

# **Up and Running: A REAPER User Guide v 4.00**

by  
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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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For more information about **OpenOffice** go to <http://www.openoffice.org>

**ReaRead:** REAPER books and training manuals printed and spiral bound are now available from <http://stores.lulu.com/store.php?fAcctID=1374784>

## **REAPER 4 Unleashed: Unlock Your Inner REAPER!**

"REAPER Unleashed" picks up where "Up and Running".leaves off.

This book lifts the lid off REAPER's most powerful features, including custom actions, menus and toolbars, FX chains, screensets, snapshots, templates, mouse modifiers and more. Many resources are supplied, including files with sample mouse modifiers, track templates, custom toolbars and much more.

Its sample work files and dozens of step by step tutorials will lead you to an understanding of how you can use these features in combination with each other to make REAPER behave for you the way you want it to.

Will it teach you everything that you could possibly ever want to know about REAPER? Most definitely not. But will it help you unlock the creativity inside you to help you get the very best out of this program for yourself? Most certainly, yes!

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

The essential and definitive guide to recording, editing and mixing with REAPER. Now fully updated for version 4.0. 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 teach 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.

## 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 **Bevosss**) for his advice and assistance with custom actions and macros.

In random order .... **Jonas Christensen**, **Wyatt Rice**, **Tom Aeio**, **Richard Munn**, **Abraham Romney**, **David (mercado negro)**, **John Bercik** and **Simon Mullings** for their helpful suggestions and the patient hours spent on the tedious job of proof-reading.

**Susan G** for her assistance and advice, especially (but not exclusively) on MIDI matters.

**Jason Brian Merrill** for, amongst other things, review and comments.

**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.

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, June 2011

## REAPER Web Resources

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

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

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

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

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

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

The REAPER Home Page

The REAPER Downloads Page

REAPER Features summary

The REAPER Forums

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. The media 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 an MP3 encoder installed in your REAPER program directory. The encoder 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)

Be sure to select the correct file for your system. For example, for 32 bit Windows this will be **lame\_enc.dll**.

After downloading the file, simply copy it into your REAPER program folder. Start REAPER, then open the sample project file and play it. If you hear no sound, you should check the **IO** setting for your Master Track and make sure that output is correctly directed to your sound device.

## Some Tips on Using This Guide

REAPER is a sophisticated program and there is no single obvious or easy way to present all of the information contained in this guide. If you need more information about any topic than appears on any particular page, try searching! The PDF edition is bookmarked, and your PDF reader includes a *Find* feature on its toolbar. Also, both the PDF and printed editions feature a comprehensive index. Use it!

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>



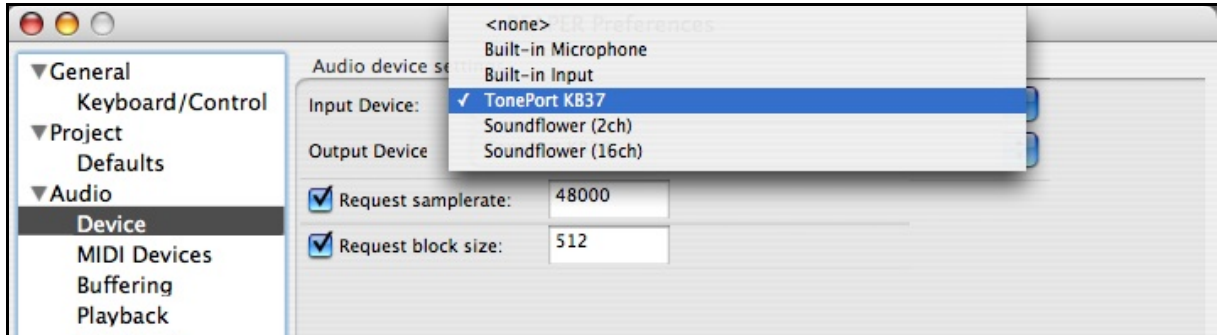
## Introduction for Apple Mac Users

### The REAPER Install Process

Installing REAPER on a OS X is simpler than it is on a PC. Just do this:

1. Download the correct DMG file for your operating system.
2. Open it, then drag the REAPER icon (and, if you wish the ReaMote icon) to the Applications icon.

### 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

OS X control key behavior is governed by an OS X only setting on the **Options, Preferences, Editing Behavior, Mouse** page, "Control+left-click emulates right-click (control key will be unavailable as a modifier)." This is disabled by default, allowing the control key to be mapped to behaviors and actions on the **Mouse Modifiers** preferences page. You can enable this preference if you wish to allow control-click to be interpreted by REAPER as right-click, but if you do so the control key will no longer be able to function as a mouse modifier. 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>Windows</b>	<b>Control</b>	Currently this key is not used in any default keyboard shortcut assignment, but you can use it with other keys in your own custom actions. See comment above.
	<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.

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

This edition of the REAPER User Guide is a major update. Material has been reorganised and entire sections rewritten so as to place more emphasis on and give more information about some of the more advanced, interesting and perhaps less obvious features. It also contains many small additions and amendments.

REAPER 4 itself introduces a whole raft of new features, improvements and innovations. For a full list, be sure to check the changelog. Most of the less major changes are documented throughout this document. In addition, the following major new features are listed in this table:

What ...	Where ...
Keeping a window on top	Chapter 2
Track input FX when recording	Chapter 3
Major changes to take lanes and comping	Chapter 3, Chapter 7
Multichannel track recording	Chapter 3
Changes to media explorer	Chapter 3
New item editing features	Chapter 6
Changes to item properties dialog	Chapter 6
Item groups	Chapter 6
The width panner	Chapter 10, Chapter 11
Mixer layouts	Chapter 10
Track manager	Chapter 11
Project media/FX bay	Chapter 11
Track layouts	Chapter 11
Item selection sets	Chapter 11
Transport and envelope layouts	Chapter 11
Using Multiple Dockers	Chapter 11
New MIDI editing features (various)	Chapter 12
Mouse modifier customization	Chapter 13
Surround panning	Chapter 15
New envelope editing features	Chapter 16
New file rendering features	Chapter 18
New customizable editing options	Chapter 19

### 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>

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## Summary List of Step by Step Exercises ....

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## Summary List of Main Tables ....

This User Guide includes many instructional and summary tables. In addition to those in Chapter 19 (REAPER's Preferences and Other Settings) and Chapter 20 (Right-click Context Menu Summaries), the most important of these are:

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## 1 Setting Up and Getting Started

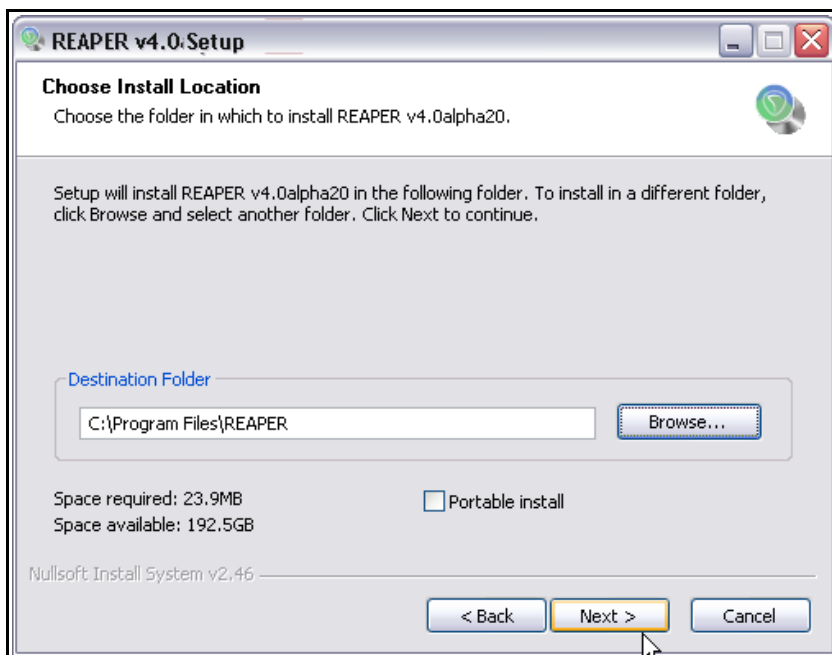
### 1.1 Downloading REAPER

To download REAPER, visit the download page [reaper.fm/download.php](http://reaper.fm/download.php). Be sure to select the correct version for your computer. If you keep the program for more than 28 days then you must purchase a license. To purchase your REAPER license, go to [reaper.fm/purchase.php](http://reaper.fm/purchase.php)

### 1.2 Installing REAPER on a PC

OS X users should refer to the "Introduction for Apple Mac Users" on page 5. PC users, read on! After downloading the REAPER install file, to install the program follow this sequence:

1. In Windows Explorer, find the install file. The file name includes the current version number, e.g. **reaper40-install.exe**.
2. Double click on this file to start the install program.
3. Click the **I Agree** button to accept the conditions and continue.
4. For a normal install, accept the default folder offered to you (but see note below) - for example, **C:\Program Files\REAPER**.
5. If you need to, enable the **Portable install** option (see note below), then click **Next**.
6. Select which elements you wish to install (if in doubt accept the default settings - see also section 1.4 below) and click on **Install**.
7. Wait while the program installs. When prompted, click on **Close** to close the Install program. You will be asked if you wish to run the program now: in this case, choose **No**.



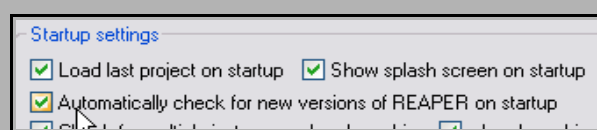
**Note:** If you are installing REAPER for the first time, or if you wish to replace an earlier version of REAPER with this one, you should accept the default destination folder and not enable portable install. If you wish to install this alongside an existing earlier 3.xx version, change the default directory (e.g. to \REAPER4) and enable portable install. This will ensure that your earlier 3.xx settings and preferences will be preserved separately.

**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.

### 1.3 REAPER Software Updates

REAPER is updated frequently and regularly, with bug fixes, new features and other enhancements. 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:** REAPER is frequently updated. An option is available under **Options, Preferences, General** (Startup Settings) to have REAPER automatically check for updates each time the program is started (provided of course that you are on-line at the time).



### 1.4 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 a free lame MP3 encoder and then copy or move it into your REAPER program directory. There is more information about this in Chapter 18.
<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 Ripping/Burning, Control Surface Support and Rewire. These aspects will be discussed at various places 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.

### 1.5 Starting REAPER

To start REAPER, just double click on the REAPER desktop icon. You might also wish to consider creating a keyboard shortcut for this. For Windows users, this is done using the **Shortcut** tab of the icon's **Properties** dialog box. Right-click over the icon to display this.



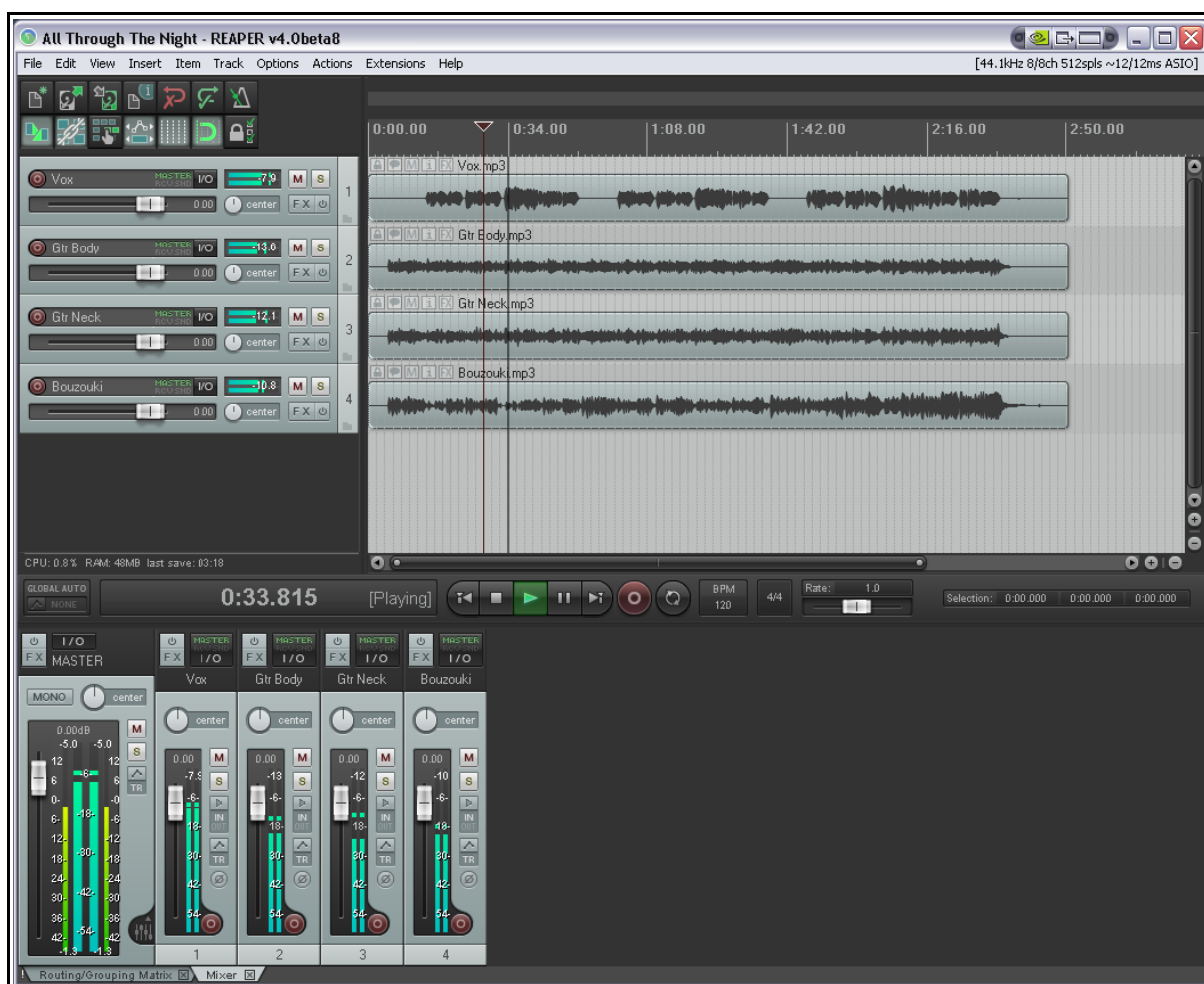
### 1.6 The REAPER Screen

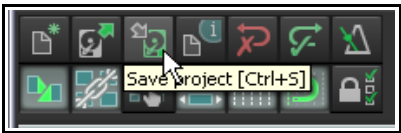
REAPER allows you to select from a number of different color themes and skins. The screen shots used in this book mostly use the REAPER 4 default theme. If you are using any other theme, you might therefore notice some visual differences. If this causes you any difficulties, consider switching to the default theme. In some cases modifications have been made to enhance clarity when greyscale printing.


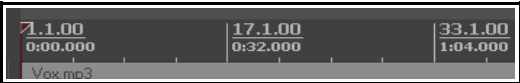
When you start REAPER, it displays a screen similar (but not necessarily identical) to that shown below. The example shows a typical project file that has been opened. The table below the illustration introduces briefly each of the main screen elements.



# 1 - Setting Up and Getting Started



Item	Explanation
<b>The Main Menu</b>	This is displayed near the top as a row of commands – <b>File, Edit, View, Insert, Track</b> and so on. As in other Windows applications, the menu is used to give commands.
<b>The Main Window Toolbar</b> 	<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>In Chapter 13 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 4 tracks, labelled from top to bottom Vox, Gtr Body 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 in Chapters 2 and 4. 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 Control Panel. 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. The Mixer will be explored in detail in Chapter 10.</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.

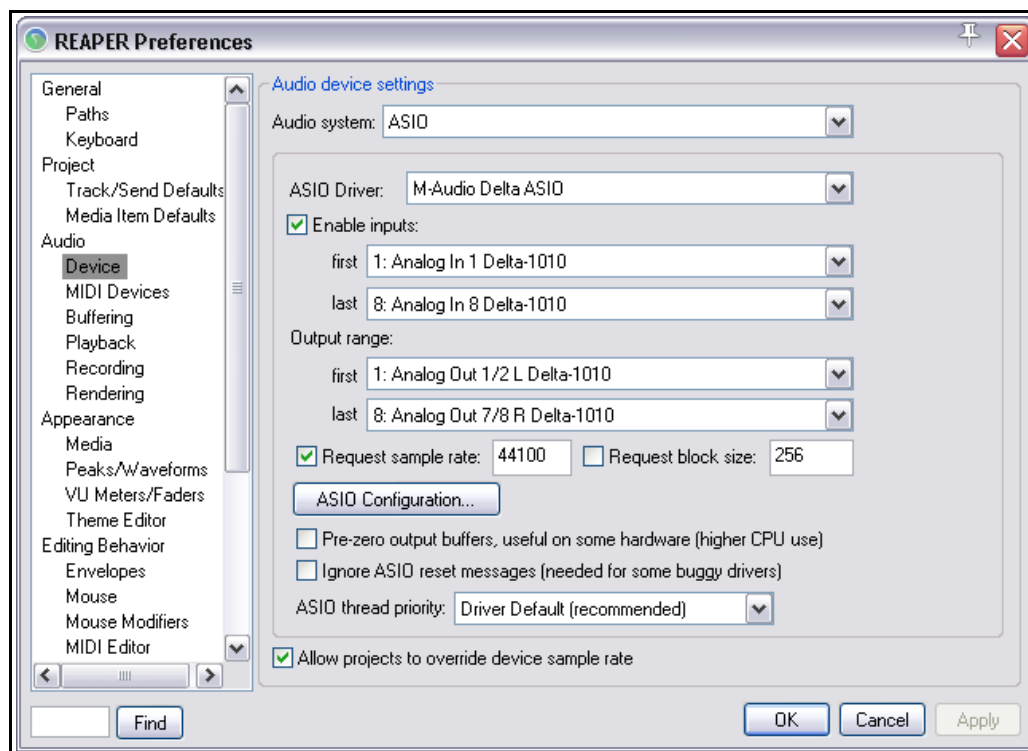
Other times, you will want to give a command that affects the whole of your project file. For example, you might wish to save all your work to date. In that case there would be no need to select anything – you would only need to give the commands.

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

Method	Comment
The Main Menu	As with other Apps, this is accessed by the mouse or keyboard.
Context Menus	Clicking your right mouse button over an item or area of the screen will display a menu relevant to where you have clicked.
Toolbars	Clicking your mouse on any tool causes its command to be executed.
Keyboard Shortcuts	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 under **Audio** select **Device** from the list of available topics:



From this screen, you should select:

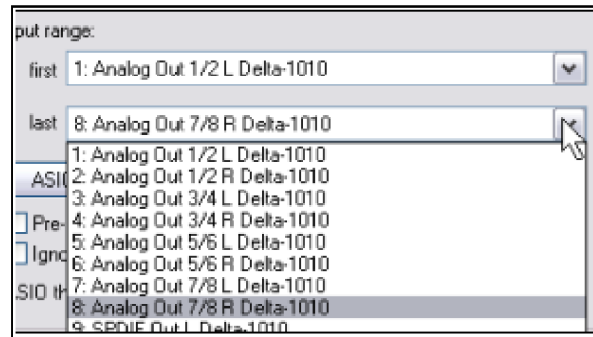
Item	Comment
<b>Audio System</b>	The remaining items on this screen will vary according to which audio system you select here. You should Choose ASIO if ASIO drivers are available for your PCI sound card or Firewire or USB device. The comments that follow assume that you have selected ASIO.
<b>ASIO Driver</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.

By default, your sound card outputs will have names something like those shown here (right). Clearly, these names are not very useful to you.

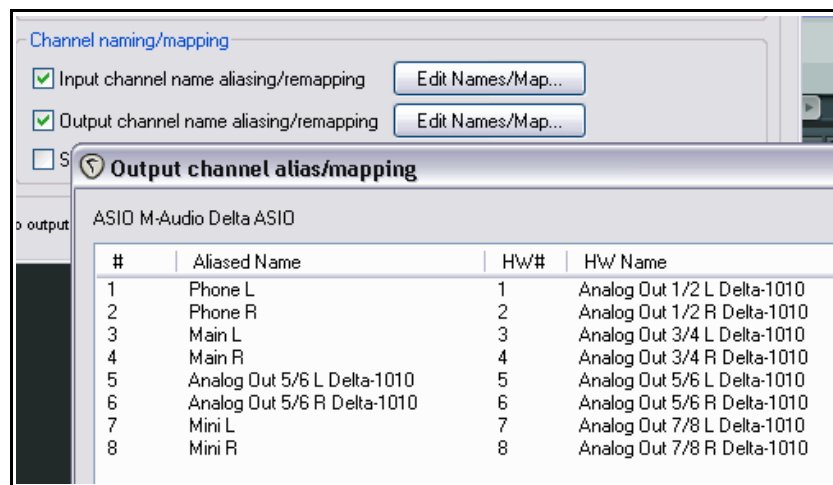
By assigning Aliases to these outputs, you can ensure that whenever you need to display a list of your outputs (for example, when determining the destination of the output from your Master) your own names will be displayed, instead of the hardware device names.



#### Example

To create output aliases:

1. Choose the **Options, Preferences** command.
2. Display the **Audio** page and in the section labelled **Channel Naming/Mapping** 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/Map** button for this item.
4. Double-click in the Aliased 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 Alias/Mapping** window (shown above).
5. Click on **OK** to close this window and return to the **Preferences** dialog box.
6. Click on **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, beginning with Chapter 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/Remapping** 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.

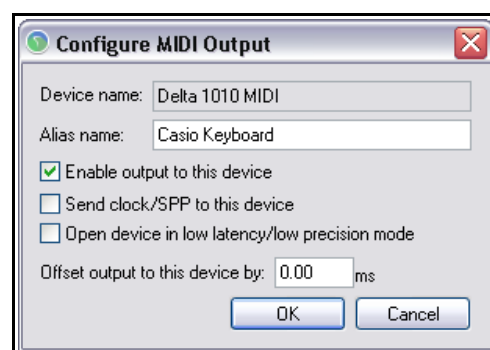
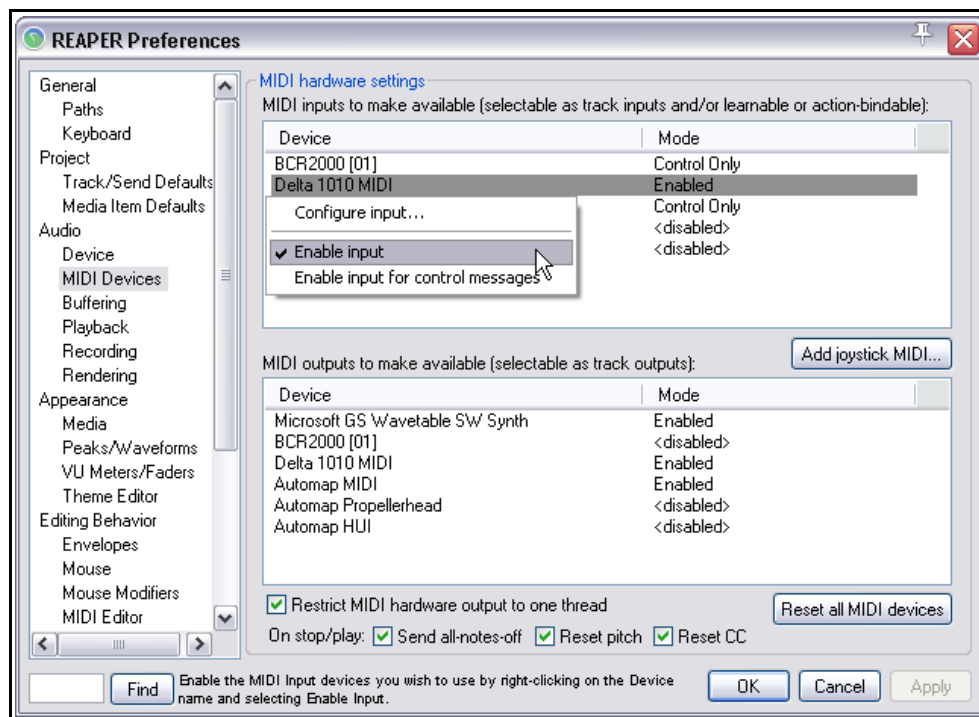
Many PCI sound cards, Firewire and USB audio devices include a MIDI input and output port (for use, for example, with a MIDI Keyboard). Choose **Options, Preferences** from the Main Menu, then display the **MIDI Devices** screen under **Audio**. You can select in turn each of the listed MIDI Input and Output devices, right-click over its name, then choose **Enable**

**Input**. You can double-click on any input device name to display its **Configure MIDI Input** settings (see below 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 Input or Output device, right click over the device name and choose **Configure Output** from the context menu (see right). You can also use **Configure Input** to name a MIDI input device.

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, notably in Chapters 11 and 13.



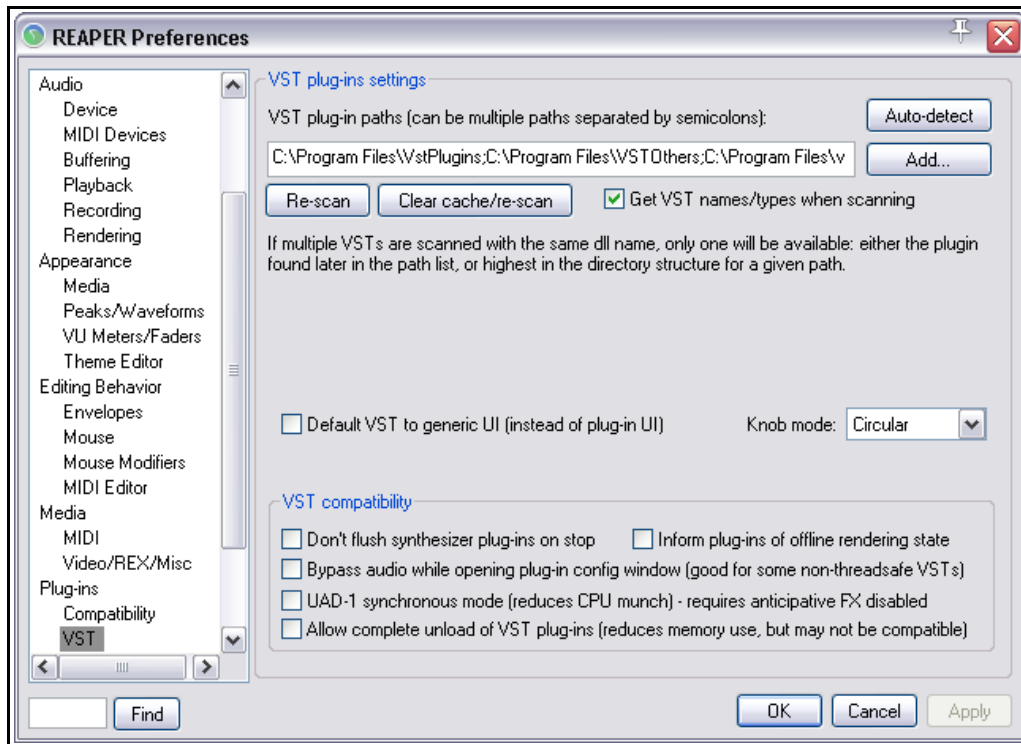
### Other Audio Preferences

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, particularly in Chapter 19. 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.

This section has covered the general issues involved in setting up your system for working with MIDI. For project specific settings and options, see Chapter 2. In particular, if you are working primarily with MIDI material you may wish to change the default project timebase setting. This too is explained in Chapter 2.

### 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 **OK** 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 **Apply** then **OK** to close this screen and cause your settings to be remembered.

You can find more information about the various VST Preferences settings and options in Chapter 19.

### 1.13 Uninstalling REAPER

There is no need to uninstall your current version of REAPER before installing a new one. Your existing installation will automatically be upgraded from the new installation. 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 it is reinstalled.



## 1.14 REAPER's Installed Folders and File Locations

If you are used to working with software that leaves a trail of 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.

The table below can be used as a guide.

REAPER's Installed Folders and File Locations	
<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> (or equivalent) is also installed to this folder if you intend to use the MP3 format. You should also copy to this directory any PDF files (such as this User Guide) that you want to be able to access from REAPER's Help Menu.  Some of the optional install items are held in sub-folders of <b>C:\Program Files\REAPER</b> . These include the COCKOS ReaPlug VST plug-ins and (if installed) the SWS Extensions. Anything stored in this directory is accessible to all users of REAPER on this computer.
<b>The Application Data Directory</b>	The information held in the Application Data directory is specific to each user. This ensures that if more than one person is using REAPER on the same computer, then each will have their own customized settings available to them. However, if you enable the <b>portable install</b> option when installing the program, no user data folder will be created in your application data folder. The various files will instead be placed in the REAPER program folder.  The exact location of the Application Data folder will depend on whether you are using OSX or Windows, and, if the latter, which version of Windows (for example, Windows XP or Windows 7). In any event, you can identify and view this directory by choosing from the main REAPER menu the command <b>Options, Show REAPER Resource Path in Explorer/Finder</b> .  Some of the main files and sub-directories stored in REAPER's Applications Data directory are listed below.
<b>preset-vst-plugname.ini</b>	For each VST plug-in, a separate file is used to store any presets that you have created or imported.
<b>REAPER.ini</b>	This includes all of your Options, Preferences settings, information about your last screen layout, and your recently used projects history.
<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> <b>reaper-reginfo.ini</b>	This file stores your product registration data
<b>reaper-recentfx.ini</b>	This file stores a list of your recently used FX: this list is used to produce the Recently Used FX submenu that is available in the Mixer.

REAPER's Installed Folders and File Locations																	
<b>screensets.ini</b>	This file stores details of your windows screen sets. Note that track screen sets are stored with the relevant .RPP file.																
<b>Sub Directories</b>	<p>In addition, you should find that you have a number of sub-directories here, such as:</p> <table><tr><td><b>Color Themes</b></td><td><b>presets</b></td></tr><tr><td><b>Configurations</b></td><td><b>Project Bays</b></td></tr><tr><td><b>Cursors</b></td><td><b>ProjectTemplates</b></td></tr><tr><td><b>Data</b></td><td><b>QueuedRenders</b></td></tr><tr><td><b>Effects</b></td><td><b>Scripts</b></td></tr><tr><td><b>FXChains</b></td><td><b>TrackTemplates</b></td></tr><tr><td><b>KeyMaps</b></td><td></td></tr><tr><td><b>MenuSets</b></td><td></td></tr></table> <p>Many of these are self-explanatory, especially those which contain the various files and items that you can create yourself as an aid to managing your REAPER projects. For example, any FX Chains that you create will be stored on the FXChains sub-directory. Custom menu and toolbar data is stored in the MenuSets sub-directory, and so on.</p> <p>Topics such as creating FX Chains and Custom Menus are covered elsewhere in this user guide.</p> <p>Information held in the <b>Data</b> directory includes track icons and toolbar icons. The <b>Effects</b> folder is where your JS effects are stored.</p>	<b>Color Themes</b>	<b>presets</b>	<b>Configurations</b>	<b>Project Bays</b>	<b>Cursors</b>	<b>ProjectTemplates</b>	<b>Data</b>	<b>QueuedRenders</b>	<b>Effects</b>	<b>Scripts</b>	<b>FXChains</b>	<b>TrackTemplates</b>	<b>KeyMaps</b>		<b>MenuSets</b>	
<b>Color Themes</b>	<b>presets</b>																
<b>Configurations</b>	<b>Project Bays</b>																
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<b>Data</b>	<b>QueuedRenders</b>																
<b>Effects</b>	<b>Scripts</b>																
<b>FXChains</b>	<b>TrackTemplates</b>																
<b>KeyMaps</b>																	
<b>MenuSets</b>																	
<b>Specify Default Paths for Recording and Rendering</b>	<p>You can use the <b>General, Paths</b> page of your <b>Options, Preferences</b> to specify default paths for your recorded media items. Note however that any path specified in your Project Settings will take precedence over this.</p> <p>You can also specify default paths for your waveform peak files and for project rendering.</p>																

There's one more thing that might interest you. All of the settings, preferences 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. However, 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 an external hard disk or flash drive. 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. You can also use the **Export Configuration** button (Options, Preferences, General) to back up any of this data collectively or selectively.

### 1.15 REAPER Startup Tips

By default, REAPER opens with the last used project. As you will see later in this chapter, 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.

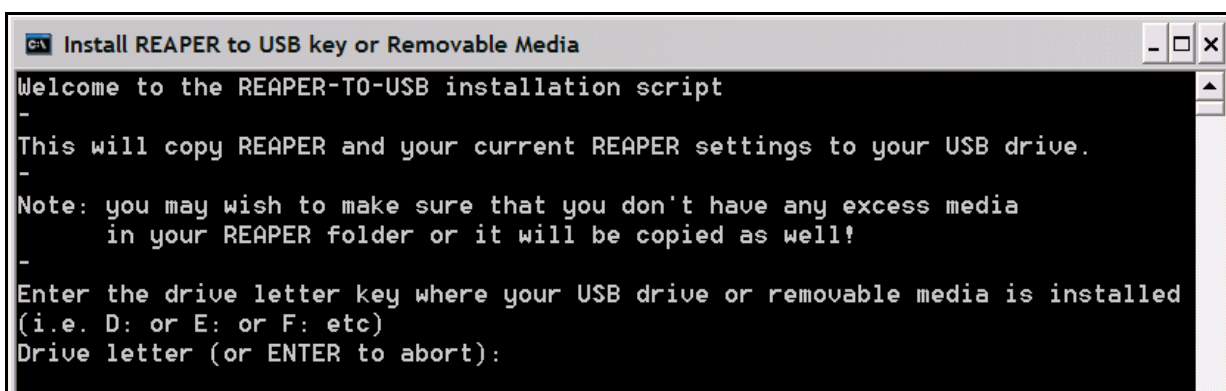


### 1.16 Running REAPER on a Flash Drive

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, first install the Flash drive in a USB 2.0 port on the computer. You can then run **reaper.exe** directly from your Flash Drive.

### 1.17 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:

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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 22.
<b>REAPER</b>	Starts REAPER normally, with last project.
<b>REAPER (create new project)</b>	Starts REAPER with a new project file.
<b>REAPER (reset configuration to factory defaults)</b>	Starts REAPER and resets all settings, options and preferences to factory defaults. Use this with caution!
<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 with the Audio settings Preferences page.
<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.

### 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>Alone.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 in any text editor. In general, however, this is not recommended practice.
<b>.RPP-bak</b> Project Backup File	<b>Alone.RPP-bak</b>	When you save an existing project file, the previous version is renamed and saved with the .RPP-bak extension. This ensures that if needs be you can recover your project from its previous state by opening the project backup file.
<b>.RPP-UNDO</b> Undo History File	<b>Alone.RPP-UNDO</b>	This 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 in Chapter 2.
<b>.reapeaks</b> REAPER Peaks File	<b>Vox.wav.reapeaks</b>	These files contain the information necessary to enable REAPER to draw the waveforms etc. on your media items.
<b>.reapindex</b> REAPER Peaks File	<b>Vox.wav.reapindex</b>	These files contain index information about your individual media items.

