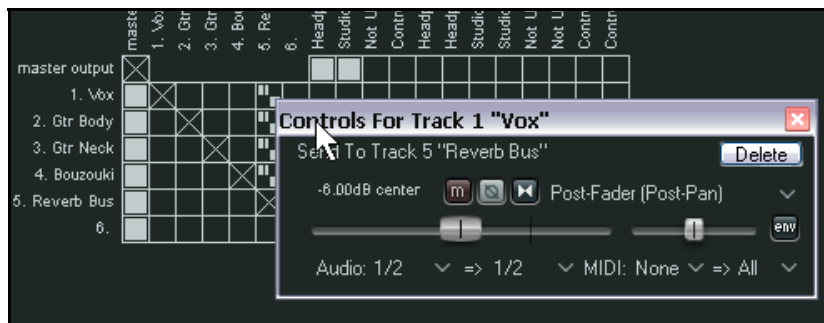
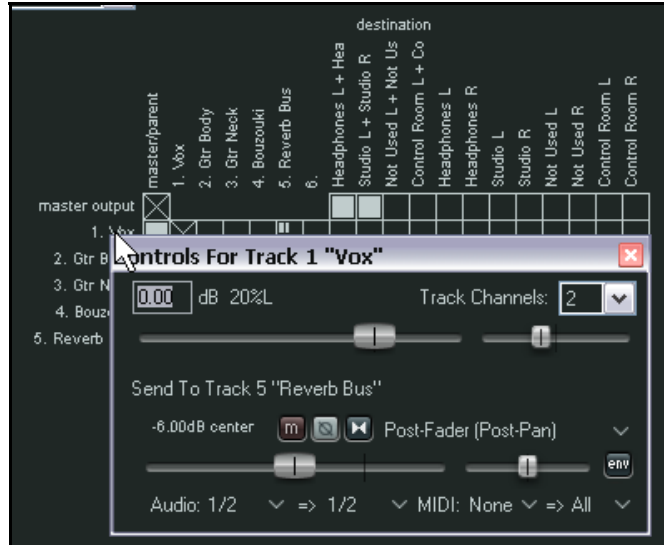
If you are using REAPER in such a way as requires the use of multiple track channels, sends and receives (as do many of the examples in this section), then there can be considerable workflow benefits in keeping the Routing Matrix in view. You can use your routing matrix to make adjustments to any of your sends and receives, or to specify the number of channels required for any track. Some examples are summarised below.

Right click over any track name (as shown right) to display the Track's Routing Window and change the number of Track Channels, or to adjust the parameters of any Send or Receive associated with that track.

Right click over the Send/Receive signal at any intersection on the Routing Matrix to adjust any of the parameters for that Send or Receive (as shown below right).

Click over any vacant intersection on the Routing Matrix to create a Send/Receive at that point. In addition, you can create Sends and Receives from the Track Control Panel in the Track View, or the Mixer Control Panel in Mixer View.

In either case, you can click on any track's **I/O** button to display that track's Routing Window, or right-click over the **I/O** button and use the flyout menu to easily add a Send or Receive.



Notice also that the three different types of send are represented in the Routing Matrix by three different symbols, as shown left. As shown, from top to bottom these are **Post Fader (Post Pan)**, **Pre Fader (Post FX)** and **Pre FX**. In each case, the height of the large thick bar indicates the send level.

### Tip:

To create sends from several different tracks to one other track (such as an FX Bus), simply select all of the tracks in the Track Control Panel, then right click over the **I/O** button for any of the selected tracks and add the send there. by selecting the destination track from the flyout menu.



## 18 Parameter Modulation

### 18.1 The Concept

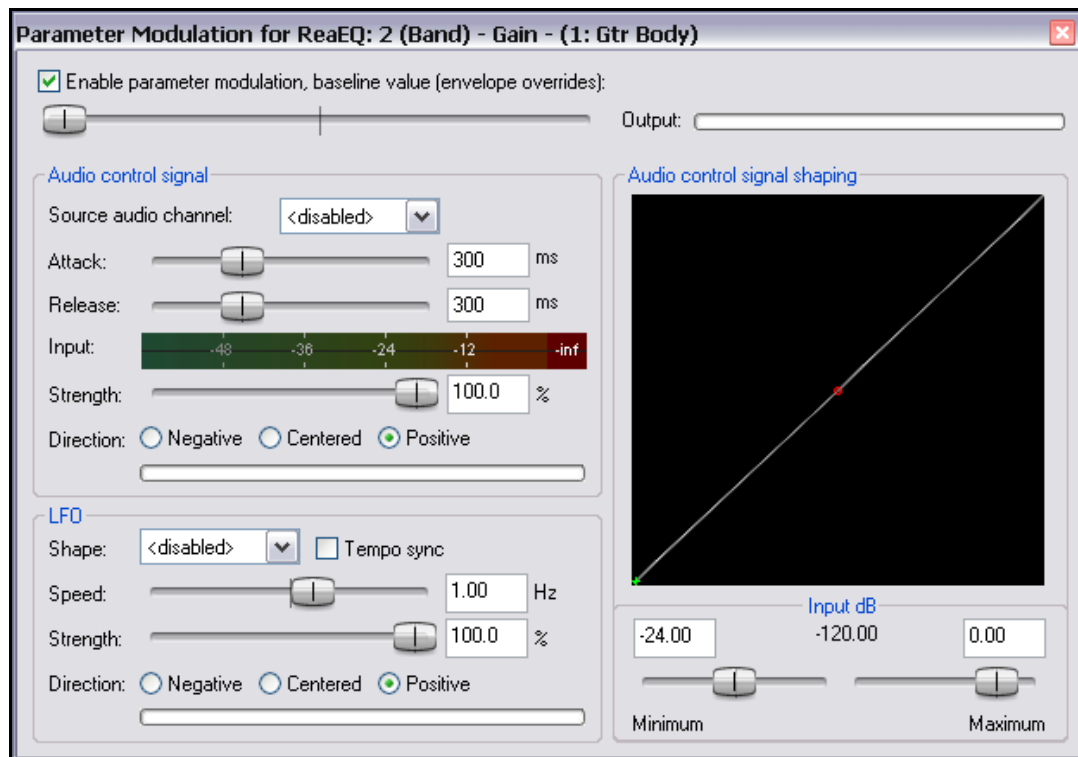
Parameter modulation is a technique which takes REAPER’s routing, channel splitting and sidechaining capabilities to extraordinary new levels. You should probably not attempt this chapter unless you already have a sound grasp of these concepts. If necessary, turn back to the chapter **More REAPER Routing Examples** and work thru it again. Parameter modulation at its simplest means using the volume level on one track to control the behavior of one or more FX parameters on the same track or a different track or number of tracks. Don’t worry if this doesn’t quite make sense yet. The concepts of what this is and how it works will become clearer after you have worked thru some examples.

One simple example might relate to the application of a chorus plug-in to a guitar or bouzouki track. Suppose that we wish to vary the wet/dry balance of the chorus throughout the track. We could, of course, accomplish this with the use of automation envelopes. However, this might involve quite a lot of work. Now take this idea a step further. Suppose that we wish to define a relationship between the instrument’s volume and the wet/dry mix, so that as the volume increases the mix becomes drier, and vice versa. Rather than have to create a series of envelopes for our chorus plug-in, we can use parameter modulation to ensure that these parameters will respond automatically to changes in volume.

Incidentally, this particular example can create an interesting effect of space and distance on the instrument, but as with the other examples in this chapter, that is not the main point of the exercise. The main point is to show you how parameter modulation is set up and used. It’s then up to you to use and apply it in ways that you find appropriate for your own mixes.

### 18.2 The Interface

Illustrated below is an example of the Parameter Modulation window. The table below that explains the main settings, what they do and how they are used. We will then go on to work thru some examples to show you how parameter modulation can be used.



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Item	Description
<b>Enable parameter modulation, baseline value</b>	This sets a default value for the specified parameter that is to be modified. However, if an automation envelope exists for the same parameter then that envelope will determine the baseline and this setting will be ignored.
<b>Source audio channel</b>	This specifies which audio channel(s) – for example, 1/2 or 3/4 – contain the audio signal that is used to control the specified parameter.
<b>Attack and Release</b>	<p>These two factors determines the speed with which changes in the level of the incoming signal will be applied to the parameter. They work in a similar way to Attack and Release on a compressor.</p> <p>Setting a low attack speed will cause the parameter modulation to respond rapidly to changes in volume in the source audio channel, a higher speed will cause a greater delay to occur.</p> <p>A low release speed will cause the modulation to be adjusted rapidly as the volume then falls. A higher speed will hold the modulation for a longer period before doing so.</p> <p>Generally speaking, the higher the attack and the release settings the more gradual will be the parameter modulation response. The lower these settings, the more sensitive and immediate will be the response.</p>
<b>Strength and Direction</b>	<p>These determine the nature and the intensity of the relationship between the incoming audio signal and the parameter being controlled. For example, set to 100% positive as the incoming audio signal increases and decreases, so will the parameter being controlled. At 50%, the relationship will still be positive, but more moderate.</p> <p>A setting of 100% negative means that as the incoming audio signal increases, the parameter being controlled will decrease, and vice versa. At 50%, the relationship will still be negative, but more moderate.</p> <p>At 0%, the effect will be completely neutral.</p>
<b>LFO</b>	These settings can be used to modify the parameter modulation using an LFO shape such as sine, square or triangle.
<b>Input dB</b>	<p>This determines the dB range within which the incoming audio signal will be applied to the parameter being controlled.</p> <p>The lower the minimum and the higher the maximum threshold setting, the more often and the longer the parameter control will be applied.</p>
<b>Audio Control Shaping Signal Graph</b>	<p>This graphical control helps shape the behavior of the parameter that is being modified..</p> <p>For example, if the direction is set to positive, then pulling the small red handle (in the centre of the diagonal line) on the graph fully to the bottom right corner will result more modest increases in the value of the parameter being modified.</p> <p>On the other hand, pulling the small red handle (in the centre of the diagonal line) on the graph fully to the top left corner will result in greater increases in the value of the parameter being modified.</p>

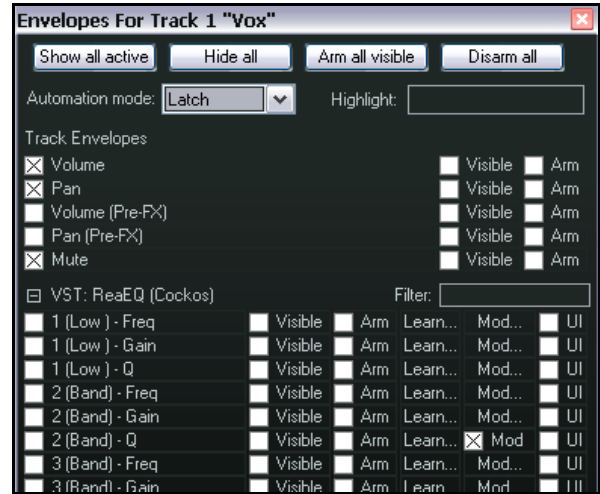
## 18.3 Defining a Parameter for Modification

To select an FX parameter to be modified, follow either of these sequences.:

1. Displaying the track's **Envelopes/Automation** window and click on the **+** for any plug-in to display the list of its controls.
2. Click on the **Mod** button for any parameter that you wish to have modified by an audio signal. You will then see a small check box next to the **Mod** text for that item in the Envelopes window (as shown right).
3. Close the Envelopes/Automation window.

Or:

1. Open the plug-in's FX window.
2. With the mouse, click on the control for the parameter that you wish to modulate.
3. Click on the **Param** button in the plug-in window, then choose **Parameter modulation** from the menu that is then displayed.



## 18.4 Controlling an FX Parameter on the Same Track

In this first example, we will insert a plug-in such as chorus into a track's FX chain, then use that track's audio signal to control the way that plug-in behaves.

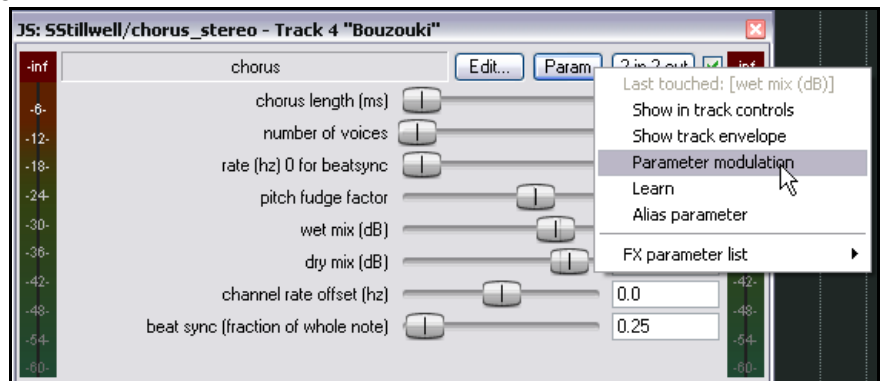
### Example

1. Open the file **All Through The Night** and save it as **All Through The Night MOD1**.
2. Solo the **Bouzouki** track. For the purpose of this example, this is the only track that is needed.



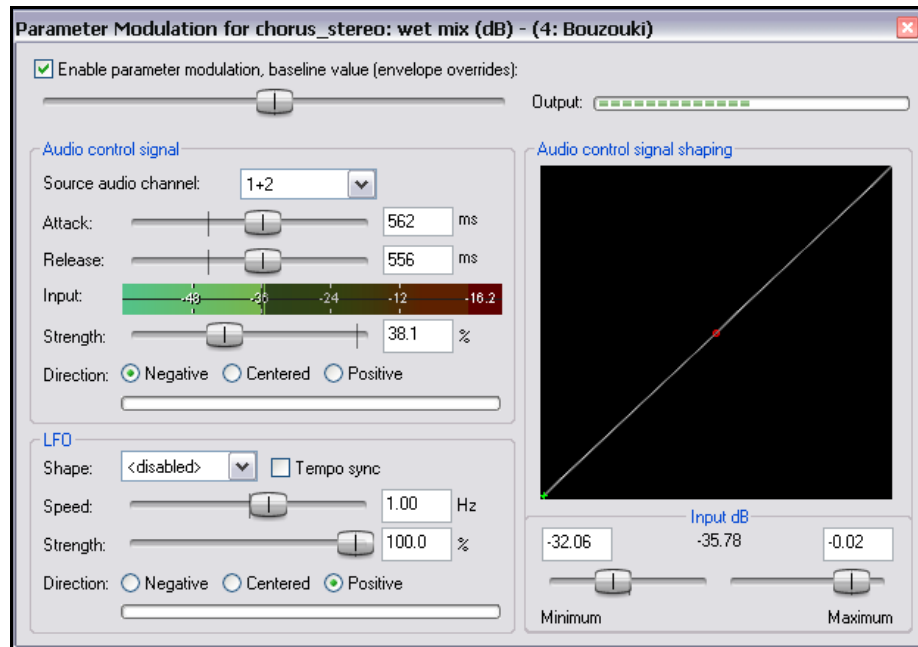
3. Pan the track dead centre and lower its volume a little, as shown above.
4. Insert the **JS: Sstillwell/chorus\_stereo** plug-in into this track's FX chain, and set the various parameters as shown here.

5. Click on the **wet mix (dB)** fader in this plug-in.
6. Click on the **Param** button, then choose **Parameter Modulation** from the menu (see right). This will open a parameter modulation window for the wet mix.

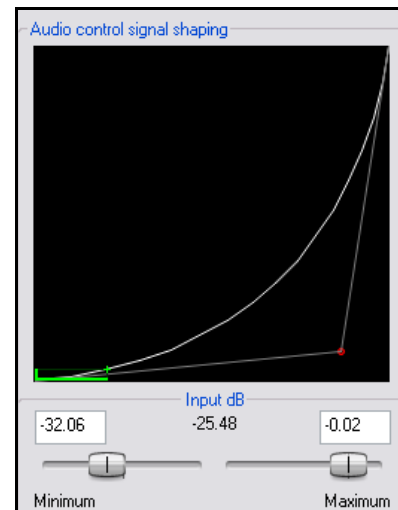


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7. Start and stop play. This is sometimes necessary to activate the parameter modulation. Now experiment with sliding the baseline value fader left and right. As you do so, you will see the **wet mix** fader in the Chorus plug-in window will be faded down and up. When you have finished, restore it to about **-9 dB**.
8. Set the various items in the **Parameter Modulation** window as shown below and play the track. You should notice the **wet mix** element of the chorus being faded down for louder notes and passages and back up for quieter notes and passages.
9. Now experiment! You should find that:
  - Moving the **Attack** and **Release** faders left will result in the wet mix chorus fader movements becoming more jerky. Moving them right should make them smoother.
  - Moving the **Strength** fader (negative) above 0% will cause the wet mix chorus fader to be faded up for louder notes and down for quieter ones. Selecting positive reverses this.
  - Moving the **Input dB** fader left will lower the threshold at which the parameter modulation is applied. Moving it right will raise the threshold.
10. When you have finished experimenting, restore the settings to those shown here.



11. This instrument becomes louder as the song progresses. By the end, there is very little chorus being applied to the bouzouki.
12. Now play the song again. Drag hold of the handle on the graph, and use your mouse to drag it to the lower right position (shown on the right). Notice that the movements of the wet mix fader now become restricted to a more modest range.
13. Now drag hold of the handle on the graph, and use your mouse to drag it towards the top left corner of the graph. Notice that the movements of the wet mix fader now become exaggerated.
14. Restore the graph to its original position when you have finished..
15. Save and close the file.



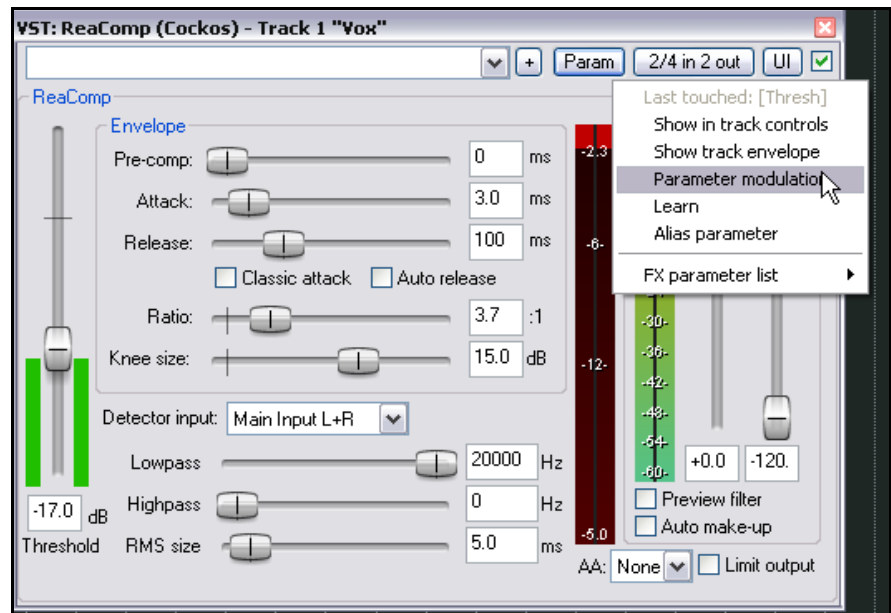


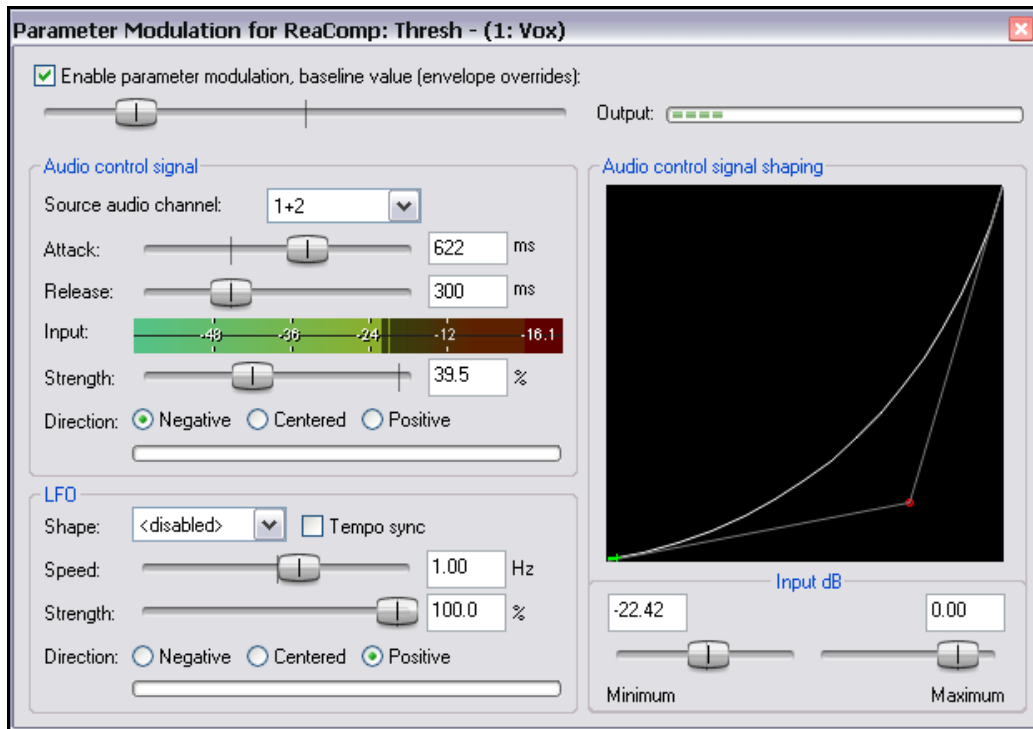
## 18.5 Dynamic Compression

In this next example, you will use parameter modulation to dynamically adjust the settings to compress a vocal track in such a way that the threshold will automatically be lowered during the louder passages. This gives you a more precise control over the compressor's operation than would otherwise be possible.

### Example

1. Open the file **All Through The Night** and save it as **All Through The Night MOD1A**.
2. In the Track Control Panel, set volume and panning levels for the various tracks and the Master similar to that shown on the right.
3. Insert an instance of **ReaComp** into the FX Chain for the **Vox** track.
4. Set the **Threshold** to about  $-16$  or  $-17$  and the **Ratio** somewhere in the range from 3:1 to 4:1. Set **Knee size** to around 15dB.
5. Set the **Wet** gain to about +1.5dB.
6. As you play the song, adjust the settings to suit. One possible set of suitable parameter values is shown below.
7. Notice as you play the track that during the louder vocal passages (near the end especially) the compressor doesn't do quite enough. This is where we can use the track's own volume level to control some parameters. In this example, we will do this with the threshold only, but it could also be done with the ratio if you wished to.
8. Click once on the Threshold fader.
9. Click the **Param** button for this plug-in.
10. From the menu, then choose **Parameter Modulation**.
11. Study the suggested settings shown below and adjust your settings accordingly as you play the song.
12. Notice in particular how the attack and release setting levels, the shape of the curve and the Input dB settings all help prevent the threshold from being adjusted too radically.
13. This is an excellent example for learning how the various Parameter Modulation controls work. Be prepared to experiment with these settings to see if you can produce a better outcome.