## 2 REAPER Project Basics

### 2.1 Section Overview

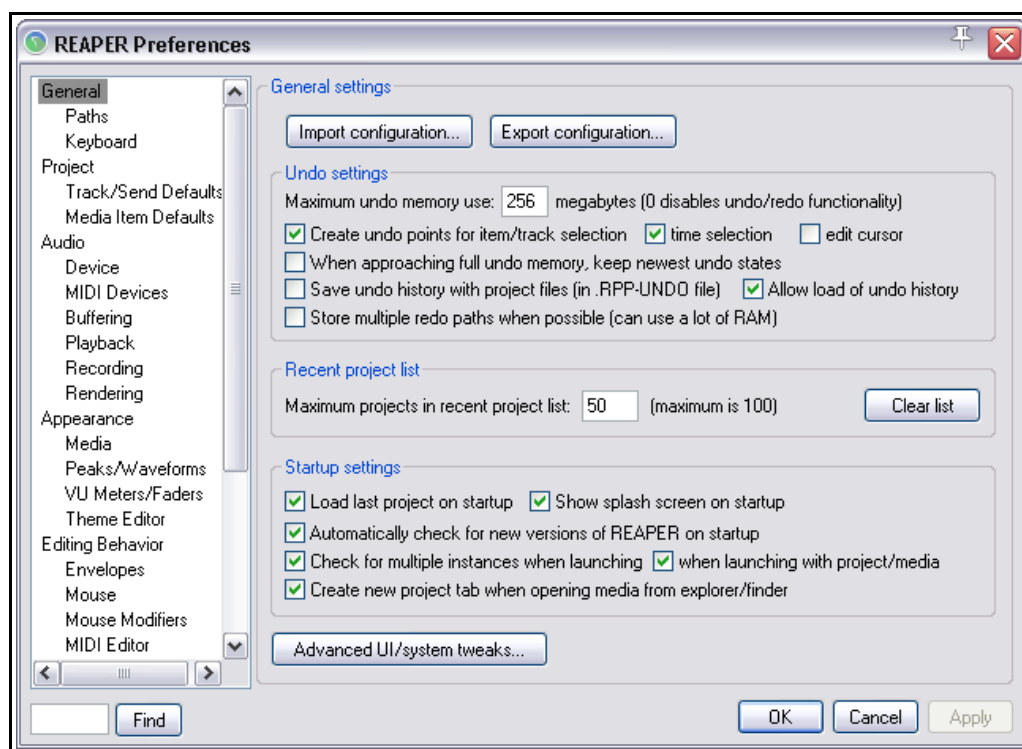
In this chapter you will be taught the essential basics about working with a project file in REAPER. Topics include opening and closing files, navigating the REAPER environment, working with tracks and audio effects, and more. Most of the topics introduced in this chapter will be covered in greater depth and detail later in this guide.

### 2.2 Opening an Existing Project

To open an 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. Recently used projects 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.

The **General** page of your **Options, Preferences** window offers a number of options. In particular, you can:

- Determine the number of files displayed on the **Recent project list**.
- Specify whether or not you want the most recently used file automatically loaded when REAPER is started. Use the **Load Last Project on Startup** option for this.
- Specify whether you want to **Automatically Check for New Versions of REAPER on Startup**.



Other General Preferences settings will be discussed and explained elsewhere in this guide, including the various Undo settings.

The examples used throughout this guide use the project file **All Through The Night.RPP**. This can be downloaded from [www.cockos.com/wiki/index.php/REAPER\\_User\\_Guide](http://www.cockos.com/wiki/index.php/REAPER_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.

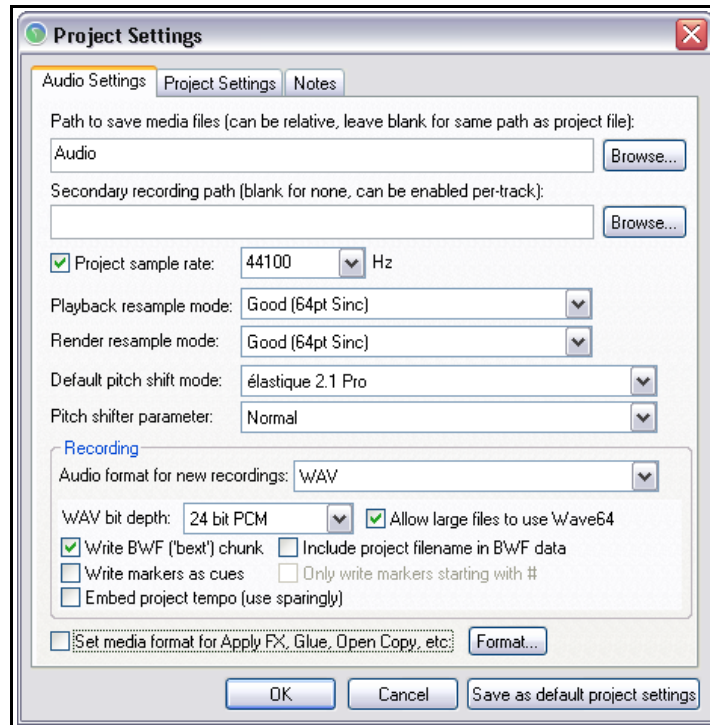
### 2.3 Project Settings

Every REAPER project has a number of settings that can be defined and changed to meet the requirements of each individual project. 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**. If in doubt, you can leave most of these settings at their default values, at least until you understand better what they are and how they work.

#### Project Settings: Audio

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 but there are others. For example, if you specify "Audio" then your media will be stored in a folder called Audio, where this is a sub-folder of the project folder.
- **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 in Chapter 9.
- Preferred **media format** when media items are **rendered**, for example by applying FX or gluing. Gluing is explained in Chapter 6 and rendering in Chapter 18. For now, just leave this option unselected.



#### Project Settings: Project

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). See **Project Time Base Settings** note below.
- **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. In Chapter 11 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 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. **Gain compensation boost** can be enabled or disabled - see section on **Pan Law and Pan Mode** late in this chapter.

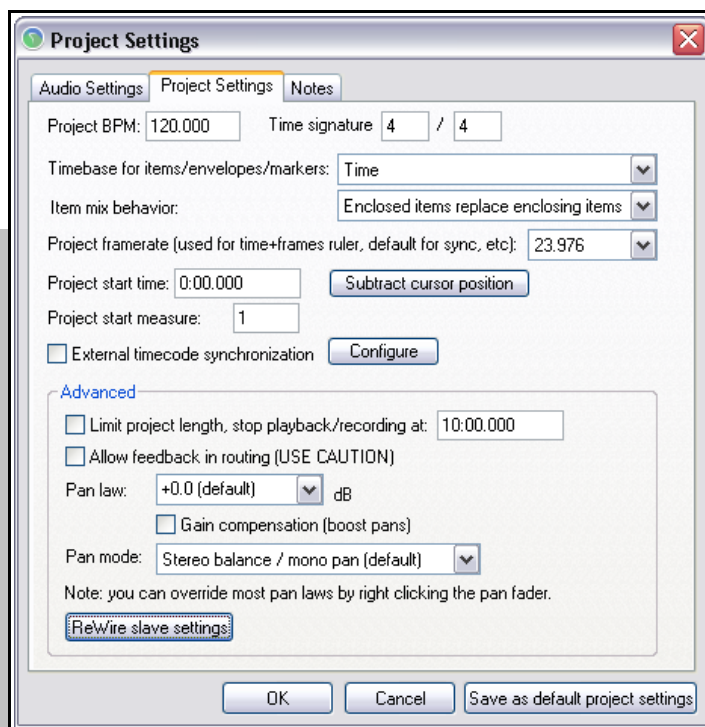
- **Default track pan mode.** You have choice of pan modes, some mono, some stereo. See also Chapter 10.

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

### Understanding Pan Laws

Pan 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 mirror these 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. If you want more information about panning laws, you can search the REAPER forums, or try Google!



### The Project Time Base Settings

Whenever possible, get your project timebase settings right *before* you record or import any items into your project. The default setting is **Time**, but you may wish to change this. For example, if you will be working primarily or exclusively with MIDI items or looped samples you will probably want to select **Beats (position, length, rate)**. This locks items to the timeline so that changes in tempo will cause items to be resized and their play rate adjusted. With **Beats (position only)**, the start of the item is locked to the beat, but the item contents are not affected or modified by tempo changes.

It's worth also noting that you can still over-ride the project timebase setting for individual tracks within your project. To do this, select the track(s) and choose **Timebase** from the track control panel context menu. To do this for an individual item, select the item then press **F2** to display the Item Properties dialog box.

### Project Settings: Notes

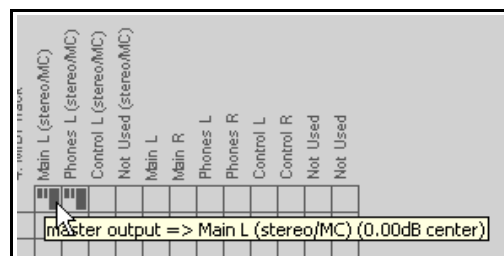
This very handy section lets you enter any notes and comments that you would like to be included with your project file. You can specify that the notes should automatically be displayed each time the project is opened.

**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.

## 2.4 Directing Audio Output

Audio output will by default go from your master to the first available pair of outputs on your soundcard (usually outputs 1 and 2), and only to this pair. If your sound card has multiple pairs of outputs and you wish to change this, you can do so via the **Routing Matrix (View, Routing Matrix or Alt R)**.

Your available hardware outputs should be displayed along the top of the grid. Here you can select and/or deselect any of the available outputs.



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## 2.5 The Transport Bar



If the Transport Bar is not visible in your REAPER window, use the **View, 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, the position of the Transport Bar does not matter. The main Transport Controls are the seven buttons in the center, which are as follows:

Function	Default Keyboard Shortcut
<b>Rewind to start of project</b>	<b>W</b>
<b>Stop and rewind to where play last started (edit cursor)</b>	<b>Space</b>
<b>Play</b>	<b>Space</b>
<b>Pause (Stop at current position and move edit cursor)</b>	<b>Ctrl 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>

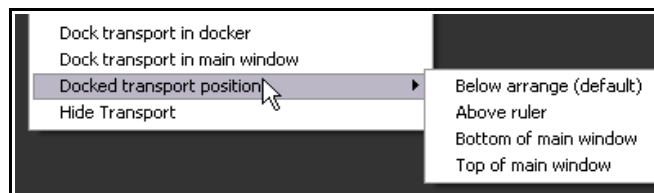
To the left of the buttons is displayed the current project time. In the above example, this is 1:27.427. Below that are shown the start and end positions and length of any current **time selection**. Time and loop selection will be covered throughout this User Guide, but especially in Chapters 6 and 8. At the far left is the **Global Automation Override** feature: we'll revisit this in Chapter 16.

To the right of the control buttons is displayed a **Rate Control Fader** edit box which can be used to speed up or slow down playback. To the left of that are edit boxes that show the Project **Beats per Minute** setting. To change the value of any edit box (such as beats per minute) you can click in the box and type the new value. If you prefer, you can also hover your mouse over the box and use your mousewheel to increase (up) or decrease (down) the value. Other useful Transport Control keys are listed in the table that follows.

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

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 in Chapter 8, but for now just notice that there are menu options available to:

- Select your preferred time display format.
- Dock or Undock the transport in the Main Window. You can choose the main docker or any of four other positions – **Below arrange view, Above ruler, Bottom of main window** or **Top of main window**.



### Scrubbing

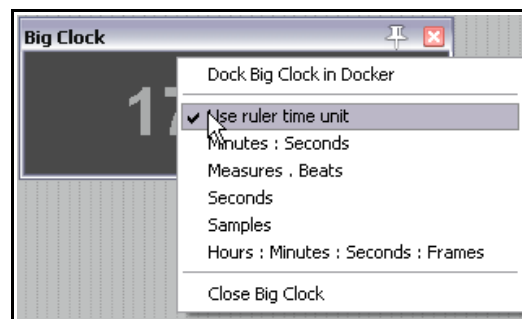
The top of the edit cursor is marked by an upside down triangle. You can grab this with your mouse and drag to move the edit cursor without affecting playback. Depending on your preferences settings, you may need to hold down the **Shift** key while you do this. If you do this when the project is not playing, it will have the effect of "scrubbing" your audio.





### 2.6 The Big Clock

Use the **View, 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 **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 exact position of these faders may vary according to the width and height of the your control panel.

The horizontal fader shown here is used to adjust a track's **volume**. The smaller rotary to its right (positioned here at center) adjusts the **panning**, sending the signal more to the left speaker or the right speaker as preferred.



Each track may also contains a second rotary pan control (not shown here) just below the first pan control. Whether this control is present will depend on which pan mode and/or track layout is selected (see Chapters 10 and 11). The width control is a more advanced concept, primarily used for tracks that contain stereo media files. This will be covered in Chapter 10. Until then, we will be working with just the one pan control. In any event, to adjust any horizontal, vertical or rotary faders in REAPER, you can:

- Click and hold down the left mouse button over the fader, then drag in the direction required, releasing the mouse when finished. For rotary faders, drag up to rotate clockwise, left for anti-clockwise. Hold **Ctrl** while doing this for more subtle adjustments.
- Hover your mouse over the fader, and use the Scroll Wheel to adjust the level down/up. If you wish to disable this feature, go to **Options, Preferences, Editing Behavior, Mouse** and select **Ignore mousewheel on track panel faders**. A comprehensive guide to this and other mouse behavior preferences can be found in Chapter 19.

By default, the volume and pan controls apply to a track's **audio** output. If you want to use these to control its **MIDI** signal, right-click on the track number in the TCP, then choose **MIDI track controls**, then **Link track volume pan to all MIDI channels** from the context menu (see Chapter 12).

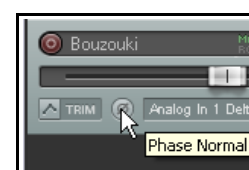
**Tip:** To audition possible changes, hold down the **Alt** key while dragging the fader with the mouse. When you release the mouse, it will then return to its original position. This can be useful if you need to raise the volume momentarily, perhaps to listen out for a glitch or a phrase.

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

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

<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. Notice also that immediately below the arm record button is another button. This is the **phase control** button. This can be used to reverse track polarity.

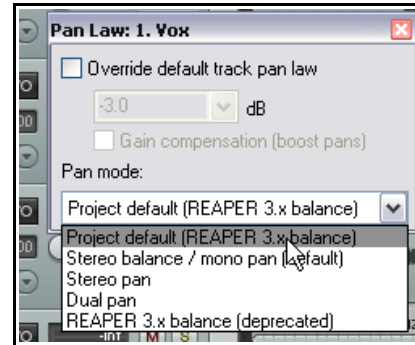
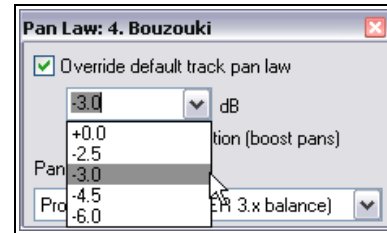


## 2.8 Pan Law and Pan Mode

You can also change the **pan law** for individual tracks. Right-clicking over a track's pan fader opens a window where you can select from the list (in a range 0.0 dB to -6.0 db) or type in your own value. A negative setting causes the signal at the center to be attenuated as panning increases. The **Gain compensation (boost pans)** option can be enabled to cause the signal's audio strength to instead be boosted as it is panned.

Another option is to select your preferred **pan mode** (see right). This is quite a complex topic and will be explained and dealt with more fully in Chapter 10 when we look at stereo panning. In brief, however, you have a number of options – **Stereo balance/mono pan** is the default (see Project Settings). This is equivalent to the panning mode used in versions of REAPER before REAPER 4. If you select stereo pan or dual pan, the width panner will automatically be displayed.

The various pan modes are explained, along with stereo and dual panning, in Chapter 10.



## 2.9 Navigation and Zooming

### 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>	<b>Go to next track.</b>
<b>Ctrl Alt Up</b>	<b>Go to previous track.</b>

### Adjusting Panel Width with Mouse

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 with Mouse

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

### Toggling Track Height with Keyboard or Mouse

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.



Keystroke	Default Function
Double click mouse on vertical scroll bar	Toggles height of all tracks between minimised, normal and maximised.

### 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, decreasing track height
Page Up	Zoom In vertically, increasing track height
Ctrl Num Pad +	Zoom to current time 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:

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

### Zooming and Scrolling with the Mousewheel

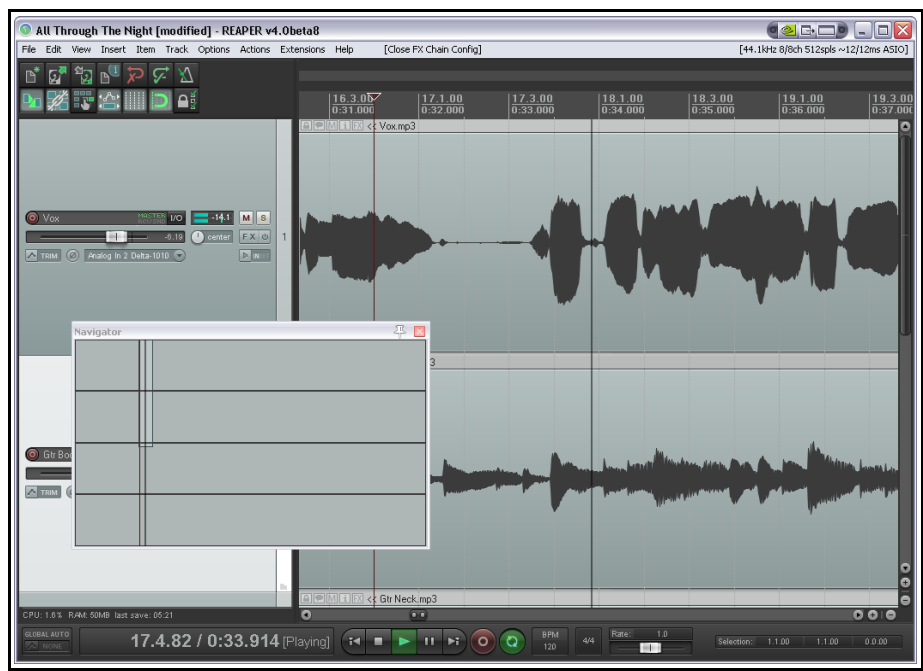
The mousewheel can also be used for zooming in and out when you are navigating a project file. The table below summarises how the mouse wheel behaves.

Modifier Key	Behavior	
(no modifier)	Horizontal Zoom	<b>Note:</b> REAPER's zoom center settings give you more precise control over the program's zoom behavior. These can be found in the <b>Editing Behavior</b> section of your <b>Preferences</b> . See Chapter 19 for more information.
Ctrl	Vertical Zoom	
Alt	Horizontal Scroll	
Ctrl Alt	Vertical Scroll	

You can change any default keyboard and mousewheel assignments if you wish. For example, you might like to use just the Down and Up arrows (without Ctrl Alt) to go to the next or previous track, or to use the mousewheel without a modifier to scroll rather than zoom. This topic will be covered in Chapter 13

**Tip: Making and using a zoom/navigate toolbar.** Most users find that zooming and navigating are activities that they need to perform often. For this reason, it might make sense for you to consider making your own Zoom/Navigate custom toolbar. It isn't as complicated as it might sound, and full instructions on how to create your own custom toolbars can be found in Chapter 13.

2.10 Using the Navigator



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

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

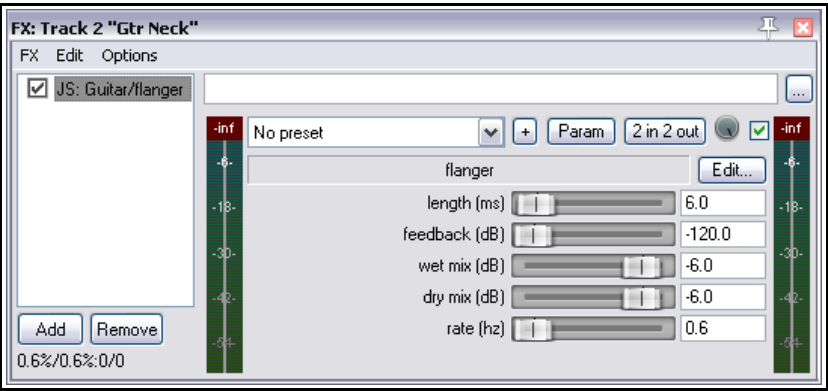
You can also use the Navigator window to scroll thru your project. Simply position the mouse over the box within the navigator window that represents the on-screen area of your project. Then hold down the left mouse

button, and click and drag to scroll the display. Release the mouse button when finished. Other ways of using the **Navigator** are:

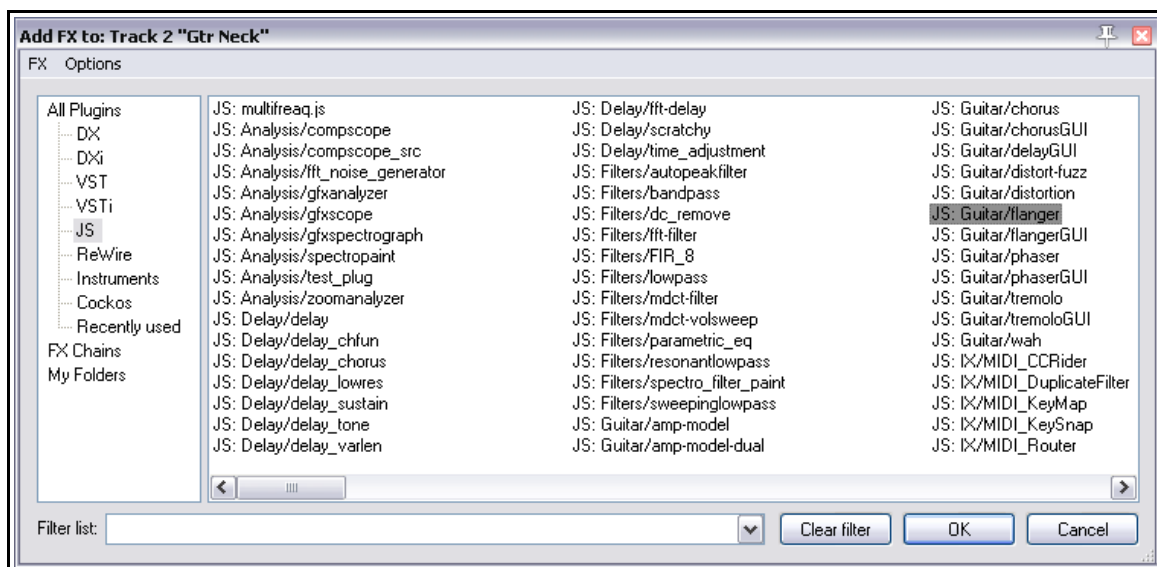
Method	Result
Hold down right mouse button, click, drag and release	Define new area to be displayed in REAPER workspace.
Left click mouse	Reposition rectangle and workspace display area.
Ctrl Left Click	Reposition and relocate play cursor.
Mousewheel	Use as in workspace to scroll and/or zoom.

2.11 Track FX Basics

Track FX (JS, 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 Jesuonic and Cockos effects. We'll be taking a closer look at many of these individually later in this User Guide, especially in Chapters 5 and 14. 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 (see below).
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 here.
4. To add more FX, click on the **Add** button in the Track FX window, then repeat steps 2 and 3 above.



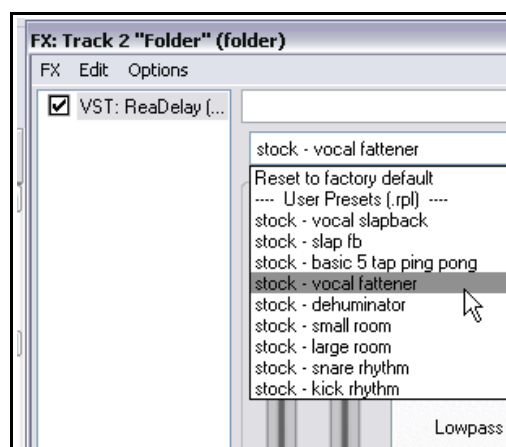
**Note:** When you add any plug-in to any track's FX chain, that plug-in will then be displayed in the FX Browser's **Recently Used** FX folder.

### 2.12 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 14, 15 and 16 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?faCID=1374784>

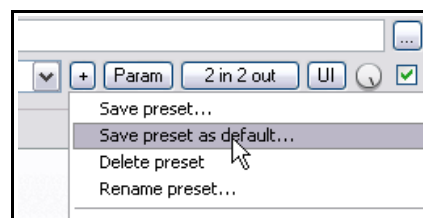
However, as a means of getting started you might wish to explore some of the presets that come with these plug-ins. For example, **Cockos ReaDelay** includes presets which as a starting point you can try with your various tracks. Simply display the drop down list and select the item that you want (example shown right).

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.



#### To set any FX preset as the default for that FXL

1. Select the required preset from the drop down list.
2. Click on the **+** button to the right of the list and choose **Save preset as default...** from the menu.
3. Type your own name for the preset and click on **OK**.



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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 left of the **Param** button in the FX Chain window).
3. Choose **Import Preset Library**.
4. Navigate to and select the required file then click on **Open**.

### 2.13 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. For fine adjustments, hold down the <b>Ctrl</b> key while you do this. If you prefer, select the control with the mouse, then use the up/down keys on your keyboard.
<b>Adjust the wet/dry mix of any FX</b>	Select the plug-in in the FX chain, then use the mouse to adjust the small rotary control next to the UI button on REAPER's FX window interface, as shown here.  A setting of 100% equals completely wet: a setting of 0% represents completely dry.
<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 an FX window</b>	Double-click on the FX name in the FX Chain window (toggles).
<b>Keep FX or Add FX window on top</b>	Click on the pin symbol at right of title bar.
<b>Close a floating FX window</b>	Double-click on FX window title bar.
<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 <b>F2</b> .
<b>Bypass an FX</b>	Untick either the check box left of the FX name in the Track FX window or the check box in the top right corner of a 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.

Task	Method
<b>Remove all FX from a track</b>	Hold <b>Alt</b> while clicking on the track's FX button in the TCP.
<b>Search for an FX</b>	Enter text in the <b>Filter List</b> at the bottom of the FX window.
<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. 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> .
<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. These are discussed in Chapter 19.
<b>Bypass all FX for a track</b>	In the Track Control Panel, click on the <b>FX Enable/Disable</b> toggle button. Click again to reverse this.



### 2.14 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:

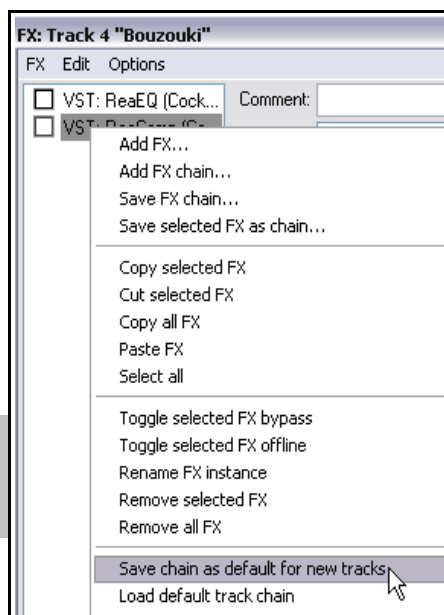
- Open the FX Window for any track.
- Add the FX required.
- With the FX selected, right click and choose **Save chain as default for all new tracks** from the menu.

**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. In the first (left) column of the Add FX window, click on **Cockos**.
4. Select in turn, first **ReaEQ (Cockos)** and then **ReaComp (Cockos)**. In each case, either use the **OK** button to add the plug-in to the track FX chain, or drag and drop them into the chain.



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5. Make sure that both these FX are unticked – this sets them to bypass.
6. Right click over one of the FX and from the context menu choose **Save chain as default for new tracks**.
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, or (to remove it) with no plug-ins at all.

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

### 2.15 Using an FX Bus

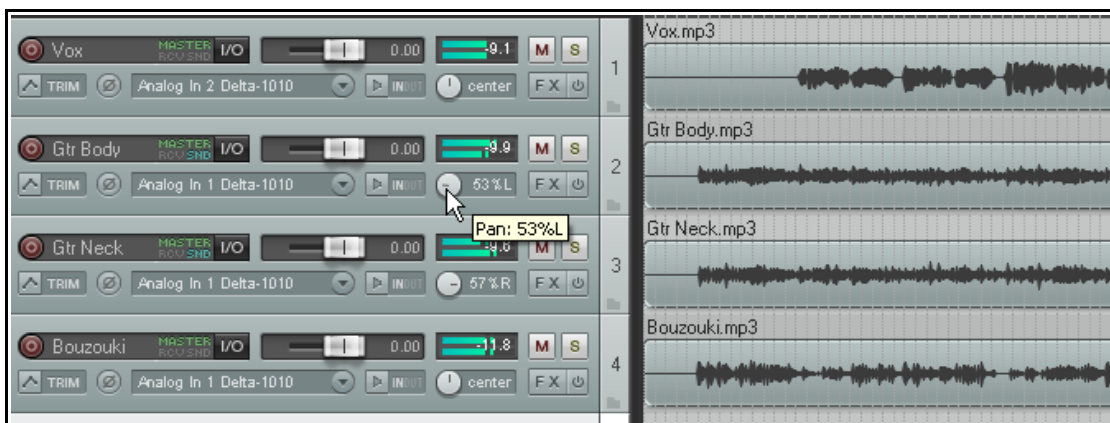
If you have used other DAW software, or an analog (tape) recording and mixing desk, you are probably already familiar with the concept of a **Bus**. The exact meaning of the term can have several variations, but most commonly (and in this example), a Bus is used to enable a number of tracks to share 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.
- In addition, a copy 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 place it just after the last track. This example uses the sample project file **All Through The Night.RPP**. 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.



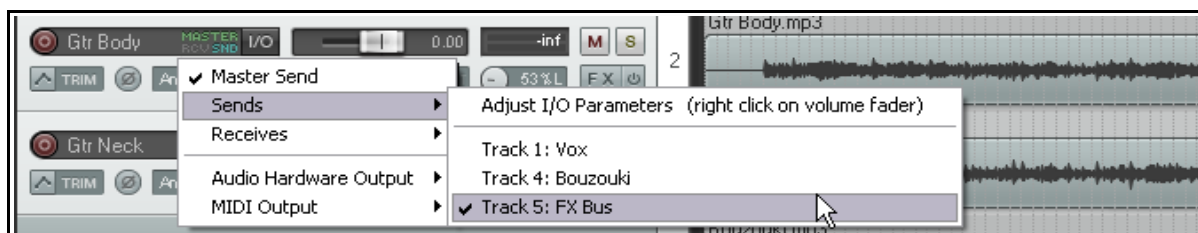


### To Create the Bus and add the FX to it:

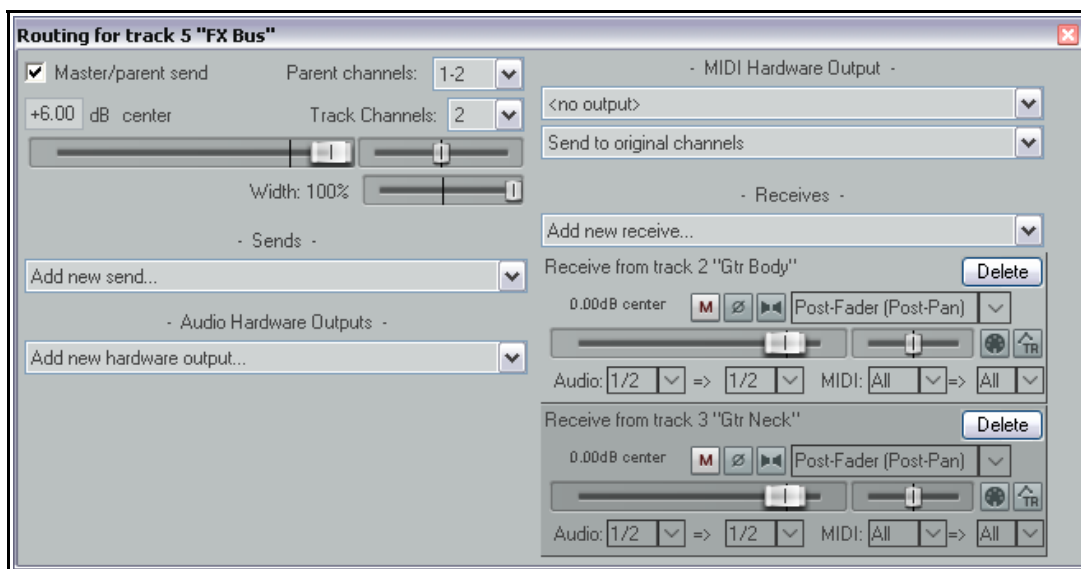
- Select track 4 (in the Track Control Panel).
- To insert a new track either choose the **Track, Insert New Track** command, or press **Ctrl ,T** or double click in the vacant track control panel area beneath the last track.
- To name this new track, click in the area where the name is to go, type **FX Bus** then press **Enter**.
- 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 two guitar tracks to the Bus:

- Select the two guitar tracks in the TCP. Right-click over the **IO** button for either of these tracks.
- From the context menu, choose **Sends** then **Track 5: FX Bus**.



Note that for every send there is an equivalent receive, and vice versa. For example, If you now open the IO Routing window for Track 5 you will see that it has two receives, one from each guitar track. You'll learn more about REAPER's routing later in this chapter (Routing Essentials) as well as in Chapter 4 and 15.



### 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 main ways to adjust this. Experiment until you find what gives you the results you want:

1. Adjust the chorus FX parameters. In this case, you could lower the amount of Wet signal in the mix.
2. Adjust the levels of one or both of the receives in the FX bus routing window.
3. Display the routing window for either guitar track and adjust the send levels for that track.
4. Adjust output volume fader for the track called **FX Bus**.

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## Speed Tips

In Order To Do This ...	Do This
<b>Toggle on/off send from track to Master</b>	Hold <b>Alt</b> while clicking on IO button. Works with single track or multiple track selection.
<b>Create a quick send on the fly from one track to another.</b>	Drag and drop from IO button of send track to IO button of receive track. This can also be done in the mixer view.
<b>Send a track's output direct to any hardware output.</b>	Right-click on IO button and select Audio Hardware Output then choose from sub-menu.  This can be used with a track selection and is independent of the track's master send status.