14. Save and close the file when finished.

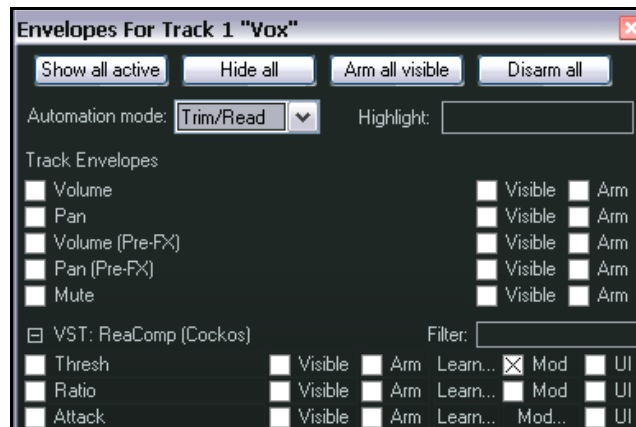
**Note:** When you are using Parameter Modulation you should be prepared to tweak the various parameters carefully. Sometimes even the slightest change to a parameter value can significantly change the result.

## 18.6 Bypass Mode

Whenever you create a parameter modulation window, a small box is added next to its name in the Envelopes/Automation window. This can be used to enable any of your parameter modulations, or set them to bypass mode (in which case they are of course ignored) as you wish.

In the example shown on the right, parameter modulation settings exist for both the Threshold (Thresh) and Ratio parameters. You can see that the Thresh modulation is currently enabled, but the Ratio modulation has been set to bypass. In addition:

- Clicking on the **Mod** button for an item where parameter modulation already exists will cause that window to be opened so that you can view and/or edit the settings.
- To delete a parameter modulation window altogether, simply set its **Source audio channel** to **disabled** and close the window.



## 18.7 NEW! Using Parameter Modulation with an Envelope

When you have an automation envelope enables for a parameter being modulated, then the baseline value will be determined by that envelope rather than by the baseline value fader in the parameter modulation window. When this happens, the baseline value that is actually applied will itself vary (according to the envelope) throughout the song.



An example is shown above.

Here we have added an envelope to control the **Ratio** setting of the compressor. By clicking the **PM** button in the envelope lane we are able to open the Parameter Modulation window and take the necessary steps to ensure that the ratio setting will respond automatically to changes in the strength of the audio signal on this track. In this example, because the envelope is lifted at approximately the position of the plat cursor, the baseline value of the parameter being modulated will also be lifted.

## 18.8 Controlling FX Parameters on a Different Track

This next example is slightly more complex than the previous two examples. In this case, we will use the audio signal from one track (a vocal track) to shape the sound of an instrument submix (that is, a folder track containing several instruments). This will be done in such a way as to cause the instruments to appear to pull back slightly during the vocal passages.

### Example

1. Open the file **All Through The Night** and save it as **All Through The Night MOD2**. There are a number of preparatory steps that need to be taken to set this project up.
2. Immediately below the **Vox** track, create a new track and name this track **Instruments**. Make this a track folder and enclose the guitar and bouzouki tracks within this folder.
3. Adjust the volume and pan faders for the Master and various tracks as shown on the right,
4. Add an instance of **ReaComp** to the Bouzouki track. This is needed only because the volume of this instrument increases quite significantly as the song progresses. We wish to pull this back a little.
5. Set a threshold of around  $-15\text{dB}$  and a ratio of around 10:1. This will ensure that the track is only slightly compressed for most of the song and more severely compressed near the end.

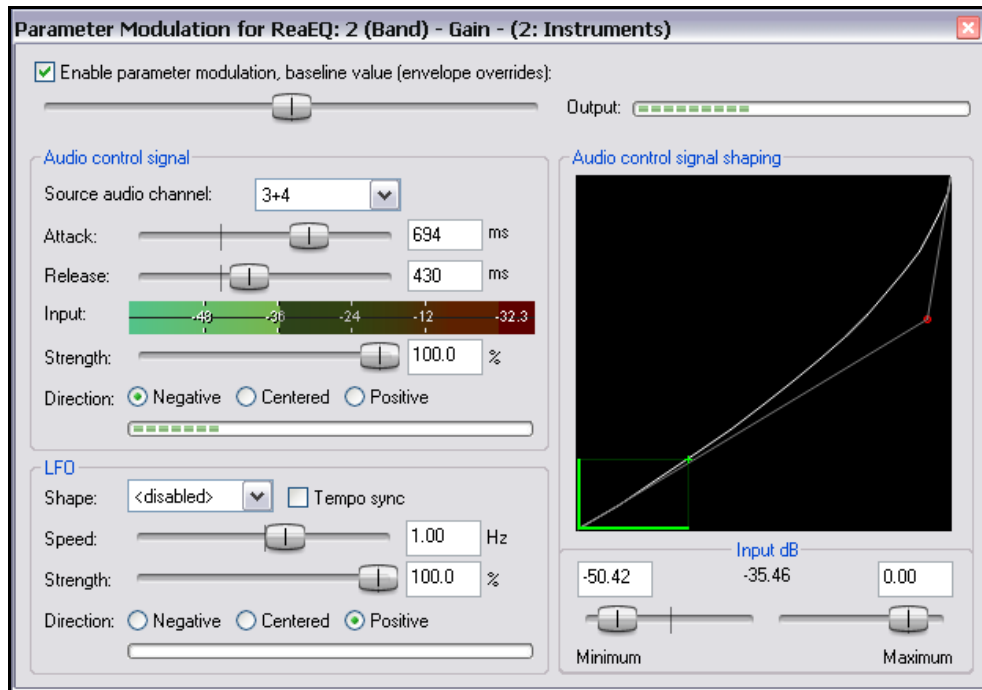


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6. Select the Instruments folder and display its Routing window. Set the number of channels to 4 and add a receive from channels 1/2 of the Vox track to channels 3/4 of the Instruments folder.
7. Open the FX Window for the Instruments folder and add an instance of **ReaEQ**. Make sure that your settings include a frequency type Band at about 300 Hz with a bandwidth of about 1.00 and a frequency type Band at about 4,000 Hz also with a bandwidth of about 1.00.

In the example shown below, these are bands 2 and 4. We are going to use the audio signal from the Vox track to control the gain on both of these bands.

8. Make sure that for now the gain settings for all bands is set at 0.0.
9. We are now going to use parameter modulation to ensure that audio signal from the vocal track drives down the gain level of the instrument mix for bands 2 and 4. This will have the effect of helping the vocal to just float over the instruments a little.
10. Open the Envelopes / Automation window for the **Instruments** folder. Click on the Mod button for **2 (Band) Gain**. By then setting the **Source audio channel** to channels 3/4 we will ensure that the gain level for Band 2 is controlled by the incoming signal from the vocal track. A suggested set of values for the various items is shown below.



11. Now create another Parameter Modulation window, this time for **4 (Band) Gain** and start with settings similar to those used for band 2 gain. Now experiment, especially with the shape of the signal shaping curve and see how it changes the way the band 4 gain level on the EQ responds to changes in the audio signal's strength.
12. As you play the song, you should be able to see the changes being made to the EQ levels. The gain in bands 2 and 4 should vary between about 0dB and -3dB. If you wish, tweak the frequency and bandwidth setting for bands 2 and 4 to see where this modulation is at its most effective.
13. You may need to make an adjustment to the volume on the Vox track, possibly adding dynamic compression to this track, in order to get the best results.
14. Save the file when finished.

### 18.9 Further Applications

This chapter has introduced you to just a few basic examples to help you understand what REAPER's parameter modulation is and how it can be used. In doing so we have barely scratched the surface.

Here are some other points to keep in mind:

- With parameter modulation, the signal from any track can be used to control parameters on any other. For example, the signal from an audio track can be used to control parameters on a synthesizer, and synthesizer's output can be used to control signals on an audio track.
- If you are familiar with working with synthesizers and low frequency oscillators, you may have developed an understanding of different types of waveforms such as sine, square and triangle. You can use these LFO shapes in your parameter modulation.
- Other applications for parameter modulation are limited only by your needs, your creativity and your imagination. For example, with this technique you are able to use the audio signal from one track (or group of tracks) to control specific parameters on a noise gate on another track (or tracks).



**Tip:** Your parameter modulation windows and their settings will automatically be saved with any FX chains and/or track templates that you create.



### 19 NEW! REAPER's Preferences and Other Settings

At several places in this User Guide we have encountered circumstances where the use of preferences and settings is important. In this chapter, you will learn other ways in which you can use REAPER's preferences and other settings to tailor the program more closely to your particular requirements. In many cases, you'll probably be perfectly happy to leave the program settings as they are and just let it run. That's fine too.

#### 19.1 Audio Configuration

We've already mentioned the **Audio Device** screen (in the **Preferences** window), but it's worth having another look at this topic.

Two important issues in the digital audio world concern **buffers** and **latency**. Understanding what these terms mean will help you in obtaining the optimum settings for your system.

Getting buffer size right is essential if you are to get the best performance from your audio interface. Make them too small and you'll get audio clicks and pops; make them too large you'll notice delays in your headphones when you're input monitoring, especially with software synthesizers.

The goal is to achieve the lowest possible latency without experiencing dropouts. The optimum setting depends on a number of things, not least of which are the audio interface (PCI sound card, firewire or USB device) that you are using, your PC's characteristics, as well as which software you're running. The use of plug-ins can also increase latency, some more than others.

Consider what happens when you are working at your DAW. As you play back your tracks, a constant stream of data passes from your hard disk and/or RAM to your sound card. Amongst other things, this converts the digital data to an analog form, so that it can be sent to, and heard thru, your speakers or headphones. When you record the reverse happens – the incoming analog audio stream has to be converted to a digital format so that it can be stored on your hard disk.

When you are overdubbing, both of these activities are going on at the same time. Indeed, with input monitoring, the track or tracks being recorded are actually being fed into the computer in analog form, converted to digital, processed, then converted back to analog again as they are fed back to your headphones. Latency is a measure of this delay.

(Incidentally, you can make this activity easier if your audio device itself supports input monitoring. In this case, the incoming audio stream that is being recorded is fed straight back into your headphones before it even gets into the computer.)

As if this wasn't complicated enough, remember that Windows is performing all sorts of other tasks at the same time as you are recording. If you don't believe this, just bring up Task Manager some time, check the **Processes** page and have a look. That's what we mean by **multitasking**.

So how is Windows able to keep up with its other 99 or so tasks at the same time as handling your recording? It does so by dividing its resources between all the tasks at hand. In order to maintain a constant audio stream, small amounts of memory are allocated to storing this audio stream. These areas are called buffers.

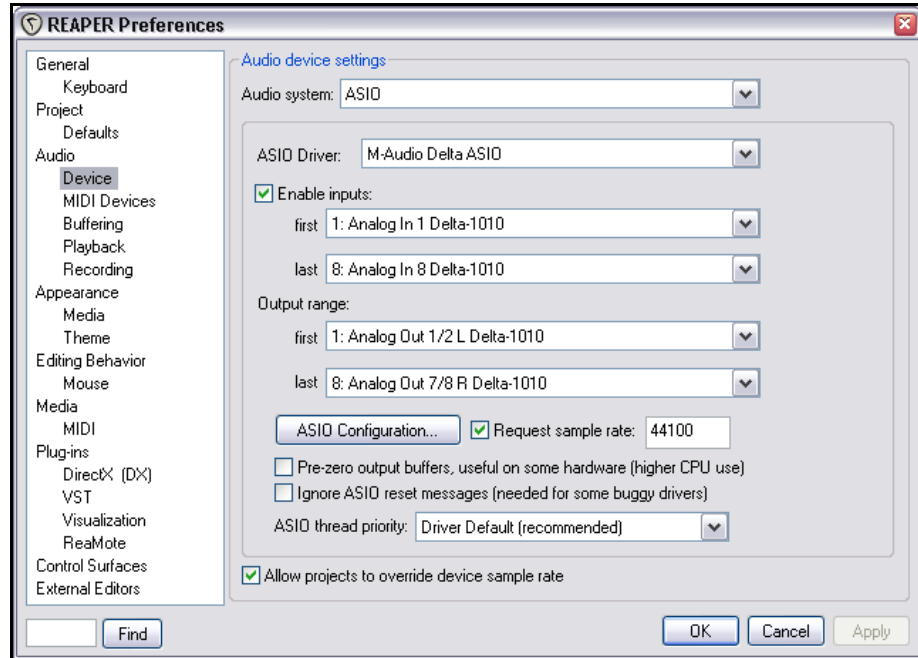
Thus, as you play back your audio, Windows hands over to your sound card a block of audio that the sound card releases at a steady rate to your external amplifier. If it empties these buffers before Windows gets round to handing it some more, then you've got a problem. The same principle applies, but in the reverse direction, when you're recording. And again, when you're layering or overdubbing, or using REAPER's input monitoring, both activities are going on at the same time.

If the buffers are too small, you'll get gaps in the audio stream. These can lead to pops, crackles and in some cases even dropouts (that's when playback and/or recording just stops suddenly and unexpectedly). Making buffers larger is usually enough to fix this problem, but it brings with it another. Make them too large, and the data at the end of the buffer has a long wait before it is processed. That's when you experience unacceptably large latency, such as the delay between pressing a keyboard and hearing the note in your headphones.

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ASIO drivers generally offer better latency than do others. As a rule, the preferred order is ASIO, WDM, DirectX and MME, in that order. This is where the **ASIO Configuration** button on the **Audio Device** screen is so important (assuming, of course that you are using ASIO drivers).

This button gives you access to the software that controls your sound card's settings and behavior. The illustration below is an example of this, using M-Audio's Delta 1010 as an example. In that example, clicking on the **ASIO Configuration** button on the first screen has caused the second screen to be displayed. Of course, exactly what you see will depend on which sound card you are using. You should consult the documentation supplied with your sound card for further information and instructions.



There's one more issue here that requires explanation, and it's an important one.

### The smaller the buffer size, the greater the load on your computer's CPU.

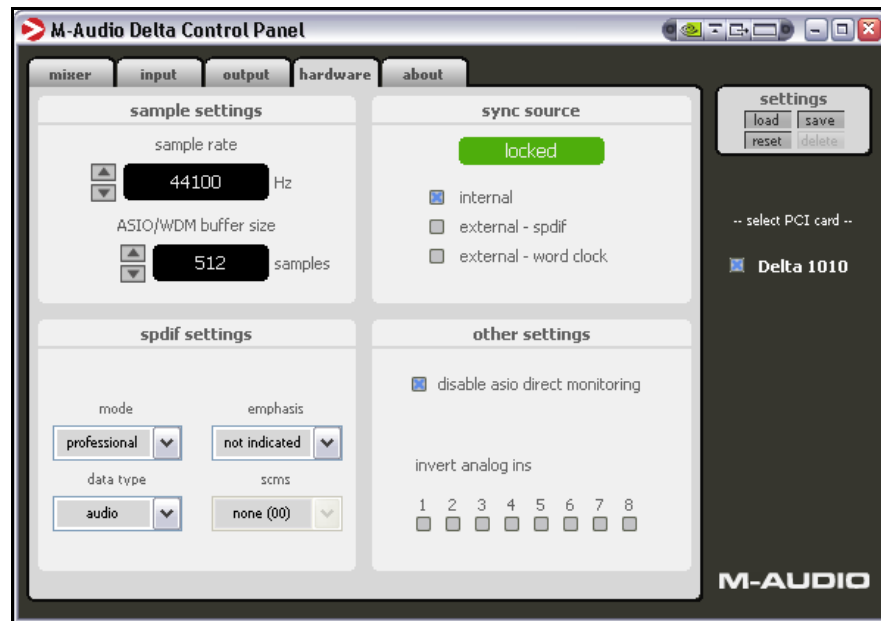
So after making changes to your buffer size, check the CPU usage on REAPER's Performance Meter.

You can use this fact to your advantage when mixing.

As a rule, low levels of latency are only really needed for recording, not when you are only playing audio back. Therefore, if you find that you are pushing your CPU close to its limits, you will often be able to fix this by accessing your audio card's control software and increasing the buffer size.

Finally. Just a word about **Sample Rate**. This also affects CPU usage. Going from 441000 to 88200 doubles CPU usage.

This is an area about which there is much debate, but in reality few of us have ears that can really detect whether a track has been recorded at 44100 or at 88200. Test this out for yourself and see what you think.

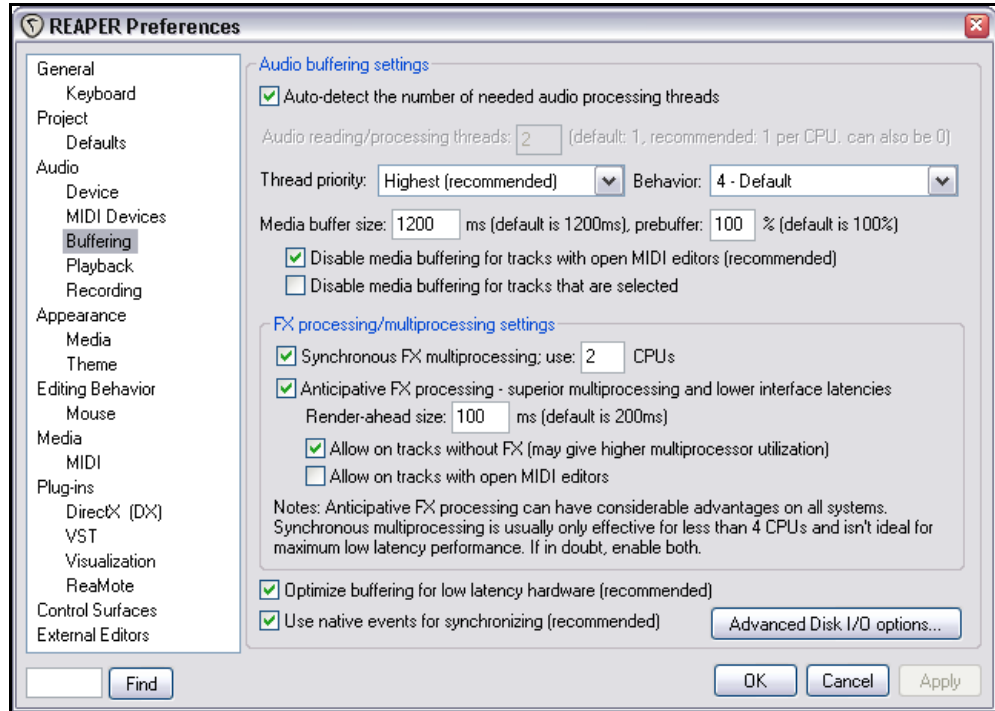




## 19.2 Customising Audio Buffering Preferences

While we're looking at optimising audio, the **Audio Buffering** page of the **Preferences** window contain a number of customisation options.

The option to **Disable media buffering for tracks that are selected** can be useful if you are using a third party plug-in that does not respond well to buffering. Otherwise, if you are not technically minded you would be best advised to leave most of these settings at their default values. If your computer has two or more processors, you might find the following options useful.

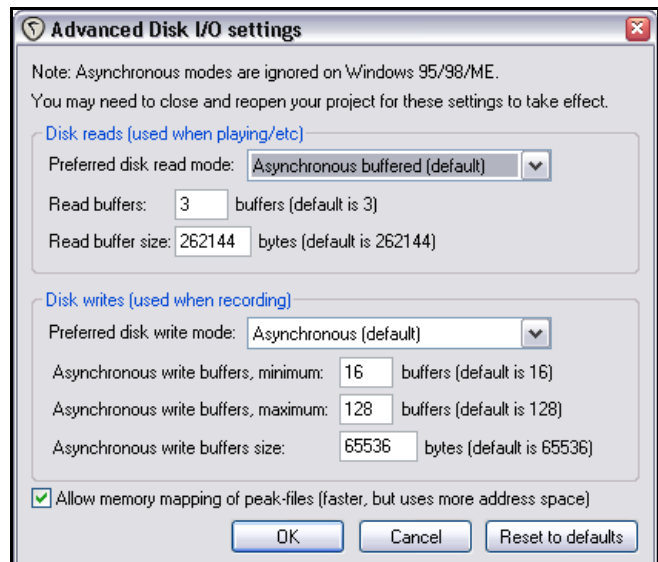


**Synchronous FX multiprocessing** only matters on multiprocessor systems. If enabled it allows all tracks (record armed or not) to have FX processed by multiple CPUs. Although a useful option, it will not produce miracles for you. This is in part because synchronizing multiple CPUs has its own overhead, and in part because it cannot do a perfect job of balancing the load. Also, it can have a slight negative effect at smallest audio latencies.

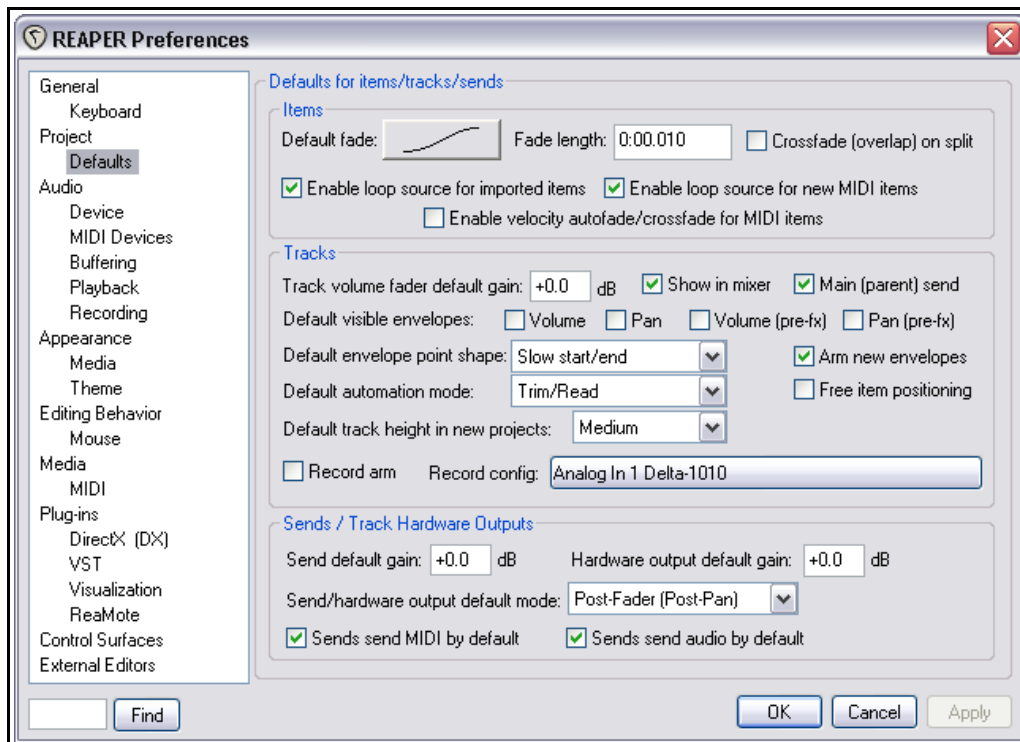
**Anticipative FX processing** has benefits for both multiprocessor and single processor systems. On single processors it makes REAPER more tolerant of lower interface latencies (and more resistant to plug-ins that do larger block-based processing, such as ReaVerb and ReaFir). On multiprocessor/multicore systems it also allows for very significant multiprocessor usage. Enabling this feature may allow improved latency.

Notice also that clicking on the **Advanced Disk I/O Options** button brings up the selection of options shown on the right.

If unsure about what you are doing, it's better to leave these settings at their defaults. Any changes that you do make should not come into effect until after you have closed and reopened your project file.



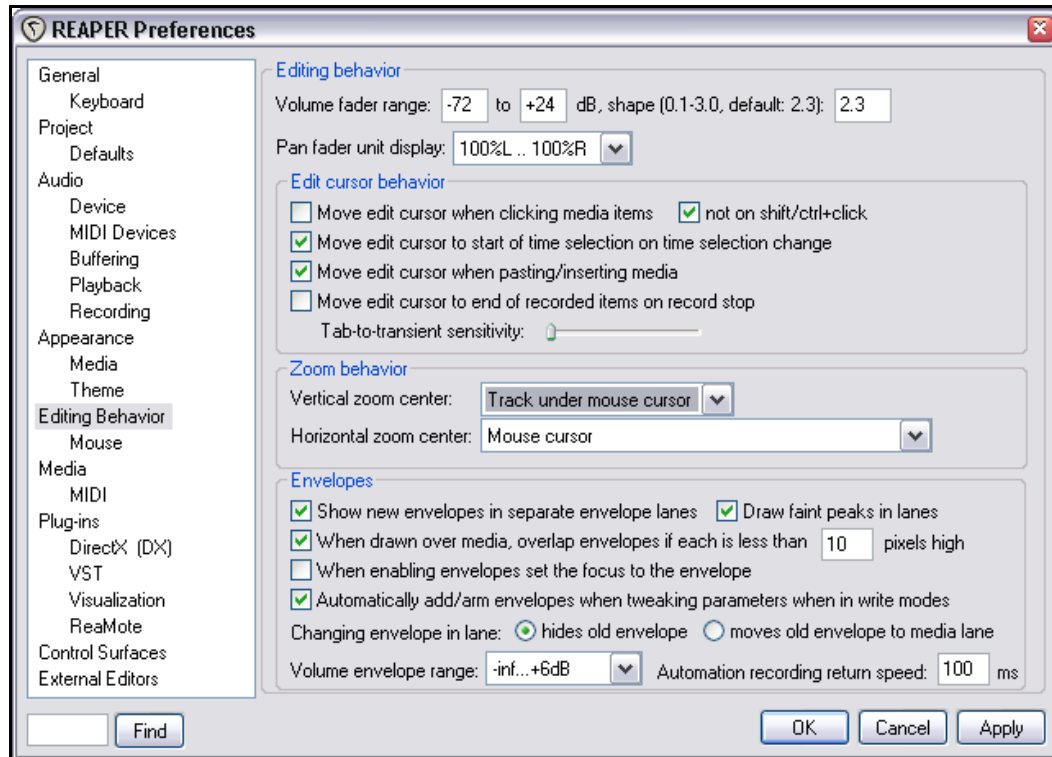
## 19.3 Customising Project Defaults



The **Project Defaults** page of the **Options, Preferences** window (shown above) includes a number of areas in which you can specify default settings for your REAPER projects. Here is a summary of some of the most useful options:

- Select your preferred default item fade shape and length.
- Specify whether or not you wish to automatically create cross fades for overlapping media items in the same track.
- Determine whether imported media items should be automatically regarded as loop sources
- Specify a default gain value for track volume faders.
- Determine whether or not to have track Volume and/or Pan envelopes automatically visible.
- Specify whether or not you would like free item positioning enabled for tracks by default.
- Specify default envelope point shape.
- Specify default automation mode for envelopes.
- Specify default track height for new projects.
- Specify whether new tracks should by default be armed for recording.
- Set default gain level for sends and hardware outputs.
- Select your preferred default output mode for track sends and receives.
- Determine whether or not audio and/or MIDI are by default sent by sends.

## 19.4 Customising Editing Behavior Preferences



The **Editing Behavior** page of the **Options, Preferences** window (shown above) includes a number of areas in which you can specify default settings which will affect how you work when editing your REAPER projects. Here is a summary of some of the most useful options:

- You can specify the Volume Fader Range. Default settings are  $-72\text{dB}$  to  $+24\text{dB}$ .
- You can specify your **edit cursor behavior**, in particular to specify which of the following actions should cause the edit cursor to be moved:

Click on media item	Changing time selection
Pasting or inserting media	Stopping recording
- You can set the tab to transient sensitivity.
- You can specify your preferred zoom behavior as follows:

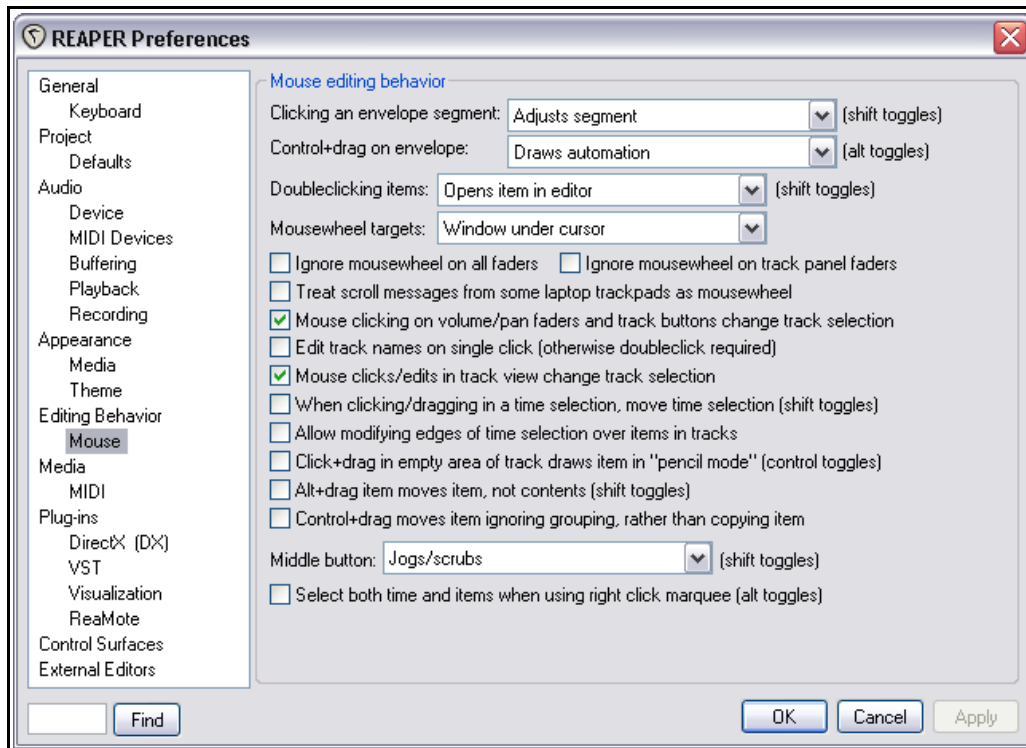
**Vertical zoom:** Track at centre of view, Top Visible Track, Last Selected Track or Track Under Mouse Cursor.

**Horizontal zoom:** Edit or play cursor, Edit cursor only, Centre of view or Mouse cursor,

You can specify various envelope editing options, including:

- whether to use separate lanes for new envelopes
- whether to draw faint peaks in envelope lanes
- whether to automatically arm/add envelopes when you have write mode enabled and adjust any parameters, and
- whether changing the envelope displayed in any lane should move the previous envelope to the track's media lane or simply hide the envelope.

## 19.5 Customising Mouse Behavior

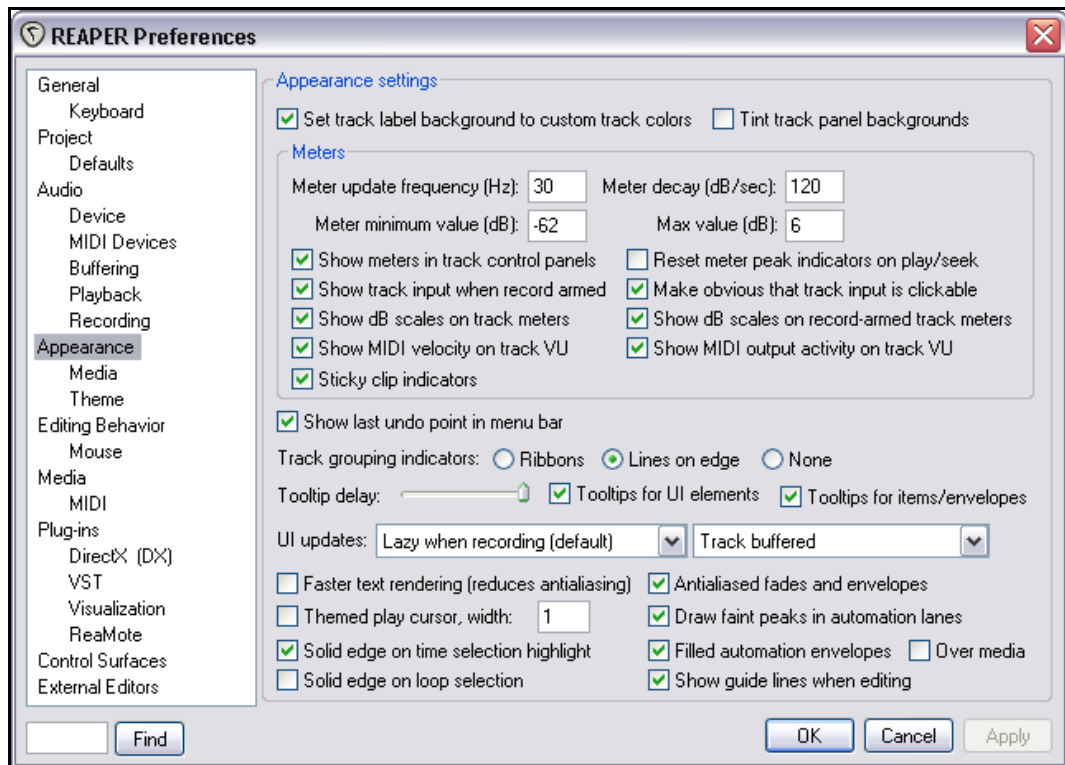


The **Mouse** page of the **Options, Preferences** window ( above) includes a number of ways in which you can specify how you would like your mouse to behave in REAPER. Here is a summary of some useful options:

- Whether clicking on an envelope adds a new point or selects that segment for adjustment (shift click will be assigned to whichever of these is not selected).
- Whether Ctrl Drag on envelopes engages freehand draw mode or finely adjusts an envelope point's position. Alt Ctrl Drag toggles.
- Whether double-clicking on an item causes the item to be set as the current time selection, or loop selection, or whether it opens your selected wave editor to edit that item.
- Whether your mousewheel acts on the window currently underneath the mouse or on the last window to have focus.
- Whether to use or ignore the mousewheel on all faders.
- Whether to use or ignore the mousewheel specifically on track panel faders.
- Whether to treat a laptop trackpad as a mousewheel.
- Whether clicking on track fader or button causes that track to become the currently selected track.
- Whether to require a single click or a double click when editing track names.
- Default behavior with loop selection on timeline: the default is click and drag to select, shift click and drag to move the current loop selection.
- Middle mouse button behavior: jog/scrub or scroll.
- Whether using marquee to select a number of items should also change the time selection.

### 19.6 Customising Appearance

The **Appearance** settings screens within the **Preferences** window aren't as essential as the Audio Device settings, but they're more fun to play with. Your choices here control the way the REAPER screen appears.

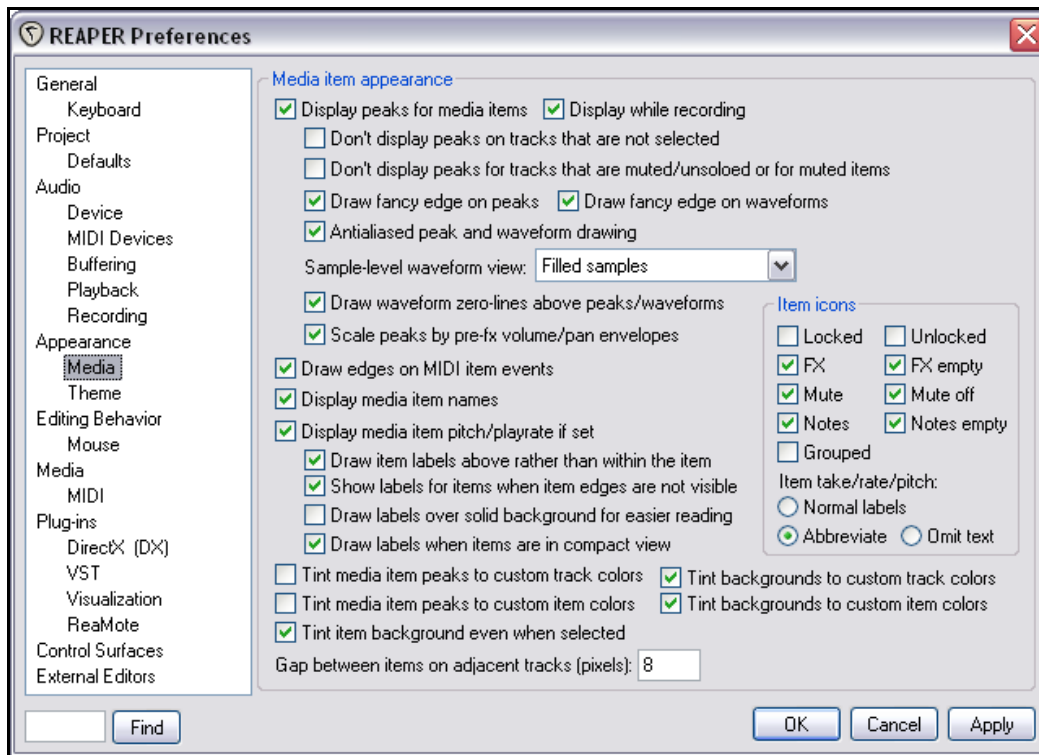


The **Appearance** screen itself lets you specify various parameters that help determine the appearance of your REAPER interface, especially the Track Control Panel and Mixer. Here is a summary of some of the options:

- Whether to use custom track colors as a background color on track labels (in TCP and mixer) and whether tint track panels in TCP and mixer) with custom track colors.
- Frequency (in ms) for VU meter updates. Minimum and maximum values (dB) used to determine the range of values displayed in VU meters.
- Whether VU meters should be shown in track control panels.
- Whether sticky clip indicators should be used to retain the red indication at the top of a meter when clipping occurs. Also whether meter peak indicators should be reset when playback is next started.
- Whether to make it visually obvious that track VU meters are clickable. Enabling this option causes a drop down arrow to be displayed.
- Whether to show dB scales and/or MIDI activity on track VU meters.
- Whether to show the last undoable action on the menu bar.
- Whether to use track grouping indicators, and if so which ones.
- Whether to use tooltips, and if so whether to use tooltip delay.
- Whether to apply solid edges to time selection highlights and draw guidelines when editing.
- Whether to show faint media peaks and filled envelopes in automation lanes.

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The **Appearance Media** Preferences window is used to determine how your Media Items will be displayed.

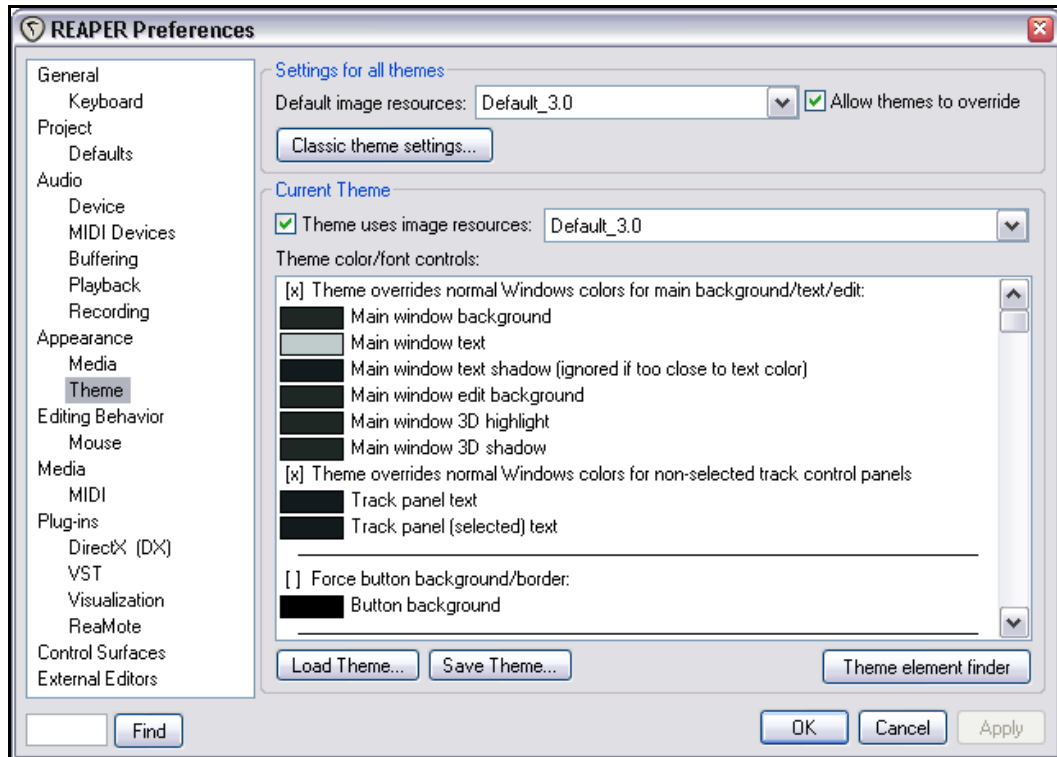


There really are a very large number of options to take into account here. Amongst the most important are;

- Whether peaks are displayed on media items, during and after recording. If so, there are a number of options that will decide their appearance, such as whether to use fancy edges.
- Whether to not display peaks for tracks when they are unselected, muted or unsoloed.
- How to display waveforms when zoomed to sample level - for example, as filled samples, dots and lines, or stepped samples.
- Whether to scale peaks (that is, adjust their height) to allow for the effects of pre FX pan and volume envelopes when these are used.
- Whether to draw edges on MIDI item events.
- Whether to display item names and/or media item pitch and playrate settings.
- If displaying these names and settings, whether to show them in a lane above the media items or on top of the media items.
- Which item icons to show.
- Whether to tint media item peaks with any custom track color.
- Whether to tint media item peaks with any custom item color.
- Whether to tint media item backgrounds with any custom track color.
- Whether to tint media item backgrounds with any custom item color.
- Whether to tint item backgrounds when the item is selected.
- Whether to leave a gap of your specified number of pixels between adjacent tracks.

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The **Color Themes** screen (below) has numerous options for controlling your screen's appearance. You can change the colors for any of the items listed under **Theme color/font** controls.



Items for which you can customize colors in various ways include:

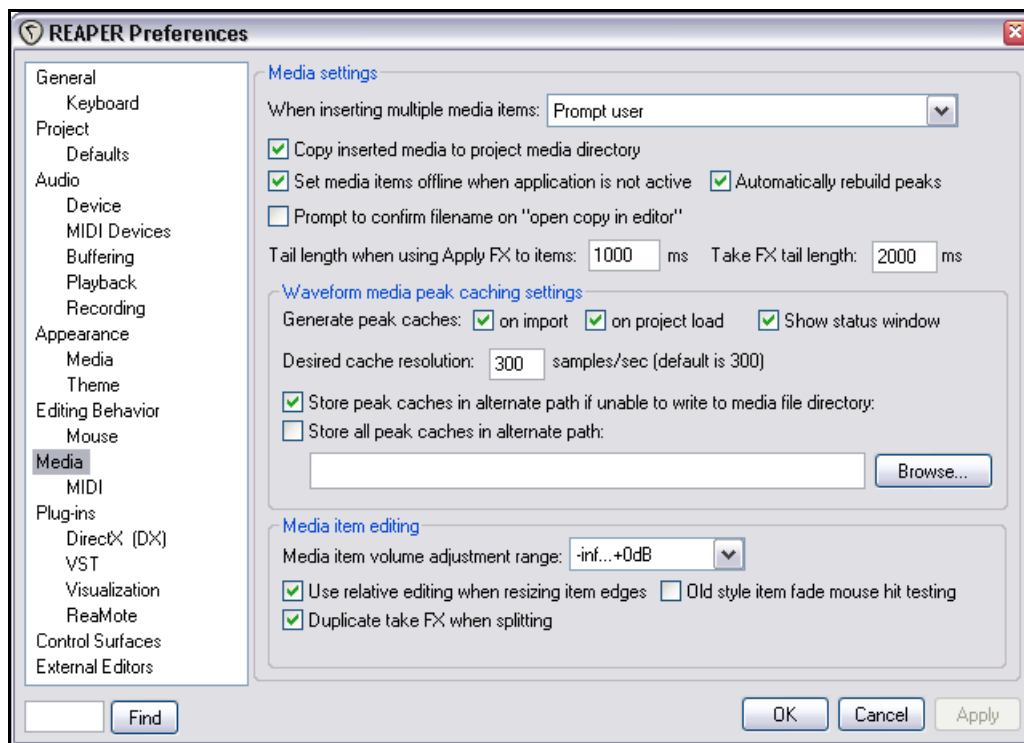
Track Control Panels	Window Background	The Mixer	Markers and Regions
Track View Background	The Timeline	Faders	The Edit Cursor
Track Pane Backgrounds	Gridlines	VU Meters	The MIDI Editor
Media Items	Envelopes	The Docker	Screen Fonts

It's worth also noting the following:

- You can also select fonts, font size and font characteristics to be used for various text items, including track names, volume/pan control labels and media item labels.
- For VU meters, you will also find on the Theme color/font controls list the option to use interlaced VU meters.
- You can use the **Theme element finder** to help you identify any of the items in the Theme color/font controls list.
- You can save any changes that you make to a new theme name.
- You cannot save changes to the default theme as such. If you wish to save any such changes, save them to a new theme name.
- You can use the Load theme button to import any existing theme.
- REAPER 3 themes use a large number of image files, more so than was the case with REAPER's original earlier themes.