## 2.16 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.

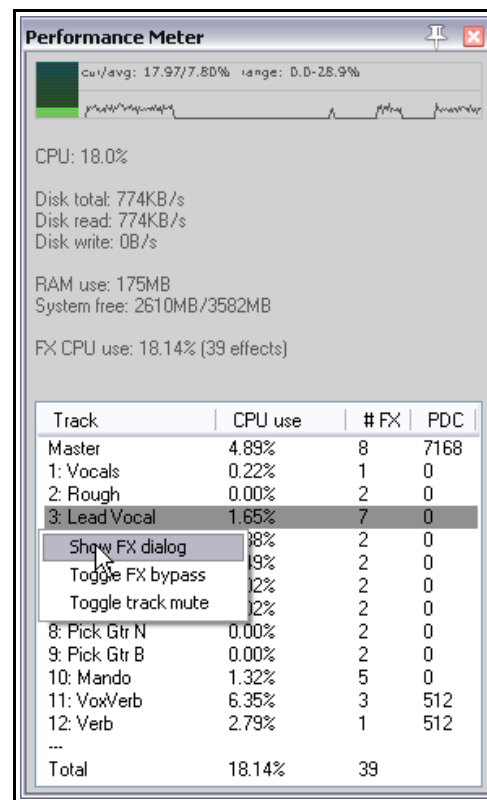
To display the Performance Meter, press **Ctrl Alt P**, or use the **View, Performance Meter** command.

### Example

In the example shown (right), you can see that our project FX are using about 18% CPU overall, and that the Master track with 8 plug-ins is using almost 5.0%. 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.

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



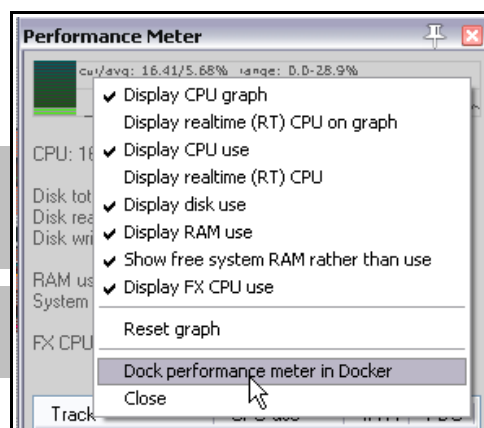
In addition, the Performance Meter has two right click menus, each with a number of options. The first is accessed by right clicking in the track list area.

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

The other menu is used mostly to select what information you want shown 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 19 of this guide, Further Customising REAPER.

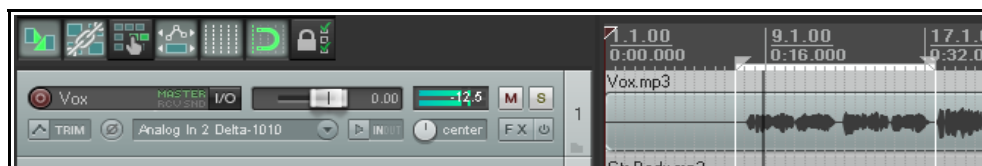


### 2.17 Selections and Loops

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 Chapter 6, 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** while you double click on that item. To set the time selection to match a media item, hold **Shift** while you double-click on the 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 time selection, the start 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.

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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.

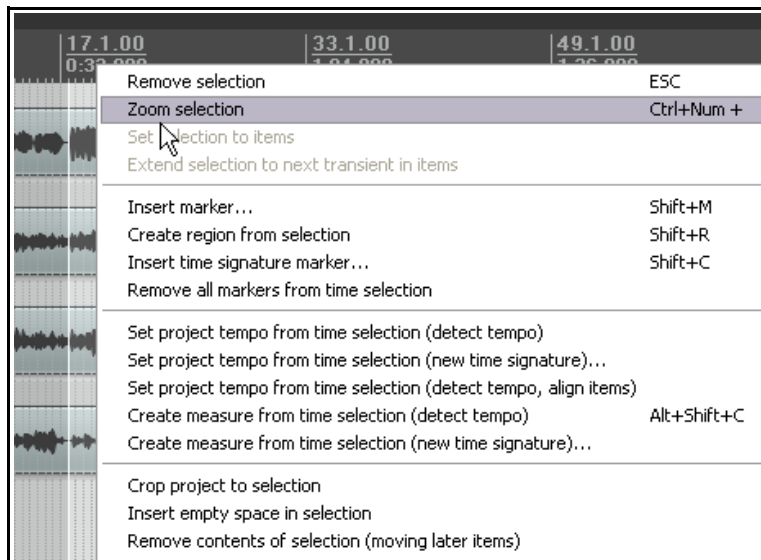
Right clicking on the Timeline gives you a menu of commands which you can apply to a time selection, including **Zoom Selection**. You can

also use this menu to change the units used on the timeline – for example, Minutes, Measures, Seconds and Samples.

Many of these commands are shown in the illustration (right) - 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.

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

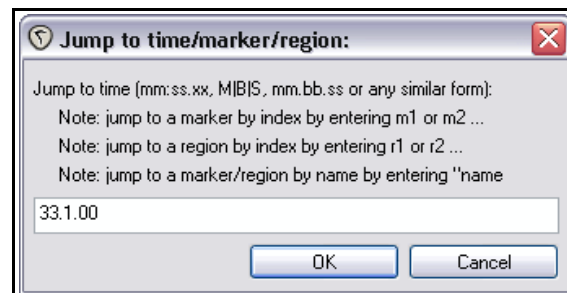
There's more about loops and time selections elsewhere in this User Guide, e.g. in Chapters 6 and 8.



### 2.18 Navigating by Jumping

You can jump to any point along the timeline using the **View, Go To, 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. **33.1** or **1:04**.



### 2.19 Item Names, Buttons and Icons

Depending on your **Appearance, Media** preference settings, you may (or may not) see your item names displayed either above the media item rather than on it (see right). You might also see some media item icons (or buttons). You'll learn more about this when we examine media items more closely in Chapter 6.



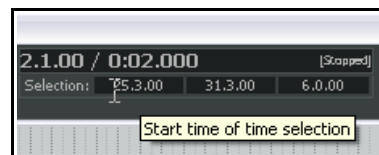
### 2.20 Managing Time and Loop Selections

In the last section you learnt how 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 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 perhaps select too large an area, or to miss 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.

You can also modify a time selection by scrolling the mousewheel over the Selection area of the **Transport Bar**. Scroll over the start area to adjust start time, end area to adjust end time, or over the length of selection area to move the entire selection. If you wish, you can enter actual times in the start and end time boxes.



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 left 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 right 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.

If you wish, you can use the keyboard rather than the mouse to define your time selections. 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.

### 2.21 Keyboard Shortcut and Mouse Defaults

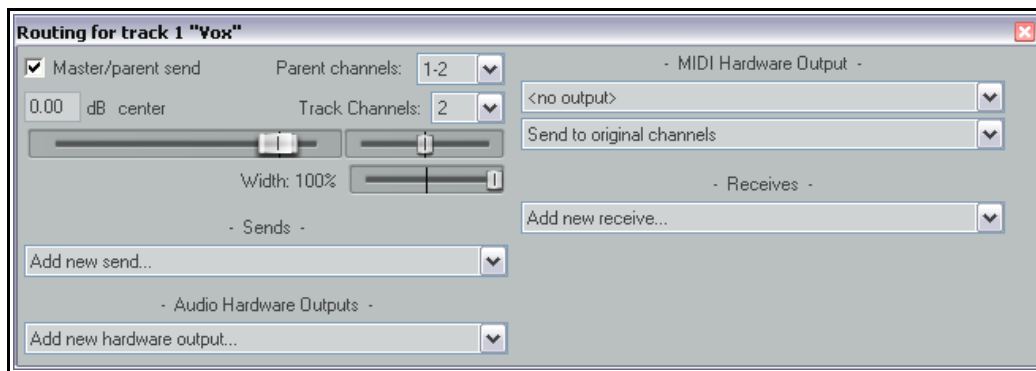
You can use the command **Help, HTML Lists (auto-generated), Mouse Modifier Keys and Action Shortcuts** (or just press **Shift+F1**) to open your default web browser with a complete list of REAPER's mouse modifiers and keyboard shortcuts. As you will see in Chapter 13, you can also define your own mouse modifiers and action keys, so that your mouse behavior will be determined by the context in which you are using it.

### 2.22 REAPER Routing Essentials

This section will teach you more about 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. You were introduced to some basic examples earlier in this chapter, when we looked at creating and using an FX bus. 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 Chapter, also in Chapters 4 and 15, and elsewhere.

Each track includes an **IO Button** in its panel toolbar. Clicking that button causes the routing window 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 click anywhere outside the window.

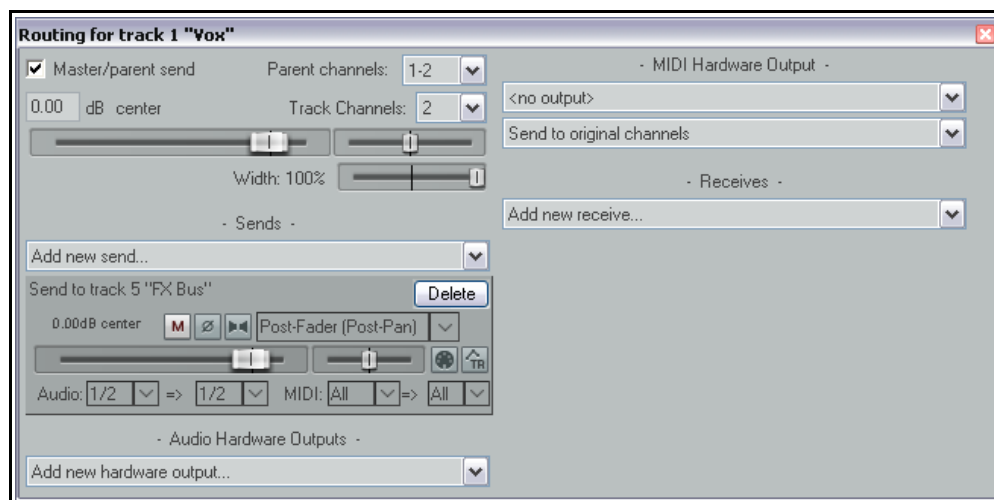
The actual contents of your Track Routing window will vary according to your project structure and your DAW hardware setup (e.g. sound card and audio devices, MIDI devices etc.).



Depending on the nature of your project, 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.
- **Sends** – In the FX Bus example earlier in this chapter you created sends. A track's output can be routed via a send from any track to any other track or tracks. This topic will be covered in more detail 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** – For every send (source) track there will be a receive (destination) track. In the example that you encountered earlier, the FX bus included two receives, one from each of the two guitar tracks in that project file.

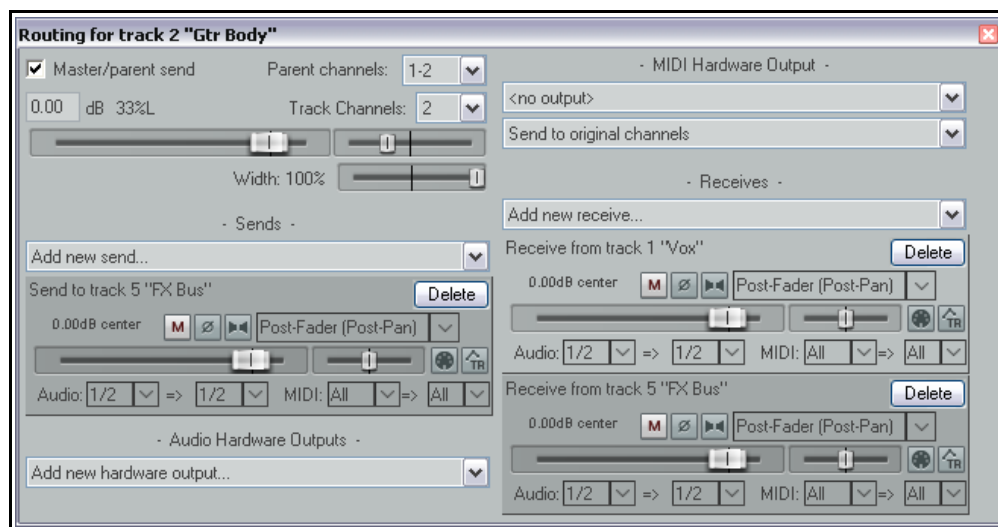
- Notice (picture below) that when you create a send, you are automatically presented with volume and pan faders which can be used to control this. You can also specify whether to send audio output, MIDI output, or both.



- 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.

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 User Guide, starting at Chapter 4.



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 rather more complex examples elsewhere in this User Guide, especially in Chapter 15.

**Note:** Sends and Receives can be any one of three types. These are **Post Fader (Post Pan)**, **Pre-Fader (Post FX)** and **Pre FX**. The differences will be discussed in Chapter 15. Meanwhile, if in doubt accept the default option **Post-Fader (Post Pan)**. They are also illustrated in the flow charts that are shown at the end of Chapter 5.

### 2.23 The Routing Matrix

REAPER's Routing Matrix is a "one stop" window where you can manage and arrange a project's entire routing structures. For example, you can add and delete sends and receives and manage their various parameter controls, such as volume and pan.

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

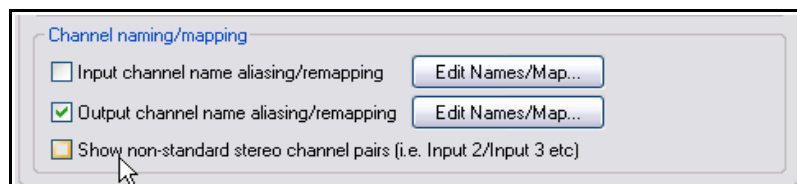
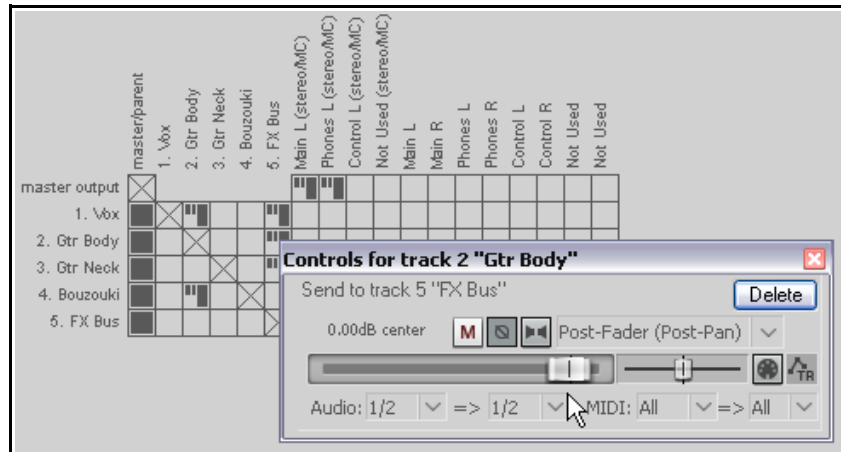
Observe the cell in the matrix where the **Gtr Body** row intersects with the **FX Bus** column. It contains two small blobs.

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 above).

#### 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. By default REAPER will allow you to use any two consecutively numbered audio outputs as a stereo pair. It is quite likely that you may want to use, for example, outputs 1 and 2 as one pair (perhaps for your speakers) and outputs 3 and 4 as another pair (perhaps for your headphone amp. However, it would be unusual to want to use outputs 2 and 3 together as a pair.

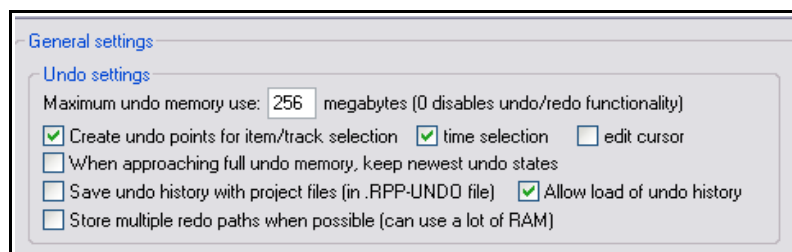
If you wish, you can prevent these unwanted combinations from being displayed by choosing the **Options, Preferences** command, then selecting the **Audio** settings page. This includes a **Channel naming** section, where you can turn off the option to **Show non-standard stereo channel pairs** (see above). 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 them individually on the matrix.



### 2.24 The Undo History Window

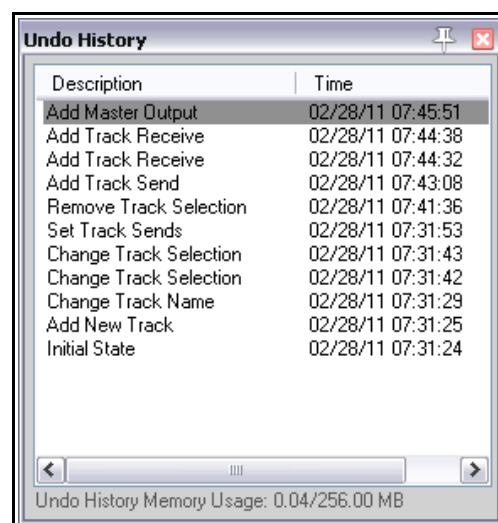
REAPER's Undo feature is user friendly and very powerful. The **View, Undo History** command (or use **Ctrl Alt Z**) toggles open and closed the **Undo History Window**. You can double click on any event displayed in that window to go back to that point.

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 and/or edit cursor movements 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** and ensure that this file is loaded with the project. This means that even after retrieving the project 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.** Within the Undo History window you can even store alternate sequences of commands and actions, then switch between them!



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. To do this (as with most other windows), right-click on the title bar and choose **Dock in Docker** from the context menu.

### 2.25 Docking and Floating

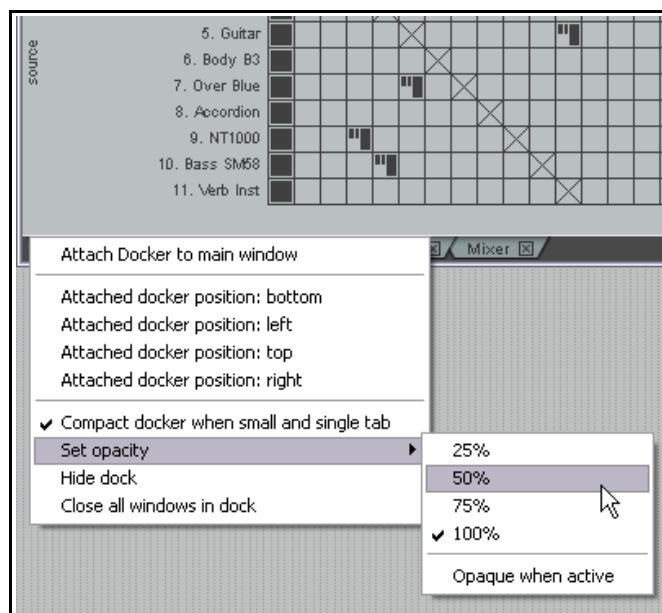
Too many views on the screen at once creates clutter. That's when the Docker becomes useful. Right clicking over the title bar or background area of most windows causes a context menu to be displayed which will offer a list of choices relevant to that window. Usually their purpose will be obvious. This will include an option **Dock in Docker**.

When a number of windows are docked, at the foot of the Docker you will see a series of Tabs. These are used to select which item is displayed by the Docker at any time. In the illustration here, 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. 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 in Docker** option.
- The Docker can itself be attached to the main window or detached and floated. Click over the small exclamation mark in the bottom left corner of the Docker and use the option to **Attach Docker to Main Window** to toggle.

By default the docker will be attached to the bottom of the main window, but you can use the same menu to change this position to left, top or right.

- Clicking over the exclamation mark 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. Opacity can be set between 25% and 100%.



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

More experienced users might be interested to know that if you wish you can work with multiple dockers. This topic is covered in Chapter 11, Project Management Features.

As an alternative to docking windows, you might consider the toggle command **View, Show/hide all floating windows** as a method of handling screen clutter. Another useful command can be **View, Cascade all floating windows**.

### 2.26 Keeping a Window on Top

The small pin shown on the right of the title bar of most windows (just before the **X**) can be used to pin a window to keep it on top. Click on this to toggle its on top status. When the pin is shown in the down position, the window is locked on top.



### 2.27 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 a particular 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 toggle command can be used to show project tabs, even if only one project is currently open.

**Hide Background Project FX/MIDI Windows**. Ensures that when one of a number of open project tabs is selected, any open FX windows and the like belonging to other open projects are not displayed on top of it.

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

**Run Stopped Background Projects**. Commences playback of projects in tabs not currently selected.

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

**Tips:** When working with multiple project tabs, they can be reordered using drag and drop. When using multiple project tabs, you can use the **File, Close All Projects** command to close all open projects at once.





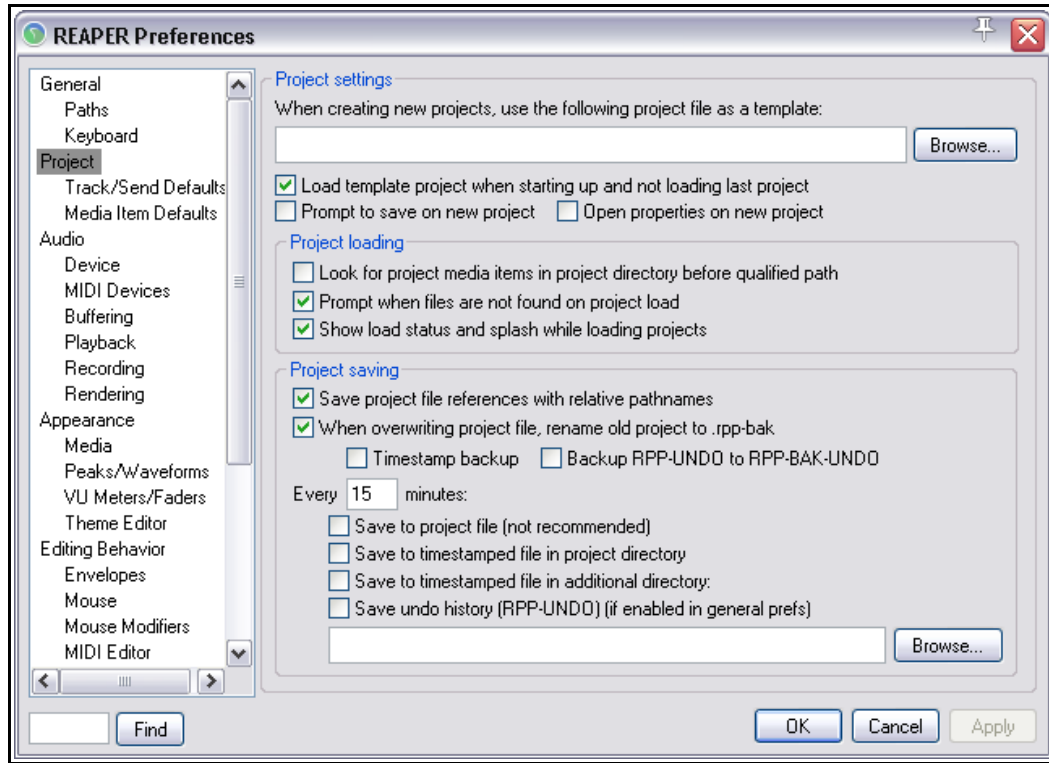
### 3 Recording with REAPER

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**.

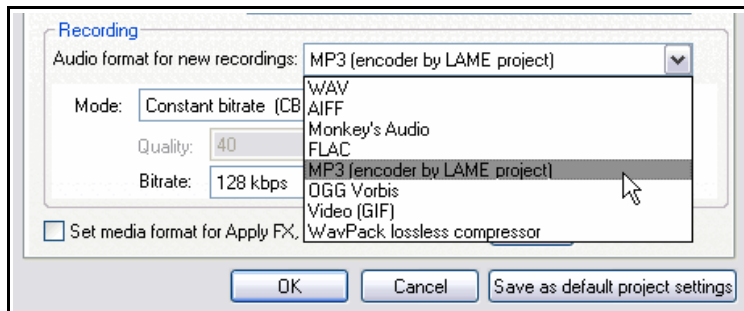
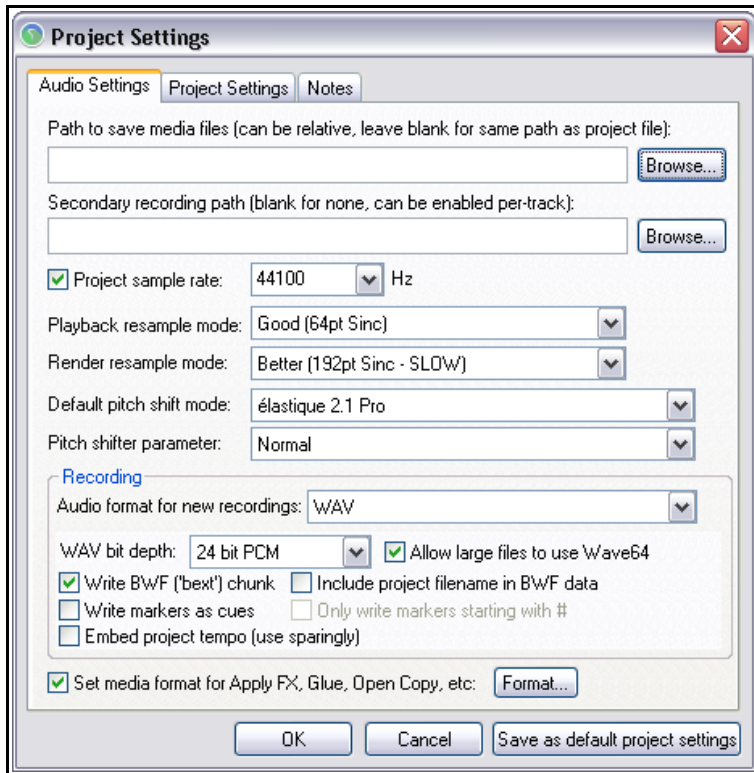
The **Project** page within the **Options, Preferences** dialog box can be used to determine how REAPER behaves each time you create a new project:



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.
- **Prompt to save on new project.** If you enable this option, you will be prompted to save your new projects immediately they are created.
- **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

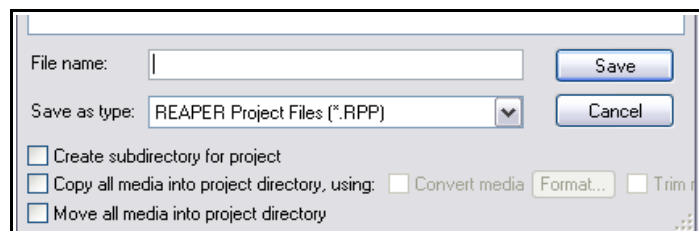


example, if you choose MP3 you will need also to specify your required bitrate.

### 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. When you first save a file you are offered a number of options (see right). If you select the options to **Create subdirectory for project** and **Move all media into project directory**, 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**.



After creating a project file, you should display the **Project Settings** window – **Alt Enter** – to ensure that you are using your preferred **Audio Settings**. In particular you should select your preferred **audio** format. If you are not sure which to choose, select **.WAV**, with settings similar to those shown below. These will give you good audio quality. If you wish later to use some other format (such as **.MP3**) you can render your files in that format.

#### 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. However, increasing sample rate also increases media item file size and slows down processing.

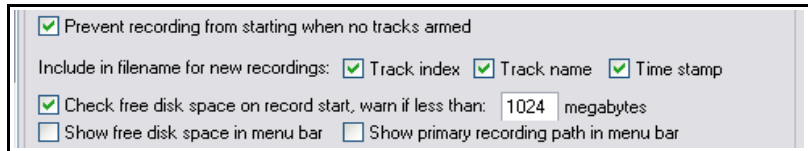
#### Other formats.

If you prefer, you can record using any of a number of available compressed formats, including MP3, OGG and WavPack. Choosing any of these will present you with further options appropriate to that format. For

### 3.4 Creating and Naming Tracks

After creating a new 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, Insert New 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 media 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 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. We'll look at more of these recording preferences later in this chapter.



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. 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:

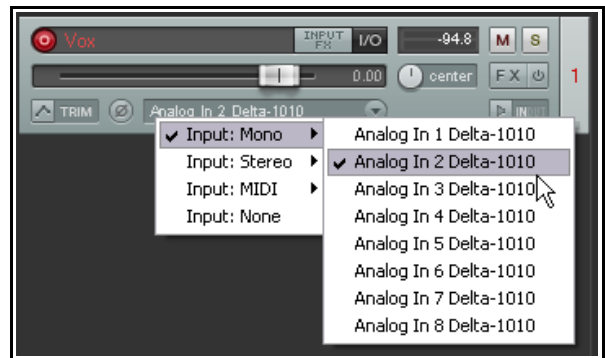
- Select a recording format other than the default.
- Turn input monitoring on.

REAPER's **Preferences** settings include a page of **Track/Send** defaults which you can use to set a track's default characteristics (such as default volume fader level). These are explained in Chapter 19.

**Note:** You do not need to specify when creating a track whether it is to be a Stereo or Mono track. When assigning the track input for recording, you can use either a single mono input or a stereo pair. Note that both stereo and mono tracks can be panned between the left and right speakers as you wish. Panning is a topic that occurs throughout this guide, for example in Chapter 4.

### 3.5 To Prepare and Record One Track

1. Check the **Options** menu to make sure that **Record mode: Normal** is selected. We'll examine the other modes as this chapter progresses.
2. Click on the **Record Arm** button for that track (over on the left) The button should now appear red.
3. Click the mouse over the **Input setting** for that track (below the volume fader - see right). This displays a menu. 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 is likely to be one of the **Input: Mono** options. If you are a newcomer, or you are not sure which option to pick, choose **Mono**. This enables you to record from a single microphone or lead onto this track.
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.*



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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.

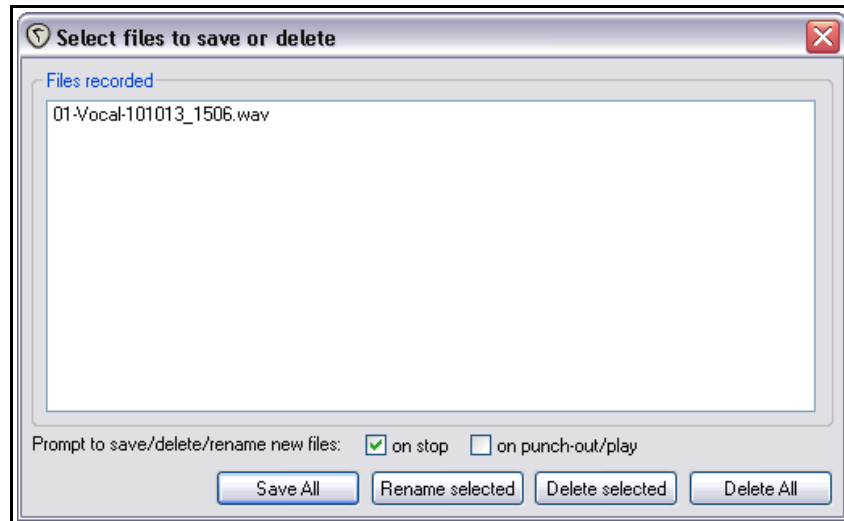
**Tip:** Notice that the Input menu (shown above) includes an item **Input: None**. This can be used to prevent material from ever being accidentally recorded onto a track where it is not wanted, such as perhaps an FX bus or a folder.

### 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 giving you the opportunity to save or delete any of your recordings (see right). This can be useful, for example, if you have armed and recorded more tracks than you intended.

You can also rename the media file. This can be useful, for example, if you forgot to name the track before recording.



### 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.

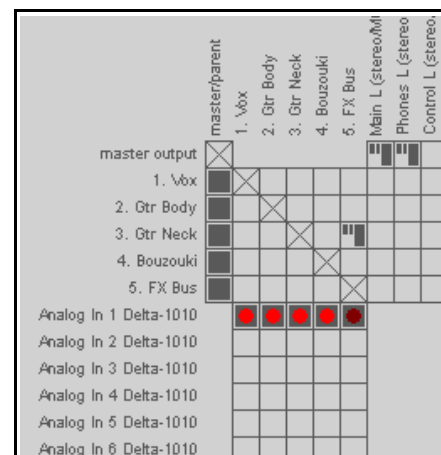
## 3.6 Record Modes and Monitoring

Getting to grips with REAPER's various record modes and in particular how they work in combination with other options (such as monitoring) can be somewhat bewildering for new users. Chapter 23 includes a summary table **Troubleshooting Record and Input Modes**.

## 3.7 To Prepare and Record Multiple Tracks

To prepare multiple tracks for recording you could repeat all of the necessary steps as many times as you require tracks, but that might be tedious – and besides, it's too easy to make a mistake when selecting 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:

1. Use the **Insert, Multiple tracks** command to insert as many tracks as you require. Specify the number of tracks required, then click **OK**. Name your new tracks.
2. 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.
3. Press **Alt R** to display the **Routing Matrix** (right). In this example, we are assuming that we are recording four tracks at a time. Notice that by default, all four tracks are assigned to the first input. If you were to record now, the

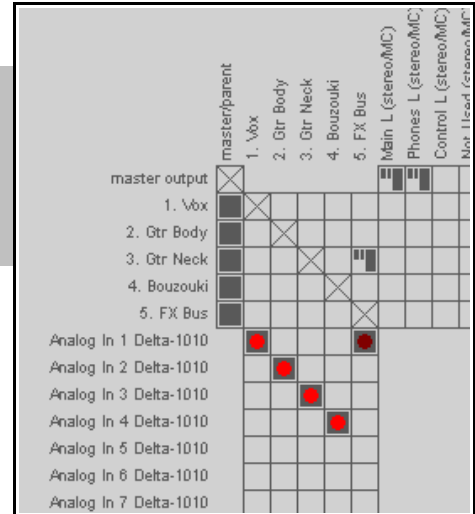


signal from the first input would simply be recorded four times! Notice in this example that by default, input 1 is also assigned to track 5 (the FX bus) but as this is not armed nothing will be recorded there.

- 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.
- 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.



### 3.8 Auto Arming Tracks

If you wish, you can ensure that 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**. This command can be toggled on and off.

To set all tracks in a project to auto arm, choose the **Track** command from the main menu, then **Set all tracks to automatic record arm when selected**.

### 3.9 Using the Metronome

You can set up and use a Metronome when using REAPER for recording. To do this, you need first to right-click on the metronome button on toolbar, or the use the **Options, Metronome/Pre-roll, Metronome/ Pre-Roll Settings** command to set up your metronome. Left-clicking on the metronome button, or choosing the **Options, Metronome/Pre-roll, Metronome Enabled** command from the main menu, 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.