## 19.7 Customising Media Preferences

The **Media** page of the **Options, Preferences** window lets you customize your Media settings.



Here is a summary of some of the other options that you might find useful.

Item	Purpose
<b>Media Settings</b>	<p><b>When inserting multiple media items:</b> You can choose whether the default behavior should be to insert as separate tracks, to insert sequentially in a single track, for REAPER to determine which appears the more appropriate, or whether you wish to be prompted each time.</p> <p><b>Copy inserted media items to project media directory:</b> When enabled, this ensures that a copy of any media items inserted into a project will be made and stored in the project directory. This helps you to keep together all those files that belong together.</p>
<b>Waveform media peak cache settings</b>	<p><b>Generate peak caches:</b> You can determine the circumstances in which you want peak caches to be generated.</p> <p><b>Desired cache resolution:</b> Determines the degree of precision used for media peaks.</p>
<b>Media item settings</b>	<p><b>Use relative editing when resizing item left/right edges:</b> Holding Ctrl and Alt when fade dragging will adjust fades according to your edge option setting.</p> <p><b>Duplicate take FX when splitting:</b> Determines whether any existing FX in an item's FX chain are automatically copied to new items that are created when the original item is split.</p>



## 19.8 Custom UI Tweaks

The **General** page of the **Options, Preferences** window includes an **Advanced UI/System tweaks** button which enables you to further customise REAPER's on-screen appearance. Clicking on this button displays a number of options including:

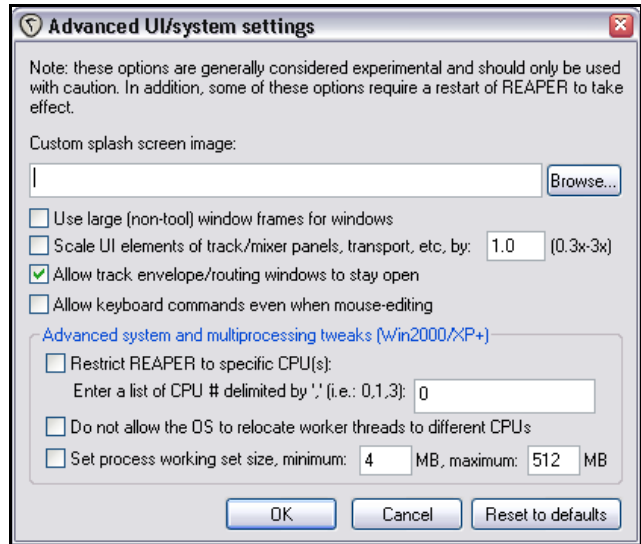
**Custom Splash Screen** – Any .BMP or .PNG file.

**Use large window frames** for windows.

**Scale UI Elements** (such as buttons on toolbars). This can be useful if you are working with a very high screen resolution.

**Allow track envelope/routing windows to stay open.** Select this option if you want track routing and envelope windows not to be closed automatically when they use focus.

**Advanced multiprocessing tweaks.** These options help determine the way REAPER behaves on a system with two or more processors.



## 19.9 Customising VST Plug-In Behavior

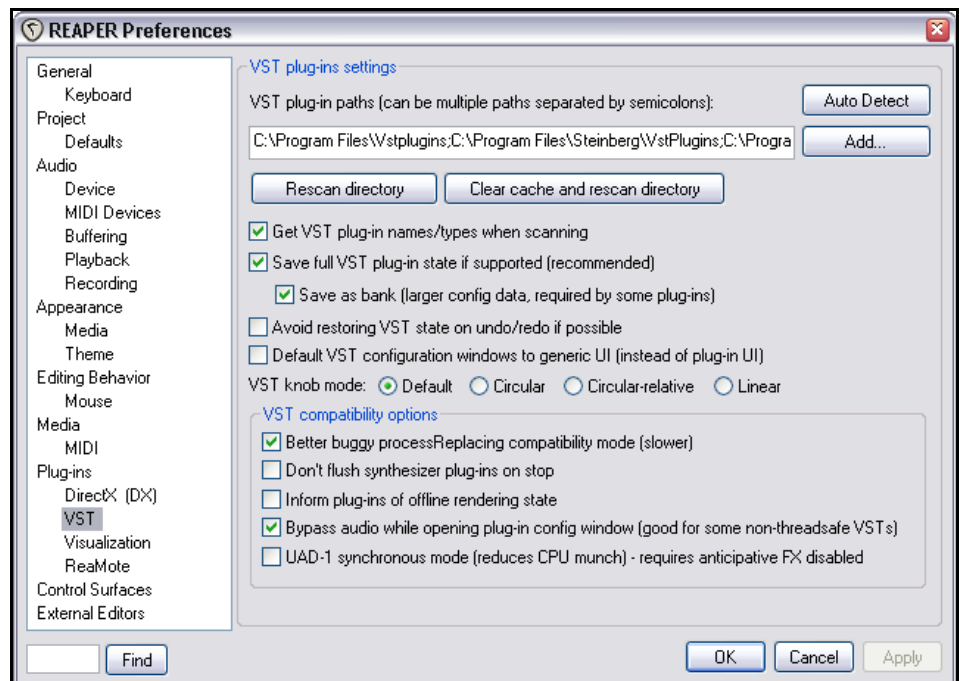
You have already seen (in Chapter 1) how to tell REAPER the location of your VST plugins, and how to ensure that these are enabled. In addition, the **VST** screen (under **Plug-ins** within the **Preferences** window) offers a number of further options for controlling the behavior of your VST plug-ins. In particular, note the following.

Your preferences, especially in the category **VST compatibility options** are likely to depend on which plug-ins you are using. You may need to experiment to get the best results.

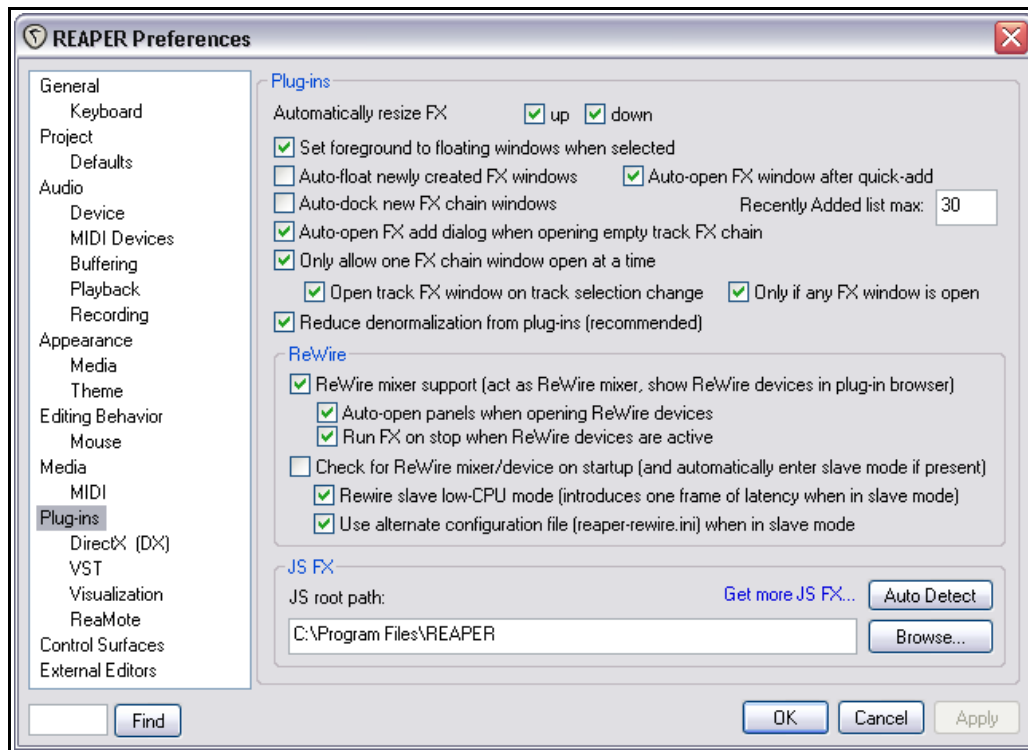
One useful option worth mentioning is

**Default VST configuration windows to generic UI.** This can be used to ensure a consistency of interface for all VST plug-ins which may not look as superficially attractive but may be easier to read and use. REAPER's default UI will be used instead of each plug-in's native interface.

Even with this option enabled, you can still switch to any plug-in's native interface by clicking on the UI button in the plug-in's window.



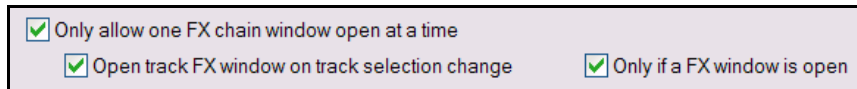
## 19.10 Customising Plug-Ins Interface and Behavior



The **Plug-Ins** page of the **Options, Preferences** window gives you a number of really useful options to control the way your plug-ins interface and behave within REAPER.

Among your options are the following:

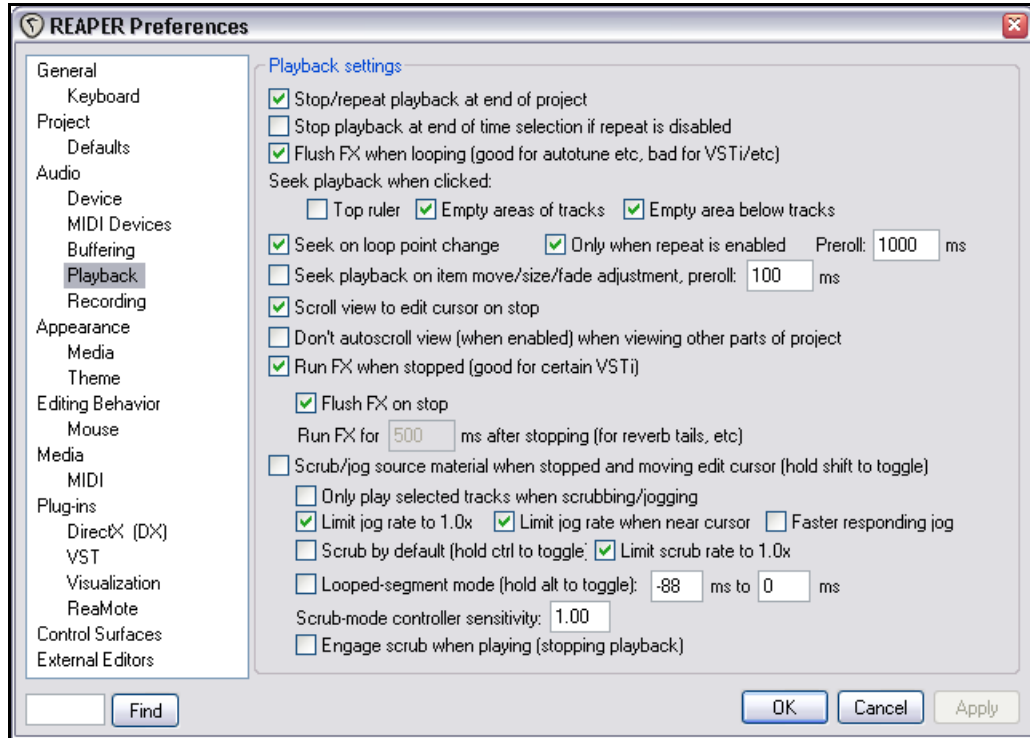
- To automatically resize the FX window to suit the currently selected plug-in in that window. This does not apply when the FX Window is docked.
- To ensure that any selected floating window is set in the foreground.
- To automatically float (or not) new FX Windows.
- To automatically dock new FX chain windows.
- To ensure that the Add FX Dialog Box is automatically opened when you open an FX Window that has not yet had any plug-ins added into it.
- To only allow one FX Window open at a time.
- By selecting all three options shown (right) you can ensure that one FX window is kept open (docked or otherwise), and that that window will always show the FX Window for whatever track is currently selected in the Track Control Panel.



**Tip:** This can be especially useful when you have the same FX (e.g. EQ) inserted in several tracks, and you want to make sure that the EQ you are tweaking really is the EQ for the currently selected track.

### 19.11 Further Customising Playback Behavior

Basic control of playback behavior has already been covered earlier in this guide. In addition, the **Audio, Playback** page of the **Options, Preferences** window lets you set a number of further options (see below).



Amongst the most important and useful options that you will find on this page are:

- Whether or not to stop/repeat playback at the end of projects.
- Whether to stop playback at the end of a time selection if repeat is disabled.
- Whether to seek playback (repositioning the play cursor) when clicking on any combination of:
  - the top ruler
  - empty areas of tracks, and
  - empty areas below tracks.
- Whether to seek playback when loop points are changed.
- Whether to scroll the view to the edit cursor position when playback is stopped.
- Whether to autoscroll when viewing other parts of a project.
- Whether to run FX after playback is stopped: this can be good for evaluating the "after effect" of delay based plug-ins such as reverb and chorus.
- Whether to enable scrubbing and jogging, and if so what options to apply in its implementation (such as limiting jog speed).

## 19.12 Project and File Management

You have already seen that when you save a REAPER project file you have the option to create a subdirectory for that project, and to copy, move and store all of the project's media files into that directory.

Making use of this option will make it easier for you to keep track of your work.

However, you will most likely find that as a project evolves, it will accumulate any number of media items, such as rejected tracks and overdubs, or deleted items that are no longer required.

You can easily remove these unwanted items, using the command **File, Clean Current Project Directory**.

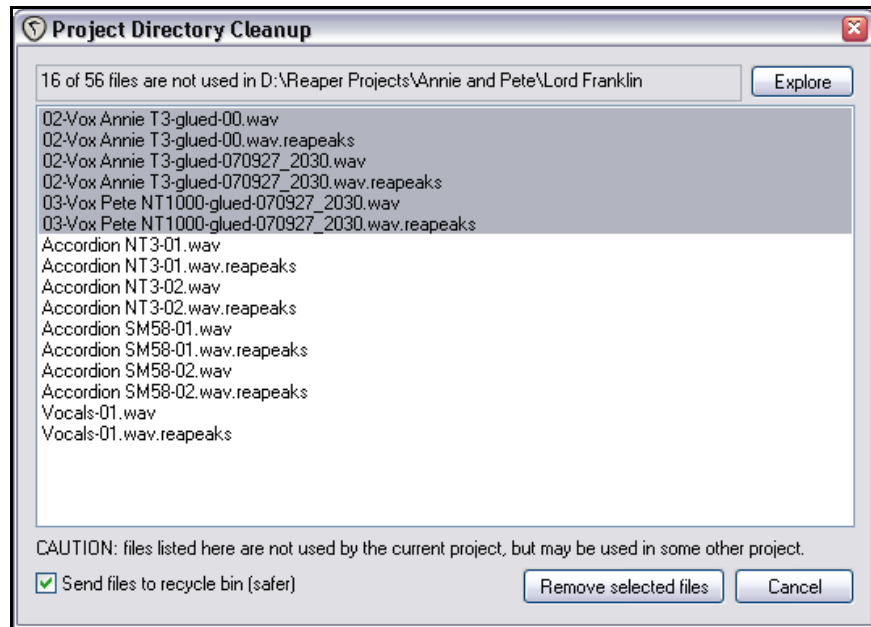
The location of the current project folder is displayed just below the Project Directory Cleanup title bar. If you wish, you can click on the Explore button to explore the folder's entire contents. Notice, however, that all the files present in the project directory but not belonging to the current project are listed in the Project Directory Cleanup window.

To select any one file, just click on its name. To build a selection, hold the **Ctrl** key while you click on each required file name.

To select all files in the list, click first on the first file name then, holding the **Shift** key, click on the last name in the list. You then have the option to either delete these files permanently from your hard drive, or to send them to the Windows Recycle Bin (as shown here).

After making your selection, click on the **Remove Selected Files** button to remove them.

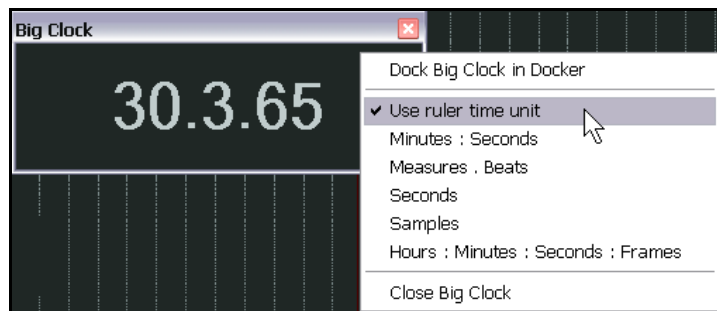
Don't forget also to **backup** your work regularly, to a flash drive, external hard disk, CD or DVD, or better still, more than one of these. The easiest way to back projects up is to simply use the Windows file management system.



## 19.13 Customising the Time Display

To set your preferred units for display on the ruler, right click over the ruler and choose any of the available options from the context menu – for example Minutes:Seconds, Measures:Beats, Samples, etc..

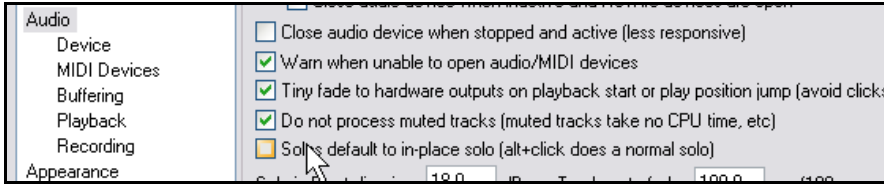
Your ruler display settings are applied on a per project basis, whereas by default the Big Clock setting is global. However, by selecting for the Big Clock the option to **Use ruler time unit** you can effectively ensure that the Big Clock time display is also determined on a per project basis.



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### 19.14 Customising Track Solo Behavior

If you are taking anything like full advantage of REAPER's routing capabilities, you can run into difficulties with track soloing. By default, when you solo a track that is routed to perhaps several other tracks (directly and indirectly), you will hear the output of these sends as well as the original track by itself. This is called *in place* solo. It might not always be what you want.



Under **Options**, **Preferences, Audio** you can deselect the option **Solos default to in-place solo**. This means that when you solo a track, you will hear just that track by itself, without its entire routing.

If you change this default, at any time and for any track you can temporarily over-write this. To solo any track in-place, hold the **Alt** key as you click the track's Solo button.

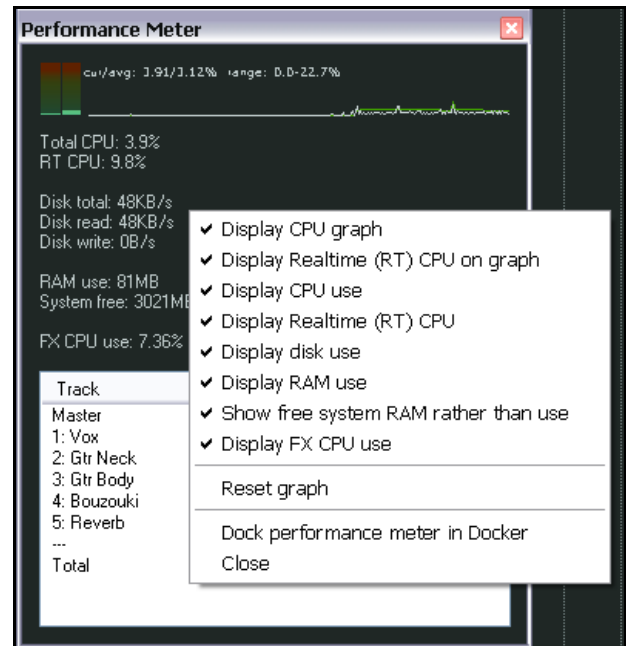
### 19.15 Customising the Performance Meter

You can customise the information shown on the performance meter, making your selections from its context menu (see right). Amongst the items that can be displayed or hidden are:

- CPU Graph
  - CPU Use
  - Disk Use
  - RAM Use
  - Free System RAM
  - FX CPU use

The Performance Meter can also be docked or undocked.

**Note:** The RT ("Real Time") CPU meter measures the amount of CPU time used by the audio thread servicing the sound device. Since it is measuring a single thread, it reflects only the CPU time used by one core, and gives you an indication of how much leeway you have in processing. If you have anticipative FX enabled (and few tracks record armed), RT CPU will generally be pretty low, as most things should be done asynchronously, allowing the real time thread to quickly put things together.



### 19.16 Customising Track Default Settings

Track default settings can be customised on the **Project Defaults** page of the **Options, Preferences** window.

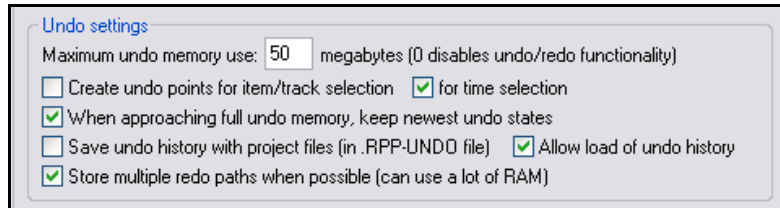
Amongst other things, here you can specify:

- Whether new tracks are automatically shown in the mixer.
- Default automation mode and whether envelopes are armed by default.
- Whether new tracks are automatically armed for recording, with or without input monitoring.
- Default Record mode.
- Default track send behavior.

## 19.17 Customising Undo History Behavior

Three important features of REAPER that enable you to customise your Undo History behavior are:

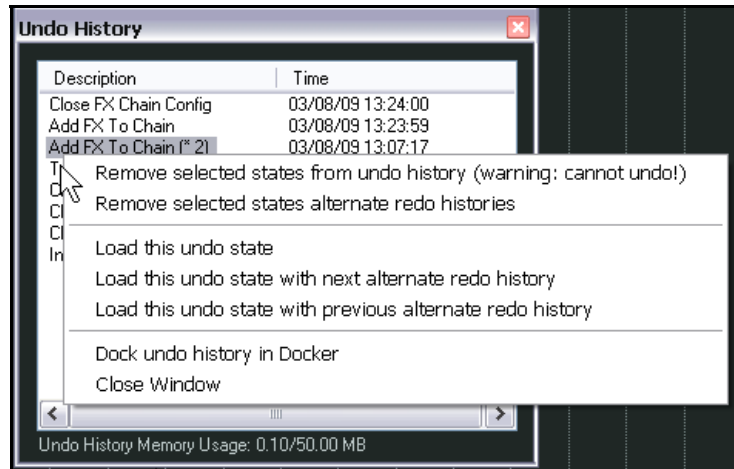
- Save Undo History with project files.
- Allow load of Undo History.
- Store multiple redo paths where possible.



All of these features can be selected from the **Undo Settings** section of the **Options, Preferences, General** screen (shown above).