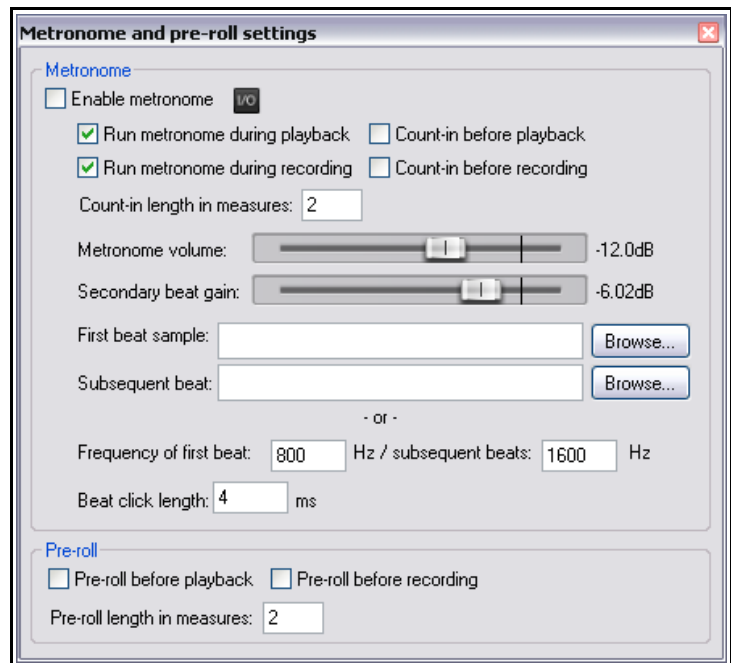
**The IO Button:** Immediately to the right of the *Enable Metronome* option, this allows metronome output to be directed to the device of your choice (e.g., Headphones).

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

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

**Run 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.



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**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.

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

**Secondary Beat Gain:-** This, in relation to the overall volume, the amount by which the volume of secondary beats will be adjusted. You can also use Samples for your own metronome sounds.

**First Beat Sample:** This is the sample for the first beat – e.g., in 4/4 time, this sample will play on the 1.

**Subsequent Beat:** This is the sample for other beats. For example, in 4/4 time, this sample will play on 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.

By default, REAPER uses a synthesised metronome. You can specify in Hz the **Frequency of first beat** and of **Subsequent beats**.

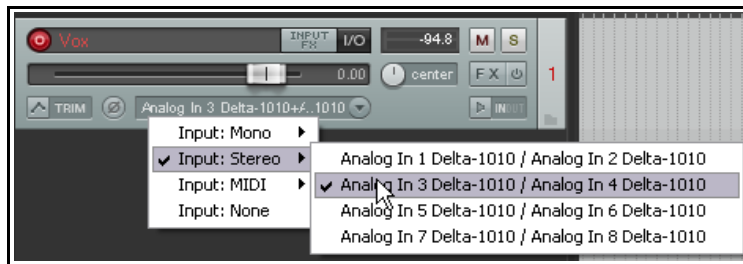
**Beat Click Length xx ms:** This is how long each beat click lasts.

The **Pre Roll** settings can be used so that when you start recording, or playback, the metronome will play for the specified number of measures before recording or playback actually begins.

**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.

### 3.10 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 previously recorded material from audio cassette into REAPER, or if you wish to record perhaps a piano with stereo paired microphones. To do this, follow a similar procedure to that explained in section 3.5, selecting a stereo input instead of mono. Remember that a REAPER track can be mono or stereo: thus the signal from paired stereo inputs can be recorded on to a single stereo track.

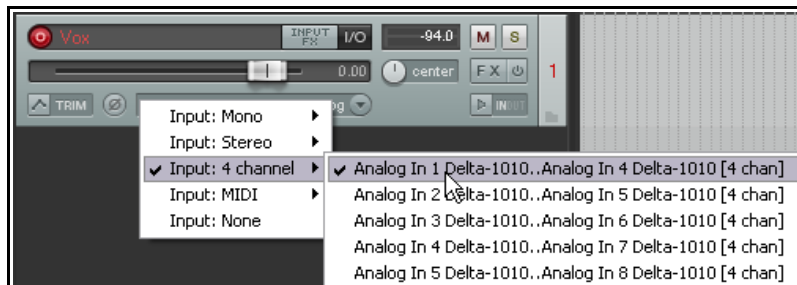


As has already explained in Chapter 2, it is advisable to open the Audio page of your Preferences settings and turn off the option to **Show Non-Standard Stereo Channel Pairs**. This will reduce your available stereo paired inputs from a list such as that shown above to a more logical selection such as that shown above.

### 3.11 Multi-Channel Recording

This is a more advanced topic, less suitable for novices.

If you define a track as multichannel (for example, perhaps 4, 6 or 8 channels) then your recording input context menu for that track will include an option for multichannel recording. You can, for example, record from four, six or eight microphones simultaneously, each to a separate channel on the one track. This method is suited, for example, for use with four channel ambisonic microphone arrays as used in surround sound production.



For multichannel tracks, there is also a toggle command on the record arm context menu **Track VU meter**, **Show peaks from all track channels (not just 1+2)**.



### 3.12 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 exactly as it is 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 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**.

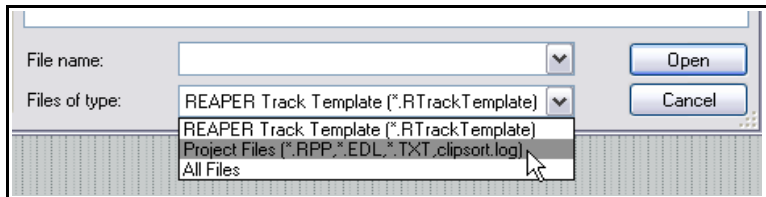
**Note:** All of a track's properties and settings are saved into the template, including track name, inputs and outputs, any FX plug-ins (with any parameter settings, parameter modulation, and track controls), sends and receives. However, if a track included in a track template includes any sends to 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.

### 3.13 Importing an Existing Project

The **Track, Insert Track from Template, Open Template** command can be used to import an entire 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.

However, 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.



### 3.14 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 an existing file as a template for all new projects:**

- Choose the **Options, Preferences** command, then **Project**.
- Click on the **Browse** button labelled "When creating new projects, use the following file as a template".
- Navigate to your project templates folder. This will be a sub directory of your application data REAPER folder.

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- Select the required file, then click on **Open**.
- Click on **OK** to close the Preferences window.

**Tip:** If you are specifying a default project template it is a good idea to also save an empty project as a project template called **Empty Project**. Then, if 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**.

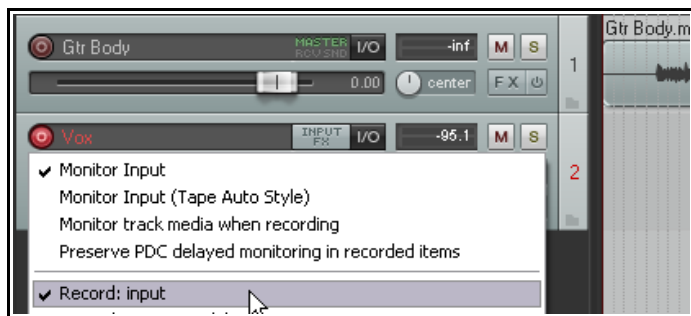
**Tip:** When you are recording, make sure that the incoming signal is not too loud, or you can damage your recording equipment. Here's what to do:

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, slowly raising the input or gain control on your input device until it sounds right.

### 3.15 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 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 **Record: input** is selected and that **Input Monitoring** is turned on for this track (see above). This will enable the the person being recorded and the recording engineer to hear in their headphones a mix of previously recorded material with that being recorded now.
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. 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 zero latency input monitoring and headphone mixing, especially those devices with 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!



**Note: Monitor Input (Tape Auto Style).** This option differs from normal input monitoring in that it monitors input only when the transport has stopped or when you are recording. During playback you will hear only the timeline audio, not the input.

### 3.16 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.

### 3.17 Non-Destructive Punch Recording

By default, punch recording is not destructive: it creates a new take, but does not destroy the original. To use punch recording, follow this sequence:

1. Choose the **Options** command, then **Record mode: time selection auto punch**. The display of the Transport Bar record button will change. Disable the Toggle Repeat function on this toolbar.
2. Select the track and arm it for recording. View the **Options** menu and for now ensure that **Show all takes in lanes (when room)** is *not* selected. We'll look at lanes shortly. Also, for this example, make sure that **Loop, points linked to time** selection is not enabled.
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. Click and drag along the timeline to select the region that you want to be re-recorded (see above).
6. 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.
7. Press **Ctrl R**. You will hear the recorded material up to the start of the defined region, where you can re-record that passage. Press **Space** to stop when you have finished recording. Disarm the track.
8. When prompted, accept the option to save your recorded media. Don't forget to restore normal recording mode when you have finished your punch recording.



Your track now contains two media items, with the new one on top of the old one.

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**.



**Note:** You can enable the option **Monitor track media when recording**. If you do this when punching in, say, a guitar or vocals, regular **Monitor Input** will cause you to hear both the existing and the new material right up to the punch, then only the new material during the punch. **Monitor Input (tape auto style)** will monitor only the existing materials up to the punch, then only the new material.

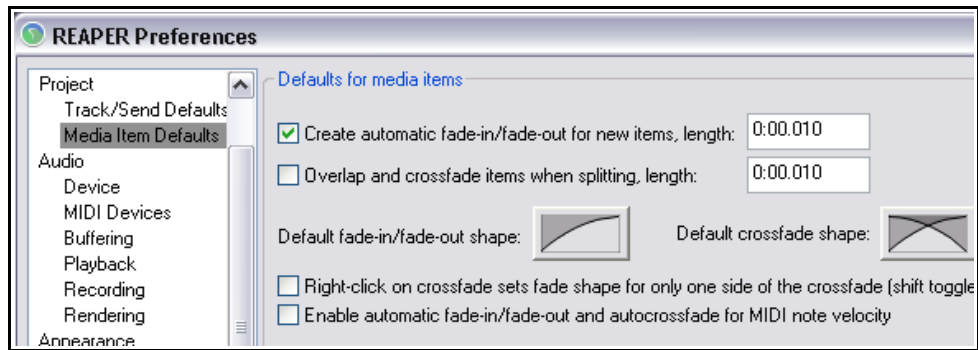
**Tip:** If you make a mistake or change your mind when overdubbing, you can use **Ctrl Z** to undo the recording or you can select the unwanted media item and use the **Delete** key to remove it.

### 3.18 Destructive Punch Recording

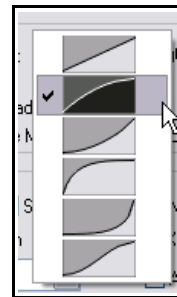
You have the option when punch recording of actually removing from the existing track the previously recorded material if you wish. If this is what you want, use the **Options, New recording that overlaps existing media items** command to turn on the toggle option **Trims existing items behind new recording**. Be careful how you use this. You can restore this option to its default setting by choosing **Splits existing items and creates new takes** from the same menu.

### 3.19 Fades and Crossfades

REAPER allows you 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, Project, Media Item Defaults**. You



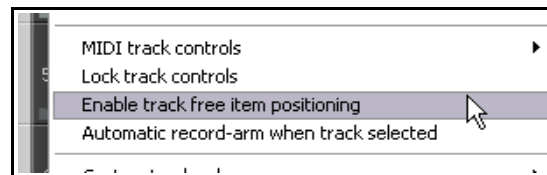
can select a preferred shape and duration (length) for your fade curves. Clicking on the image of the curve (shown above) causes you to be offered a number of choices (see right). As you will see in Chapter 6, you can easily change the default fade type and/or length for individual media items. If you prefer not to use automatic fades, just disable that option.



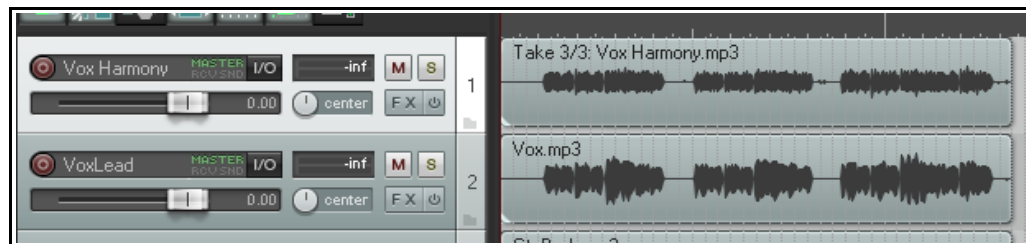
### 3.20 Recording Multiple Takes

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 **Enable track free item positioning** (FIPM) is *not* enabled (i.e., not ticked) for the tracks being recorded. Use the TCP right click context menu to do this. We'll get to FIPM later in this chapter.
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, an initial vocal track has been recorded, then above it three takes have been made of a vocal harmony track. Notice the text displayed with the name of the media item



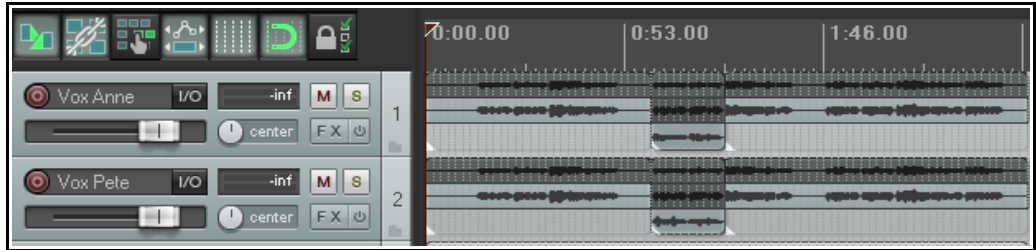
displayed for the Harmony Vox track. It begins with the text **Take 3/3**.

**Note:** Under **Options, Preferences, Appearance, Media** there is a setting to **Automatically color any recording pass that adds new takes to existing items**. When you are recording multiple takes to two or more tracks at the same time, enabling this option can help you to visually identify which takes belong in the same set.

### 3.21 Showing Takes in Lanes

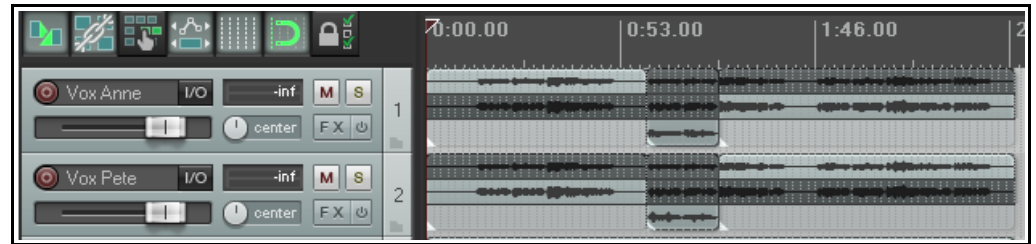
Optionally, when you have multiple takes, you may choose to have them displayed in lanes. This of course takes up more room on the screen, but has the advantage that it makes it easier to see for your various tracks which take is currently selected. This option is toggled on and off by pressing **Ctrl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

In the first example (shown right), three takes have been made of a vocal duet. The first and second are complete takes, the third is a punched-in overdub of one small section.



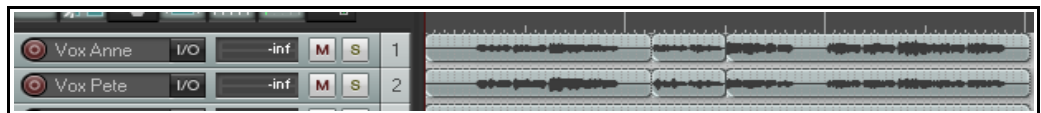
In this case, the option to **Display empty take lanes (Options, Take lane behavior menu)** has been enabled. This ensures that the short overdubbed section is given its own complete lane. This makes it easier for you to keep track visually of which parts of each take belong together.

For both tracks, the second take is currently selected (except for the overdubbed section) and will be played.



In this second example (right), different takes (and permutations of takes) have been selected for the different tracks.

In this third illustration, the tracks have been minimised, so that at any point



only the selected take 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 height of these tracks is expanded.

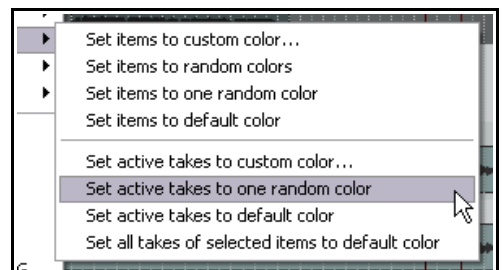
**Note:** When you create multiple alternative takes in this way you will later be able to easily pick the best passages from each of your takes and join them together as a single item. The method for doing this will be explained in Chapter 7 of this User Guide.

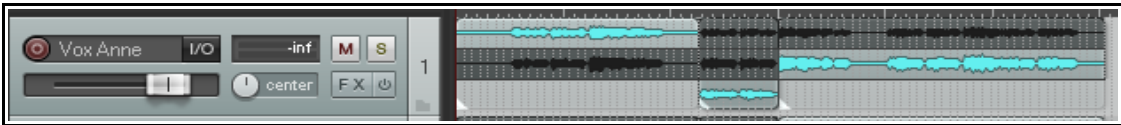
### 3.22 Using Color Coded Takes

REAPER's **Item, Item and take colors** command offers a variety of interesting ways that you can use color when working with takes and items (see right). We'll look at this whole topic in detail in Chapter 7, but for now notice the command **Set active takes to one random color**.

If after making your preferred working selection from the available takes for any track you double-click on that track in the Track Control Panel then all media items in that track will be selected.

Choosing **Set active take to one random color** will now produce an effect similar to that shown below. This will only be visible if an option to show take colors is enabled in the Appearance, Media page of your Preferences.



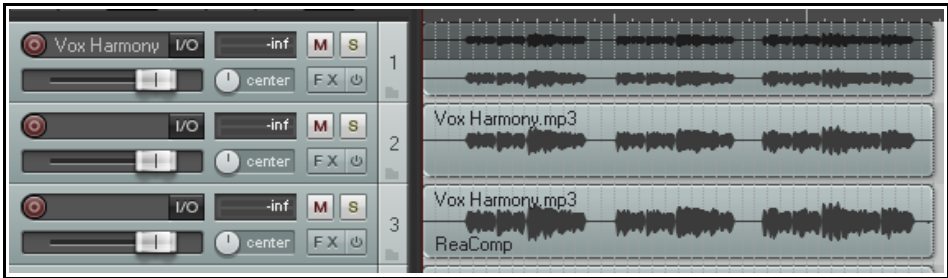


3.23 Working With Multiple Takes

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	<b>T</b>	Displays next take for selected track(s).
Previous Take	<b>Shift T</b>	Displays previous take for 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 on the right 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.



**Caution:** One look at the **Take** submenu (on the media item's right-click context menu) will show you that there are commands available for deleting takes and cropping to active take. You are advised to avoid these until you have worked thru Chapter 7 of this guide. In particular, avoid using the **Delete** key when selecting takes: you are likely to delete more than just the take that you don't want!

**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.

3.24 Overlapping Items

You have already been shown two of the three overdubbing options on the **Options** menu command **New recording that overlaps with existing media**, i.e. **Splits existing items and create new takes (default)** and **Trims existing items behind new recordings (tape mode)**. The third option is to **Create new media items in separate lanes (layers)**.

The example below shows how this works.



In the first illustration (above) a part of a track has been recorded. In the second illustration (below), we have returned to this track and with the option **Create new media items in separate lanes (layers)** enabled we have re-recorded the last part again, together with some new material.

In this case, despite the two takes being labelled Take 1 and Take 2, the second take is to all intents and purposes a separate media item.

You can choose which of these media items are and are not played. This topic will be addressed later in this guide, especially in Chapters 4, 5 and 7.



### 3.25 Recording Multiple Additional Items

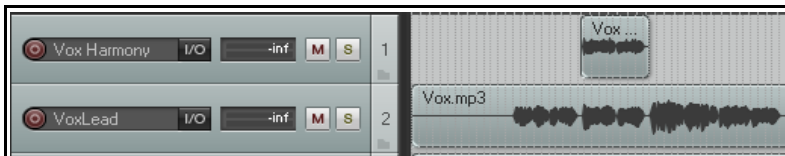
We have already seen how you can use REAPER to record multiple takes on the same tracks. Later, in Chapter 7, you will be shown how to edit these, so as to take the best parts from each of several takes and then patch them together into a single take.

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 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 **Free Item Positioning** (FIPM) is enabled (ticked) for the tracks being recorded. Right click on 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 first 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** (FIPM) has been enabled for Track 1. The mouse cursor 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, Track/Sends Defaults window there is an option to make free item positioning enabled for your tracks by default.



### 3.26 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 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.

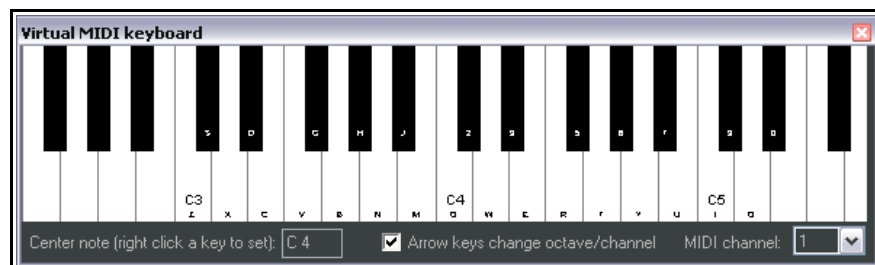
6. Select all of the required events. To do this, use the **Ctrl** key while clicking on each in turn. An example of what you should now have is shown below. If you need to reposition the Edit Cursor before recording, do so by clicking on the Timeline.
7. Press **Ctrl R** to start recording. When finished, press **Ctrl R** again to stop. If prompted, accept the option to save all files. Your previously empty media items will have been replaced with your newly recorded material. Disarm the track.

### 3.27 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**.

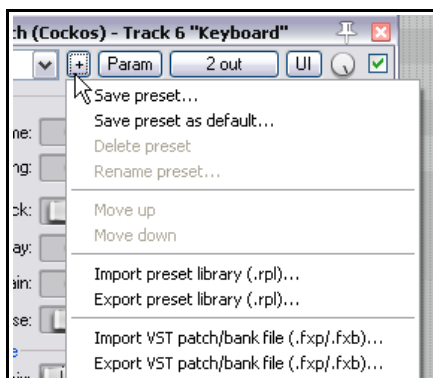
The shortcut keys **Alt B** can be used to toggle display on and off.

### 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. 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 be your centre note.
3. On the track you are using, right click over the arm record button (as shown). Make sure that **Monitor Input** and **Record Input** are both selected, and that you have selected the **Virtual MIDI Keyboard** as the **Input: MIDI** device. For 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 your speakers or headphones are attached.
5. In this example we will use a Software Synthesizer. Open the **FX Window** 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.
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.

In Chapter 12 we will see how your MIDI data can be edited using REAPER's built in midi editor.

### Procedure for Playing Back a MIDI Item

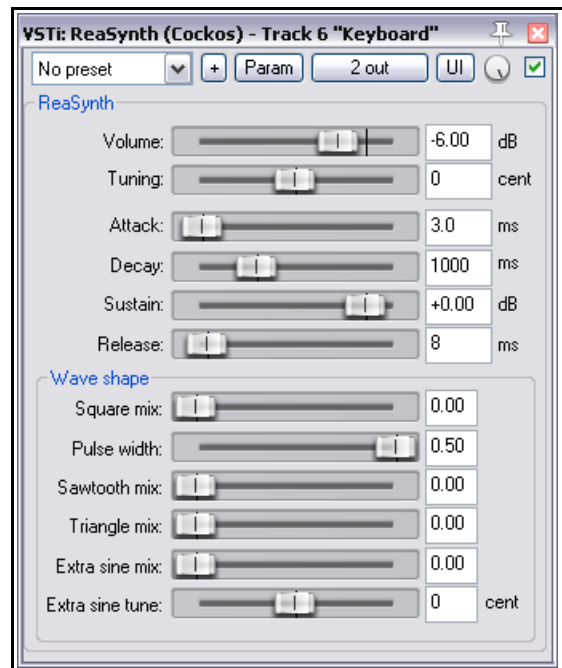
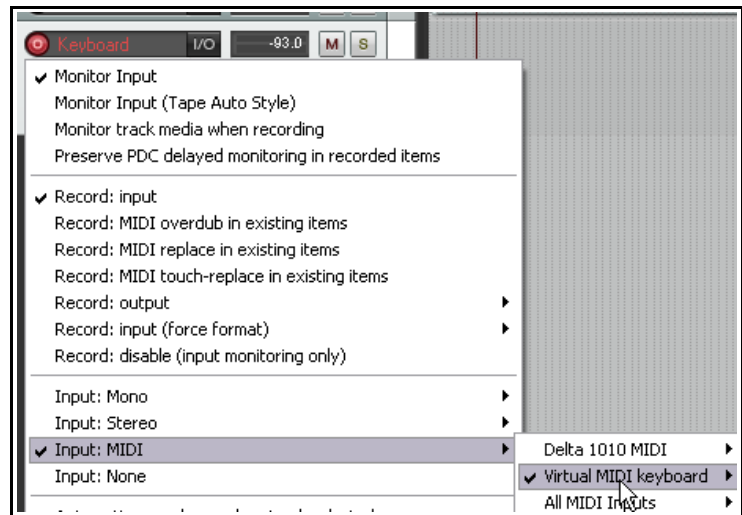


Play the track, as you would any other. As it

plays, you can alter the nature and shape of the sound by adjusting the soft synth parameters.

When you have found a sound you like, you can click on the + button in the FX Window (indicated by the mouse cursor, shown right) and then choose **Save Preset** to name and save that set of parameters. Your named preset can be recalled from the Preset drop down list any time. You can make and use presets in this way for all FX Plug-ins and Synths.

With VSTi synths, you are also able to import and export patch/bank files (see left).



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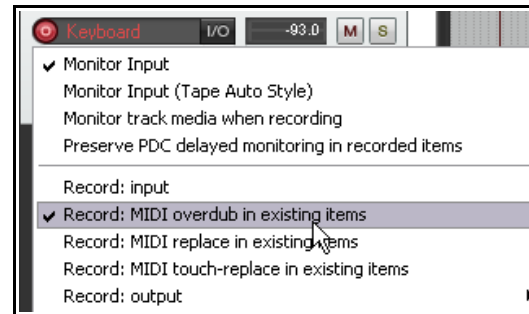
**Note** Unlike some other DAW programs, REAPER makes no artificial distinction between a MIDI track and an Audio track. MIDI items and Audio items can be combined in the same track.

**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 and Compression to alter how the audio item sounds when it is played back, but the audio item 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. By changing the parameters of the synthesizer's settings – or even by changing the synthesizer – we are able to produce a completely different sound.

### 3.28 MIDI Recording Modes

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

- **Record MIDI overdub in existing items:** this will add new notes **within** existing items while preserving what is already there.
- **Record MIDI replace in existing 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 existing 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.

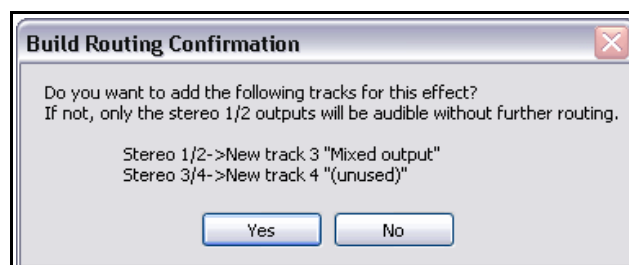
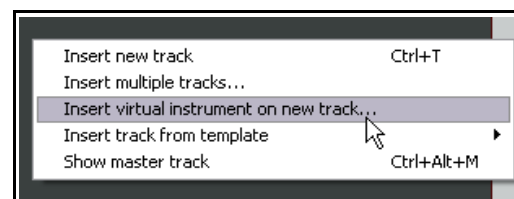
### 3.29 Recording With a Virtual Instrument

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 can be done 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 **Yes** the entire output chain will be built for you, as shown on the left. What exactly this produces will, of course, depend upon which Virtual Instrument you have selected.





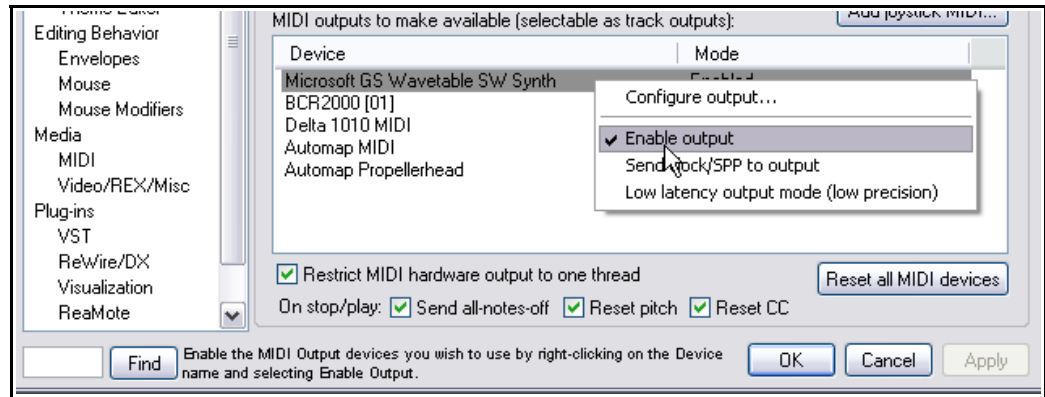
### 3.30 Monitoring an External Synthesizer

If you are working with an external hardware synthesizer then it is likely that at times you may wish to monitor its output in REAPER. This topic is covered in Chapter 12, Manipulating and Editing MIDI Items.

### 3.31 Using Microsoft GS Wavetable SW Synth

You can use the Microsoft GS Wavetable Synth that is included with Windows. This can be especially useful for playing any MIDI files that you may wish to import into REAPER. You will be shown how to import files later in this section.

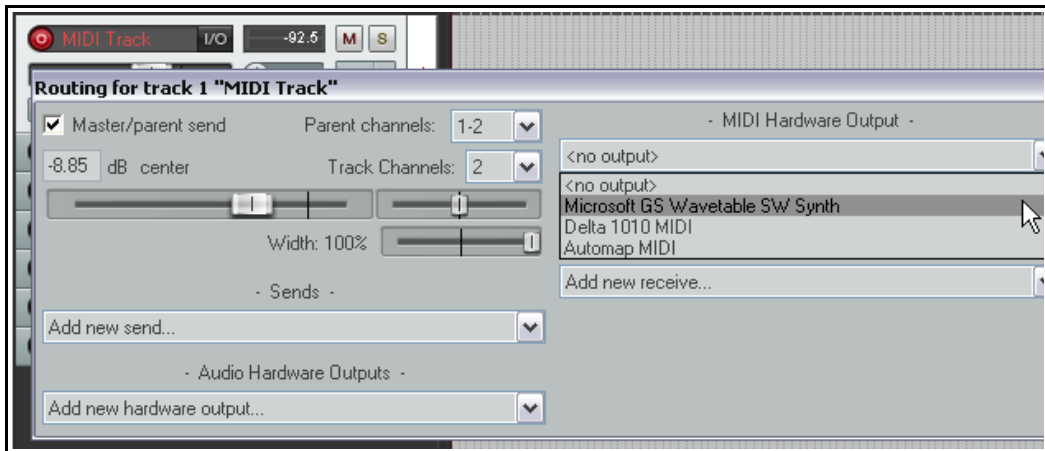
To enable the Microsoft GS Wavetable SW Synth:



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.

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).



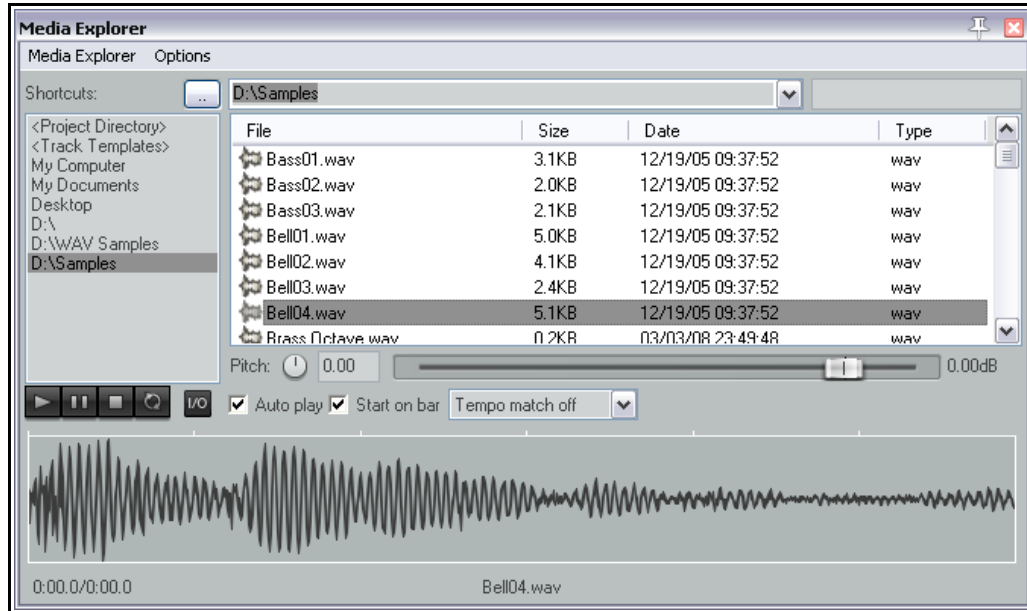
### 3.32 Importing Media: the Media Explorer

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 often easier and more flexible to use REAPER's **Media Explorer**. The Media Explorer includes several features that make it easier for you to import items. The Media Explorer's state is toggled between displayed and hidden using the **View, Media Explorer** command, or the keyboard shortcut **Ctrl Alt X**. Amongst the Media Explorer's useful features are these:

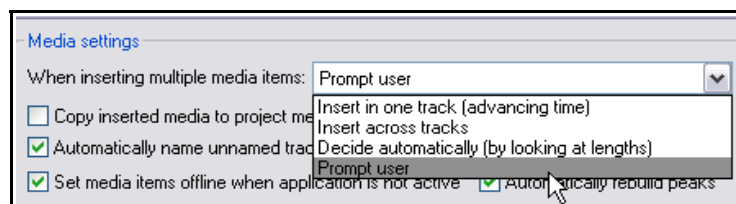
- The Media Explorer can be docked and undocked in the usual way. You can navigate to display the contents of any folder in its main window, by clicking on the small button shown in the above illustration just above and to the left of the column headed *Name*.
- You can add the currently displayed folder to the Media Explorer's shortcut list by using the **Media Explorer, Add current folder to shortcuts list** command.

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- Notice the Transport Bar beneath the Shortcuts Panel – this lets you (for example) Play, Pause, 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. Use the mousewheel to zoom in and out of the media peaks. Display of waveform peaks can be turned on and off from the **Options** menu.
- By clicking on the **IO** button, you can direct the Preview output to any audio output. The peaks within the preview window can be zoomed using your mousewheel. You can also scroll by holding **Shift** while you drag the mouse left or right. You can mark any time selection by clicking and dragging over the preview display, and move a selection left or right by holding **Alt** while you drag the mouse.