If you enable the option to **Store multiple redo paths where possible** then during your current work session, any time you use the Undo History window to go back to an earlier point, then any actions you take from that point on will be stored as an alternate set of actions to the set of actions already stored. REAPER will remember both paths independently of each other. Moreover, every time you return to that point, another new undo path will be created.

An example is shown on the right. The highlighted action **Add FX to Chain** is flagged with **(\*2)**. This means that in addition to the original set of actions, two more undo history paths exist where twice we have gone back to that point. By right-clicking where shown, we are able to choose which undo state we wish to load, this enabling us to restore those commands and actions.



If you also enable the options to **Save undo history with project files** and **Allow load of undo history**, then this undo history will still be available to you next time you use this project file, even if you have since closed REAPER and shut down your computer.

## 19.18 Some Other REAPER Options

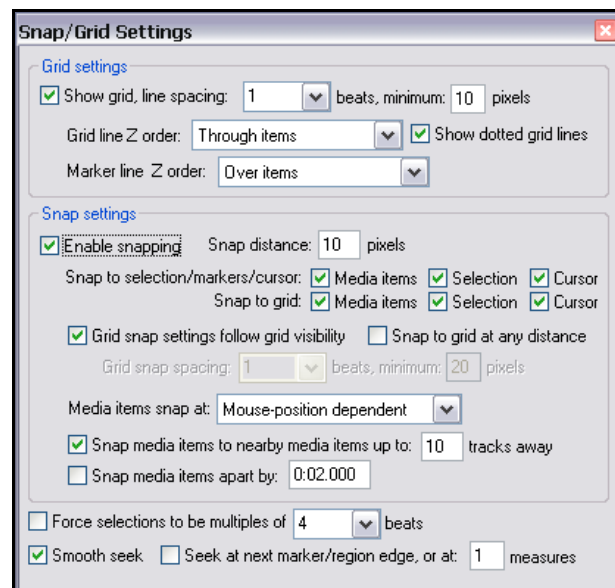
The following are items that appear on the REAPER **Options** menu that are not adequately covered in detail elsewhere in this User Guide.

### Enable snapping

This option will toggle snapping to the grid. Items will snap to the specified grid locations. That is to say that they will snap to the grid lines. The amount of 'snap' will depend on the resolution that you specify in the snap settings. If you turn this off, items will move free of the grid and will not snap to the lines.

Snapping behavior is determined by the **Snap/Grid Settings** (see right). This includes the option to use **Smooth Seek**.

With this option enabled, seeking is totally changed, especially for projects aligned to the grid. If you want to jump from one part of the time line to



## 19 - NEW! REAPER's Preferences and Other Settings

another without playing in between those parts then enable this, and go to the measure you want to hear next. It won't move there right away, but after the measure you are on is over. Then it will smoothly go to the later part making a seamless transition. It will smoothly seek the next part, without pausing. This can be handy for trying different chorus or verse combinations etc.

This feature can also be enabled and disabled directly from the **Options** menu.

### Show grid

This will show the lines of the grid in order to line items up with it. Grid characteristics are determined by your **Snap/Grid Settings**.

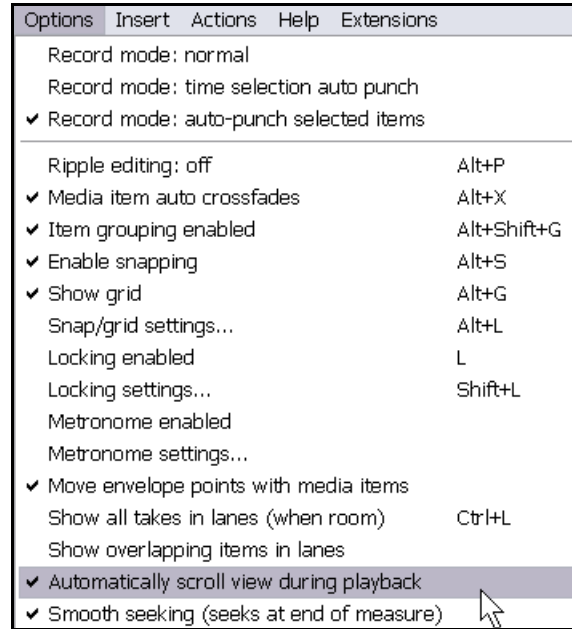
### Move envelope points with media items

If enabled, this will move the envelopes along with any movement of the items that they are associated with. Normally envelopes are statically placed on a track and stay put wherever an item is moved.

### Automatically scroll view during playback

During Playback/Recording when the playback reaches the end of the screen, it will normally move to the next screen over automatically, so that you don't have to manually follow the play/record point.

However, by disabling this option, you can ensure that the media items displayed on the screen when playback is commenced will remain there during playback – the scroll cursor will just disappear off the screen. This can be helpful, for example, if you want to focus on editing a particular passage.







### 20 Main Right-Click Context Menus Summary

If you've got this far then you must have discovered how important right-click context menus are in REAPER. Right click just about anywhere and a menu will pop up. That menu will depend on exactly where the mouse is pointing when you click the right button. Point and right click over a track name or number in the track control panel or mixer and the track control menu will be displayed. Right click over a track's mute button and you'll get a menu of various mute options. Right click over a media item and you'll get a menu of command and actions used for managing, editing or processing media items.

These are just a few examples. Many of these have already been explained in the preceding chapters. There isn't room here to review every one of REAPER's right click context menus in detail, but in this section you'll find a summary of the major ones.

#### 20.1 The Track Control Panel Context Menu

Insert new track	Ctrl+T
Insert virtual instrument on new track...	
Insert track from template	▶
Save selected tracks as track template...	
Remove selected tracks	
Duplicate selected tracks	
Copy selected tracks to clipboard	
Cut selected tracks to clipboard	
Render selected tracks to stem tracks (and mute originals)	
Render selected tracks to mono stem tracks (and mute originals)	
<hr/>	
Enable free item positioning for selected tracks	
Show MIDI track control for selected tracks	
Set all tracks to automatic record-arm when track selected	
<hr/>	
✓ Show selected tracks in track list	
✓ Show selected tracks in mixer	
Filter visibility by track name...	
<hr/>	
Set track color to custom color...	
Set track color to random colors	
Set track color to one random color	
Set track color to default	
SWS track color	▶
Set track icon...	
Remove track icon	
<hr/>	
Set timebase for selected tracks	▶
Set automation mode for selected tracks	▶
Set automation mode for all tracks	▶
Track performance options	▶
Track grouping parameters...	Shift+G
✓ Track grouping enabled	
<hr/>	
Show master in track view	Ctrl+Alt+M
SWS Snapshots	▶
Xenakios Extensions	▶

To display this menu, right click over the Track Name or Number of any track, either in the Track Control Panel or the Mixer.

An explanation of the commands follows.

## Up and Running: A REAPER User Guide v 3.11

Command	Comments
<b>Insert new track ...</b>	Inserts a new track after the currently selected track.
<b>Insert virtual instrument on new track ...</b>	Inserts and builds VSTi/DXi on new track.
<b>Insert track from template</b>	Inserts a new track based on any existing template.
<b>Save selected tracks as track template ...</b>	Saves all tracks in current selection as a single track template.
<b>Remove selected tracks</b>	Removes (deletes) any track or tracks currently selected.
<b>Duplicate selected tracks</b>	Creates a duplicate of any track or tracks currently selected, immediately below the original track.
<b>Copy selected tracks to clipboard</b>	Copies any selected track or tracks to the Windows clipboard from which it or they can be pasted elsewhere within the current project or to a different project.
<b>Cut selected tracks to clipboard</b>	Cuts any selected track or tracks to the Windows clipboard from which it or they can be pasted elsewhere within the current project or to a different project.
<b>Render selected tracks to stem tracks (and bypass originals)</b>	Renders any selected tracks to stem tracks.
<b>Render selected tracks to mono stem tracks (and bypass originals)</b>	Renders any selected tracks to mono stem tracks.
<b>Enable free item positioning for selected tracks</b>	Toggles free item positioning mode on and off for selected tracks.
<b>Show selected tracks in track list</b>	Toggles display of selected tracks in the track control panel.
<b>Show selected tracks in mixer</b>	Toggles display of selected tracks in the mixer.
<b>Set track colors to custom color...</b> <b>Set track colors to random color</b> <b>Set track colors to one random color</b> <b>Set track colors to default</b>	Any of these commands can be used to modify the colours of your currently selected tracks, as required.
<b>SWS track color</b> ( <i>if SWS extensions have been installed</i> )	Displays SWS color management menu.
<b>Set track icon ...</b>	Allows you to select an icon to be displayed with the track.
<b>Remove track icon</b>	Removes previously selected track icon from track.
<b>Set all tracks to automatic record arm when tracks selected</b>	Causes all tracks to be automatically armed when selected, unarmed when deselected.
<b>Set timebase for selected tracks</b>	Offers a sub menu of options for determining the timebase for currently selected tracks.
<b>Set automation mode for selected tracks</b>	Lets you change the automation mode (for example, to Write or Read) for all currently selected tracks.
<b>Set automation mode for all tracks</b>	Lets you change the automation mode (for example, to Write

## 20 - Main Right-Click Context Menus Summary

Command	Comments
	or Read) for all tracks.
<b>Track performance options</b>	Allows or disallows anticipative FX and/or media buffering.
<b>Track grouping parameters ...</b>	Modify parameter settings for track groups.
<b>Track grouping enabled</b>	Enables/disables track grouping.
<b>Show master in track view</b>	Toggles on and off the display of the Master in track view.
<b>SWS Snapshots</b> <i>(if SWS extensions have been installed)</i>	Opens SWS mixer snapshots menu.
<b>Xenakios Extensions</b> <i>(if Xenakios extensions have been installed)</i>	Opens Xenakios extensions menu.

### 20.2 The Empty Track List Area Context Menu

Insert new track	Ctrl+T
Insert virtual instrument on new track...	
Insert track from template	▶
Show master track	Ctrl+Alt+M

This menu is accessed by right-clicking anywhere in the empty area below the track list in the track pane area.

Command	Comments
<b>Insert new track</b>	Inserts a new track below currently selected track.
<b>Insert virtual instrument on new track</b>	Inserts a new track for a VSTi along with multichannel outputs if required.
<b>Insert track from template</b>	Inserts new track from any template you select.
<b>Show master track</b>	Toggles on and off the display of the master track.

## 20.3 The Timeline and Ruler Context Menu

Remove selection	ESC
Zoom selection	Ctrl+NUM PLUS
Set selection to selected items	Ctrl+I
Extend selection to next transient in selected items	
Insert marker...	Shift+M
Create region from selection	Shift+R
Insert time signature marker...	Shift+C
Remove all markers from time selection	
Set project tempo from time selection...	
Create measure from time selection (detect tempo)	Alt+Shift+C
Create measure from time selection (new time signature)...	
Crop project to selection	
Insert empty space in selection	
Remove contents of selection (moving later items)	
Paste	Ctrl+V
Split items at cursor	S
Split items at time selection	Shift+S
Select All	
Copy selected area of selected items	Ctrl+Shift+C
Copy loop of selected area of items	Ctrl+Alt+L
Minutes : Seconds	
✓ Measures . Beats (M:S secondary)	
Measures . Beats	
Seconds	
Samples	
Hours : Minutes : Seconds : Frames	

This menu is accessed by right clicking the mouse in any of the following areas:

- Over the Ruler or Timeline displayed above the first track (see illustration left).
- Over the blank area above the ruler.
- Over the empty background area in the Track View area.

An explanation of the menu follows.

Command	Comments
<b>Remove Selection</b>	Deselects currently selected area. Removing the selection does not cause any media items to be deleted.
<b>Zoom selection</b>	Zoom to current selected area
<b>Set selection to selected items</b>	Makes the selection along the timeline for the whole project the same as the portion of the timeline covered by the currently selected item or items.
<b>Extend selection to next transient in selected items</b>	Extends the area of the selection to the next transient.
<b>Insert marker ...</b>	Inserts marker and opens the Add Marker dialog box at the current cursor position.
<b>Create region from selection</b>	Creates a region from the current selection.

## 20 - Main Right-Click Context Menus Summary

Command	Comments
<b>Insert time signature marker...</b>	Allows you to insert a time signature marker at the current cursor position.
<b>Remove all markers from time selection</b>	Removes all markers from the currently selected area.
<b>Set project tempo from time selection...</b>	Creates project tempo based on current time selection.
<b>Create measure from time selection (detect tempo) ...</b>	Creates a new measure from the current time selection using the current tempo.
<b>Create measure from time selection (new time signature) ...</b>	Creates a new measure from the current time selection with a new time signature.
<b>Crop project to selection</b>	Crops all media items in the project to the current loop selection.
<b>Insert empty space in selection</b>	Inserts an empty space equal to the currently selected area into all tracks in the current project.
<b>Remove contents of selection (moving later items)</b>	Effectively deletes the currently selected area from the project, moving all later items up to fill the gap, whether or not ripple editing has been turned on.
<b>Paste</b>	Pastes any previously cut or copied item into the currently selected track at the current cursor position.
<b>Split items at cursor</b>	Splits currently selected item or items at the current cursor position. If no item is selected, splits all items.
<b>Split items at time selection</b>	Splits currently selected item or items at the start and end of the current loop selection. If no item is selected, splits all items.
<b>Select All</b>	Selects all media items.
<b>Copy selected area of selected items</b>	Copies the selected area of selected items to the clipboard.
<b>Copy loop of selected area of items</b>	Copies the selected area as a loop.
<b>Minutes : Seconds</b> <b>Measures – Beats (M:S secondary)</b> <b>Measures – Beats</b> <b>Seconds</b> <b>Samples</b> <b>Hours : Minutes : Seconds : Frames</b>	<p>These six options are mutually exclusive.</p> <p>Select any one to set the unit of measurement used for ruler display.</p>

## 20.4 The Media Items Context Menu

Item settings		▶
Item properties...	F2	
Source properties...	Ctrl+F2	
<hr/>		
Group		▶
Take		▶
Item processing		▶
Extensions : Item/Take Selection		▶
Extensions : Item/Take Manipulation		▶
Open items in editor		▶
Item notes...		
<hr/>		
Apply track FX to items as new take		
Apply track FX to items as new take (mono output)		
Apply track FX to items as new take (MIDI output)		
Render items as new take		
Reverse items as new take		
Glue selected items		
<hr/>		
Copy selected items	Ctrl+C	
Copy selected area of selected items	Ctrl+Shift+C	
Copy loop of selected area of items	Ctrl+Alt+L	
Cut selected items	Ctrl+X	
Cut selected area of selected items	Ctrl+DELETE	
Paste	Ctrl+V	
Remove selected items		
Trim items to selected area		
<hr/>		
Split items at cursor	S	
Split items at prior zero crossing	Alt+Z	
Split items at time selection	Shift+S	
Heal splits in selected items		

This menu is accessed by right-clicking over any media item.

If a number of media items have been selected, the command selected from this menu will be applied to all those items.

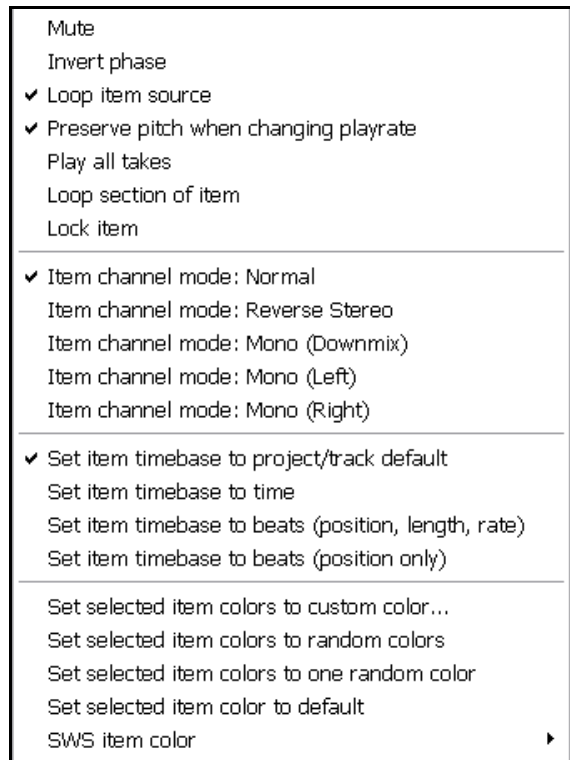
An explanation of this menu appears below.

Command	Comments
<b>Item Settings</b>	Opens the Item Settings menu.
<b>Item Properties...</b>	Opens Item Properties dialog box.
<b>Source Properties...</b>	Opens Source Properties dialog box.
<b>Group</b>	Opens Group fly out menu, to Group or Ungroup selected items,
<b>Take</b>	Opens Take submenu.
<b>Item processing</b>	Opens Item Processing submenu. This is explained separately.
<b>Extensions: Item/Take Selection</b>	If you have the Xenakios extensions installed, these commands will be added to your menu.

## 20 - Main Right-Click Context Menus Summary

Command	Comments
<b>Extensions: Item/Take Manipulation</b>	If you have the Xenakios extensions installed, these commands will be added to your menu.
<b>Open items in editor</b>	Opens a submenu whose commands are used to open the selected item or items (or copies of these items) with the Wave Editor of your choice (specified under Options, Preferences, External Editors).
<b>Item Notes</b>	Opens the Item Notes window for you to add, delete or edit notes for this item. Same as notes icon.
<b>Apply track FX to items as new take</b>	This group of commands allows you to process selected items as new stereo takes.
<b>Apply track FX to items as new take (mono output)</b>	This group of commands allows you to process selected items as new mono takes.
<b>Apply track FX to items as new take (MIDI Output)</b>	This group of commands allows you to process selected items as new MIDI takes.
<b>Render items as new take</b>	Renders selected items with any FX as new takes.
<b>Reverse items as new take</b>	Reverses selected media item or items as a new take.
<b>Glue selected items</b>	Joins selected media items into one new item.
<b>Copy selected items</b> <b>Copy selected area of selected items</b> <b>Copy loop of selected area of items</b>	This group of commands offers three options for copying the current selection to the clipboard.
<b>Cut selected items</b> <b>Cut selected area of selected items</b>	This group of commands offers two options for cutting the current selection to the clipboard.
<b>Paste</b>	Pastes content of the clipboards to the currently selected track at the current cursor position.
<b>Remove selected items</b>	Deletes selected media items and removes them from the project file.
<b>Trim items to selected area</b>	Trims media items to the currently selected area.
<b>Split items at cursor</b>	Splits currently selected items at current cursor position
<b>Split items at prior zero crossing</b>	Splits currently selected items at the last zero crossings point before the current cursor position.
<b>Split items at time selection</b>	Splits currently selected items at the start and end of the currently selected timeline area.
<b>Heal splits in selected items</b>	Removes splits and joins items as one again.

## 20.5 The Item Settings Context Menu



An overview summary of these commands can be found in the table below.

Command	Comments
<b>Mute</b> <b>Invert Phase</b> <b>Loop item source</b> <b>Preserve pitch when changing playrate</b> <b>Play all takes</b> <b>Lock item</b>	Toggles these various Item Properties parameters. These can also be modified in the Item Properties dialog box, in addition to which there are icons that can be used for Mute and Lock item.
<b>Loop selection of item</b>	Toggles loop selection status.
<b>Set item timebase</b>	Four mutually exclusive options used to set item timebase
<b>Set selected item colors to custom color...</b>	Allows you to specify color for selected item(s).
<b>Set selected item colors to random colors</b>	Sets all items in selection to a different randomly chosen color.
<b>Set selected item colors to one random color...</b>	Sets all items in selection to the same randomly chosen color.
<b>Set selected item color to default...</b>	Restores color of selected items to the theme default.
<b>SWS item color</b>	If SWS extensions have been installed, displays SWS color management menu.



## 20 - Main Right-Click Context Menus Summary

### 20.6 The Item Take Context Menu

When a track consists of multiple takes, right clicking over a media item in that track and choosing **Take** from the context menu produces the sub menu shown on the left.

An explanation of some of these commands is shown in the table below.

Next take	T
Previous take	Shift+T
Delete active take	
Crop to active take	Alt+Shift+T
Duplicate active take	
Show FX chain for active take	Shift+E
Remove FX for active take	
Take volume envelope	
Take pan envelope	
Take mute envelope	
Explode all takes to new tracks	
Explode all takes (in place)	
Explode all takes (in order)	
Implode selected items across tracks into takes	
Implode selected items on same track into takes	
Paste to takes in selected items	
Take 1: Vox.mp3	
✓ Take 2: Vox.mp3	

Command	Comments
<b>Next take</b> <b>Previous take</b>	Causes the next or previous take to be selected.
<b>Delete active take</b>	Causes the currently active (selected) take to be deleted.
<b>Crop to active take</b>	Crops all other takes for this item to the currently active take.
<b>Duplicate active take</b>	Creates a duplicate copy of the currently active take.
<b>Show FX chain for active take</b>	Opens FX chain for the currently active take.
<b>Remove FX for active take</b>	Removes all FX from the take's FX chain.
<b>Take volume envelope</b>	Toggles volume envelope for take on/off.
<b>Take pan envelope</b>	Toggles pan envelope for take on/off.
<b>Take mute envelope</b>	Toggles mute envelope for take on/off
<b>Explode all takes to new tracks</b>	Creates a new track for each take.
<b>Implode selected items across tracks into takes</b>	Creates one track with one take for each media item selected, where the media items are selected across several tracks.
<b>Implode selected items on same track into takes</b>	Creates one track with one take for each media item selected, where the media items are all selected from the same track.
<b>Paste to takes in selected items</b>	Pastes to takes in selected items.
<b>Take 1:, Take 2:, Take 3: etc</b>	Makes the selected take active.

## 20.7 The Item Processing Context Menu

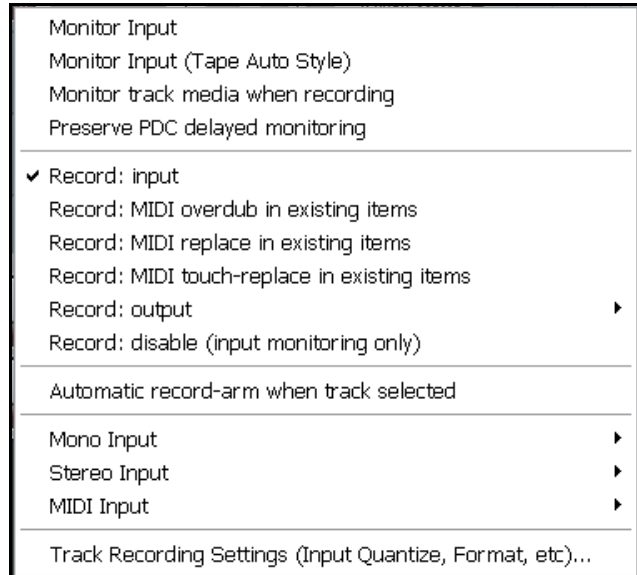
Normalize selected items	Ctrl+Shift+N
Normalize selected items (common gain)	
Dynamic split selected items...	
Quantize item positions to grid...	
Move items to source preferred position	
Implode selected items across tracks into items on one track	
Auto-reposition items in free positioning mode	
Explode multichannel audio or MIDI items to new mono items	
Explode MIDI item by note row (pitch)	
Convert active take MIDI to in-project event	
Convert active take MIDI to file (ghost copyable)	
Import media cues from selected items as project markers	

An explanation of these commands appears below.

Command	Comments
<b>Normalize selected items</b>	Normalizes all selected items, assessing each one independently.
<b>Normalize selected items (common gain)</b>	Normalizes as far as possible all selected items, adding the same amount of gain to each.
<b>Dynamic split selected items ...</b>	Opens the dynamic split dialog box for dynamic splitting.
<b>Quantize item positions to grid</b>	Quantizes the positions of selected items according to grid settings.
<b>Move items to source preferred position</b>	Moves items to source preferred position
<b>Implode selected items across tracks into items on one track.</b>	Merges the selected items into a single track.
<b>Auto-reposition items in free positioning mode</b>	Sets the status of selected items to free positioning mode.
<b>Explode multichannel audio or MIDI items to new mono items.</b>	If the media item is a multichannel one, this command will create an additional new mono track for each channel used. This command will explode (or "dissolve") MIDI channels.
<b>Explode MIDI items by note row (pitch).</b>	Dissolves MIDI items by note row instead of channel.
<b>Convert active take MIDI to in-project event</b>	Changes a previously ghost copied item into a project event in its own right.
<b>Convert active take MIDI to file (ghost copyable)</b>	Changes the status of the active MIDI take so that it can be ghost copied.
<b>Import media cues from selected items as project markers</b>	Converts existing media cues in an imported item into REAPER markers.

### 20.8 The Record Arm Context Menu

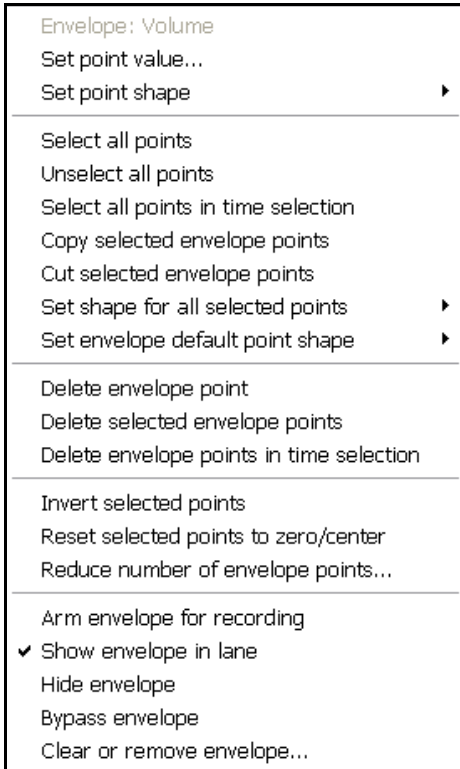
This menu is accessed by right-clicking over the Record Arm button or VU meter of any track.



An explanation of the commands follows.

Command	Comments
<b>Monitor Input ...</b> <b>Monitor Input (Tape Audio Style)</b> <b>Monitor track media when recording</b> <b>Preserve PDC delayed monitoring</b>	The first two of these options are mutually exclusive: you should select whichever of these you prefer if you wish to use REAPER's input monitoring. You do not need to select either of these options, however, if using any input monitoring facility supplied by your sound card. Optionally, you may choose to also monitor track media when recording.
<b>Record: input</b>	In most cases, for normal audio recording you will want to select <b>Record: input</b> to record the incoming audio signal.
<b>Record: output</b>	Used to record a track's output (post FX). Options include multichannel, stereo or mono (with or without latency compensation) and MIDI output.
<b>Record: disable (input monitoring only)</b>	Allows for input monitoring without recording.
<b>Automatic record-arm when selected</b>	Causes the track to be auto armed when selected.
<b>Mono Input</b>	Displays sub menu from which to select the required mono input from your sound card.
<b>Stereo Input</b>	Displays sub menu from which to select the required stereo input from your sound card.
<b>MIDI Input</b>	Displays a menu from which to select your required MIDI device and channels
<b>Track recording settings</b>	Used to change recording format settings and/or input quantize settings for this track.

## 20.9 The Envelopes Context Menu



The envelope menu shown (left) is accessed by right-clicking over any existing point on any existing envelope.

Right clicking over an existing envelope but not on a specific point produces a similar menu, but with some point-specific commands such as commands such as **Set point value...** and **Set point shape** excluded, and the command **Create new point** added.

An explanation of this menu appears below.

Command	Comments
<b>Set point value...</b>	Opens a dialog box in which you can specify a different value for the specific point, and, if you wish, position and shape.
<b>Set point shape</b>	Lets you specify any of the six available shapes for the current point.
<b>Select all points</b>	Selects all points in the envelope.
<b>Unselect all points</b>	Unselects all points in the envelope.
<b>Select all points in time selection</b>	Selects all points on the envelope that are contained within the currently selected area along the timeline.
<b>Copy selected envelope points</b>	Copies currently selected envelope point or points to the clipboard.
<b>Cut selected envelope points</b>	Cuts currently selected envelope point or points to the clipboard. Pressing <b>Ctrl V</b> causes cut or copied points to be pasted onto whichever envelope is currently selected, at the cursor position.
<b>Set shape for all selected points</b>	Allows you to select any one of the six available shapes to apply to all currently selected envelope points.
<b>Set envelope default point shape</b>	Allows you to change the default shape that will be applied to new envelope points.
<b>Delete envelope point</b>	Deletes the envelope point.

## 20 - Main Right-Click Context Menus Summary

Command	Comments
<b>Delete selected envelope points</b>	Deletes all currently selected envelope points.
<b>Delete envelope points in time selection</b>	Deletes all points on current envelope that are contained within the currently selected area along the timeline.
<b>Invert selected points</b>	Causes currently selected envelope points to be inverted.
<b>Reset selected envelope points to zero/center</b>	Resets all currently selected envelope points effectively to a "neutral" value.
<b>Reduce number of envelope points</b>	Displays the Reduce Points dialog box, enabling you to reduce the number of points in either the whole envelope or only the current time selection.
<b>Arm envelope for recording</b>	Arms the envelope ready for recording, for example to write automation changes to the envelope.
<b>Show envelope in lane</b>	Determines whether envelope will be shown in its own lane or not.
<b>Hide envelope</b>	Hides the envelope whilst keeping it active. Hidden envelopes can be redisplayed using the Envelopes window.
<b>Bypass envelope</b>	Toggles the bypass state of the envelope.
<b>Clear or remove envelope</b>	Removes all points from the current envelope. You are prompted to indicate whether you also wish to remove the envelope completely.

Right clicking over the background area of any envelope lane in the track control panel will produce a menu similar to that shown on the right. The commands on this menu fall into three sections:

**Existing available envelopes:** Use this to change the envelope displayed in this lane to any of those shown on the menu.

**Envelope mangement:** Use these commands to show, hide, arm or disarm all envelopes on this track, or to move all visible envelopes into or out of lanes.

**Automation mode:** Change your required automation mode for this track.

<p>Display track automation envelope (• active but hidden):</p> <ul style="list-style-type: none"> <li>✓ Volume</li> <li>• Pan               <ul style="list-style-type: none"> <li>Volume (Pre-FX)</li> <li>Pan (Pre-FX)</li> <li>Mute</li> <li>Send Envelopes ▶</li> </ul> </li> </ul>
<p>Show all active track envelopes</p> <p>Hide all track envelopes</p> <p>Arm all visible track envelopes</p> <p>Disarm all track envelopes</p> <p>Move all visible track envelopes to envelope lanes</p> <p>Move all visible track envelopes to media lane</p>
<p>Track automation mode:</p> <ul style="list-style-type: none"> <li>✓ Trim/Read (envelopes are active but faders are all for trim)</li> <li>Read (play faders with armed envelopes)</li> <li>Touch (record fader movements to armed envelopes)</li> <li>Latch (record fader movements after first movement)</li> <li>Write (record fader positions to armed envelopes)</li> </ul>

## 20.10 The Transport Bar Context Menu

Jump to marker	▶
Play rate	▶
Transport	▶
External Timecode Synchronization	▶
<hr/>	
✓ Automatically scroll view during playback	
✓ Smooth seeking (seeks at end of measure)	
<hr/>	
Record mode: normal	
Record mode: time selection auto punch	
✓ Record mode: auto-punch selected items	
<hr/>	
✓ Use ruler time unit	
Minutes : Seconds	
Measures . Beats + M:S	
Measures . Beats	
Seconds	
Samples	
Hours : Minutes : Seconds : Frames	
<hr/>	
✓ Show play rate control	
✓ Show play state as text	
✓ Center transport controls	
<hr/>	
✓ Dock transport in main window	
Hide Transport	

This context menu is accessed by right-clicking over the Transport Bar.

An explanation of the commands on this menu appears below.

In addition, more specific context sensitive menus are available by right clicking over many of the items on the transport bar. For example, right-clicking on the **Record** button gives you a menu of the three record mode options. Right clicking on the play rate fader causes the specific play rate sub menu to be displayed.

Command	Comments
<b>Jump to marker</b>	Displays a fly out menu of markers. Click on any marker in the list to jump to it.
<b>Play rate</b>	Displays a sub menu of options for adjusting the play rate (with or without preserving pitch) and to set the play rate fader range.
<b>Transport</b>	Displays a sub menu of various actions equivalent to the Transport control buttons - play, record, pause, stop, go to start, go to end, etc.
<b>External timecode Synchronization</b>	Used to synchronize REAPER's clock to an external device.
<b>Record mode: normal</b> <b>Record mode: time selection auto punch</b> <b>Record mode: auto-punch selected items</b>	Sets the specified recording mode. The three options are mutually exclusive.
<b>Use ruler time unit</b>	Ensures that whatever time unit is selected for the ruler is also used on the Transport Bar. Alternatively, you can select one of the other options (see below).
<b>Minutes : Seconds</b>	Select your preferred unit of measurement for display on the Transport

## 20 - Main Right-Click Context Menus Summary

Command	Comments
<b>Minutes – Beats + M S</b> <b>Measures – Beats</b> <b>Seconds</b> <b>Samples</b> <b>Hours:Minutes:Seconds:Frames</b>	Bar. These options are mutually exclusive.
<b>Show play rate control</b>	Toggles this option on and off.
<b>Show play state as text</b>	Toggles this option on and off.
<b>Center transport controls</b>	Toggles this option on and off.
<b>Dock transport in Main Window</b>	Toggles this option on and off.
<b>Hide transport</b>	Hides the Transport Bar. To redisplay, press <b>Ctrl Alt T</b> .

### 20.11 The Routing Matrix Context Menu

The commands in this menu are used mainly to determine which items are and are not shown in the routing matrix. Exactly which items you will wish to show will vary at different times in your project's life cycle. Making the right selection for the right time can prevent screen clutter and make the matrix easier to work with.

<input checked="" type="checkbox"/> Matrix mode: routing Matrix mode: grouping
<input checked="" type="checkbox"/> Show master/parent as destination <input checked="" type="checkbox"/> Show tracks as destinations <input checked="" type="checkbox"/> Show audio hardware as destinations Show ReaRoute as destinations
<input checked="" type="checkbox"/> Show master as source <input checked="" type="checkbox"/> Show tracks as sources Show audio hardware as sources Show ReaRoute as sources
Dock routing window in Docker Close Window

Command	Comments
<b>Matrix mode</b>	Decides whether the routing or grouping matrix is shown.
<b>Show ---- as destination</b>	Determines which items are and are not shown as destinations for sends in the header row.
<b>Show ---- as sources</b>	Determines which items are and are not shown as sources of sends in the left hand column.
<b>Dock matrix in docker</b>	Determines whether the matrix is or is not docked.

## 20.12 The FX Window Context Menu

Add FX...	Insert, A
Add FX chain...	Shift+Insert, Shift+A
Save FX chain...	Ctrl+S
Save selected FX as chain...	
Copy selected FX	Ctrl+C
Cut selected FX	Ctrl+X
Copy all FX	Ctrl+Shift+C
Paste FX	Ctrl+V, Ctrl+Insert
Select all	Ctrl+A
Toggle selected FX bypass	Ctrl+B
Toggle selected FX offline	Ctrl+Alt+B
Rename FX instance	F2
Remove selected FX	Delete
Remove all FX	Shift+Delete
Save chain as default for new tracks	
Load default track chain	
Window float selected FX	(doubleclick)
Send all keyboard input to plug-in	
Build multichannel routing for output of selected FX...	
Build 16 channels of MIDI routing to this track	
Dock FX window in Docker	
Close FX window	

This menu is accessed by right-clicking within any track's FX window.

An explanation of the commands on this menu appears below.

Command	Comments
<b>Add FX ...</b>	Opens Add FX Window to add one or more plug-ins to the current FX chain.
<b>Add FX chain ...</b>	Displays a menu of previously saved FX chains from which to select for insertion in the current FX window.
<b>Save FX chain ...</b>	Saves all FX in current FX window as an FX Chain.
<b>Save selected FX as chain ...</b>	Saves selected FX in current FX window as an FX Chain.
<b>Copy selected FX</b>	Copies currently selected FX to clipboard.
<b>Cut selected FX</b>	Cuts currently selected FX to clipboard.
<b>Copy all FX</b>	Copies all FX in current FX window to clipboard.
<b>Paste FX</b>	Pastes FX from clipboard into current FX window.
<b>Select all</b>	Selects all FX in current FX window.
<b>Toggle selected FX bypass</b>	Toggles bypass of all currently selected FX.
<b>Toggle selected FX offline</b>	Toggles online/offline status of all currently selected FX.



## 20 - Main Right-Click Context Menus Summary

Command	Comments
<b>Rename FX Instance</b>	Allows you to assign a specific name for this instance of the plug-in.
<b>Remove selected FX</b>	Removes all selected FX from current FX window.
<b>Remove all FX</b>	Removes all FX from current FX window.
<b>Save chain as default for new tracks</b>	Makes the FX chain in the current FX window the default FX chain automatically inserted when you create new tracks.
<b>Load default track chain</b>	Loads the current default FX chain into the currently open track FX window.
<b>Window float selected FX</b>	Floats selected FX so that they are displayed independently of the FX window.
<b>Send all keyboard input to plug-in</b>	Ensures that keystrokes (such as navigation keys) operate within the selected plug-in (where the plug-in has been designed to recognise and accept these keystrokes). Note that not all plug-ins will recognise these keystrokes.
<b>Build multichannel for output of selected FX</b>	Creates multichannel/multitrack where appropriate: for use with multichannel VSTis and Dxis.
<b>Build 16 channels of MIDI routing to this track</b>	Where appropriate, for use with multichannel VSTis and Dxis.
<b>Dock FX window in docker</b>	Toggles the docked/undocked status of the FX window.
<b>Close FX window</b>	Closes the FX window.

You should also be aware of the more limited number of options available from the menu that is displayed when you right click over any FX in the FX area of the Mixer.

This menu is shown on the right:

**Add FX** or **Add FX chain** can be used to insert an FX or an FX plain into that track.

**Float FX configuration** will open the interface for an individual plug-in in a window of its own.

**Show FX chain** will open the track's FX chain.

**Bypass chain** will toggle the bypass state of the entire FX chain for that track.

**Bypass FX** will toggle the plug-in's bypass status **Offline FX** will toggle its offline status.

**Delete FX** will remove the plug-in from that track's FX chain.

**Rename FX instance** allows you to rename this individual FX instance.

Add FX...	
Add FX chain	▶
Float FX configuration	Click
Show FX chain	Ctrl+Click
Bypass chain	
✓ Bypass FX	Shift+Click
Offline FX	Ctrl+Shift+Click
Delete FX	Alt+Click
Rename FX instance	

## 20.13 The MIDI In-Line Editor Context Menu

Insert note at edit cursor	Shift+I
Copy notes	Ctrl+C
Cut notes	Ctrl+X
Paste	Ctrl+V
Paste preserving position in measure	Ctrl+Shift+V
Select all notes	Ctrl+A
Delete notes	Delete
Split notes	S
Join selected notes	J
Mute notes	Alt+M
Reverse	
Note properties...	Ctrl+F2
Note channel	
<hr/>	
Quantize events...	Q
Quantize selected events using last settings	
Quantize selected events to grid	
Unquantize selected events	
Freeze quantization for selected events	
Humanize notes...	
Select all notes with same note value	
Remove selected duplicate notes	
Set selected note ends to start of next note	
<hr/>	
<input checked="" type="checkbox"/> Show note names on events	Alt+0
<input checked="" type="checkbox"/> Show velocity handles on events	Alt+9
Single click inserts/removes notes	Alt+8
Use last note length when inserting notes	
<input checked="" type="checkbox"/> Preview notes on add/edit	
<hr/>	
<input checked="" type="checkbox"/> Show all note rows	
Hide unused note rows	
Hide unused and unnamed note rows	
<hr/>	
<input checked="" type="checkbox"/> Rectangles	Alt+5
Triangles (drum mode)	Alt+6
Diamonds (drum mode)	Alt+7

Right-clicking within the MIDI In-Line Editor the context menu shown on the right.

These commands are a subset of some of the MIDI Editor's menu commands and are explained in detail in Chapter 12.

The first section (from **Insert note at edit cursor** to **Note channel**) contains the same commands as the right click notes menu in the MIDI Editor.

The second section (from **Quantize events** to **Set selected note ends to start of next note**) can also be found on the **Edit** menu in the MIDI Editor's main menu.

The remaining commands (from **Show all note rows** to **Diamonds \*drum mode**) can also be found on the **View** menu in the MIDI Editor's main menu.

## 20.14 The MIDI Editor Context Menu

Right clicking over the title bar in the MIDI Editor (or tab if docked) produces a composite menu made up of all the commands on its main menu. The commands are grouped, first the **File** commands, then **Edit** commands, then **Navigate** commands, then **View**, then **Actions**, then **Navigate**.

These commands are explained in detail in Chapter 12.

# The Extra Stuff



### 21 ReaRoute: Using REAPER with Other Audio Apps

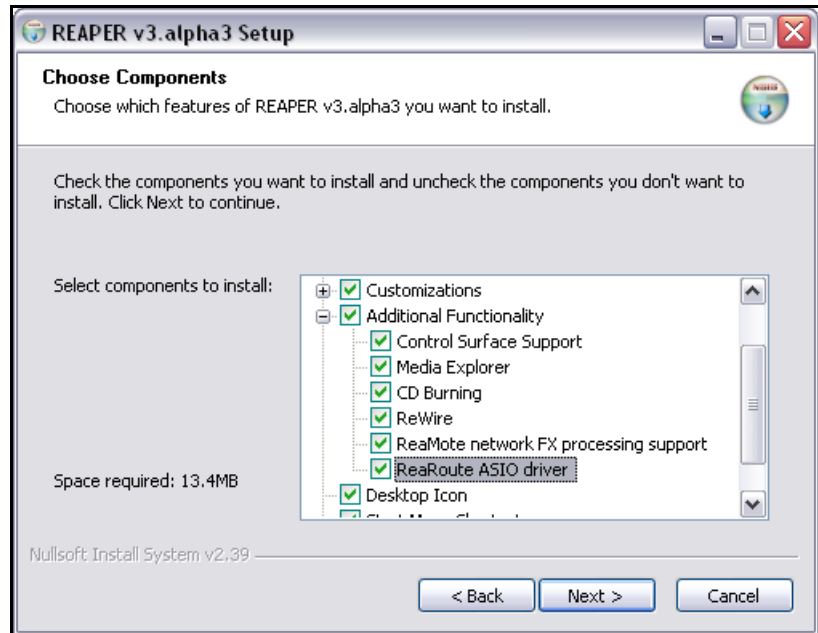
#### 21.1 What is ReaRoute?

ReaRoute is an ASIO driver that allows you to route audio to and from any other ASIO enabled application. ReaRoute is only installed on your system if you select the **ReaRoute ASIO driver** during the REAPER installation process.

This option is found on the REAPER Setup screen on the **Choose Components** page (shown right), under the heading **Added Functionality**.

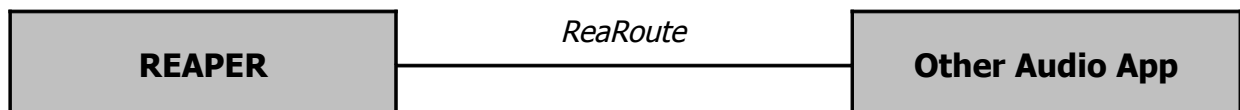
If you did not have this option selected (or if in doubt) when you last installed REAPER, simply reinstall REAPER, this time making sure that you have this option selected.

When you choose to install ReaRoute, the **ReaRoute ASIO driver** appears in the ASIO driver list for the other audio applications on your system.



**Note:** Some users have reported problems with native ASIO drivers after installing the ReaRoute driver. If you experience problems with your ASIO drivers after installing this feature, uninstall REAPER, then re-install with this check box cleared.

Once ReaRoute has been installed, you can pass audio streams between REAPER and other audio applications. In this example, we will use the example of sharing audio between REAPER and Sonar. The same principles apply, however, if you are working with an application such as Cubase or Ableton Live instead of Sonar.



In this section, you will be introduced to using ReaRoute by working thru the following tasks:

- Setting up Sonar (or any other DAW application of your choice) to work with ReaRoute.
- Sending a project out from REAPER to that app and recording it track by track within that app.
- Sending a project from Sonar to REAPER, this time bringing it in as a series of submixes. You can then apply REAPER features to that project.
- Using a synthesizer workstation such as Project 5 in conjunction with REAPER.

Please remember that the purpose of this exercise is to teach you how you can go about sharing audio between different applications. How you apply that knowledge, and what benefits you derive from it, is of course up to you.

## 21.2 Setting Up Apps for ReaRoute

Before you can use any audio application with REAPER via ReaRoute, you need to ensure that the audio settings for that application are set up correctly. There are usually one or two basic steps involved. The first is to enable **ReaRoute ASIO** as the preferred driver, the second is to enable the various input and output channels required to transmit audio between the application and REAPER. With some applications, this second step is not required. The method will vary with the application, but always involve specifying your preferences on the **Audio Settings** dialog box (or similar). The table below gives some examples. They are accurate at the time this is being written, but be aware that all software programs are likely to change over time. If you are using a different application, you should be able to work out what is required.