- If **Auto play** is enabled, you can automatically **preview** any file in the Media Explorer by clicking on its name. It will play when selected.
- The **Pitch** rotary control adjusts the pitch of the item being previewed. Double-click to reset.
- To adjust the height of the waveform preview, click and hold the mouse on the top edge of the preview area, then drag up or down.
- To avoid possible clashes of tempo, you can select an option (including **Tempo Match Off** and **Tempo Match On**) from the drop down list in the preview area. There is also a toggle option to **Start on Bar**.
- Right clicking over the name of any media item will produce a context menu, whose main choices are explained in the table below.
- The **Options** menu includes the command **Use Windows Explorer for browsing**. If enabled, this causes the whole Windows Explorer context menu to be available to you when right-clicking on an item. If disabled, only REAPER's Media Explorer commands are shown.
- Items can be inserted into a project by dragging and dropping, or by right-clicking and using the context menu (see table below).
- If you mark a time selection within the Media Explorer preview, you can right-click or drag and drop to insert only that selection.
- If you mark a time selection on one of your tracks before right-clicking over an item in the Media Explorer, then you have the additional option to **Insert at time selection (stretch/loop to fit)**.
- Multiple selections can be inserted from the context menu or by dragging and dropping. The **Media** screen in the **Preferences** window includes a setting for the default behavior of multiple insertions. If in doubt, set this to **Prompt User**. See also section 3.33.



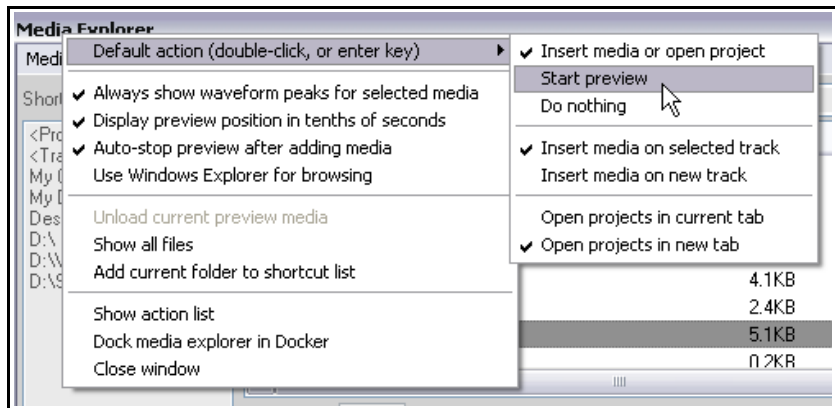
### Context Menu Options for Inserting Media Items (Audio or MIDI) into a Project

Command	Comment
<b>Insert into project</b>	Inserts item on selected track.
<b>Insert at time selection (stretch/loop to fit)</b>	Inserts and fits item within project time selection.
<b>Insert into project on new track</b>	Adds item to project on a new track.
<b>Insert as take in selected item</b>	Adds item to currently selected item in project as a new take.
<b>Use as media source for selected item</b>	Replaces media source in selected item in project.
<b>Use as media source for selected item (stretch/loop to fit)</b>	Replaces media source in selected item in project and stretches (or squeezes) to fit that item length.

### 3.33 Setting a Default Media Explorer Action

Right clicking on the Media Explorer's title bar produces a handy menu (see right). Most of the commands and options on this menu require no further comment, but one that deserves special attention is **Default action (double-click, or enter key)**.

This can be used to specify what happens when you double-click on a media file name in the Media Explorer. For example, choices include **Start Preview**, **Insert media on selected track**, **Insert media on new track**.



For **.RPP** files, you can also choose between **Open project in current tab** and **Open project in new tab**. This enables you to open any existing project file easily from inside the Media Explorer.

### 3.34 Importing Multiple Audio Files

Wave and other audio files can be imported directly into a project 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. Spend some time exploring the options under **Options, Preferences, Media** (*not Appearance, Media*). These are summarized and explained in Chapter 19. However, in particular you should be aware of the choices that you have when importing multiple media items

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 each time to indicate your preference.

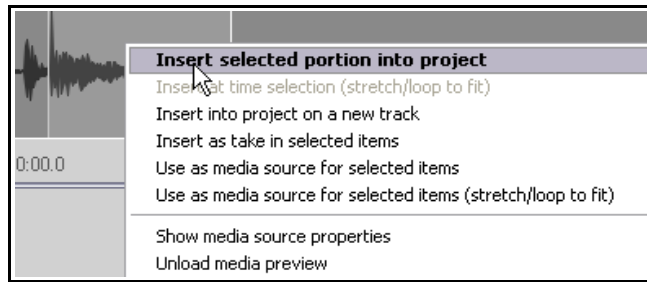
### 3.35 Importing Part of an Audio File

To import part of an audio file into your project, simply follow this procedure:

1. Select the file within Media Explorer.
2. Click and drag along the waveform preview to select the portion that you want to import.
3. Drag and drop the selected area into your project, or right-click and use the menu.

The context menu choices are the same as those shown in the table on the previous page. In addition, you can use **Ctrl Alt** while dragging and dropping your selection for either of two special purposes:

- ◆ To a track in arrange view to render the selection as a new loopable file, inserted into that track.
- ◆ To a sampler plug-in or other application to export the selection, tempo matched to the sampler.

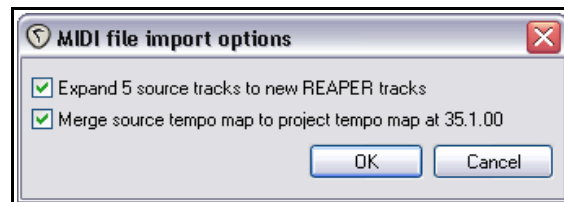


### 3.36 Importing MIDI Files

To preview a MIDI file in Media Explorer, first create an empty track in your project and insert a virtual instrument or synthesizer into that track's FX chain. You can then select any MIDI file in Media Explorer and preview it. You can also select any part of a MIDI file to import: use the same technique as that described immediately above. Right-click over the file to choose one of the insert options.

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. A message such as that shown on the right will appear.

If you enable the **Expand** option, 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. You have also the option of merging the MIDI files tempo map to the project tempo map.



There are several methods available to you to then assign these tracks to an external synth for output (to enable you to play the song). This is one suggestion:

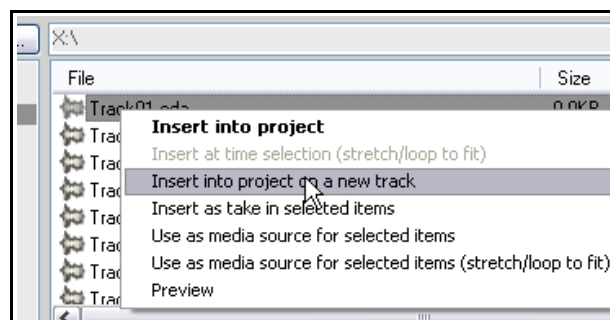
1. Add a new track immediately above the first of your MIDI tracks.
2. Make this a folder track all of with your MIDI tracks contained within the folder.
3. Insert a synthesiser (such as ReaSynth) into the FX chain for the folder track.
4. Save and play the file.

You'll learn more about folders and how you create them, set them up and use them in Chapter 4.

### 3.37 Importing Media from Audio CD

You can use REAPER's Media Explorer to import into a project material from an audio CD (such as you might play on a CD player). This could, for example, be material that you have previously rendered to audio yourself, or it could be material that has been passed to you for inclusion in a project. To use this facility you should follow this sequence:

1. Insert an audio CD into your PC CD drive and wait for it to be read.
2. Display the Media Explorer, select **My Computer** in the left panel, then double-click in the main panel on the letter which represents your CD drive.



3. The contents of the CD will be displayed in a similar fashion to that shown above. In this example, the CD drive is labelled **X:**.
4. To play (preview) any track from the CD, right click over that track then choose **Preview** from the context menu (see above). Depending on whatever software is on your computer, you may also see some non-REAPER related commands below this.
5. To insert the contents of a track into your project as a media item, right click over that track and choose one of the other commands from the menu. Each of these commands works as explained in Section 3.30.

Alternatively, you can double-click on the item to insert it into the currently selected track, or drag and drop to insert either on to an existing track or to a new one.

### 3.38 Recording with Audio FX Plug-ins

Audio effects (FX) are usually added to a track later in the production process, well after the material has been recorded. This subject was introduced in Chapter 2, and you'll find more about it elsewhere (for example, in Chapter 14). However, REAPER does allow you to add effects to material as it is being recorded if you wish. Use this facility with caution, as once an effect has been added to a recorded item in this way it cannot be easily removed (if at all). The procedure for recording with FX is as follows:

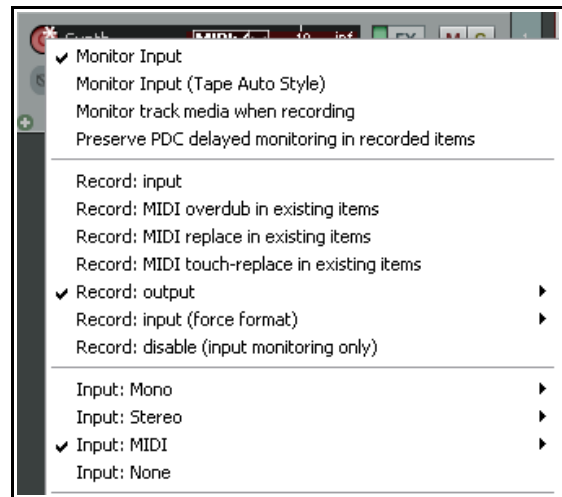
1. Arm the track for recording and select the required audio or MIDI input device in the usual way.
2. Right-click on the Record Arm button and choose **Track input FX chain** from the context menu. This causes the **Add FX to Track** window to be displayed.
3. Select any effect required, then click on **OK**. Set the parameters for this effect.
4. Use the **Add** button to add any additional effects.
5. Close the FX window.
6. Audition the performance and the effects as necessary (see comment below), then record the track in the usual way.

Effects placed in a track's input FX chain only use resources when the track is armed, and are applied destructively to the media item during recording. Most probably, before doing this you will want to audition the instrument or voice being recorded together with these FX so that you can get the parameter settings right. To do this, you simply need to keep the track armed and turn on input monitoring while you listen to the live material and adjust the FX parameters to suit. Input monitoring is explained elsewhere in this guide, for example in the sections dealing with layered and overdub recording.

### 3.39 Recording a Track's Output

There could be any number of reasons why you might wish to record a track's output. One example might be to record the output from an external synthesizer directly onto an audio track, as a wave file or similar. Here is an example of how you might do this:

1. Make sure that your MIDI keyboard is connected to your PC.
2. Create a new track. Name it and arm it for recording. Enable input monitoring.
3. Select **Record: output** then your required option. Most likely this will be mono, latency compensated.
4. Select **Input: MIDI**, then select your input device from the available options.
5. Make such adjustments as you need (for example to the synthesizer parameters) while you audition the music.
6. When ready, record.
7. Stop recording when finished.



### 3.40 Recording FX On Their Own

You can record a track's FX on their own. This could 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. Here's an example:

1. In a project file, select a **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.

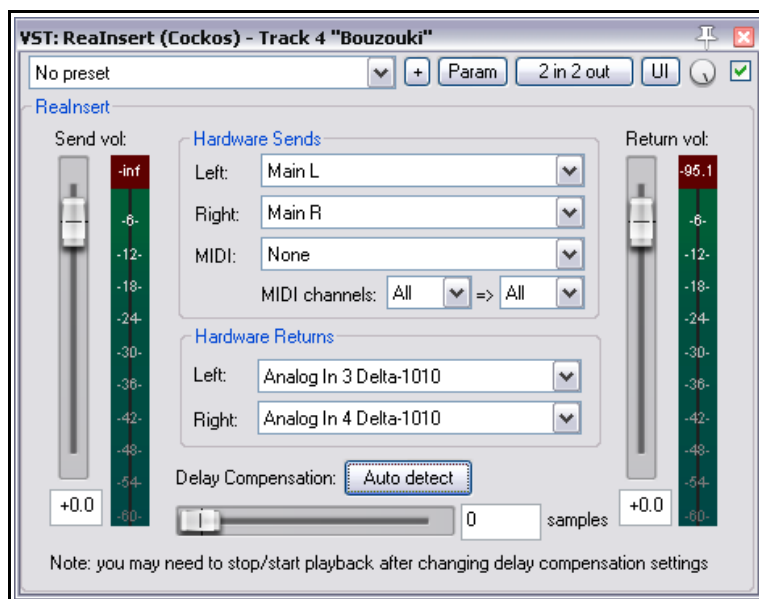
**Tip:** If you do this, you will most likely want to set the track's FX to bypass mode after doing so. It is nevertheless a good idea to leave the FX inserted in the track's FX bin, as a record of how the FX was produced.

### 3.41 Recording with External Hardware FX

REAPER can record a track with 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. You use a plug-in called **ReaInsert**. 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

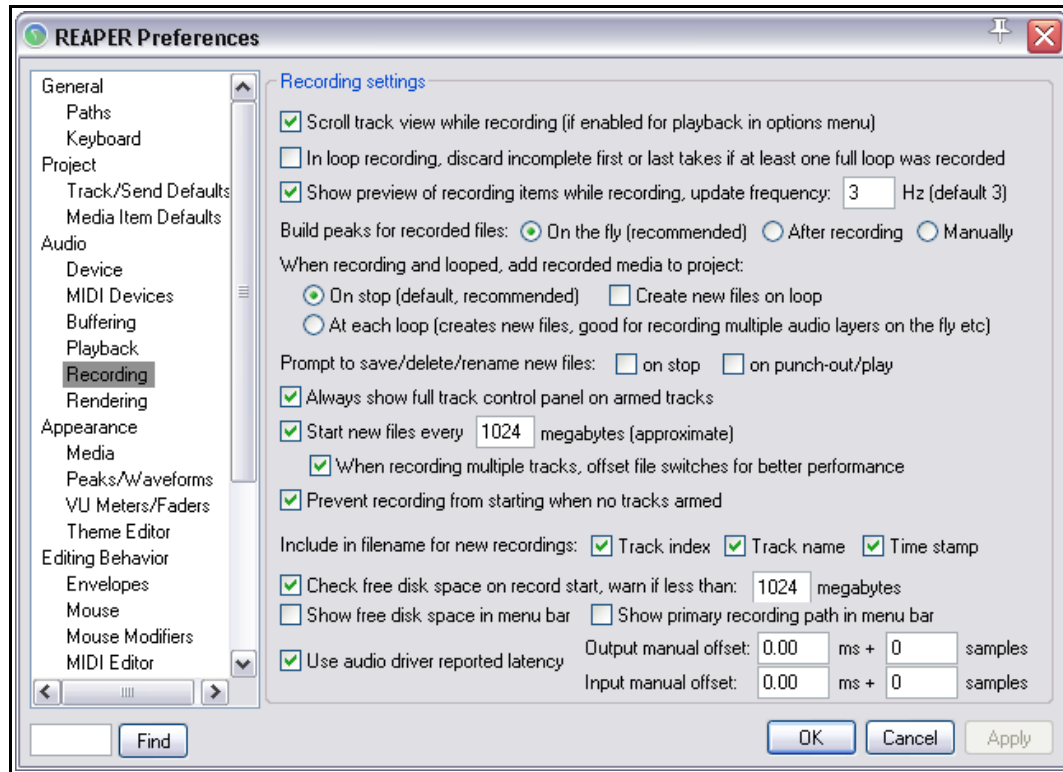
1. Connect an otherwise unused audio output to the input for your FX device. Connect the output of your FX device to an otherwise unused audio input.
2. Create a new REAPER project file and add a single audio track. Give this track a suitable name. Let's record a vocal with the FX on it.
3. Connect your microphone to an otherwise unused audio input. Switch on the FX Device.
4. Arm the track for recording.
5. 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 right).
7. Specify the actual Hardware Sends and Returns that you set up at steps 1. and 3.
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**.





### 3.42 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:

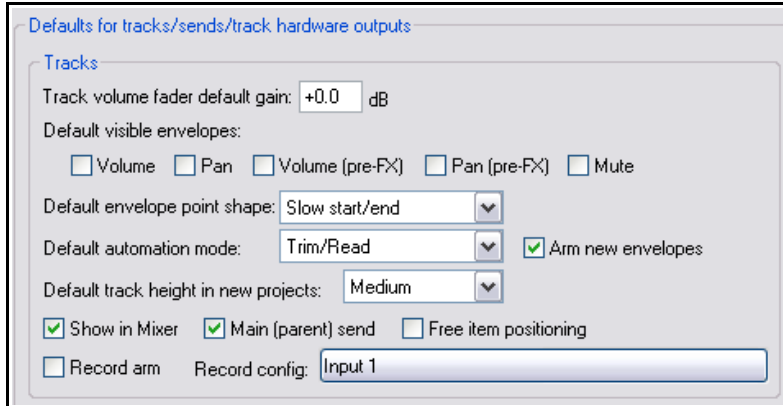
- To scroll track view while recording.
- When loop recording, to automatically discard incomplete takes when a full loop has been recorded.
- To display a preview of media item peaks as they are being recorded. This is useful to confirm that you really are recording and haven't, for example, forgotten to arm one or more tracks. You can also specify a screen update frequency.
- When to build the peaks for recorded media files.
- When to add recorded media to a project when loop recording.
- To automatically display the whole Track Control Panel (including VU meters) when a track is armed.
- 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.
- 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 and/or recording path on the menu bar.



### 3.43 Track Preferences for Recording

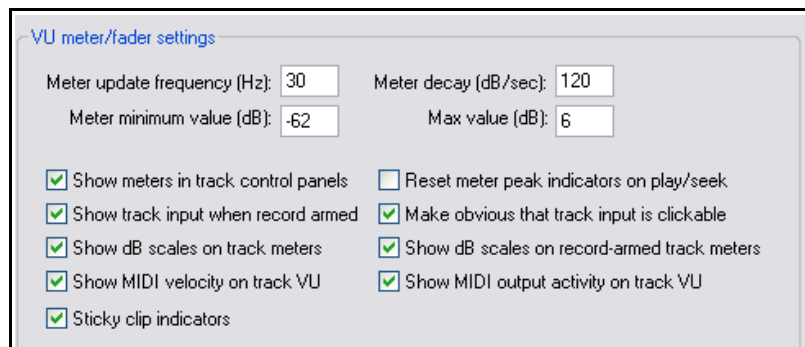
The REAPER **Track Defaults** settings includes a number of items that you can use to help make the recording process a little easier. These settings can be found on the **Project, Track/Send Defaults** page of the **Options, Preferences** window. Settings on this page include:

- The default gain level for the track's volume fader.
- Whether a track's output should be routed to the Main send.
- The default height for new tracks.
- Whether new tracks are automatically armed for recording.
- A Record Config option which sets defaults for the Record Arm context menu. This can be used, for example, to turn on by default Input Monitoring and specify default record input settings.
- Which Record Mode should be the default for new tracks.



Notice also that under **Options, Preferences, Appearance, VU Meters/Faders** 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. Enabling **Show db scales on record armed track meters** and **Sticky Clip Indicators** helps you to monitor peak levels.

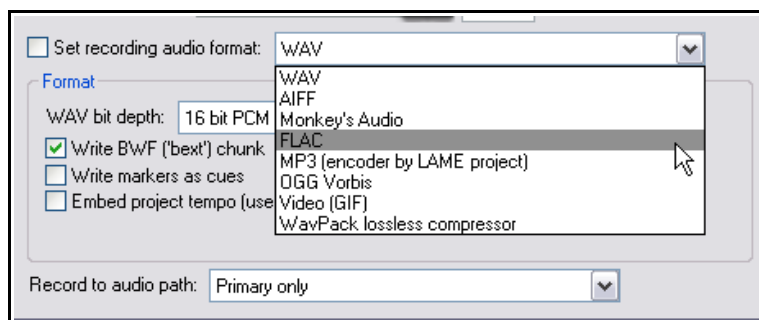


### 3.44 Recording with Mixed Formats

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.

### 3.45 REAPER Audio Recording Checklist

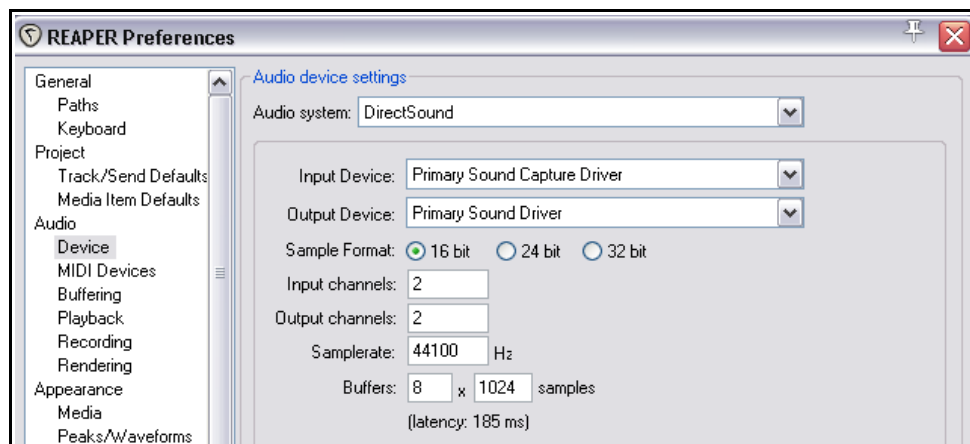
The following checklist is for guidance only. In some cases you may vary the suggested order (e.g., you can switch on your PC and start REAPER before getting together your microphone and leads). In other cases the order is critical (e.g. you should always connect your microphone to your preamp before turning on the phantom power supply). If you are not sure, keep to the exact same sequence outlined here.

Item	Comment
<b>Preparation</b>	<p>Set up all external recording equipment needed (microphones, stands etc.).</p> <p>All faders and gain controls on mixer and/or sound device turned right down.</p> <p>Phantom power (if available) turned off.</p> <p>Everything connected that needs to be connected (e.g. microphone leads to mixer or sound device).</p> <p>Turn equipment on, but check volume on speakers isn't too loud.</p> <p>Connect headphones to headphone amp or sound device.</p> <p>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.</p> <p>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.</p> <p>Is a different format required for this track?</p> <p>Make sure Record Mode is set to Normal.</p>
<b>Track Settings</b>	<p>Named and armed for recording?</p> <p>Track Input Monitoring on or off?</p> <p>Use the Sound Card's direct input monitoring if available in preference to REAPER's.</p> <p>Record Input selected?</p> <p>Correct input channel selected?</p> 
<b>Test Recording Levels</b>	<p>Start low and work up.</p> <p>Record a small sample to test levels: the examples below show too low, too high and about right.</p> <p>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.</p> <p>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>

### 3.46 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) the required option. You should probably temporarily disable input from all other sources (Microphone, Line, etc).
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. These settings may not be the best for your particular system.
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.

## 4 Project Arrangement Basics

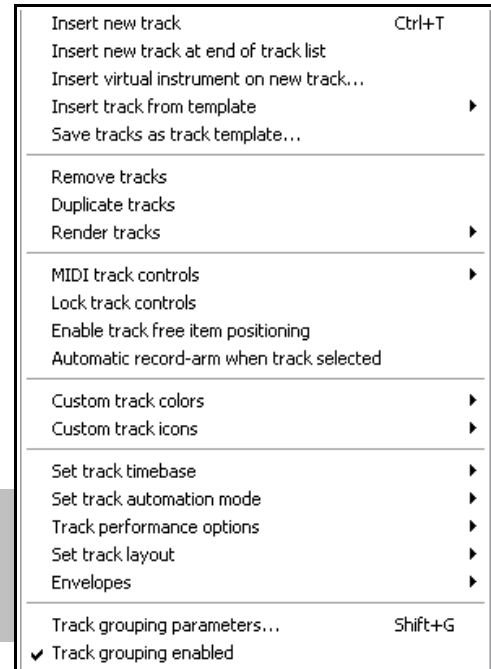
### 4.1 Managing Tracks

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 several others, including moving and removing tracks, the use of track folders and track parameter grouping.

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 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.



### Basic Track Management

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 the track number, then click and drag the track up or down the track list, then release the mouse. Media items are moved with the track.
<b>Move two or more adjacent tracks up or down</b>	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. Again, 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 and choose <b>Remove 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 tracks</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> , or use the keys <b>Ctrl Alt M</b> to toggle.
<b>Make the Track Control Panel wider/narrower</b>	Click and drag right/left on the boundary between the TCP and the arrange area. As the TCP becomes narrower, some controls may disappear from view and faders may change to knobs.

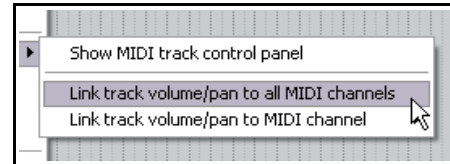
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## 4.2 Track Control Modifiers

Four of the items used when auditioning tracks are the **Volume**, **Pan**, **Mute** and **Solo** controls. These controls were introduced in Chapter 2.

The **Width** control is also shown here. This is only displayed if you select the stereo pan law (from the pan fader right-click menu). This will be discussed in Chapters 10 and 11.

By default, volume and pan faders control audio output. If you wish instead to use them for data on MIDI channels for any track(s) you should first select the tracks, then right-click over the track number and choose **MIDI track controls** then one of the **Link track volume/pan to MIDI** options from the menu (see Chapter 12).



### Volume and Pan Controls

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

### Mute and Solo Controls

Modifier Key	with Mute Button	with Solo Button
<b>Shift</b>	When more than one track is selected, only the current track is toggled.	When more than one track is selected, only the current track is toggled.
<b>Ctrl</b>	Clears all mutes.	Clears all solos.
<b>Alt</b>	Unmutes selected track(s), mutes all others.	Solo selected tracks only, excludes output from any sends.
<b>Ctrl Alt</b>	Mutes selected track(s), unmutes others.	Solos selected track(s), unsolos all others.
<b>Ctrl Shift</b>	Not applicable	Toggles <i>Solo Defeat</i> mode for the track or track selection. See below for more information.

### Solo Defeat

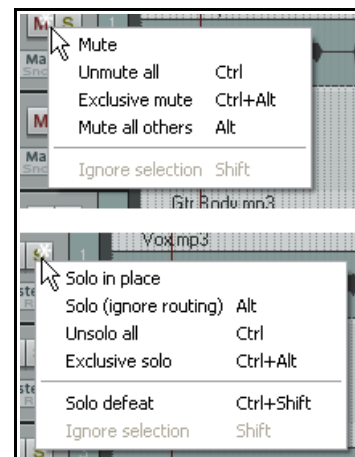
Solo Defeat can be used to ensure that a track will still be heard even when another track or track selection is soloed exclusive.

### The Mute and Solo control context menus

The options shown above are also available by right-clicking over the Mute and Solo buttons respectively. These context menus are shown on the right. They can be applied to an individual track or to a selection of tracks.

### Bulk Track Mute/Solo

To mute or solo a 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.



### Volume and Pan Faders



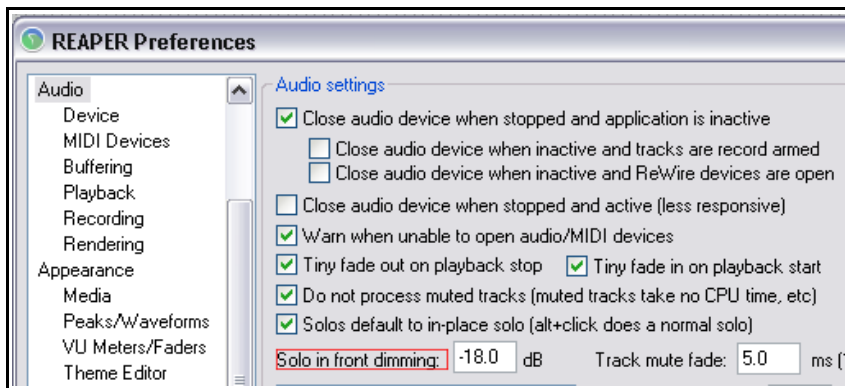
Right clicking over the volume fader of any track or folder will open a window displaying volume and pan faders not only for the track itself but also for any sends and receives associated with that track. An example is shown here.

Right clicking over the Pan fader opens a window which can be used to change that track's pan law. This subject was discussed in Chapter 2.

**Tip:** By default, double-clicking on a track number in the track control panel will cause all media items in that track to be selected. You can change this behavior if you wish on the **Mouse Modifiers** page of your **Preferences**. For more information about customizing mouse modifiers, see Chapter 13.

### 4.3 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.

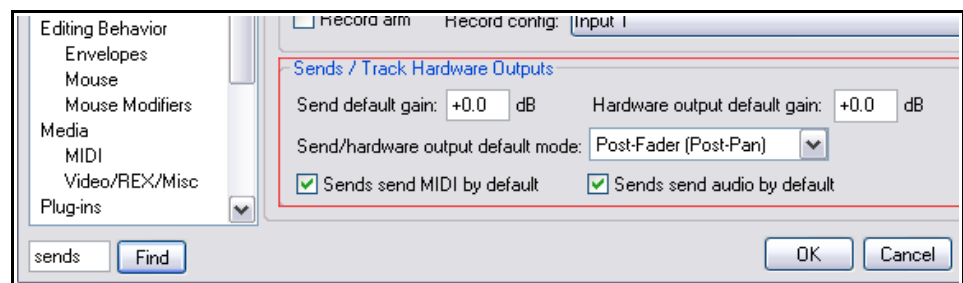


The level at which the background tracks are heard can be specified via the *Options, Preferences, Audio* settings page. Notice that this setting (in the above example it is set at 18dB) determines the number of decibels by which the background mix is *reduced*. This means that the higher the setting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

### 4.4 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.



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In the example shown here, a search for **sends** has turned up some information about various options for setting the default parameters for track sends when they are created.

**Tip:** By default, double-clicking on a track number will cause all media items on that track to be selected. You can change this, and/or add mouse modifiers of your own via the **Editing Behavior, Mouse Modifiers** preferences page. For example, you could assign **Alt Double-click** to the action View:Toggle track zoom to maximum height. Instructions for customizing mouse modifiers can be found in Chapter 13.

## 4.5 Track Colors

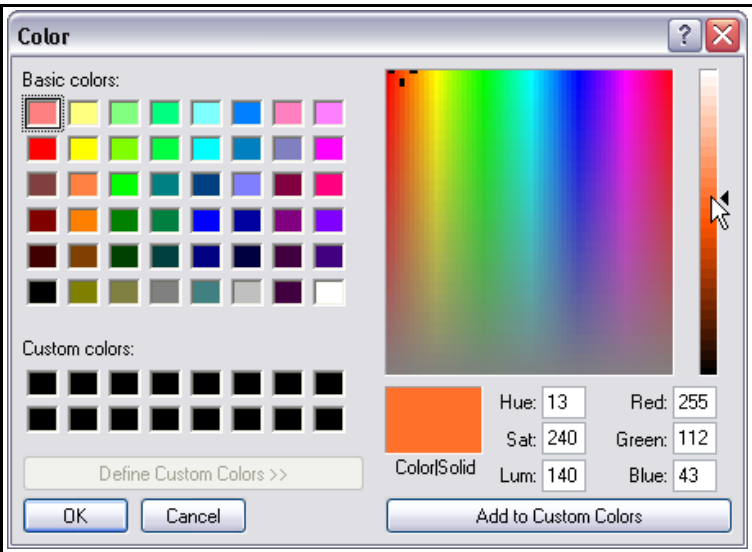
Besides keeping tracks together in folders, you can use color as an effective means of helping you visually identify the relationship between different tracks. To do this, simply select the track (or tracks) in the Track Control Panel, then right click, choose the **Custom Track Colors** command, then use any of these commands from the submenu:

Command	Effect
<b>Set tracks to custom color...</b>	Opens a Color Selection dialog box for you to select a color for the track's media items.
<b>Set tracks to random colors</b>	Sets the media items for each track in the selection to a different randomly chosen color.
<b>Set tracks to one random color</b>	Sets the media items for all tracks in the selection to the same randomly chosen color.
<b>Set tracks to default color</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 tracks to custom color...** command) can be used to specify different colors for different tracks and groups of tracks.

On the **Appearance** page of your Preferences settings (Options, Preferences) you can use the **Track Control Panel** options to apply your colors to the track label background, the track panel background, or both.

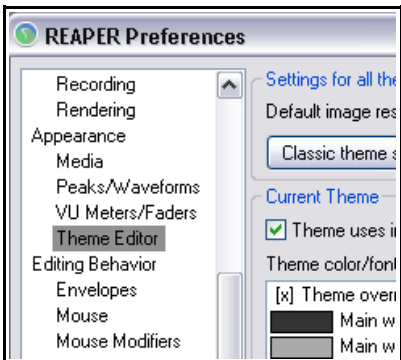
How the colors will be displayed for your track media items will depend upon which options you select on the **Appearance, Media** page of your Preferences settings. You can choose to tint the waveform peaks and/or the background. You can also set the color strength (between 0 and 4) for both selected and unselected tracks. More details of these and other Appearance options are listed and explained in Chapter 19.



## 4.6 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, Themes** command. You can modify the colors and other characteristics of your preferred theme by going to the **Appearance, Theme Editor** page of your Preferences settings. More details of this can be found in Chapter 11. In addition, a very large number of themes are available in





the **REAPER stash**. These are available for free download at [stash.reaper.fm](http://stash.reaper.fm) You can also visit the REAPER User Forums for more themes.

### 4.7 Track Icons

Icons can be added to tracks as you wish. 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 **Custom Track Icons** then **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 here 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.

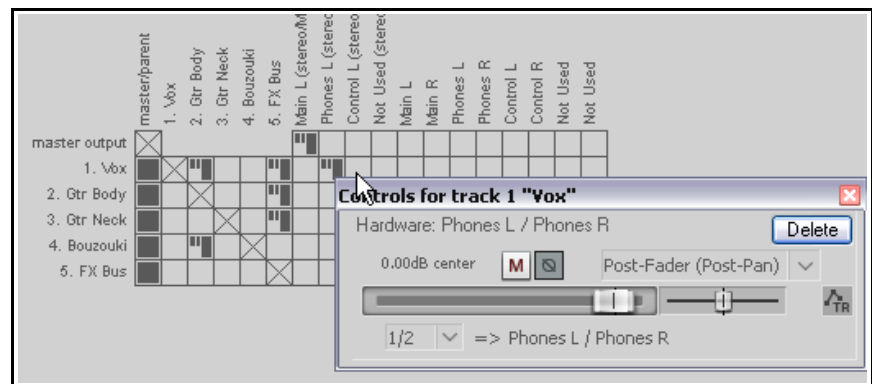
If you don't care for the icons supplied with REAPER – or you can't find what you want – you can download more track icon sets from the REAPER stash, at [stash.reaper.fm](http://stash.reaper.fm)

### 4.8 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. However, you may wish also to use headphones from time to time, perhaps for those occasions when you need to focus in detail 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, 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.