Application	Instructions
<p><b>Note:</b> Before setting up or using any application for use with ReaRoute, you should:</p> <ul style="list-style-type: none"> <li>• Make sure that the ReaRoute ASIO Driver has been installed (see previous page), and</li> <li>• Make sure that REAPER is open and minimised.</li> </ul>	
<p><b>Ableton Live</b></p>	<ol style="list-style-type: none"> <li>1. <b>Options, Preferences</b> then click on the <b>Audio</b> tab.</li> <li>2. Set <b>Driver Type</b> to <b>ASIO</b>.</li> <li>3. Set <b>Audio Device</b> to <b>ReaRoute ASIO</b>.</li> <li>4. Click on <b>Input Config</b> then on each input channel that you wish to enable, then <b>OK</b>.</li> <li>5. Click on <b>Output Config</b> then on each output channel that you wish to enable, then <b>OK</b>.</li> <li>6. Close <b>Preferences</b> window.</li> </ol>
<p><b>FL Studio</b></p>	<p><b>Options, Audio Settings</b>, then select <b>ReaRoute ASIO</b> for <b>Output</b>. Close Audio Settings window.</p>
<p><b>Project 5</b></p>	<p><b>Options, Audio</b> then under <b>Audio Driver Selection – Outputs</b> select <b>ReaRoute ASIO ReaRoute Client -&gt; REAPER 1 (ASIO)</b> then <b>OK</b>.</p>
<p><b>Sonar</b></p>	<ol style="list-style-type: none"> <li>1. <b>Options, Audio, Advanced</b> then set Driver Mode to <b>ASIO</b> then <b>OK</b>.</li> <li>2. <b>Options, Audio, Drivers</b> then disable all existing drivers (input and output)</li> <li>3. <b>Options, Audio, Advanced</b> then set Device to <b>ReaRoute ASIO (8 in, 8 out)</b> then <b>OK</b></li> <li>4. <b>Options, Audio, Drivers</b> and enable all ReaRoute drivers, then <b>OK</b>.</li> </ol> <p><b>Note:</b> Sonar requires that you exit and restart the program before certain changes to audio settings are applied. Because of this, you may not be able to complete all of these steps at once – you may find that you have to close and reopen the program after each step before you can go on to the next one.</p>
<p><b>Tracktion</b></p>	<ol style="list-style-type: none"> <li>1. Click on the <b>Settings</b> tab.</li> <li>2. From the <b>Wave Device</b> drop down list choose <b>ReaRoute ASIO</b>.</li> <li>3. Click once on the red word <b>disabled</b> for each channel that you wish to use. The display should change for each item clicked on to green <b>enabled</b>.</li> <li>4. Click on the <b>Projects</b> tab when finished.</li> </ol>

### 21.3 Sending Audio From REAPER to Another DAW App

Before attempting this example, make sure that you have installed the ReaRoute ASIO Drivers and that you have set up your other DAW application (such as Cubase, Sonar, Ableton Live, Tracktion or Samplitude) to use ReaRoute Drivers, as explained on the previous page.

In this example, we are going to send a project from REAPER to Sonar. You might wish to do this, for example, to use Sonar to apply V-Vocal to a vocal track. Of course, the same principles would apply if you were using a different application other than Sonar, such as Cubase, Ableton Live, or Samplitude. Provided you know your other application well enough and have already set it up to use ReaRoute (see previous page) you should have no difficulty in applying these guidelines.

The general guidelines are:

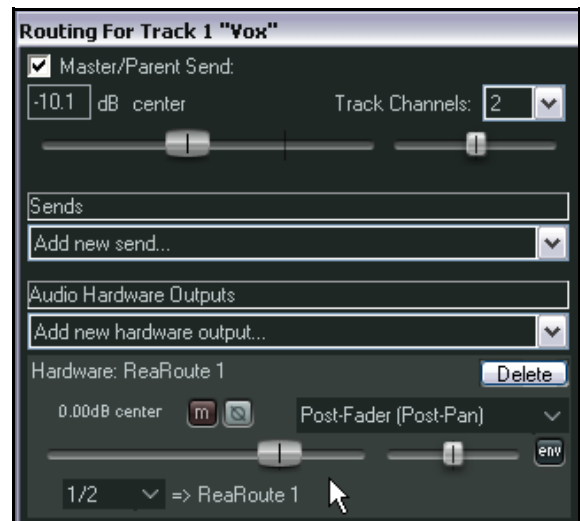
- Open REAPER. It is important that you open REAPER before the other application.
- Open the project file that you wish to use. For each track that you wish to use, set the output to a different ReaRoute channel.
- Open the other application (e.g. Sonar) and create a new project file.
- Insert into your new file one new track for each track that you wish to bring in from REAPER. For each track, the input should be set to correspond with the equivalent output used in REAPER. For example, if in REAPER you set a track's output to *ReaRoute Channel 1*, then the corresponding new track in Sonar will need to have its input set to *Left ReaRoute ASIO ReaRoute REAPER Channel 1*.
- Within the second application, start recording. Within REAPER, play the song.
- Stop both when the song finishes.
- You can then do whatever work you wish. An example follows shortly.
- When finished, first close the other application and then close REAPER. You should always remember – *Open REAPER first, close it last.*

Of course, in many cases it would be easier and quicker simply to import the wave files directly into the second application. There are, however, other instances when it may be advantageous to use ReaRoute instead. For example:

- It might not be easily possible to line up all tracks. Some may start and finish at different times. Others might consist of a large number of media items each of short duration. It would be difficult to import these piecemeal.
- Some tracks might consist of a combination of MIDI items and audio items. Many applications do not let you mix MIDI and audio on the same track. This way, they are all taken across as audio.

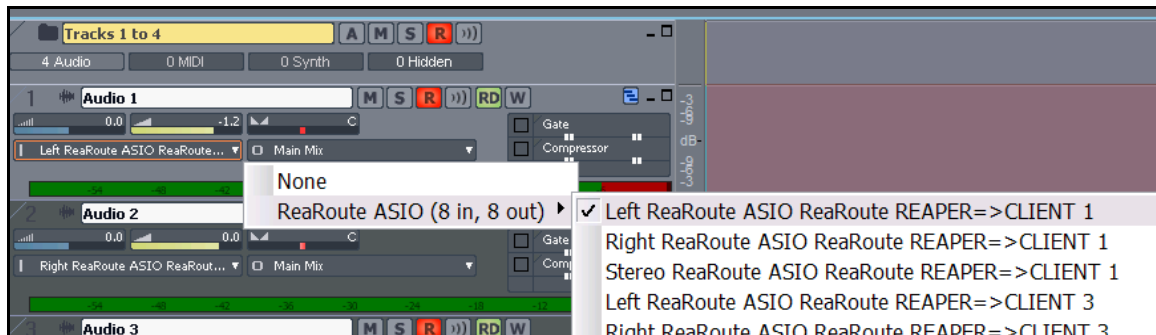
#### Example

1. Start REAPER. Open the file **All Through The Night.RPP** and save it as **All Through The Night REAROUTE.RPP**.
2. Select the first track. Display the I/O window for this track and direct Hardware Output to **ReaRoute Channel 1** as shown (right).
3. Similarly, direct Hardware Output for Track 2 to ReaRoute Channel 2, Track 3 to ReaRoute Channel 3, and Track 4 to ReaRoute Channel 4.
4. Save the file.

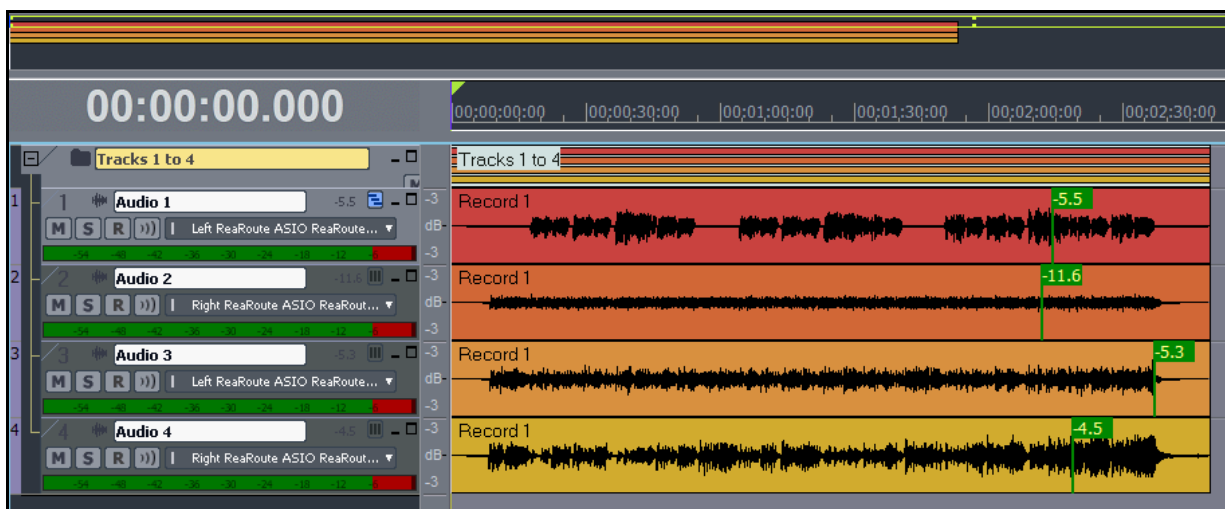


## Up and Running: A REAPER User Guide v 3.11

5. Open Sonar (or whatever application you are using). These instructions assume that you are already familiar with how to give commands and perform basic tasks in this application.
6. Create a new project file containing four blank audio tracks.
7. Arm all four tracks for recording. Set the Input for **Track 1** to **Left ReaRoute ASIO** **REAPER=>CLIENT 1** as shown below.



8. Set the Input for **Track 2** to **Right ReaRoute ASIO REAPER=>CLIENT 1**, the Input for **Track 3** to **Left ReaRoute ASIO REAPER=>CLIENT 3**, and the Input for **Track 4** to **Right ReaRoute ASIO REAPER=>CLIENT 3**.
9. Save this file as **All Through The Night REAPER.cwp**
10. Start Recording.
11. Select REAPER and press Play. As the song is recorded, the track will be recorded in Sonar. Note that if any of your REAPER tracks have any active FX in their FX windows, then it will be post FX signal that will be recorded in Sonar.
12. When the song finishes, stop the recording in Sonar, then stop playback in REAPER.
13. In Sonar, unarm the four tracks.
14. The file should now resemble that shown below. **Save** this file, then wait. We will shortly be using Sonar to do some work on this file. Meanwhile, keep REAPER and Sonar both open.





### 21.4 Sending Audio From Another DAW App to REAPER

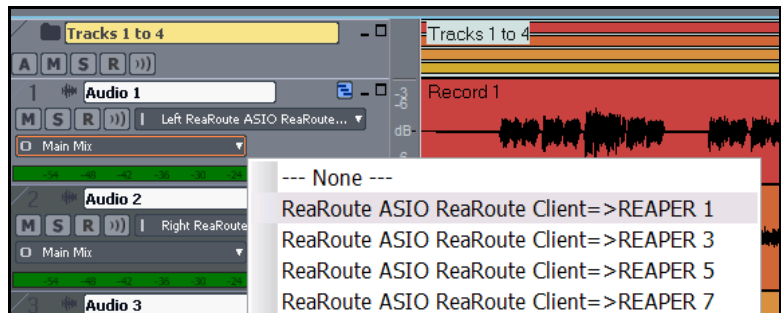
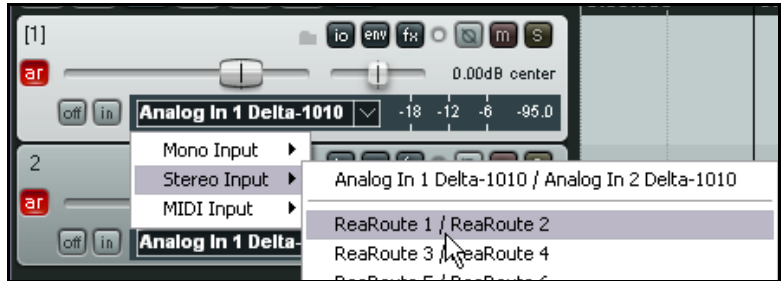
Staying with the same example, we are now going to use ReaRoute to take our open Sonar project and send an audio signal back to REAPER. In overview, this is how it is done.

- Open REAPER and create a new project file. Insert as many new tracks as you need.
- Open Sonar. In Sonar, open the file you wish to work on, and assign outputs on a track by track basis to your various ReaRoute channels as required. Arm these tracks for recording.
- Insert any FX (such as V-Vocal) that you may wish to use in your Sonar tracks.
- Assign the outputs of your Sonar tracks to the various FX channels as required.
- Play the song in Sonar, adjusting your FX to suit.
- When ready, start recording in REAPER, then play the song in Sonar from the beginning.
- When finished, stop both playback and recording.

#### Example

If you are carrying on from the Example in the previous section, go straight to step 3 below. Otherwise ...

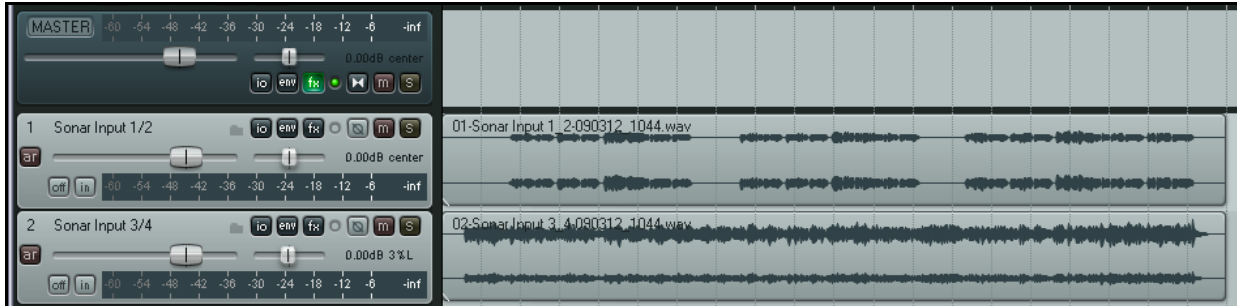
1. Open REAPER.
2. Open Sonar, then open the file All Through The Night REAPER.cwp – this file was created in the previous example.
3. In REAPER, create a new project file. Save it as **All Through The Night SONAR.RPP**. Insert two tracks into this project. Arm both these tracks for recording.
4. For the first of these tracks, set the input to **ReaRoute Channel 1/ ReaRoute Channel 2**, as shown right.
5. For the second of these tracks, set the input to **ReaRoute Channel 3/ ReaRoute Channel 4**. Give both tracks a suitable name.
6. We are going to use Track 1 to import the Vocal track from Sonar, and Track 2 to import an instrumental submix. For both these tracks, make sure that Input Monitoring is turned on.
7. In Sonar, set the output of Track 1 to **ReaRoute ASIO ReaRoute Client =>REAPER 1**, as shown right.
8. In Sonar, for tracks 2, 3 and 4 set the output to **ReaRoute ASIO ReaRoute Client =>REAPER 3**
9. In Sonar, play the song in Sonar. Adjust the panning and levels of the instrumental tracks – Track 3 40% Left, Track 3 40% Right, Track 4 Centre.
10. In Sonar, insert any Cakewalk FX required for the vocal in the Vocal Track.



## Up and Running: A REAPER User Guide v 3.11

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11. When you are ready, in REAPER, start recording.
12. In Sonar, play the song from the beginning.
13. When finished, stop both playback and recording, then close Sonar.



14. In REAPER, unarm your tracks. Save your project, which should now look similar to that shown above.
15. Notice that the first track contains the Vocal (with Cakewalk FX) and the second track the instrumental submix.
16. You can now finish this project in REAPER. For example, you could insert ReaComp into the Instrument Submix Track, define this track as four channels, then create a send from the Vocal Track to channels 3 and 4 of the Instrumental Track. This could then be used for audio ducking, to ensure that the voice floats smoothly above the instruments. ([Audio ducking](#) is explained in detail elsewhere this User Guide).

### 21.5 Using REAPER With a Synth Workstation

Project 5 from Cakewalk is a Synthesizer Workstation application. In this section, you will see how ReaRoute can be used to make the functionality of Project 5 (or any similar application) available to you when you are working with REAPER. To be able to work thru this example, you will need to already know how to use Project 5 (or whichever synth app you are using) to create music.

*Before proceeding with this section, you will need to ensure that your ReaRoute ASIO drivers have been installed (see Section 20.1) and that the Synth Workstation program has been set up to use them (see Section 20.2).*

#### Example

In this example, you will be shown how to use ReaRoute to allow you to use a synth workstation program such as Project 5 to record tracks onto REAPER for an existing REAPER project file.

1. Open REAPER. Open the file **All Through The Night.RPP** and save it as **All Through The Night PROJ.RPP**.
2. Add another track after the last track in this project. Your new track should be Track 5. Name this track **Synths**.
3. Arm this track for recording, turn input monitoring on and set the Track Input to Stereo, **ReaRoute Channel 1 / ReaRoute Channel 2**.
4. Open **Project 5** and create a new project file. Choose the **Options. Audio** command and direct output to **ReaRoute ASIO ReaRoute Client => REAPER 1 (ASIO)** as shown below.

## 21 - ReaRoute: Using REAPER with Other Audio Apps

- For this simple example, insert a synth of your choice into your Project 5 project file.

Of course, you could if you wish insert several different synths and take full advantage of the program's features, but for this simple demonstration we will confine ourselves to just the one.



- Within REAPER, make sure your cursor is at the start of the project. Press **Record**.
- Within Project 5, play the Synth to compose a track to accompany your REAPER song. As you do so, REAPER will record it as a wave file. This of course is additional to any activity that occurs within Project 5.
- When you have finished, save your Project 5 file as **ReaRoute Demo.p5p** and close the program.
- In REAPER, unarm the Synths track and save your file.

### 21.6 Syncing Ableton Live to REAPER

If you have ever tried using use Ableton Live with Rewire, then you might already have discovered that a serious limitation of this is that Live will not support the use of VSTis while the program is Rewired. Enter ReaRoute! In this section, you will be shown how to use ReaRoute to sync Ableton Live, thereby making sure that all your Live VSTis will still be available to you.

I am indebted to Bevoss for taking the time and trouble to research this subject and come up with a solution, and for kindly agreeing to make his material available here.

Before you can set up the connection between REAPER and Ableton Live, you must first install a virtual midi cable such as **MidiYoke**. You can download this from: <http://www.midiox.com/zip/MidiYokeSetup.msi>. After downloading, run this setup file and follow the onscreen prompts and instructions.

After installing MIDI Yoke, you will need to reboot your computer.

You must also, of course, have ReaRoute installed along with REAPER. Instructions for doing this can be found at the beginning of this section of the User Guide.

This example uses Ableton Live 6.0.7. The differences if you are using some other version are largely cosmetic.

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Before you begin, open REAPER and make sure that the option to **Check for Rewire mixer device on startup (and automatically enter slave mode if present)** under **Options, Preferences, Plug-ins** is set to **Off**.

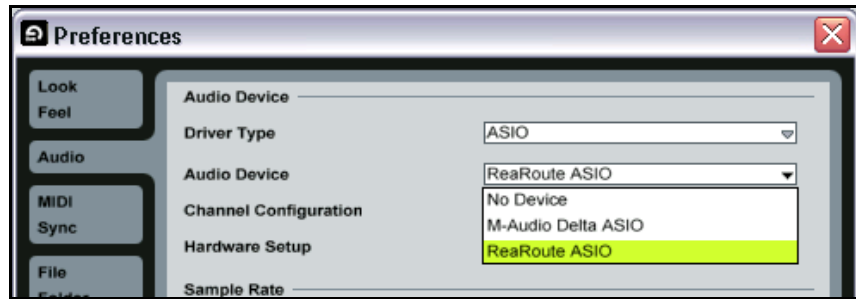
You should also ensure that **Smooth Seeking** is enabled (on REAPER's **Options** menu) if you want Live to change smoothly on the bar from REAPER.

After doing this, exit REAPER.

## Example

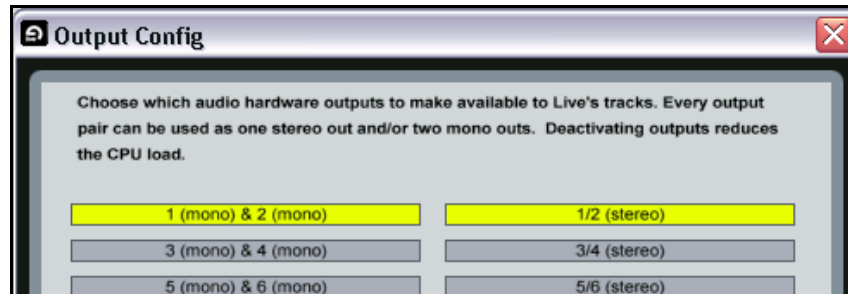
1. In this case, you must open Live before REAPER (or Live will act as a Rewire slave). First open Live, then open REAPER. Open your REAPER Project File.

2. In Live, choose the **Options, Preferences** command and select the **Audio** category. Specify **ReaRoute ASIO** as the Audio Device.



3. Check Input configuration and Output configuration to ensure that one paired stereo input and output are selected.

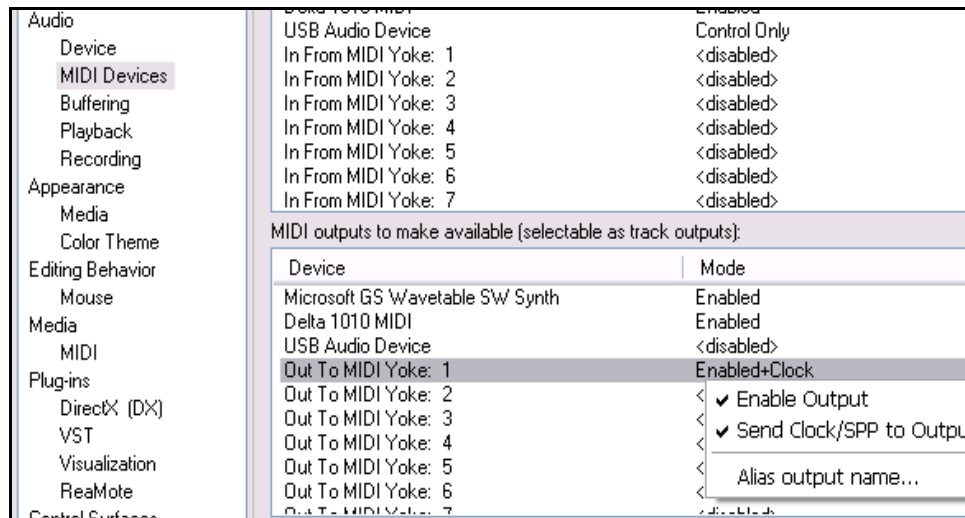
Your available options will of course depend on which sound card you are using.



An example is shown on the right. For this exercise, we will be assuming that you are using Outputs 1/2 and Inputs 1/2.