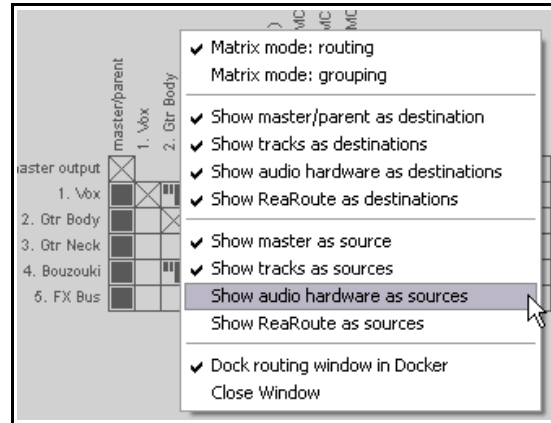
In the example shown (above), the entire mix (from the Master) is being heard thru the Main Speakers, but only track **1 Vox** is also being heard thru the headphones.

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 her own track while you are mixing!

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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.

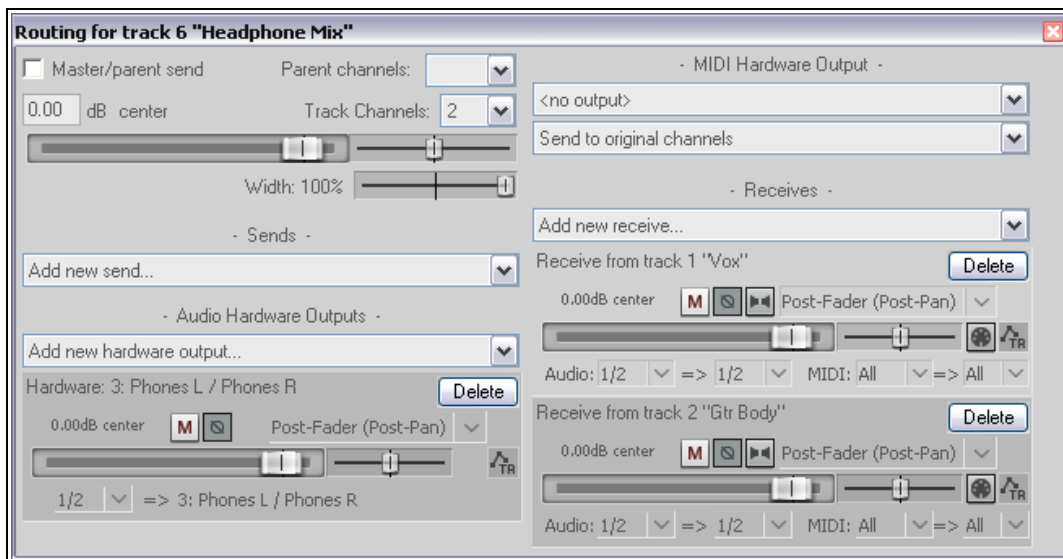
Right clicking over the background area lets you customise its display. In the example shown here, by unchecking **Show audio hardware as sources** we have simplified the display. If you have installed ReaRoute, consider also disabling the options to **Show ReaRoute as destinations** and **Show ReaRoute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



### 4.9 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**. Create sends to this track for any and all tracks that you want to be able to monitor thru your headphone mix.
3. Choose the **Options, Preferences** command, select the heading **General** then click on the **Advanced UI/System tweaks ...** button. Enable **Allow track envelope/routing windows to stay open**.
4. Click **OK** then **OK** again to close the Preferences window.
5. Select your **Headphone Mix** track and open the **IO Routing Window**. Add an **Audio Hardware Output** to the paired outputs to which your Headphone Amp is connected. Disable the **Master/Parent Send** for this track.



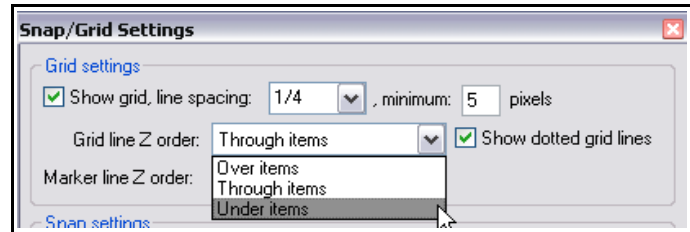
6. You can now use the Pan and Volume faders for your receives, together with the Mute buttons, to control your headphone mix.

### 4.10 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. 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 **Grid** button on the toolbar, or the **Options, Snap/grid, Show grid** command, or the keyboard shortcut **Alt G**.

Grid line settings are accessed by right-clicking on the **Grid** button, or choosing the **Options, Snap/grid, Snap/grid settings** command or by the keyboard shortcut **Alt L**. The examples below illustrate the effects of various permutations of grid setting options. These include options for the display of **marker lines**. Markers will be explained in Chapter 8.



**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 (Chapter 5 and 6), you will be shown how you can use your grid settings to automatically snap various REAPER objects and items to position.

### 4.11 Understanding Sends, Buses, Submixes and Folders

You have already seen that each of the tracks in your projects has its audio output routed by default to the master, and that from here the audio signal is directed to your preferred output device or devices, such as speakers or headphones. The signal flow that occurs here within REAPER can be represented by the first diagram on the right, which shows a simple project with just three tracks.

In Chapter 2 of this User Guide, you were shown how to use a track as an effects bus, for example to add the same reverb effect to a number of tracks. The signal flow for this arrangement can be represented by the second of the two flow charts (below right).

The sends that you create for each track carry a 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 remains enabled, the dry signal for each track is also sent directly to the master. Here it is finally mixed together with the "wet" signal from the bus before being directed to your speakers and/or headphones.

These two example models use routing arrangements that you would expect to find in probably any DAW program. However, we are now about to enter territory where REAPER may be substantially different from other software that you may have used before. This relates to how you can create and use submixes.

With most programs, to create a submix (perhaps for your various drum tracks or vocal harmonies) you will need to create a bus, add sends from each track that is to be included in the submix, and then disable the direct sends to the master from each of these tracks.

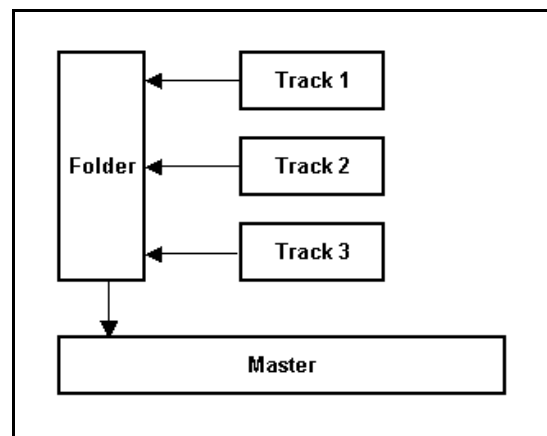
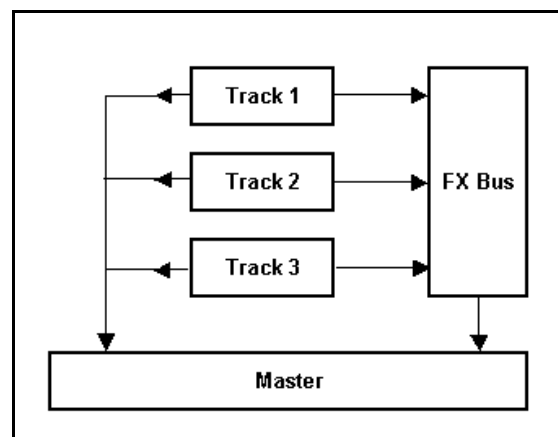
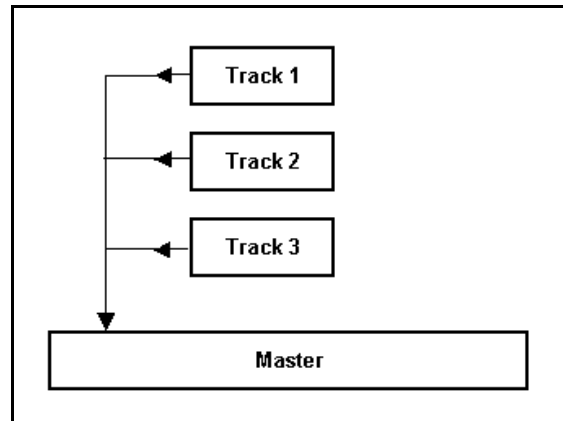


You can use this method in REAPER. Holding the **Alt** key while you click on a track's **IO** button will toggle on and off the direct send to the master. If a track's output to the master is enabled this is shown on the track control panel. If disabled, the word **Master** is dimmed. This distinction is shown on the left. In the first (top) example,

the output from the track to the master is enabled. In the second (bottom) example, the output to the master has been disabled.

However, a smarter and potentially more powerful way of creating a submix is to use folders (sometimes called track folders). We'll look at how this is done shortly, but first let's get our heads around the concept.

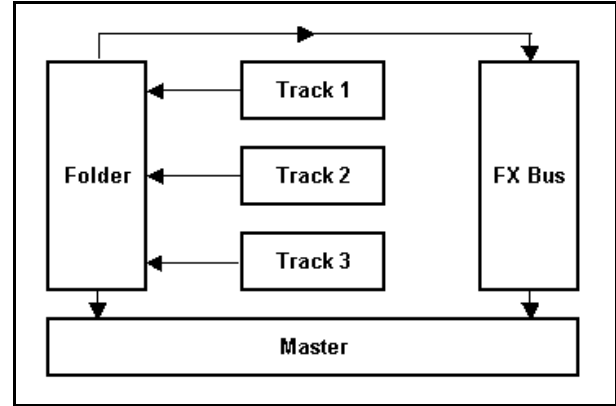
A folder track is created initially in the same way as any other track. You then tell REAPER to treat this as a folder track - and essentially that's it. You now have your submix (as shown here on the right). Direct output to the master from the individual "child" tracks within the folder is automatically disabled. Instead, they are passed thru the folder. Note that you should not manually disable the master/parent send for child tracks within a folder, or their output will no longer go to the folder (the master track).



Anything that you do to the folder will be done to the entire submix. For example, if you adjust the volume up or down, the volume of the submix will be adjusted up or down. If you add an effect such as a compressor to the folder then that effect will be applied to the submix.

Before we see exactly how a folder and its child tracks are set up, there's one more scenario to consider. Even when you have a folder which contains a submix of other tracks, you can still use buses for the folder itself or for individual tracks inside the folder (see right). In this case our folder (submix) still consists of the same three tracks as before. In addition, however, a send has been created from the folder to an FX bus, perhaps to add reverb to the submix. We'll see an example of this soon.

There are three types of send – **Post-Fader (Post Pan)**, **Pre-Fader (Post FX)** and **Pre FX**. These are explained in Chapter 15 and illustrated by the flow charts at the end of Chapter 5. For the time being, accept the default option, Post-Fader (Post Pan).



### 4.12 Track Folder Essentials

When a number of tracks are collected within a folder, you will probably want to use both the individual track controls and the folder controls. For example, you can use the **Volume** controls for individual tracks within a folder to set the volume levels for the different tracks relative to each other. You can then use the Volume control for the folder itself 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 act on the folder as a whole. However, you do still have the option of using each track's individual Mute and Solo controls.

The example illustrated (right) shows a folder called **Instruments** that contains three individual tracks. The faint peaks that you see in the folder's lane in arrange view represent the combined contents of the folder's child tracks. This can be disabled on your Preferences, Appearance, Peaks/waveforms page. Identify the little icons that you can see below the track number of each item in the track control panel. These are used to determine a track's folder status. Ordinarily, this can be one of four states:



- ◆ An ordinary top level track (the default). The icon is displayed as a faint image of a folder. Hover the mouse over this image and it changes to a + sign.
- ◆ A folder track. This is displayed as in the Instruments track above, as a stronger image of a folder. Hover the mouse over this image and it changes to an X (see right).
- ◆ A child track within a folder. The track is nested and the icon is displayed as a faint image of a folder. Hover the mouse over this image and it changes to a + (see below right)
- ◆ The last track in a folder. A folder icon is shown and the track is nested. Hover over this icon and it displays a down pointing arrow.



You can click on this icon to set a track's status. Let's work thru an example.

1. Open the file **All Through the Night.RPP** and save it as **All Through the Night Folder.RPP**
2. Make sure the Vox track is track 1, Gtr Body track 2, Gtr Neck track 3 and Bouzouki track 4.



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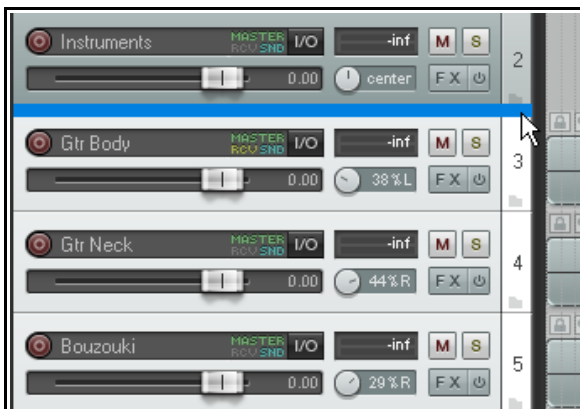
3. Select track 1. Press **Ctrl T** to insert a new track immediately underneath this track. This becomes track number 2. Name this track **Instruments**.
4. Click once on the folder button for this track. Notice it becomes a folder and the tracks below it are indented.
5. We want the bouzouki to be the last track in the folder. Click twice on that track to set this. Adjust the panning of the three child tracks as you wish.
6. To illustrate a point, select the Bouzouki track and press **Ctrl T**. A new track is added outside the folder.
7. Name this track **Reverb** and insert **ReaVerbate** into its FX chain. Drag and drop in turn from the IO button of the Vox track and the IO button of the Instruments folder to this Reverb track. This will create two sends.
8. Lower the Reverb track volume to about -10.0 db (see right) and save the file.
9. Play the file. Experiment with some of the folder controls. For example, mute the folder and you mute all instruments. Solo it and you solo all instruments. Adjust the volume and the overall volume of the instrument submix changes.

To restore a folder as a normal track, click on the folder control icon as many or as few times as are required to cycle thru the various options until you see the one that you want.



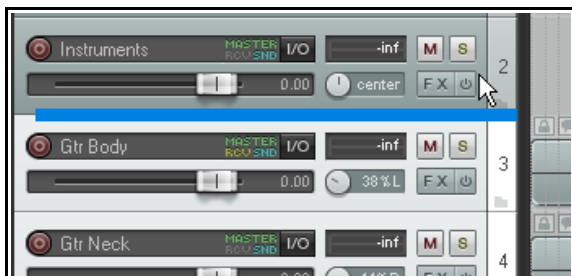
### 4.12.1 Drag and Drop Folder Management

Another way of creating folders is by dragging and dropping. You identify which track is to be the folder, which are to be its children, then select and drag and drop the children into the folder. When you know what you are doing, this method is probably quicker, but it can be tricky at first. This process is illustrated below.



Here's the same project file as before (except that this time the Reverb track has already been added).

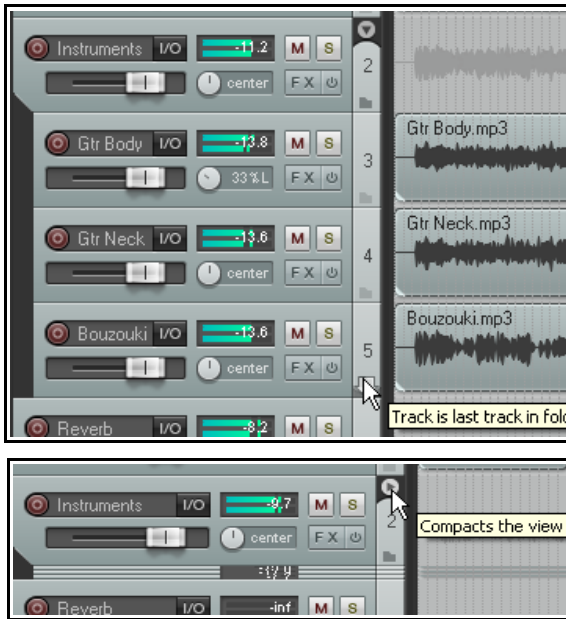
Three tracks have been selected and we have begun to drag and drop them up. Notice that the thick horizontal bar shown above the first of these tracks occupies the whole width of the track control panel.



Carefully and slowly drag them a little higher and you will notice that the horizontal bar is now indented slightly.

Now release the mouse and you will see the three tracks have been placed as child tracks within a newly created Instruments folder (see below).





If you hover the mouse over the folder icon for the Bouzouki track you should see confirmation that it is the last track in the folder.

The drag and drop method can also be used to add tracks into an existing folder, and/or to remove them. However, the technique may take a little getting used to.

Experiment with this now if you wish.

Notice the small down pointing arrow just above the track number of the folder track (in this case Track2).

This can be used to toggle the display of child tracks in the folder between normal (as shown above left), minimized and collapsed (as shown below left).

### 4.12.2 Nested Folders

REAPER allows you to nest folders within folders, to as many levels as you like. This feature is probably more suited to relatively experienced DAW users than it is to newcomers.

To create a nested folder, first create an empty track within an existing top level folder, then use the folder control icon to make that track into a folder. Because the track is itself contained within an existing top level folder, it will automatically be made into a second level folder.

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

- There is a top level folder called Vox Tracks which holds a Lead Vox tracks and a Harmonies sub-folder with four child tracks.
- There is another top level folder called Instruments which holds two sub-folders (Drum Kit and Guitars).
- The two second level folders which are sub-folders of the Instruments folder each contain child tracks of their own.
- There is another top level folder (Reverbs) which itself contains two reverb busses.

Any action taken on a folder will effect its entire contents. For example, if in this case you were to mute the Instruments folder, then you would automatically also mute the contents of the Acoustic Guitar and Other Instruments folders.

REAPER does not limit you two levels of folders. You can have more if you like. Be warned, however, that if you do, life can get complicated!





### 4.13 Track and Track 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 this principle. *You can define group relationships between different tracks and their controls 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 or muted together.

In a moment, we'll work thru some examples. There are two main ways to create and manage your groups. This can be done either using the **Track Control Panel** or the **Track Grouping Matrix**. Here is an overview of both methods.

Method 1 uses the Grouping dialog box (shown right), which can be accessed from the Track Control Panel or the Mixer Control Panel. The method is as follows:

- ◆ In the TCP or MCP, select the tracks whose parameters you wish to group.
- ◆ Right-click over any track number in the group and choose **Track grouping parameters** from the context menu (or press **Shift G**).
- ◆ When the Grouping dialog box is displayed (see left) specify those parameters that you want to group, then click on **Close**.
- ◆ Make sure that the option **Track grouping enabled** on the TCP or MCP menu is selected (ticked).

You can use this same method later to make changes to your grouped parameter definitions.

This interface might appear a little overwhelming at first. For this reason, it may be easier, especially at first, to use the second method. Method 2 uses the **Track Grouping Matrix**. This is illustrated overleaf.

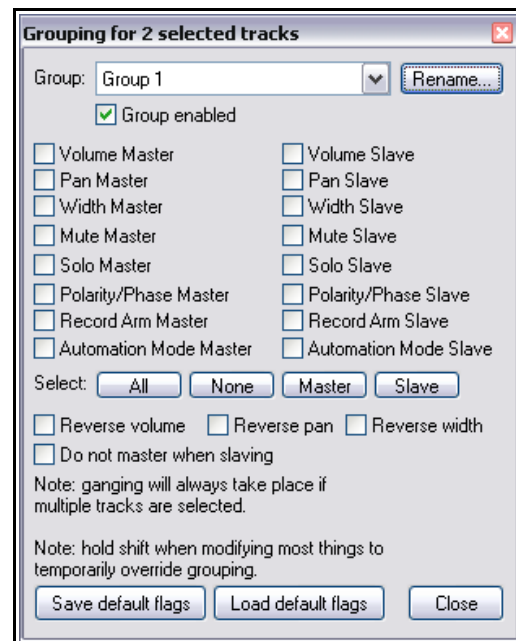
The grouping matrix, which can be docked can be used to manage up to 32 different groups. To display this, choose the **View** command, then **Track Grouping Matrix**, or press **Ctrl Alt G**. The example above shows just three groups on display. By way of preparation, we can create a special project file for our examples. You can group any selection of tracks that you like: in this example, we will be working with two of three tracks enclosed within a track folder. Of course, you do not need to place tracks in a folder in order to be able to group them.

#### 4.13.1 Basic Track Grouping

##### Example

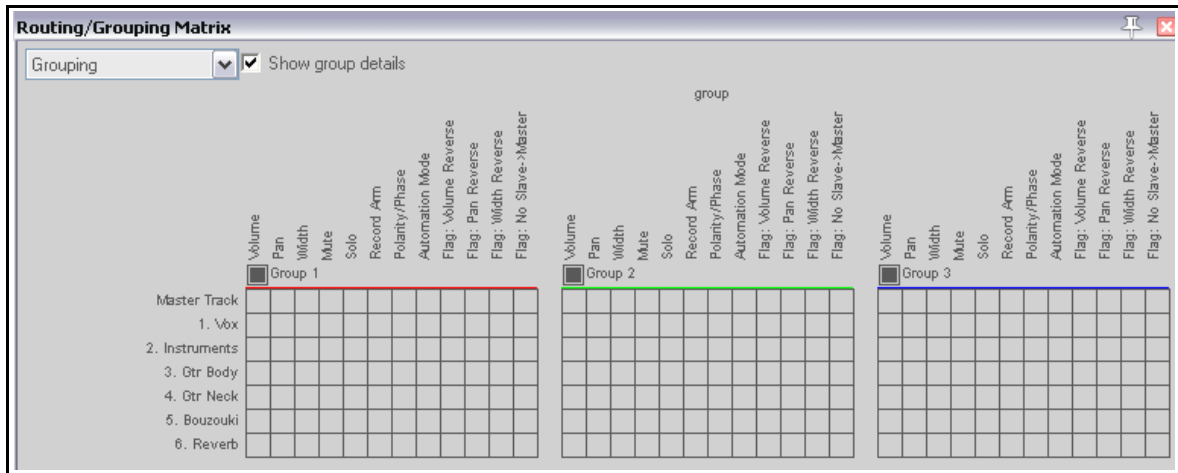
In the examples that follow, the optional **Width** control is shown, but not included in any groups. Whether or not this is visible will depend on your choice of track layout. This is explained in Chapters 10 and 11.

1. Open the file **All Through The Night.RPP** and immediately save it as **All Through The Night GROUPS.RPP**

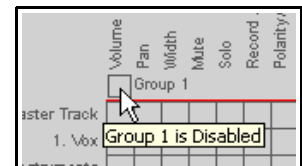
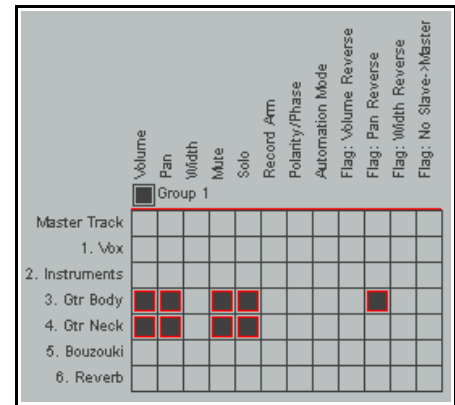


## 4 - Project Arrangement Basics

- Select Track 1 (Vox) and press **Ctrl T** to create a new track immediately below it. Name the new track **Instruments**. Using the techniques explained earlier in this chapter, make this track into a folder. Enclose in the folder the two guitar tracks and the bouzouki track. Make the bouzouki the last track in the folder. Save this file. 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.
- Choose the **View, Track Grouping Matrix** command to display the Grouping Matrix.



- Pan one guitar track about 50% left, and the other 50% right.
- In Group 1 on the Grouping Matrix, click in the cells representing **Gtr Body** and **Gtr Neck** in the **Volume** column.
- Click also in the cells representing **Gtr Body** and **Gtr Neck** in the **Pan** column. In this column, click also in the **Pan Reverse** cell for one of the guitars. This is shown on the right.
- You will now find that the volume controls for these two tracks are grouped so that when you adjust the volume for either track, both volume faders will move together in the same direction.
- Perhaps more interesting, when you now move the pan control left or right for either of these tracks, the other track's pan fader will move in the opposite direction.
- Save the file.
- Now click in the cells for the two guitar tracks in the **mute** and **solo** columns and again save the file. The solo and mute controls for these two tracks are also linked together. As shown above. Try them out!
- To temporarily override the grouping, hold **Shift** while you adjust the volume of one of the guitar tracks. Notice only that one fader is adjusted. You can use **Shift** to temporarily override any grouped track parameters.
- To temporarily disable the group altogether, click where shown (right) on the Group 1 enable/disable toggle control. You will now find that all group controls for this group are disabled.
- Click in this same cell again to again enable the group. Save the file.



The table that follows on the next page summarizes what you might have discovered about grouping track control parameters from this exercise.

**Note:** A item's group control status can be master only (M), slave only (S) or master/slave (the default). In this exercise, all grouping has been of the default type, master/slave. We'll get to the other two options shortly.

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### 4.13.2 Track Grouping Matrix Basic Controls

In order to do this ...	Using the Track Grouping Matrix
Define the tracks in a new group	Display the Track Grouping Matrix. Select at least one parameter (such as Pan) for each track in the group.
Adjust all linked faders for a group	In Mixer or Track Arrange view, adjust the fader for any one track in the group.
Adjust the fader for only one track in a group containing linked faders	In Mixer or Track Arrange view, hold <b>Shift</b> while adjusting the single fader.
Define a pan or volume relationship as reverse for a track within a group	In the track row, click on the intersection cell for <b>Pan Reverse</b> or <b>Volume Reverse</b> .
Change an existing toggle parameter relationship (such as Solo, Mute or Record Arm) into a reverse one	In Mixer view, hold <b>Shift</b> while clicking on the appropriate button (such as Solo or Mute) for the individual track. Use <b>Shift</b> again to restore the positive relationship.
Link more parameters for tracks in an existing group	Click on the intersection cells where the required parameter column meets the track rows.
Add another track to an existing group	Click on intersection cell where the required parameter column meets the row for the track that is being added.
Remove a track from an existing group	Click once, twice or three times on the appropriate intersection cell until it shows blank. If more than one parameter is linked, do this for each parameter.
Enable/Disable group	Click in the group's Enable/Disable box.
Select all tracks in a group	Click on the group name.

### 4.13.3 Track Grouping Indicators

By default, colored ribbons are used on the Track Control Panel to identify grouped track parameters (see right).

Under **Options, Preferences, Appearance** there is a sub-section **Track Control Panels** whose contents includes the option to instead use lines on the edges, or not to use any indicator at all.



### 4.13.4 Master and Slave Group Relationships

Each parameter that is included in a grouped relationship can take one of three states – Master/Slave (the default), Master only, or Slave only. The different ways in which this affects that parameter's behavior are:

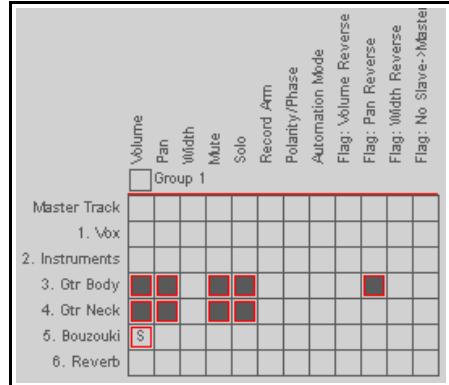
- ◆ A Master/Slave item can control other Master/Slave and Slave only items, but not Master only items. It can itself be controlled by other Master/Slave and Master only items.
- ◆ A Master only item can control other Master/Slave and Slave only items, but not Master only items. It cannot be controlled by any other item
- ◆ A Slave only item cannot control any other item, but can itself be controlled by Master/Slave items and Master only items.

## 4 - Project Arrangement Basics

Don't worry, this isn't as complicated as it sounds. To make sense of it all, let's work thru a couple of examples. In the previous exercise, all items within our group had Master/Slave status. This meant, for example, that when you adjusted the panning or the volume on either of the two guitar tracks, the equivalent parameter on the other guitar track would move according to the defined relationship. This happened regardless of which of the two tracks you used to make the adjustment. Let's now look at some different scenarios.

### Example

1. Open the file **All Through The Night GROUPS.RPP** that you made in the last example. We are going to add the Bouzouki volume control to this group as a slave only.
2. Make sure the grouping matrix is displayed. Click in the Bouzouki row of the Volume column for group 1 to add this to your group. It is assigned the default status of Master/Slave.
3. Click in the same cell again. The display changes to a letter **M**. It now has master only status. Click again, and the display will change to **S** for slave only status (see right).
4. Observe this track in the track control or mixer panel. You will see only one colored ribbon on the track's volume control (instead of two). In the TCP this will be on the right, in the MCP (mixer control panel) this will be at the bottom. This indicates its slave status.
5. Play the song. Adjust the volume for either of the guitar tracks, first up, then down. Observe that because of its slave status the volume of the bouzouki track will be adjusted with it.
6. Now adjust the volume of the bouzouki track, first up then down. Because of its slave only status, it cannot control any other track. The volume faders of the guitar tracks will not move as you change the volume of the bouzouki track.
7. Now, for learning purposes, let's change the bouzouki volume status to master only. Click on that cell several times to cycle thru the options. Stop when it displays **M**.
8. This is the opposite of what happened at step 3. First, the colored ribbon indicator for this item is now shown only on the left instead of the right. This confirms its master only status (see right).
9. Play the song. If you now adjust the volume fader on the bouzouki track, the faders on the two guitar tracks will also move. However, if you adjust the volume of either guitar track, the other guitar track will also move, but the bouzouki fader will not.
10. Save the file when you have finished.



### 4.13.5 Track Grouping Window

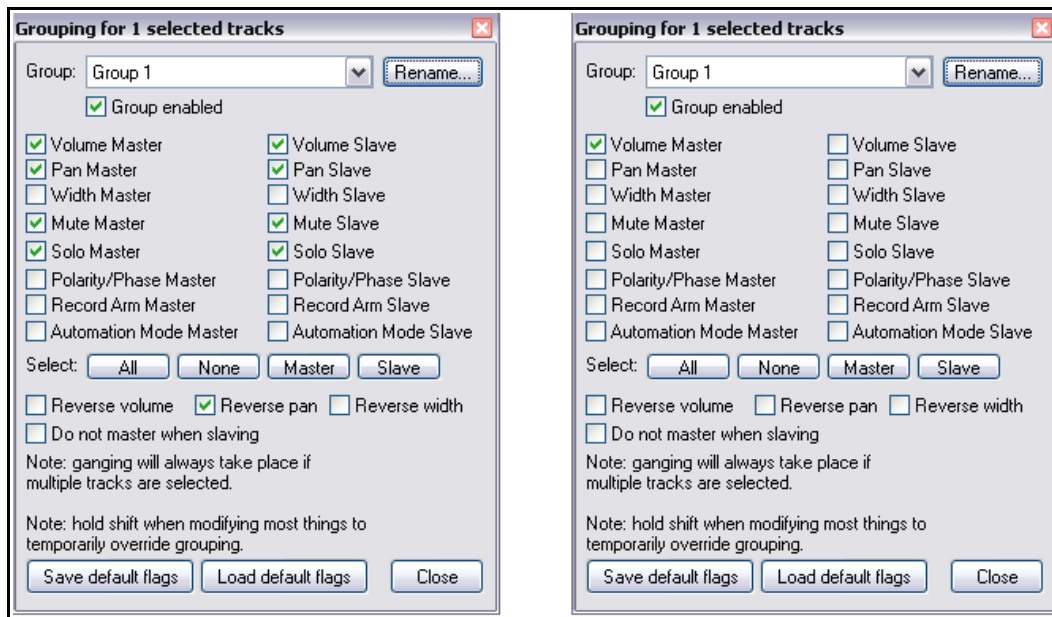
Earlier we introduced the track grouping window, and said that this interface offered a different method of working with track grouping and with grouped track parameters. Let's now see how.

The Grouping window displays all the group information there is about the various parameters for any selected track or selection of tracks. Most commonly (and most usefully) it makes sense to use it with individual tracks, one track at a time. Again, this will be more readily understood if you work thru an example.

### Example

1. With the project file **All Through The Night GROUPS.RPP** open, select the **Gtr Body** track in the track control panel.
2. Either right-click over the track number and choose **Track Grouping Parameters ...** from the context menu, or press **Shift G**.

- This causes the Grouping window for the selected track to be displayed (see below left).



- In the TCP, select the Bouzouki track. The display in the Grouping window changes (above right), to show the currently grouped parameters for the bouzouki – in this case, just the master control on the volume track.
- In this dialog box, click and select **Mute Master**, **Solo Master**, **Mute Slave** and **Solo Slave**. These group parameters are now also selected for this track. This is confirmed by the display in the track grouping matrix.
- One more thing we can do here is to rename the group. Click on the **Rename** button, type **Instruments** and press **Enter**.
- Close the dialog box and look at the track grouping matrix.
- Save this file.

You can define up to 32 groups in a project file. In the example below, a second group has been added, to help when adjusting the balance between the volume of the vocal track and the instrument mix.

### 4.13.6 Track Grouping Window Basic Controls

In order to do this ...	Using the Track Control Panel
<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.
<b>Name a group</b>	Press <b>Shift G</b> , 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.
<b>Adjust the fader for only one track in a group containing linked faders</b>	Hold <b>Shift</b> while adjusting the single fader.
<b>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.
<b>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.
<b>Link more parameters for tracks in an existing group</b>	Open the Grouping dialog box for the group and select the required parameters.
<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.
<b>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>
<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.

**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 the TCP or top of the VU in the MCP. To clear all peaks, hold down the **Control** key while you do this.

### 4.14 VU Meters on Multichannel Tracks

Where a track has more than two channels you have the option of showing the output of all channels on the track's VU meters in the TCP and Mixer.



This feature is toggled on and of by right-clicking over the arm record button and choosing **Track VU meter, Show peaks from all track channels** from the context menu.



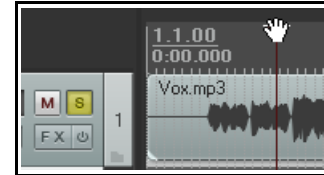
In the example shown here, a **Big Meter** layout has been selected for this track in the mixer.