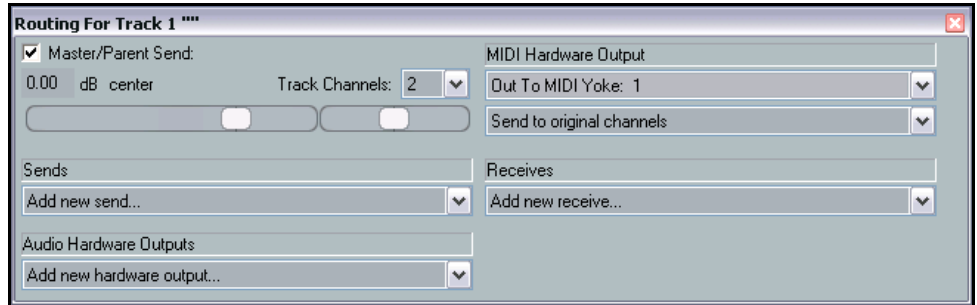
4. Close the Preferences window in Live.

5. In REAPER, Go to **Options, Preferences, Audio, MIDI Devices** and make sure that **Out to MIDI Yoke 1** is enabled, along with **Send Clock/SPP to Output**.



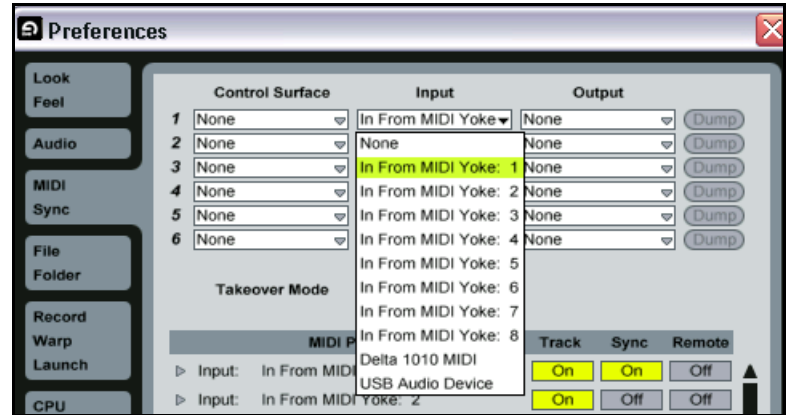
## 21 - ReaRoute: Using REAPER with Other Audio Apps

6. Insert a track in Reaper, record arm it, select **Monitor Input**. Click on the track VU meter and select **Stereo Input-ReaRoute1/ReaRoute2**.



7. Click on the I/O button on the track, and under **MIDI Hardware Output**, choose **MIDI Yoke NT: 1** (see above).
8. Now switch to Live. Display the **Options, Preferences** window, then select **MIDI Sync**.

Under Input, select **In from MIDI Yoke 1** (as shown). Ensure also that both Track and Sync settings for this Input are set to **On** (as shown, right).



9. Make sure also that the **Ext** button on Live's toolbar is set to the **On** position, as shown.
10. Now open your Live project file.
11. Switch to REAPER and press play on the Transport Bar.
12. Your REAPER project will play, and Live will play along.

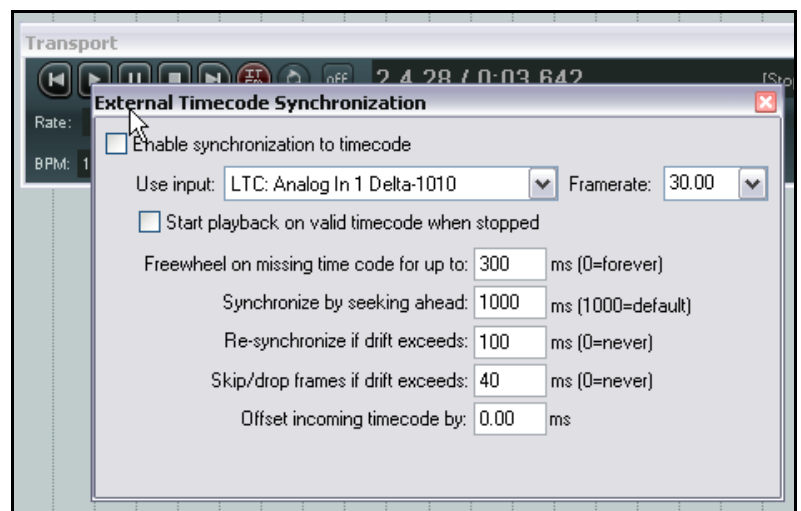


### 21.7 Syncing to an External Device

If you are using REAPER in conjunction with an external device then you may need to ensure that your DAW is in sync with that device, and to take its time clock from that device. For example, you may need to slave REAPER to another DAW, or to a video deck. Another example might be if you need to upload time-stamped material from ADAT tape.

To synchronize REAPER to an external timecode, follow this sequence:

- Right click over the **Play** button on the Transport Bar. This opens the settings dialog box shown on the right.
- Select the Input to be used. Available sync types include ASIO Positioning Protocol, MTC and SPP.



## Up and Running: A REAPER User Guide v 3.11

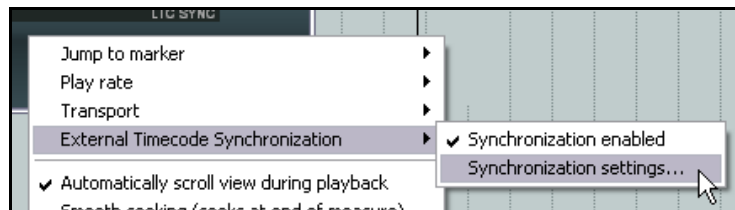
- Complete the other settings and close the dialog box. You should consult the documentation of your external device for further information.
- To play REAPER in sync with an incoming timecode, hold the **Alt** key while right clicking on the play button (as shown). **Alt Right Click** toggles Sync Play on and off (see right).



REAPER Sync Types (Summary)	
Sync Type	Comment
<b>ASIO Positioning Protocol</b>	Creates a synchronization that is sample accurate with the external device. In other words, the time code has as many time locations as your projects sampling rate. Requires that your audio hardware uses ASIO 2.0 drivers.
<b>Linear Time Code (LTC)</b>	This is the same as SMPTE. It is a time based method of synchronization which uses hours, minutes, seconds and frames.
<b>MIDI Time Code (MTC)</b>	As its name implies, this is also a time based method of synchronization which uses hours, minutes, seconds and frames. It is simply a conversion of the SMPTE code that is transmitted via the MIDI cable.
<b>Song Position Pointer (SPP)</b>	This method is based on bars, beats and subdivisions of beats. The information is transmitted along with MTC data, every six clocks or ticks. For some devices, this is all you need.

### The Context Menu

The commands for enabling/disabling external timecode synchronization and for changing the settings are also available on REAPER's **Transport Bar** context menu and on the main **Options** menu.



### Assignable Actions

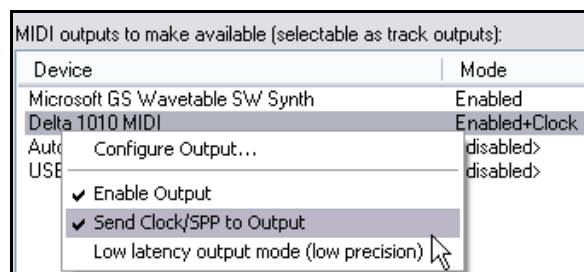
The following actions are assignable using the keyboard shortcut editor (Options, Preferences, Keyboard Shortcuts):

- Show external timecode synchronization settings.
- Toggle external timecode synchronization.

### Sending Clock/SPP from REAPER to an external MIDI Device

To send Clock/SPP data from REAPER to an external MIDI device, you need to enable the feature under **Options, Preferences, MIDI Devices**.

Right click over the device name and select the option **Send Clock/SPP** to output.



## 22 Some Other REAPER Features (Overview)

We've just about come to the end of this User Guide – and there's still plenty left that we haven't told you about!

Once you get up and running with REAPER, you'll find there's heaps more information available to you on the REAPER WIKI and of course thru the user forums. You can find these at:

<http://www.cockos.com/wiki/>

<http://www.cockos.com/forum/>

In this section, we are just going to introduce you in overview to some of these features, just so that you'll get an idea of some of REAPER's other capabilities.

### 22.1 ReaMote

ReaMote is REAPER's network FX functionality. It allows you to have any FX chain in your project processed on a remote machine on your local network.

This is very useful if you have a lot of CPU consuming effects and want to add more CPU power to your project without upgrading your main host's CPU.

To set up ReaMote, simply install REAPER and whatever plug-ins you need on the slave machines. Run the ReaMote slave on the slave machines, then enable ReaMote in the **REAPER Preferences** on the master, and you're ready to go!

### 22.2 Rewire

REAPER also supports Rewire.

ReWire is a technology developed by Propellerhead Software that allows applications to share audio, MIDI and synchronization data. Audio and MIDI data are transferred between the two applications in real-time, allowing you to use the features in each application as if they were one.

In a ReWire session, the first application acts as the host, and the second application acts as the slave. The slave receives and sends signals via the host application. REAPER can be used as either host or slave.

### 22.3 REAPER and NINJAM

NINJAM is an innovative software program that allows musicians to collaborate in "fake time" over the Internet. The software connects to a central server where participants can share audio and text information, and has the ability to record both the local and remote channels of each "session" (audio only). REAPER has the ability to import these recorded session files to allow you to edit and mix at your leisure. "Fake time" means that some players will hear a delayed version to which they play along.

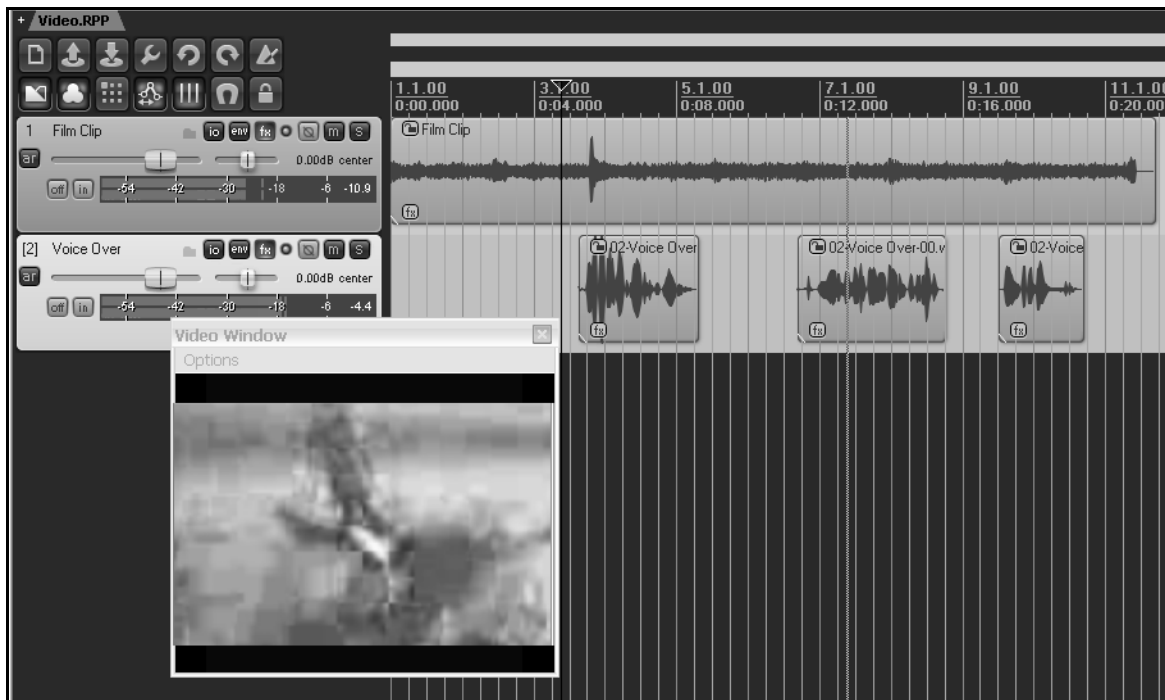
To learn more about the NINJAM software or download a copy, visit <http://www.NinJam.com>

To learn more about using NINJAM with REAPER, visit the Cockos WIKI <http://www.cockos.com/wiki/>

### 22.4 REAPER and Video

REAPER can be used to edit the soundtrack of your video files, such as .AVI, .MPG and .WMV files. These files are imported using the **Insert, Media File** command. In addition, you can use the **Track, Insert Track from Template** command to import data from a .EDL file. Use the **View, Show Video Window** command, **Ctrl Shift V**, to show the Video Window. Use the **Options** command within this window if you wish to resize it.

You cannot perform any video editing within REAPER, but you can work on the soundtrack. You can edit the existing soundtrack, and/or add create new tracks and media items to be mixed with it. In the illustration below, Track 1 contains the original soundtrack; Track 2 contains a voice over that has been added in REAPER.



The Audio Tracks can then be mixed down and rendered to a new .WAV file, that can be imported back into the original video file using a program such as Vegas.



## 23 Troubleshooting REAPER

This section aims to help you resolve problems that are sometimes encountered by new users.

### 23.1 Input/Output Issues

Input Output Issues	
Problem	Diagnosis and Possible Solution
<p><b>When I play back, my audio track is silent, even though there is activity in the track's VU meter.</b></p>	<p>The problem is likely to be either with your routing in REAPER, your sound card's settings or with your audio hardware setup.</p> <p><b>REAPER's Routing:</b></p> <p>Make sure that the track's output is directed to the master.            Make sure that the Master output is directed to the outputs on your sound card to which your speakers or headphones are attached.</p> <p><b>Sound Card Settings:</b></p> <p>Use the control software supplied with your soundcard to make sure that none of the following has occurred:</p> <ul style="list-style-type: none"> <li>• Output muted, or volume lowered too much.</li> <li>• Output patched to different hardware output.</li> </ul> <p><b>Audio Hardware Setup:</b></p> <p>Make sure that the amplifier is connected to the same outputs on the soundcard as the output of the Master.            Make sure that everything is connected to the power supply, switched on, and with appropriate volume levels.            Use Windows Device Manager (Control Panel, System, Hardware, Device Manager, Sound Video and Game Controllers) to ensure the device is enabled and functioning correctly.</p> <p><b>Tips:</b></p> <p>Opening a different audio application and playing any wave file can help you determine whether the problem lies within REAPER or with your Sound Card or Audio Setup.</p>
<p><b>I get an error message to the effect that MIDI device(s) cannot be opened</b></p>	<p>The device may not be connected, or may be in use by another program.</p> <p>Check that the device is connected and supplied with power.            Check whether another program has use of the MIDI device.            Check that you have not accidentally opened REAPER twice.</p>
<p><b>When I play back, my audio track is silent, and there is no activity in the track's VU meter.</b></p>	<p>The problem is likely to be specifically related to that track or item, especially if you have other projects which do play correctly.</p> <p>Make sure that the track has not been muted.            Make sure that the item has not been muted (right click over item, Item Properties).</p>

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Input Output Issues	
Problem	Diagnosis and Possible Solution
	<p>Check the FX Window for the track to make sure there is no FX which is causing the track to be silenced.</p> <p>Check the track's volume fader to make sure it is not set too low.</p>
<p><b>When I play back, I don't hear some or all of a track's FX being applied</b></p>	<p>The problem could be happening in the track's FX window or in the plug-in's own window, or both.</p> <p>Check that the track's FX Window has not been set to bypass mode.</p> <p>Check that the individual FX has not been set to bypass mode. This might occur in the FX Chain window or with some plug-ins within the plug-in's own window.</p> <p>Check that the plug-in's Wet/Dry mix setting (where present) has not been set to 100% dry.</p>
<p><b>When I play back, I get clicks, pops, stutters or dropouts</b></p>	<p>This probably means that you are attempting to play this project at a latency too low for your system. This is more likely to happen if you use a large number of CPU hungry FX such as Reverb. Try one or more of these remedies:</p> <p>Consider whether you can rearrange your mix to use fewer CPU intensive plug-ins, for example by making more use of FX busses to share FX used by more than one track.</p> <p>If you are using a high sample rate, such as 88200 or 176400, try a lower one. Go to File, <b>Project Settings</b> and reduce the Sample rate to 44100. This will reduce the load on the CPU and you will probably find that you can live with any perceived difference in sound quality.</p> <p>Consider increasing buffer size. This will increase latency, but should not be a problem when playing back. Go to Options, Preferences, <b>Audio Device</b>. Click on <i>ASIO Configuration</i> to bring up the Control Software for your sound card. Increase buffer size, perhaps to 1280 samples.</p> <p>Check your <b>Audio Buffering</b> preferences, especially for <b>FX processing/multiprocessing</b>. Be prepared to experiment with <i>Render ahead size</i> and with which options are allowed.</p>
<p><b>When I play back, the Master clips into the red and distorts, even though the track level(s) appear quite low</b></p>	<p>This can arise as a result of routing problems, for example when you have any track or tracks routed to the Master by several different routes at the same time.</p> <p>Check the Routing Matrix</p>
<p><b>When I play back, the audio sounds clipped, even though it doesn't appear to be visibly clipping anywhere</b></p>	<p>This could be caused by a routing problem, or by some FX or combination of FX which might be distorting your sound.</p> <p>Check the Routing Matrix to see if any track or tracks is/are being directly routed to the same audio hardware output as the Master. If this isn't the cause of the problem ...</p> <p>Disable all FX to see if this fixes the problem.</p>

Input Output Issues	
Problem	Diagnosis and Possible Solution
	<p>If it does, reintroduce the FX gradually until you can identify which is causing the problem.</p>
<p><b>When I try to play an imported MIDI track, it is silent</b></p>	<p>This can be a routing, sound card or setup issue – see previous page.</p> <p>In addition it may be caused by a MIDI specific issue. This occurs when the track has not been assigned to a valid MIDI Output device or software synthesizer.</p> <p style="padding-left: 20px;">If you are using a MIDI Hardware device, display the track's Routing Window and make sure it is assigned to a MIDI Hardware Device.</p> <p style="padding-left: 20px;">If you are not using a MIDI Hardware device, display the FX Window for the track, and insert a software synthesizer of your choice (usually DXi or VSTi).</p>
<p><b>When I try to record audio, nothing is recorded</b></p>	<p>The problem here could lie either with your REAPER settings or with your hardware set up.</p> <p style="padding-left: 20px;">Make sure the track is armed for recording.</p> <p style="padding-left: 20px;">Make sure that the track has been assigned an input.</p> <p style="padding-left: 20px;">Check (Options, Preferences, Audio Device) that your range of audio inputs has been defined <i>and enabled</i>.</p> <p style="padding-left: 20px;">Make sure under the Options menu that you have the correct required Record Mode set (usually this should be Normal).</p> <p style="padding-left: 20px;">Check that <i>Record Input</i> is enabled. Or, if you have selected <i>Record Output</i>, check the FX window for any FX that could be silencing the track's output.</p> <p style="padding-left: 20px;">Make sure that the microphone or lead for the instrument being recorded is connected to the correct audio input.</p> <p style="padding-left: 20px;">If the microphone requires phantom power, make sure that the phantom power supply is enabled.</p> <p style="padding-left: 20px;">Check your audio input mixer (external hardware desk, sound card mixer software, or both) to make sure that the incoming signal is correctly routed.</p> <p style="padding-left: 20px;">Check your audio input mixer (external hardware desk, sound card mixer software, or both) to make sure that the incoming signal is not muted.</p>
<p><b>I don't have enough CPU to play back my project</b></p>	<p>Almost certainly, this is because you are trying to use more FX than your DAW can handle.</p> <p style="padding-left: 20px;">Use the Performance Meter to determine which tracks are using the most CPU hungry FX.</p> <p style="padding-left: 20px;">Then right click over the media items for those tracks and either <b>Apply FX to items as new take</b> or <b>Apply FX to items as new take (Mono)</b>.</p>

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### 23.2 REAPER Interface Issues

Interface Issues	
Problem	Diagnosis and Possible Solution
<b>When I press Space (or some other Transport Control), nothing happens</b>	This happens when focus is with another window, such as the Routing Matrix, or an open Dialog Box. Two possible solutions are: Give focus to another view such as the Track View or Mixer before pressing the key, or Use an external MIDI control device such as a BCR2000 and assign transport functions to its various buttons. These will then work regardless of which window has focus, or whether a dialog box is open.
<b>When I try to place the edit cursor exactly where I want it, it moves a little</b>	Snapping may be enabled. If so, use the Options, Enable Snapping command to disable it.
<b>When I try to make a time selection, the start and end points move from where I want them.</b>	Snapping may be enabled. If so, use the Options, Enable Snapping command to disable it.
<b>I add a Volume or Pan envelope to a track, but when I play back the fader does not move.</b>	Make sure that Automation Mode is set to Read and the envelope is armed.
<b>I record multiple takes on a track, but only the last one is visible.</b>	To view all takes for a track, choose the Options, Show All Takes in Lanes Command, <i>or</i> To view a take other than the last take, right click over the media item and choose the Take command from the context menu.
<b>When I maximize a track, the wrong track is displayed</b>	Check your <i>Vertical Zoom Behavior</i> settings under Options, Preferences, Editing Behavior. You probably want to set this to <i>Last Selected Track</i> .
<b>When I zoom in horizontally, the edit cursor disappears from view and I lose my place</b>	Check your <i>Horizontal Zoom Behavior</i> settings under Options, Preferences, Editing Behavior. You probably want to set this to <i>Edit Cursor or Play Cursor</i> .
<b>I try to view a window, such as Big Clock or Performance Meter, but I can't see it on the screen</b>	This can be tricky, and can sometimes happen because of changes made to your Windows display settings. There are two main ways to fix this. Use Windows Notepad to edit the <b>reaper.ini</b> file in the folder C:\Documents and Settings\User Name\Applications Data\REAPER. This should only be attempted if you are confident that you understand what you are doing. For example, if the Big Clock has

Interface Issues	
Problem	Diagnosis and Possible Solution
	<p>been lost, delete only that section of the reaper.ini file, save it, close it, then restart REAPER.</p> <p>For example, in the <b>reaper.ini</b> file extract shown here, the Big Clock section is shown as italicized:</p> <pre>[flac encoder defaults] default_size=12 default=63616C66100000005000000AB <i>[bigclock]</i> <i>wnd_vis=1</i> <i>wnd_left=967</i> <i>wnd_top=600</i> <i>wnd_width=426</i> <i>wnd_height=137</i> <i>time_mode=0</i> [namecache] Analog_In_1_Delta_1010__1_=_In 1</pre> <p>A safer option would be to simply rename this file as <b>reaper.old</b> or similar. This will return <i>all</i> preferences and options to their original default settings next time you run REAPER.</p>
<p><b>My Undo History window is cluttered with every item and track selection I make</b></p>	<p>Go to Options, Preferences, General and disable <i>Create Undo points for item/track selection</i>.</p>



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