### 4.15 Audio Scrubbing

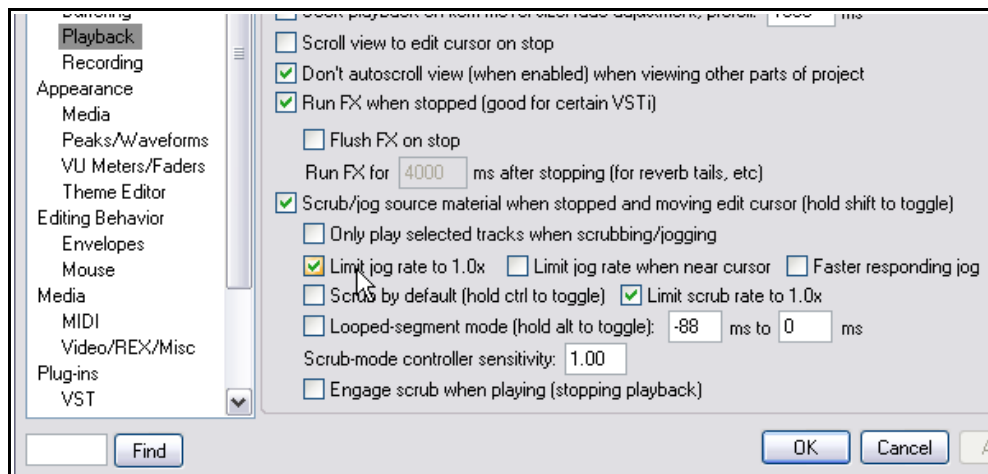
Scrubbing is a technique that originated in the pre-digital days when all recording was done with magnetic tape. It helps you to move within a project, or track, or group of tracks, to audition or locate a particular section. Scrubbing is most commonly used in REAPER when your project is not playing,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

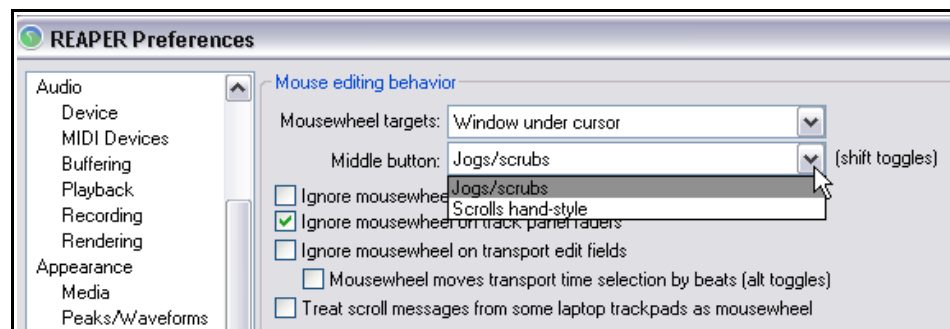


You can set your scrub preferences in the **Audio, Playback** page of the **Options, Preferences** window, as shown below. Notice in particular that:

- 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 use the **Shift** key 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.



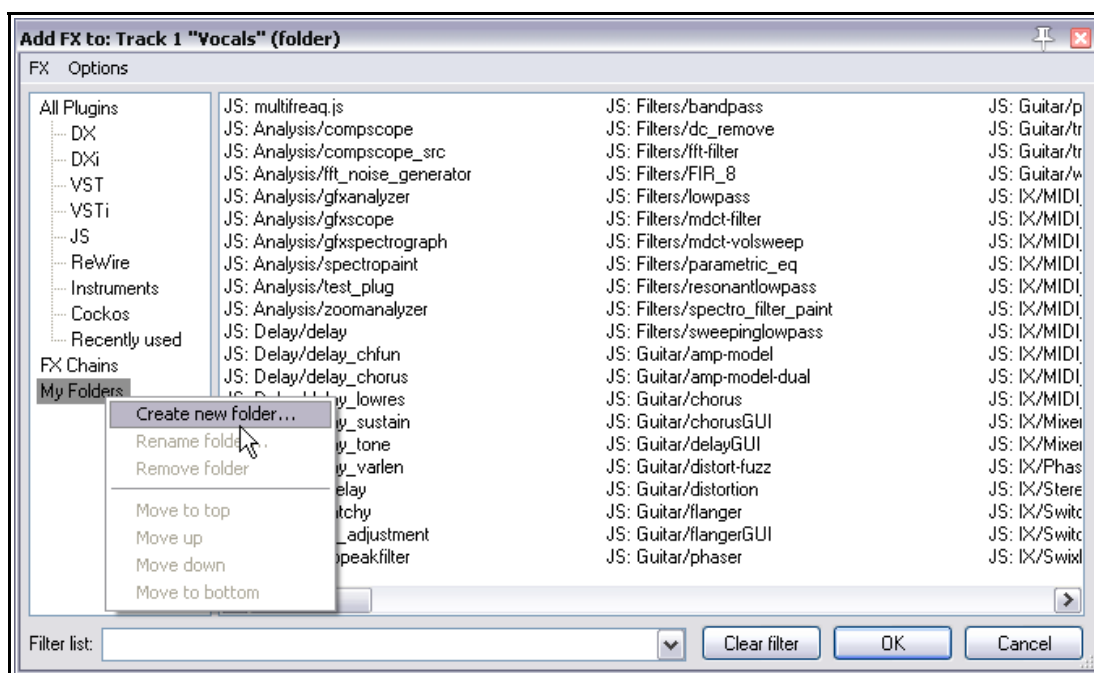


## 5 Managing Track and Item FX

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 more detail at how you use some of the more important individual plug-ins later (Chapter 14): 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:

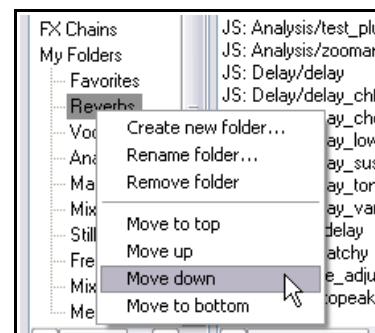
- ◆ Use the command **View, FX Browser** or the keyboard shortcut **Shift F** to open the FX browser window.
- ◆ Right click over the text **My Folders** where shown (see above) and choose **Create new folder**.
- ◆ Type a name, then press **Enter**.

#### To add FX to a group:

- ◆ 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.
- ◆ Drag and drop the required FX from the right hand panel to the folder in which you want the FX to be listed. To drag multiple FX, use **Ctrl** with left mouse click to build up a selection, then drag them all together.

#### To change the order in which FX groups are displayed:

- ◆ Right click on the name of the folder that you wish to move.
- ◆ From the context menu choose Move to top, Move up, Move down, or Move to bottom.



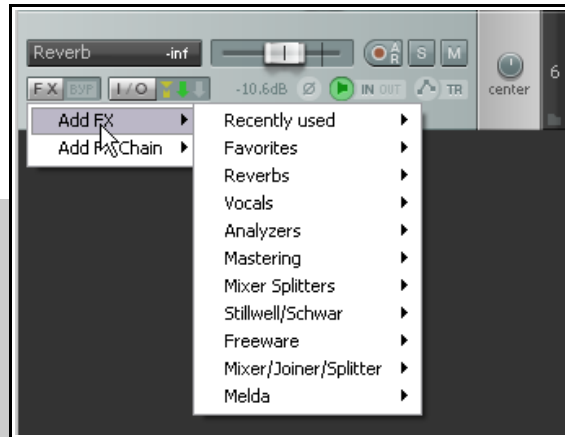
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### To display and select from a group

- ◆ 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.
- ◆ 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 (TCP) or Mixer Control Panel (MCP).

**Tip:** You can add FX from an existing folder to any track directly from the TCP or MCP. 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

By entering a text string in the **Filter list** text box in the bottom left corner of the **Add FX** window, you can display a list of those FX which match your criteria. Before doing this, you should select either **All Plugins** from the list of plugin folders, or any particular folder if you wish to restrict your search.

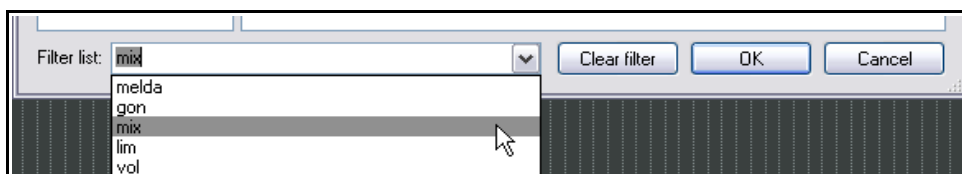
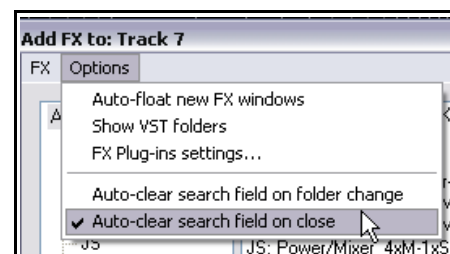
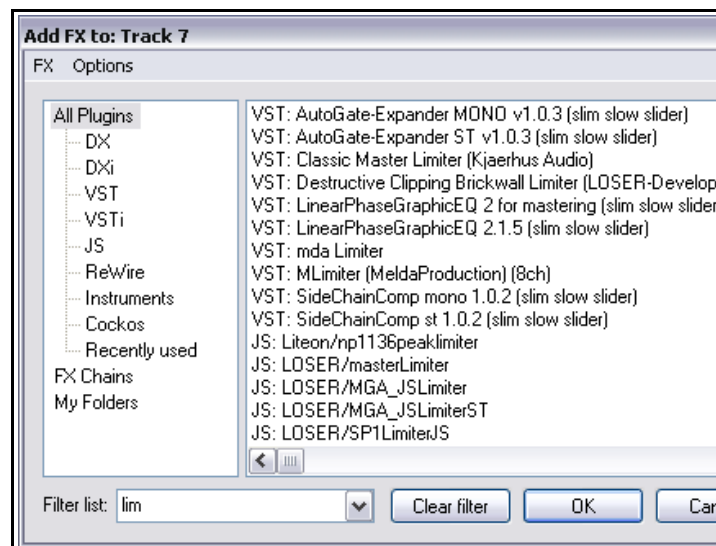
In the example shown here, we have applied the text string *lim* as a filter, in order to see what limiters we have available.

The **Clear Filter** button can be used to remove the filter and restore all plug-ins to view.

In addition to being able to clear the filter in this way, you have two options (on the **Options** menu) which if enabled will ensure that your filters are automatically cleared for you.

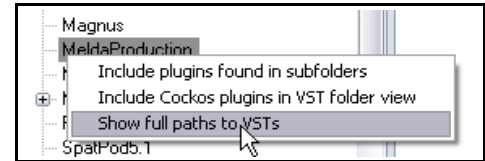
These are **Auto clear search field on folder change** and **Auto clear search field on close**. This latter option refers to closing the FX browser window, not closing REAPER.

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 *mix* (for mixer).



### 5.3 Showing VST Folders

If you use sub-folders to organize your effects within your Windows VST Plug-ins folder then you can display and use this folder structure within REAPER's FX Browser (Add FX window). This feature is toggled on and off using the **Options, Show VST Folders** command. You can then select any folder listed in the left pane to display its contents in the right pane of the FX browser.



You can right click over any displayed folder name (see right) to display a menu of options which includes **Show full paths to VSTs** and **Include plug-ins found in sub-folders**.

As in Windows Explorer, you can collapse or display the various levels of subfolders. REAPER will remember your settings so that each time the browser is opened it will recall the layout that was last used before it was closed.

### 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. You can use standard Windows techniques like **Ctrl C** and **Ctrl V** if you like, but the simplest way is to simply select the required plug-in in the FX window of your source track and use the mouse to drag and drop to the FX button of any other track. This can be done from either the TCP (track control panel) or the MCP (mixer control panel).

#### Example

For this example, open the file **All Through The Night Folder.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 track's FX Window.
2. Insert the **VST ReaEQ(Cockos)** plug-in into this window.
3. Hover the mouse over the text *VST ReaEQ* in the plug-in window. Press and hold down the left mouse button and, holding it down, drag the mouse to point on or near the FX button of the **Gtr Body** track (see right).
4. Release the mouse. The **ReaEQ** plug-in will now have been copied into this track.



You can of course repeat this as often as required to copy the same plug-in to other tracks. When you copy an FX in this way, any settings and parameter values that you have set will be copied with it.

To copy more than one plug-in at the same time from one track to another, use this sequence:

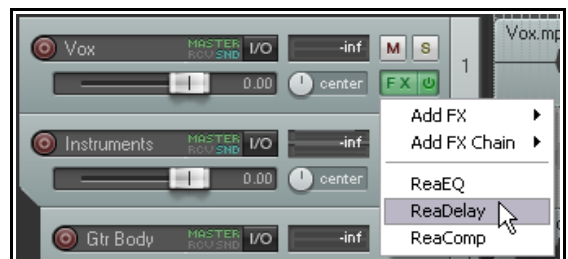
1. Click on the first plug-in to be selected. Hold the **Ctrl** key down while clicking in turn on each additional plug-in that you want copied. Alternatively, if you want to copy all FX in a chain, click on the first item, then hold **Shift** while you click on the last item in the chain.
2. Use the method described above to drag and drop on or near the FX button of the track to which you wish to copy your plug-ins.

### 5.5 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.

### 5.6 FX Quick Display

Track FX are listed on a track's FX button right click menu (see right). You can open the window for any of these FX direct from this menu.

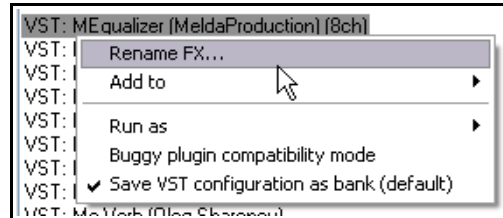


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### 5.7 Changing the Default FX Name

To change the default name of any Direct X or VST FX (but not JS) plug-in:

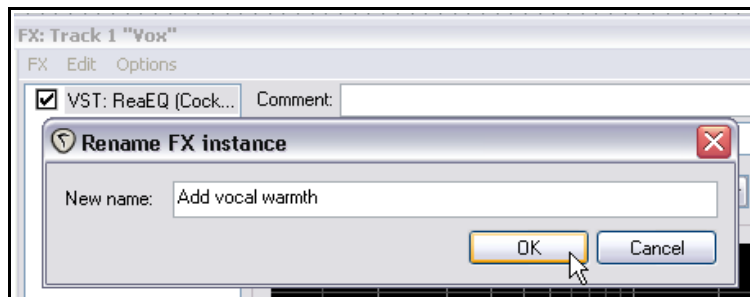
- Display the FX Browser Window (**View, FX Browser** or **Shift F**).
- Right Click over the plug-in to be renamed.
- Choose **Rename FX** from the menu.
- Type the new name and press **Enter**.



### 5.8 Renaming Track FX Instances

You can rename individual FX Plug-in instances so that your custom name is used for that FX in both Track View and in the Mixer. Typically this can be used to describe the purpose of the FX. For example, you might want to rename an instance of ReaEQ that has been added to a vocal as "Add warmth" or "More presence" and so on. To do this, simply select the plug-in and press **F2**, or follow this sequence:

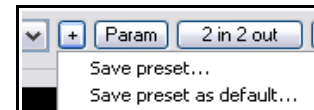
- Right click over the FX Item in either the FX Chain window, or the FX Bin in the Mixer view.
- From the menu, choose **Rename FX instance**.
- Type your custom name.
- Press **Enter**.



Note that your custom name will only be applied to that single instance of the FX Plug-in in that one track. Other instances will not be affected.

### 5.9 Using Default FX Parameter Settings

You can specify that any set of FX parameter settings is to be used as a default whenever that FX is applied to any track or item. When you have your settings right, click on the small **+** button and choose **Save preset as default** from the menu. You will need to enter a name for the preset. The use of presets is explained more fully in Chapter 14.

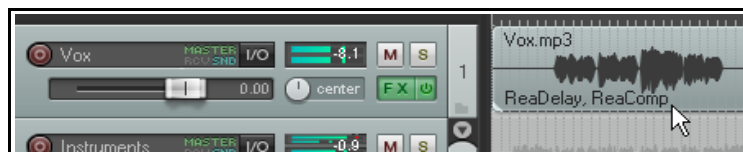


### 5.10 Per Item FX

REAPER allows you to apply FX not only to individual tracks but 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 **No FX** item icons (**Options, Preferences, Appearance, Media**) you can click on any item's **FX** button to open its FX window. This topic will be explained in more detail in Chapter 6. Otherwise you can select a media item 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.
- Press **Shift E** to display the FX Chain for that item. The **Add FX to Item** window will be displayed.
- Double-click on the Plug-In.
- Adjust the parameters.
- Close the FX Window.



If you find this method too "fussy" then try this. You can simply drag and drop any FX from the **FX Browser** window straight on to any media item. You can drop the FX anywhere on the item.

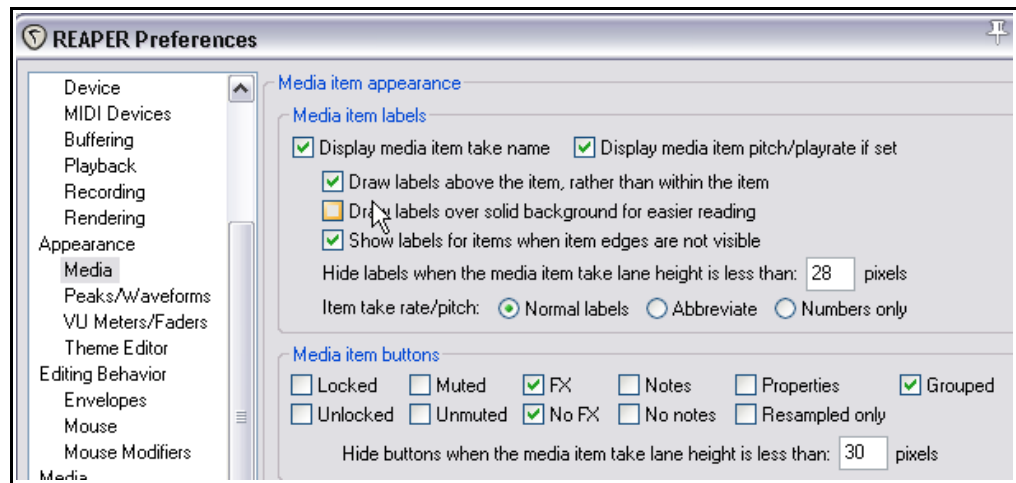
When FX have been added to an item, then the FX names will be displayed in arrange view together with the item name (see above).

### Managing Item FX – Summary Table

To do this ...	You need to do this ...
<b>Add a plug-in to an item's FX chain</b>	Drag and drop from FX browser window on to the item.
<b>Open and view an item's FX Chain</b>	Select the item, press <b>Shift E</b> .
<b>Delete an item's FX Chain altogether</b>	Select the items in the FX chain, press <b>Delete</b> .
<b>Copy an item's FX Chain to another item</b>	Select the items, then drag and drop the FX from one item to another.  If the <b>FX</b> button is visible, just drag and drop from the FX button on to the destination item.

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 available item icons (buttons) include its lock and mute status, its FX chain, its notes and properties.

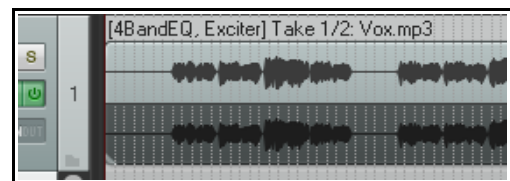
If you enable the option **Draw labels above the item rather than within the item** then the buttons will be displayed (with the item name) above the item. if you disable this option, they will be superimposed on the media item itself.



### 5.11 Using Item FX with Multiple Takes

When you use the multiple alternative takes method of recording your tracks, each take can be assigned its own media item properties. For example, you can insert separate FX plug-ins into individual takes, as shown in the example here.

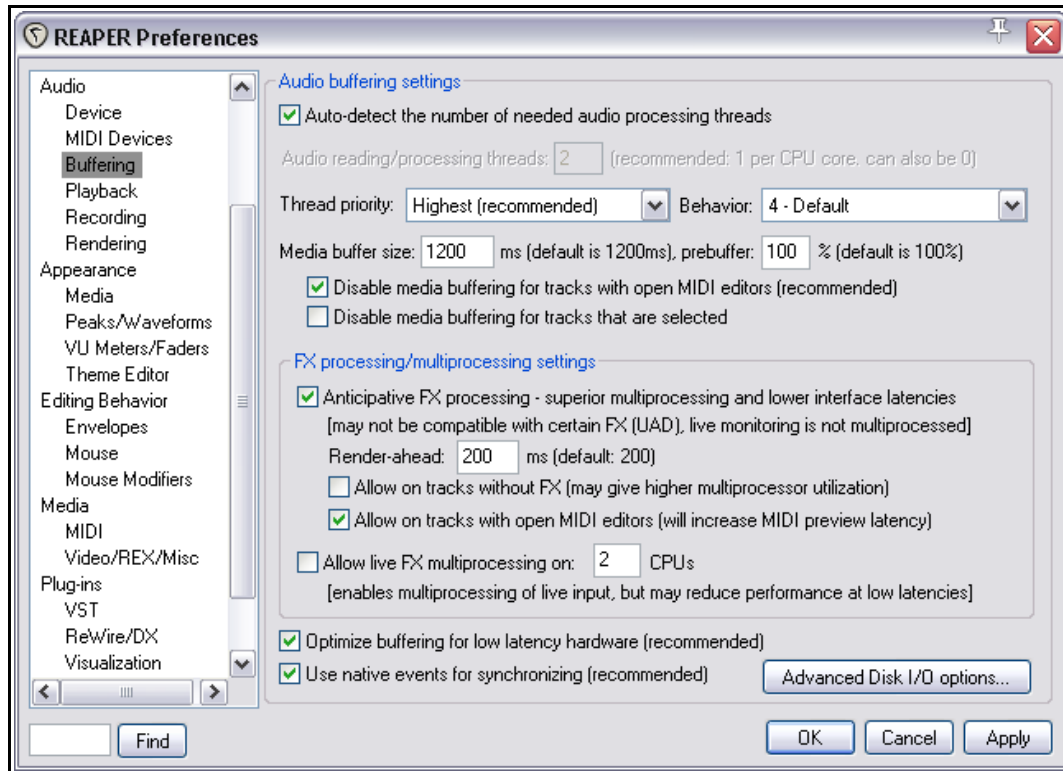
If you have enabled the options **Display media item take name** and **Draw labels above the item** (both under Appearance, Media, see above), then any FX chain for the currently selected take will be included in the information displayed. In the example shown on the right, Take 2 is currently active: the FX names displayed above the item are therefore the FX assigned to Take 2.



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

### 5.12 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**.

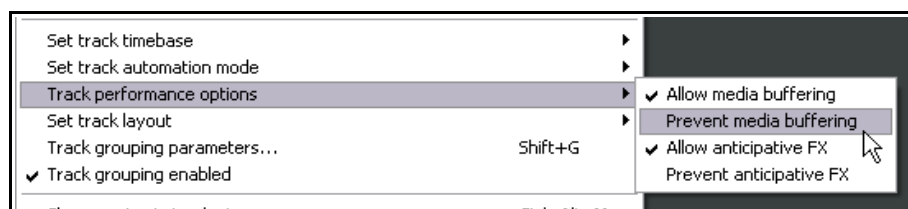


There's no "one size fits all" optimal group of settings. What is best for you depends on various factors, including which processor(s) you are using and which plug-ins. However it shouldn't be too difficult to experiment. Note in particular the following:

- 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 1 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.



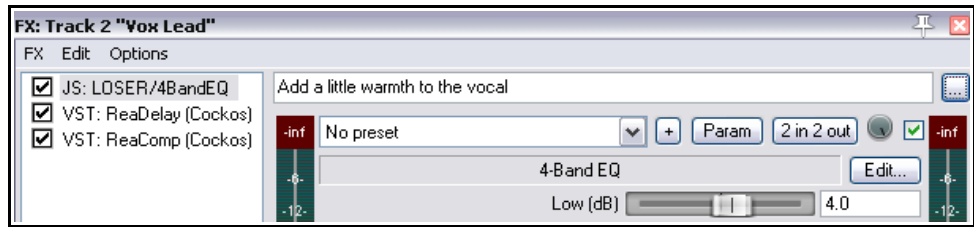


### 5.13 FX Notes and Comments

The REAPER FX Chain window includes an area for any **Comments** (or notes) that you may wish to make – see example below. Click on the ... button just above the bypass tick box to add comments.

The notes are linked to the individual instance of the specific plug-in. In the example shown, the comment is only displayed when the 4 band EQ is selected for Track 2, the Vox Lead. You may add notes for all or any of a track's FX if you wish, but only one comment at a time will be displayed in the track's FX window.

You can open the comments in a separate window of their own by clicking on that ... button. You may have as many as you wish of these comment windows open at any time.

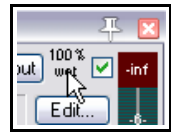


### 5.14 Wet/Dry Mix and Bypass

The wet/dry mix control was mentioned in Chapter 2, but it's worth another mention. Click and hold your mouse over the small rotary fader near the top right corner of the plug-in window and you will see the wet/dry balance for that plug-in displayed as text (see right). At 100% wet (the default) the plug-in is applied to the track in the way that you would normally expect. Click and drag the mouse on this to adjust this value to create a mix of the dry signal (the audio stream with no effect applied) and the wet signal (the audio stream with the effect fully applied).

For example, set to 100%, this mix is fully wet. At 0% it is fully dry (effectively sounding the same as bypass). At 50% the dry and wet signals are mixed together in equal amount.

Notice also that the small check box to the immediate right of this control has a bypass function. Leave it ticked as shown and the effect (as determined by its various parameter settings including the wet/dry mix control) will be applied to the track. Untick this box and the effect is bypassed.

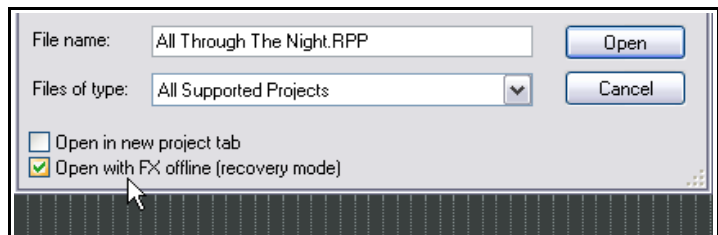


### 5.15 Opening a File in Recovery Mode

Any computer program will crash given the right (or wrong?) circumstances. REAPER is very stable, but nevertheless there may be occasions when you experience a crash. This can be caused by a problem with some third party VST, VSTi, DX or DXi plug-in.

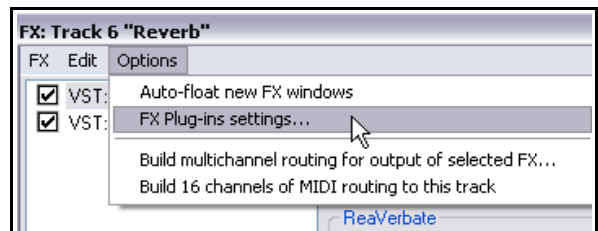
If this happens, you should enable the option to **Open with FX offline (recovery mode)** when re-opening the file from the **File, Open project** dialog box (see right). This will open the file with all FX set offline. By reintroducing them online one at a time, you should be able to identify which is the plug-in that is causing the problem. To then fix the problem you should remove this plug-in and replace it with another of equivalent functionality.

Another method is to hold down **Ctrl Shift** while you open a file from the **File, Recent projects** menu.



### 5.16 Plug-ins Settings

REAPER's Plug-ins settings and preferences are explained and discussed in Chapter 19. You can access this settings page directly from any track's FX Chain window by choosing the command **Options, FX Plug-ins settings ...** from the menu.

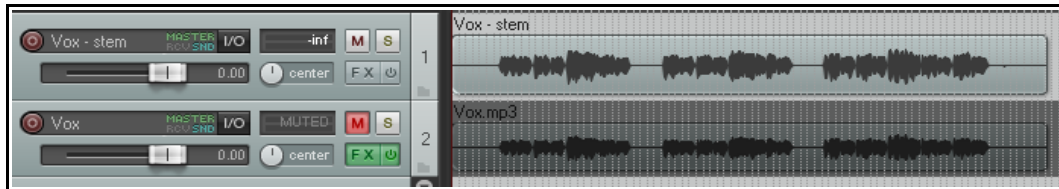




### 5.17 Stem Rendering

Stem Rendering is a technique that can be applied to ease your CPU load, to prevent it from becoming overstressed. The item is rendered to a new track, whilst the original track remains but is automatically muted and its FX are bypassed. 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 you make a stem track:

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



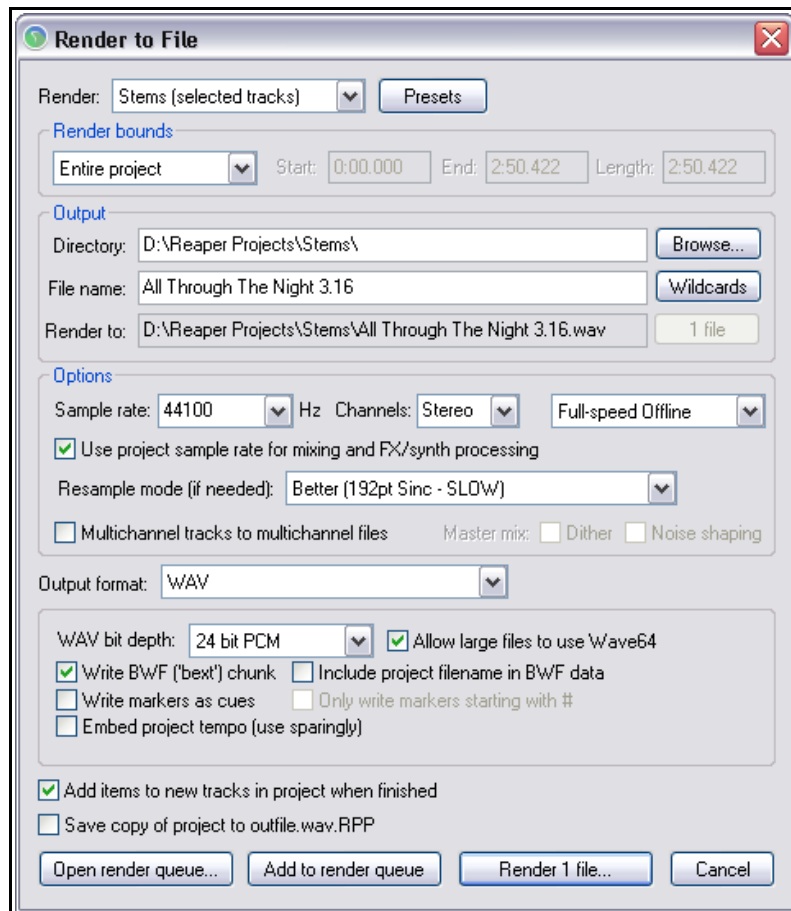
Stem rendering has a similar effect to a process known in some other DAW software as freezing tracks. If you only wish to freeze the track FX without creating a separate track, you should consider using **Apply track FX to item as new take** instead. This is covered later, in Chapter 7.

**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.

### 5.18 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. No other track should be selected.
3. Choose the **File, Render** command.
4. Make sure your selected options include **Stereo** and **Stems (selected tracks)** as shown on the right. If you wish, also select the option to **Add items to new tracks in project when finished**.
5. Select your required output format (e.g. WAV) and format specifications (e.g. 24 bit).
6. Click on **Render 1 file...**



In the example on the right, the contents of the Instruments folder have been rendered to a single stereo track and the folder has then been muted.



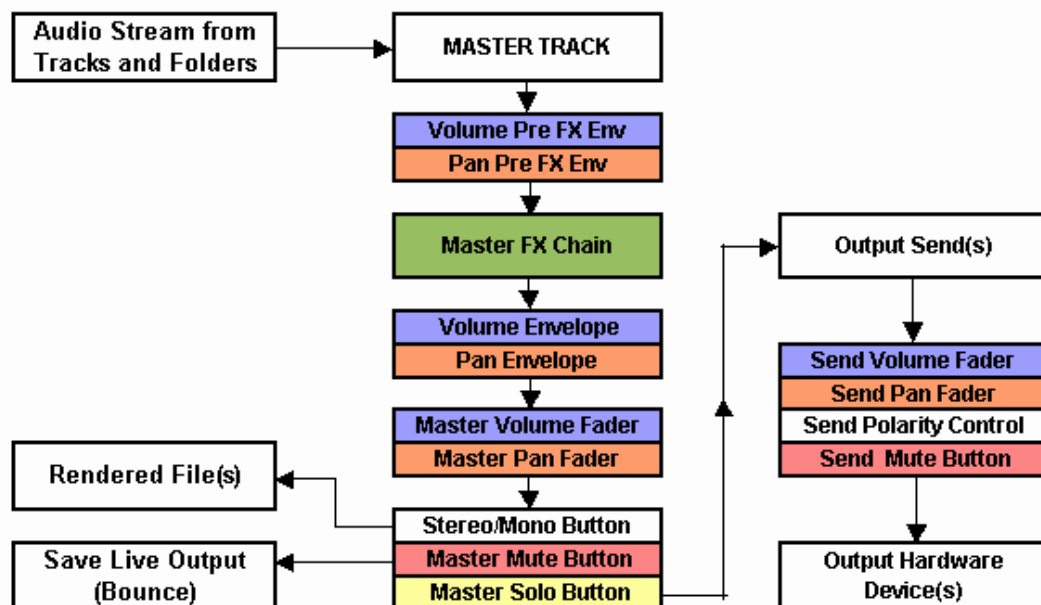
If you are working with multichannel tracks You can also render your output in multichannel format. We'll have more to say about that in Chapter 18.

### 5.19 Audio Signal Flow Chart: Master Track

The two diagrams that follow should help you to understand how audio signals flow thru REAPER's tracks to the master and ultimately to your output devices. Some of the items shown in these charts (such as Item/Take settings) have not yet been discussed in this User Guide. Don't worry, they will be covered, mostly in Chapter 6. You can refer back to these charts at any time.

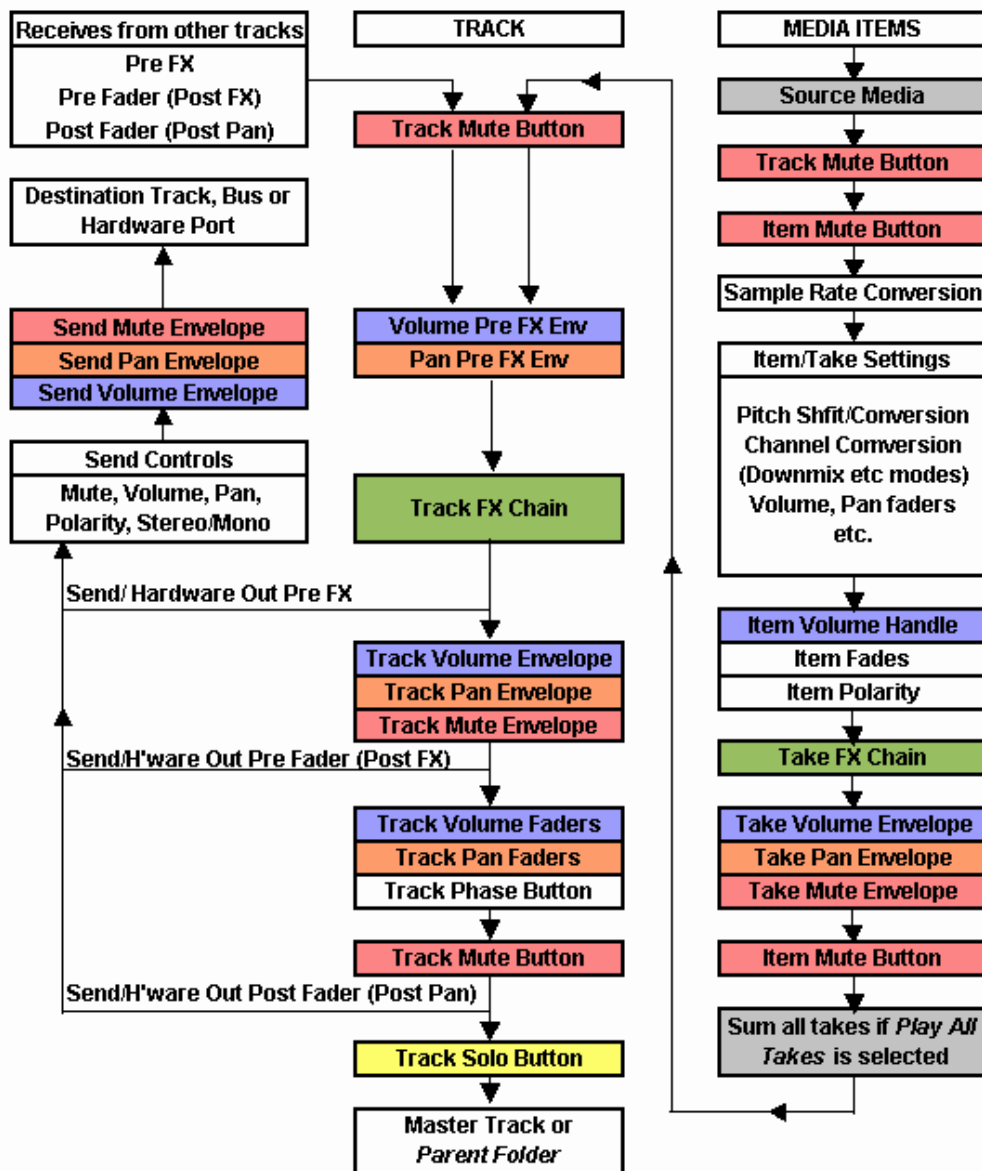
Studying these charts will help you to understand, amongst other things, at what stage your effects are applied .

#### REAPER Audio Playback Signal Flow - Master Track



## 5.20 Audio Signal Flow Chart: Tracks and Folders

REAPER Audio Playback Signal Flow - Top Level Track or *Child Track*



The following diagram should help you to understand REAPER's audio playback signal flow. *See notes below.*

### Notes:

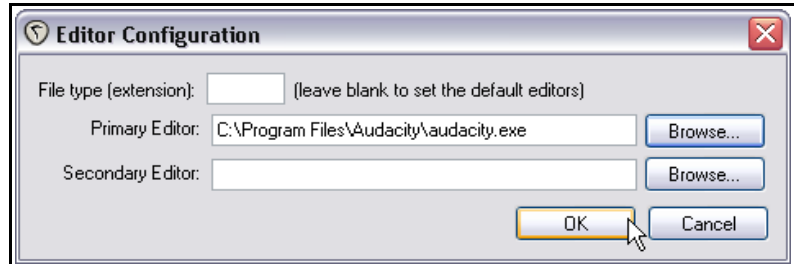
1. The track mute button is shown more than once (near the beginning and near the end of the chain). This is because it does not only mute at the beginning (so that for example, all media items are effectively muted), it also mutes at the end (so that, for example, a synth in the track FX chain that is fed MIDI data via a receive from another track is also muted).
2. If track mute and track solo buttons are both enabled, then solo overrides the mute.
3. If the Master is soloed (see 5.18), direct outputs to hardware from tracks/folders will not be processed.

## 6 Editing Tracks and Items

### 6.1 Using an External Editor

You can specify up to two third party programs (such as Adobe Audition, Audacity, Wavosaur or Sound Forge) which you wish to integrate with REAPER for editing your media items. To do this:

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



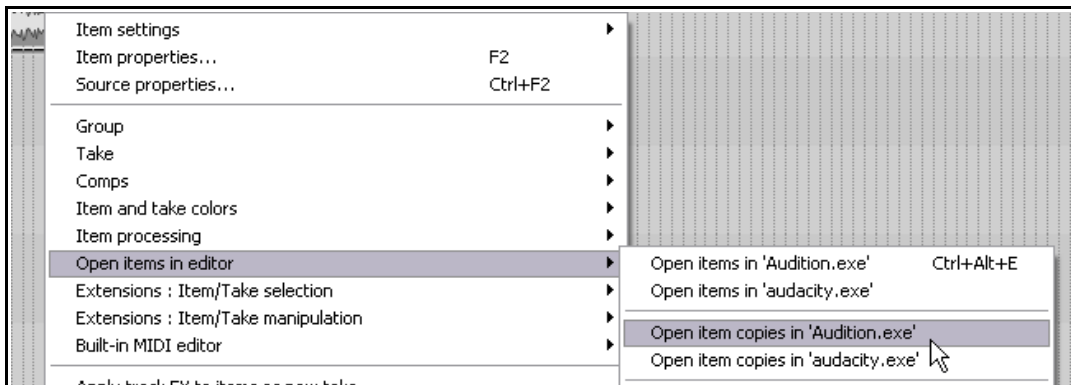
Notice that you can specify different editors for different file types, e.g. WAV, MP3, Midi.

#### To use your external wave editor:

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

- Select the media item and press **Ctrl Alt E**.
- Within a REAPER project, right click over the media item that you wish to edit. From the menu, choose either **Open Items in editor** then, from the sub-menu, select either the option to open the item itself or to open a copy of the item.

Unlike versions of REAPER earlier than 4.0, by default double-clicking on an audio media item will no longer open it with your primary editor. This behavior can be changed thru the **Preferences, Editing Behavior, Mouse Modifiers** page if you wish. This topic is covered in Chapter 13.



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.

### 6.2 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 the first time that you use REAPER! 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. What's more, you can create and add as many editing tools of your own as you like. We'll get to this in Chapter 13.

There are some basic concepts that you need to understand about REAPER's design philosophy and structure

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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 a number of steps might be required to achieve an editing task. If so, you can assign a single keyboard shortcut to the entire sequence. Just how to do this is covered in Chapter 13.
- If you really miss having editing tools, then fear not. You can quite easily create your own tools and toolbars for this (or any other) purpose. This topic is covered in Chapter 13.
- To a very large extent, you can customise REAPER's editing behavior thru the **Editing** settings within your **Options, Preferences** window. We'll get to this later in this section.

In a moment, we'll be working thru REAPER's many editing facilities and features. Before we do, don't forget that when you are editing you have available not only the **Edit**, **Undo** command but also the **Undo History** window (covered in Chapter 2). Remember that if you get into trouble, this Undo History window can be used to restore a project file to any earlier state. How to enable these various options is explained in Chapter 2.

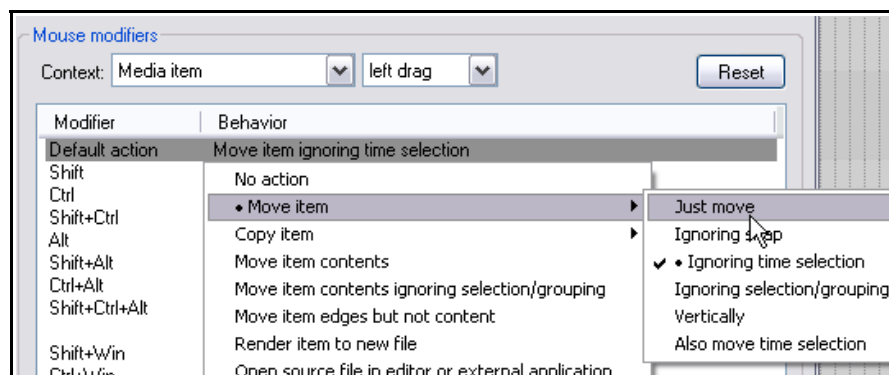
### 6.3 REAPER's Smart Editing

REAPER's smart editing features enable you to do many of the most commonly required editing tasks quickly and easily. In this section, we will look at smart editing techniques for moving, copying and deleting media items, selections of media items and parts of media items. To use them, make sure that the option **Loop Points Linked to Time Selection** is **disabled**.

The table below shows REAPER's default behavior for various mouse actions. You can change any of these by selecting the context **Media item** and **Left drag** on the **Mouse Modifiers** page of your Preferences.

To do this with the mouse ...	You need to do this ...
Move item or selection of items ignoring time selection	Drag and drop.
Move item or selection of items ignoring snap and time selection	<b>Shift</b> drag and drop.
Copy item or selection of items	<b>Ctrl</b> drag and drop.
Copy item or selection of items ignoring snap	<b>Shift</b> and <b>Ctrl</b> with drag and drop.
Move item contents (within item)	<b>Alt</b> drag and drop.
Adjust item pitch fine	<b>Shift</b> and <b>Alt</b> drag and drop.
Render item to new file	<b>Ctrl</b> and <b>Alt</b> drag and drop.
Copy item, pooling MIDI source data	<b>Shift Ctrl</b> and <b>Alt</b> drag and drop.

Shown right is an example of how you might change any of these. In this example, we are in the process of changing the default click and drag behavior from **Move item ignoring time selection** to **Move item: just move**. This will enable us to move any selected area of an item just by dragging and dropping it. You'll find more of that in Chapter 13.



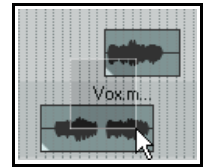
### 6.4 Standard Windows Editing

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. There are also some extra ones. Here is a summary.

#### Select Items

- Select an item by clicking on the item.
- 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.

It is not necessary to marquee the whole of an item to select it (see above right). The marquee feature can, however, be made to behave differently by using any of a number of modifier key options (see **Marquee Modifiers** table below).



#### Split Items

Splitting items plays an important part in several REAPER editing functions. Be sure to familiarise yourself with the following:

- If no item is selected, pressing S will do nothing.
- If item(s) are selected, pressing S will split all selected item(s) at the edit cursor position.
- If there is a time selection current, pressing Shift S will split all selected Item(s) at the beginning and end of the time selection.

**Note:** If an item containing an FX chain is split, then both of the resulting items will contain that FX chain. This can be changed in your **Options, Preferences, Media** page by disabling the option **Duplicate take FX when splitting items**.

#### 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 items**.

Heal is different from Glue. In short, heal restores items to their original state, whilst glue renders them to a new file. Glue will be discussed later in this chapter. Note also that 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.

#### Cut/Copy Items

Apart from smart editing (see previous section) there are other ways to copy or cut items in REAPER. These are based on standard windows techniques

- Use the keyboard shortcut **Ctrl Shift C** to copy or **Ctrl Shift X** to cut any selected item(s) in its entirety. Note that if a time selection is current, **Ctrl C/Ctrl X** will copy/cut only that current time selection, not the whole item. You can use the Actions Editor (Chapter 13) to change this behavior if you wish.
- Right-click on an item and select **Copy items** or **Cut items** from the menu.
- Select an item, then select **Edit, Copy items/tracks/envelope points ignoring time selection** or **Cut items/tracks/envelope points ignoring time selection** from the menu.

**Note: Copying MIDI Items in Arrange View:** Special considerations that need to be taken into account when you are copying MIDI (rather than audio) items in arrange view. These are explained in Chapter 12.

#### Paste Items

- Use **Ctrl V** to paste an item at the 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 track that was selected in the TCP. If you give focus to the main arrange view window before pasting, a new track will be created.
- Select a track and use **Edit, Paste** to paste the item at the current edit cursor position.

#### Copy or Cut Part of an Item

For those times when you prefer not to use smart editing you can use the Windows clipboard.

- Select the item then make the time selection.
- To copy or cut the selected area, first make sure that focus is on the main arrange view window, then to copy use **Edit, Copy items/tracks/envelope points within time selection** or right-click on the item

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and select **Copy selected area of items** from the menu, or press **Ctrl C**, or

- To cut the selected area, use **Cut items/tracks/envelope points within time selection** or right-click on the selected area and select **Cut selected area of items** from the menu, or press **Ctrl X**.
- Select a track in the TCP, position the cursor in arrange view and choose **Edit, Paste** from the menu.

### Delete Items

Delete completely removes the item from the track. Note that it does not remove the media file from the project directory. There are several ways to delete items. Where an item has several takes, any of these actions will delete all takes, not just the active one. See Chapter 7 for how to deal with individual takes.

- Use the **Delete** key to delete selected item/s.
- Right-click on a selected item and select **Remove items**. This will delete any selected items.
- Select **Item, Remove items** from the main menu.

### Show Overlapping Items In Lanes

You might wish to place several overlapping media items on one track. If so, consider whether or not you wish to crossfade them. Crossfades can be applied manually, or automatically, by enabling the Auto Crossfade tool on the toolbar. You might also wish to enable **Show overlapping media items in lanes** on the **Options** menu.

### Move Items: Special

Shortcut keys exist for moving items in ways that might be difficult to control with the mouse. For example:

Default Shortcut Key	Purpose
<b>Num Pad 1</b>	Slide item a little to the left
<b>Num Pad 3</b>	Slide item a little to the right
<b>Num Pad 4</b>	Move item a little to the left
<b>Num Pad 6</b>	Move item a little to the right
<b>Num Pad 8</b>	Move item up one track
<b>Num Pad 2</b>	Move item down one track

**Note:** This feature is often referred to as “nudge”. With REAPER, nudging is 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 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.

### Marquee Modifiers

Modifier keys exist for changing the marquee behavior when you right-click and drag. By default, these are::

Modifier Key(s)	Purpose
<b>Right-click drag (no modifier)</b>	Marquee select items.
<b>Shift Right click-drag</b>	Marquee add to item selection.
<b>Ctrl Right click-drag</b>	Marquee toggle item selection
<b>Alt Right click-drag</b>	Marquee select items and time
<b>Shift Alt Right click-drag</b>	Marquee select items and time ignoring snap.

mouse modifiers

Context: Arrange view right drag

Modifier	Behavior
Default action	Marquee select items
Shift	Marquee add to item selection
Ctrl	Marquee toggle item selection
Shift+Ctrl	
Alt	Marquee select items and time
Shift+Alt	Marquee select items and time ignoring snap
Ctrl+Alt	
Shift+Ctrl+Alt	Hand scroll

You can change any of these modifiers and/or add others of your own choosing, using the **Mouse Modifiers** page of your REAPER Preferences. More information about how to do this is given in Chapter 13.

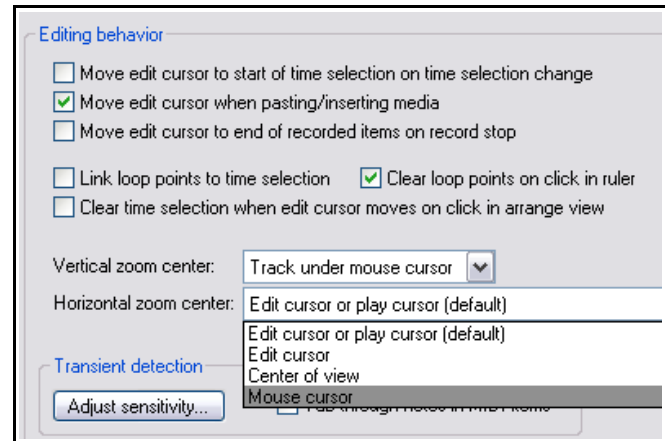


### 6.5 Editing Behavior Preferences

Familiarise yourself with REAPER's main editing behavior preferences and how they work. If you do, you will find life getting a lot easier! They are displayed on the **Editing Behavior** page of the **Preferences** window. These are explained in Chapter 19, but in short, some of the most useful of these include:

- ◆ Whether to move the edit cursor when performing various actions – e.g. changing time selection or inserting media.
- ◆ Whether by default to link loop points to time selection.
- ◆ Which focus point to use as the center when zooming horizontally and vertically. These two important options put you in control of REAPER's zoom behavior. Selecting mouse cursor allows you to simply point and zoom with the mousewheel.

The option whether to move the edit cursor when selecting a media item is no longer on this page, but can now be set using the **Media item left click** context on the mouse modifiers page. The default behavior for this is **Select item and move edit cursor** but this can be changed to just **Select item**.



### 6.6 Separating Loop Selection From Time Selection

The setting **Link loop points to time selection** (on your **Preferences, Editing Behavior** page) determines whether by default the loop points are linked to your time selection. When linked, this means that when you select a time area other than that currently selected, the loop selection changes with it. At any time you can override the default behavior by using the toggle command **Loop points linked to time selection** on REAPER's main **Options** menu. Even 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 set 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 to which we could add FX), but the original loop area is still selected.

Here we have muted the previous (and now split) time selection, and made another new time selection, which we could also edit as required.

Notice that we can carry on working with different times selections, but our original loop area remains intact. You can play this looped area over and over again while working on different time selections within it.

### 6.7 Snapping with Combined Snap/Grid Settings

You have already learnt (Chapter 4) how to define 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 below) can also be used if you wish to ensure that various actions (including time or loop selection) 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 L**, or by right clicking on the Grid button on the REAPER toolbar. 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 a number of ways, including:

**Media Items:** Ensures that media items when created, moved or edited will be snapped to your settings - at their start, at both the start and the end, or as determined by the mouse position at the time.

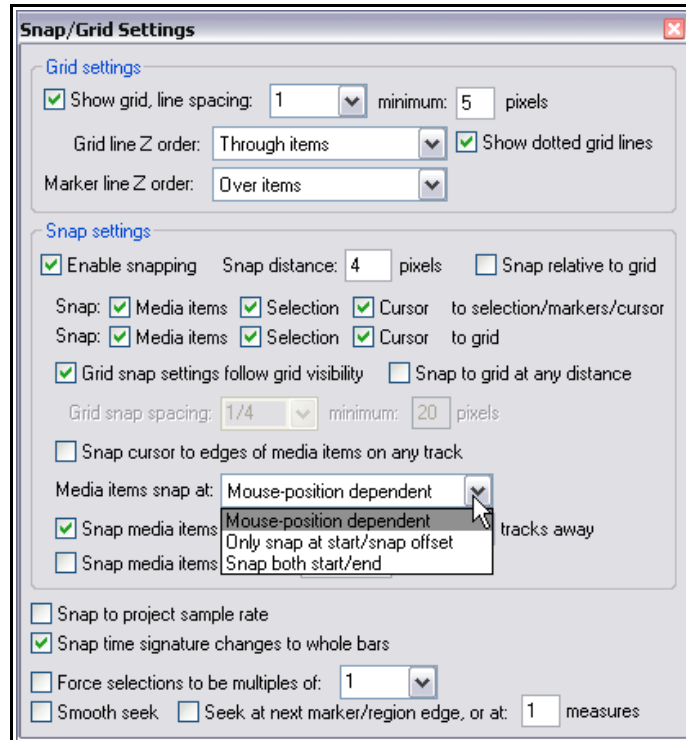
**Selection:** Determines whether your time and loop selections should be snapped.

**Cursor:** Determines whether your cursor should be snapped.

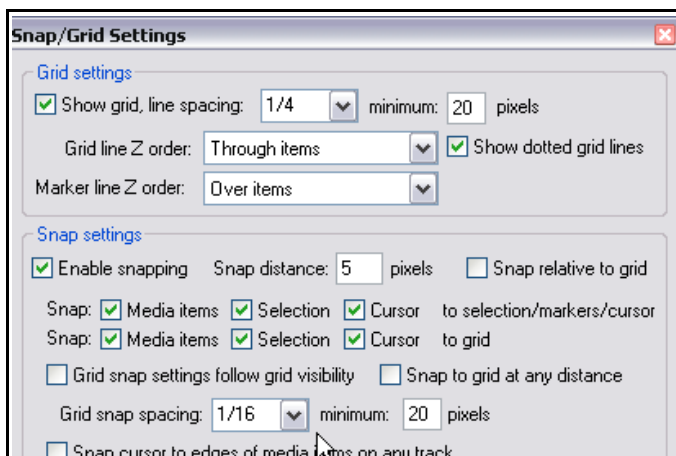
**Cursor to edge of media items on any track:** Good for navigating to item start, end, splits, etc.

**Snap to sample rate:** Enables items to be snapped to items samples, cursor, markers, loop points and envelope points to snap to samples.

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**.



### 6.8 Snapping with Separate Snap and Grid Settings



In the above examples, 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.

Let's now see what we can do if we disable 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 (at the point where the cursor is shown on the screen shot) a **grid snap spacing** of one sixteenth beats.

This produces a less cluttered display on the screen. Provided you have zoomed into your

project sufficiently, gridlines will be shown for every quarter beat but snapping will take place between as well as on the gridlines, at every sixteenth beat.

Notice also the **Media items snap to** option. This can be set to **Snap both start/end, Only snap at start/snap offset** or **Mouse position dependent** (that is, at whichever position the mouse is nearer at the time, the start or the end).

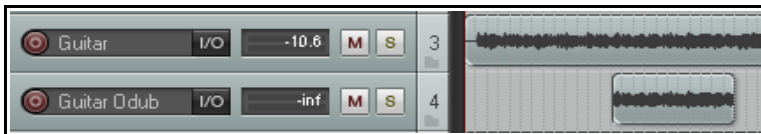
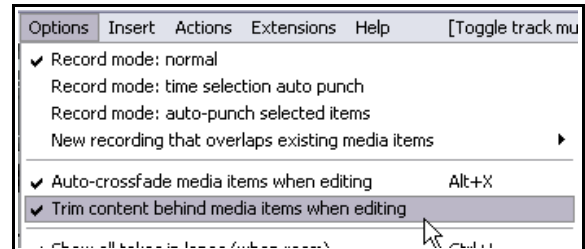
**Tip:** When snapping is enabled, this can be over ridden when selecting a loop along the timeline by holding down the **Ctrl** key while you make the selection.

### 6.9 Trim Behind When Editing

The toggle command **Options, Trim content behind media items when editing** can be used to ensure that existing material is effectively replaced by new material which as a result of some editing action is placed over it. This option is also available by right-clicking on the Auto Crossfade icon on the main toolbar.

The easiest way to understand what this feature does is to look at an example of what happens when you move one item onto another with "trim behind" disabled and enabled. In this example, we are assuming that auto-crossfade has been turned off.

Let's first recall how REAPER behaves with trim behind disabled (the default setting).



1. Shown left are two guitar tracks.



2. We drag and drop the item from the second track over the top of the first.

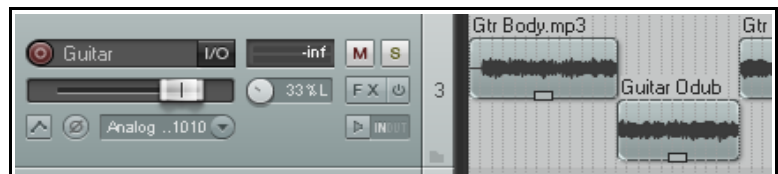


3. If we now enable free item positioning on the track and increase the track height, by dragging the item on top below the original media item we can see that both the original item and the new item are now stored in this track.

Let's now see what happens if we repeat this exercise, but this time with the option **Trim content behind media items when editing** enabled.

Steps one and two would appear to be the same as before. But look what now happens at step 3:

This time, when we allow free item positioning and drag the new item down, there is nothing behind it! The original item has been replaced with the new one.

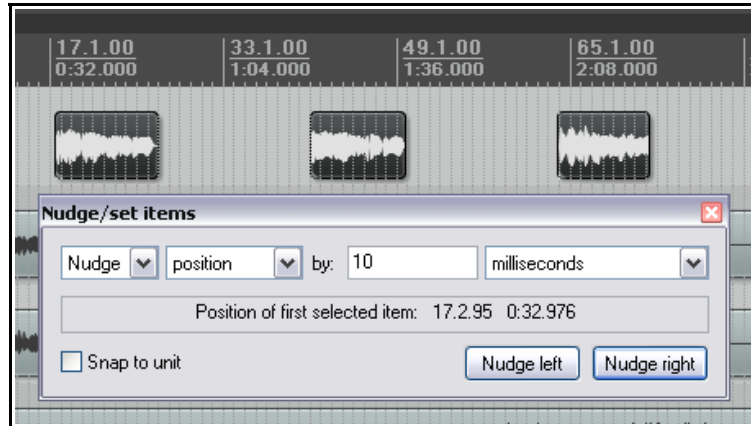


This example has been included only as an illustration and an example. It does not mean that you have to make use of free item positioning if you wish to work with "trim behind" enabled.

## 6.10 The Nudge/Set Items Window

The **Nudge/set items** window can be opened from the media items right-click context menu. You can use the Actions List editor to assign this action to a keyboard shortcut, or the Customize Menus/Toolbars editor to assign it to a toolbar. The use of both the Actions List editor and the Customize Menus/Toolbars editor is covered in Chapter 13.

Once opened, this window will stay open until you close it. You can select any item (or a number of items) and use this window to nudge or set a position. Exactly how this behaves will at times depend on your other settings (for example, snap settings, and whether or not the item is loop enabled). The main options and parameters in this window are described in the table below, moving from left to right.



Item	Explanation
<b>Action</b>	Choose <b>Nudge</b> or <b>Set</b> . Which of these you choose will determine how REAPER will interpret the <b>Unit</b> information. If you choose Nudge, the item will be moved according to the unit specified <i>by</i> the amount specified. In the example shown above, the item position would be moved 10 ms to the left or right (depending on which Nudge button is clicked). If you choose Set, the item will be moved <i>to</i> the position specified.
<b>Nudge/Set Definition</b>	Determines exactly <i>what</i> will be nudged or set. Your choices are: <b>Position</b> Whole item: the whole item will be physically moved <b>Left Trim</b> The item is trimmed from the left <b>Left Edge</b> The left edge is moved <b>Right Edge</b> The right edge is moved <b>Contents</b> The item itself remains static, its contents are moved within it <b>Duplicate</b> Creates duplicate item(s) Whether the movement is left or right will depend on which button is clicked. If <b>Duplicate</b> is selected, you will be able to specify number of copies required.
<b>Unit Value</b>	Determines the number of units by which the item will be nudged. This information needs to be interpreted together with the <b>Unit Type</b> selection. In the example shown above, the unit type is milliseconds and the unit value is 10.
<b>Unit Type</b>	Options include milliseconds, seconds, grid units, measures/beats, samples, frames, pixels, item lengths, item selections and notes. If notes is selected, an additional drop down list offering various fractions of a note (from 1/256 to whole) is also displayed.
<b>Snap to Unit</b>	Whether to enable or disable snapping.
<b>Nudge Left</b> <b>Nudge Right</b>	These buttons are displayed only if Nudge is selected. They determine whether to nudge the item(s) to the left or to the right.
<b>Get Cursor</b> <b>Apply Move</b>	These buttons are only displayed when Set is selected. <b>Get Cursor</b> returns the current cursor position and writes it in the "to:" box. <b>Apply Move</b> moves the item according to the various options and settings, including the position specified in the "to:" box.

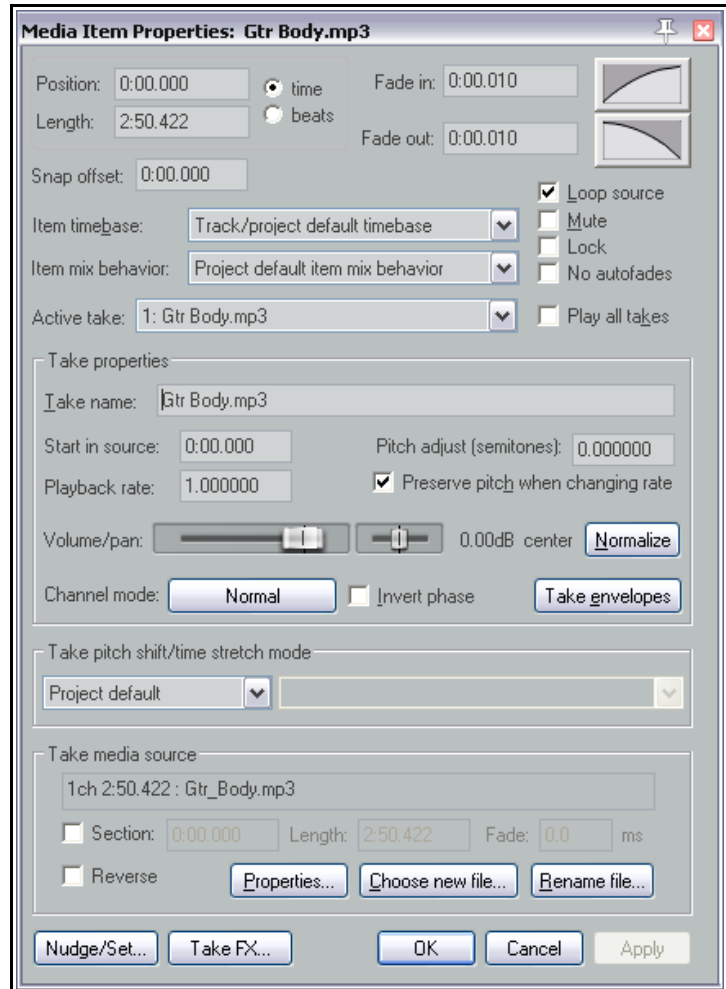
### 6.11 Media Item Properties

All media 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.

To display an item's properties, select it then press **F2**, or right click and choose **Item Properties**, or click on its properties button (if visible). For audio (but not MIDI) items, you can also double-click on the item to do this. The Media Item Properties box will stay open until you close it. If you leave it open, its contents will reflect the properties of whichever item or items is/are currently selected at any time.

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. The main properties contained within this dialog box are:

- **Position:** entering a precise figure here will move the start of this media item to 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, also enable or disable **Autofades**.
- **Snap offset:** The amount of offset from the default snap position if snapping is enabled.
- **Item timebase:** Defaults to project timebase but can be changed (time, beats, etc.).
- **Item mix:** Effectively whether to replace or mix when an item is placed over another. Defaults to project default.
- **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.
- Whether or not to **play all takes**. Obviously, this only applies where two or more takes exist.
- **Active take** file name.
- **Active take name.** By default REAPER will use the media item file name, but you can change this.
- **Pitch** adjustment.
- **Start in source:** sets start time.
- **Playback rate.** For example, type **x2** to double the playback rate of all items currently selected.
- Whether to **preserve item pitch** when the playback rate is changed.
- Adjust **Volume** and **Pan**, **Normalize** Volume.
- **Channel mode:** this is discussed shortly.
- Whether to **invert phase**.
- Add or remove **Take envelopes**.
- Which **algorithm** is to be used for pitch adjustment. This is obtained by default from the project settings.
- The option to use only a **section** of the media item.
- Options to **reverse** the item.
- Examine the media item source file's **properties**.
- Choose a **new file** to replace the existing source file.





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- **Rename** the source file.
- Access the **Nudge/Set** dialog box for this item.
- Open the **FX Chain** window for this take/item.

Some of these options – such as **Loop Source** and **Channel Mode** – are also available on the **Item Settings** menu. 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 in Chapter 13 when we examine the **Actions List Editor**.

**Tip:** To change a property (e.g. playback rate) of several items at once, simply select all of the items then, with the Media Properties window open, make whatever changes you require.

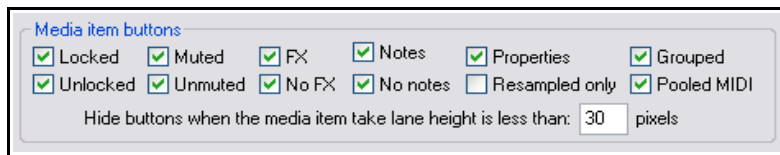
### 6.12 Media Item Icons

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.

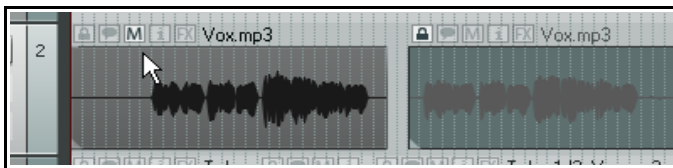
The icons are listed in two rows. Ticking options in the first row means that the icons will be displayed only when the item has been enabled (by a keyboard shortcut, the menu, or the Item Properties dialog box). Ticking options in the second row means that the icons will be displayed whether the feature is enabled or not.

For example, if you tick the **Mute** option in the first row but not the **Unmuted** option in the second, then the mute button will be displayed only when the item is muted. The button indicates the track's mute status and can also 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.



Enabling **Properties (resampled only)** means that this button will only be displayed if an item is resampled.



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.

Whether your icons are displayed above the media items or superimposed upon the media items will depend on your preference setting

(on the same preferences page) for the option **Draw labels above item rather than within item**. Note that even if you have this option enabled, it will only be applied if there is sufficient track height. You'll find more information about other settings on this **Appearance, Media** page in Chapter 19.

### 6.13 Item Notes

The Notes button (or the **Item settings, Item notes ...** command from the right-click 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.

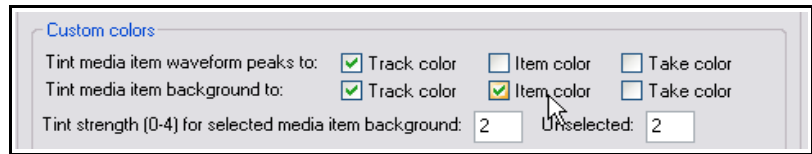


Icons can also be inserted into media items by dragging and dropping from Windows Explorer.



### 6.14 Coloring Individual Items

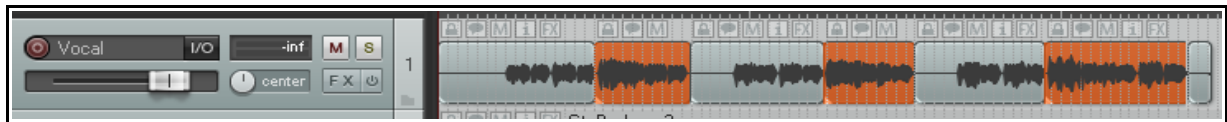
You can change the colors of individual media items (or selections of media items) by first selecting the items and then displaying the context menu and choosing **Item and take colors**, then **Set items to custom color**, then **Set items to random colors** or **Set items to one random color**. You will need to ensure that at least one of the options to tint media item waveform peaks and/or backgrounds with **Item colors** is enabled on the **Appearance, Media** page of your Preferences (see above).



#### Examples

In the example shown below, our vocal track has been split into several individual items. Let us suppose that these include several verses and choruses, and that for whatever reason we wish to easily identify the choruses.

We can select the chorus items, then right-click over any item in the selection and choose **Item and take colors**, **Set items to custom color** from the menu. (These commands are also available on the main **Edit** 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 similar commands include **Set items to random color** and **Set items to one random color**. To remove a custom color, choose **Set items to default color**.

### 6.15 Adjusting Item Volume

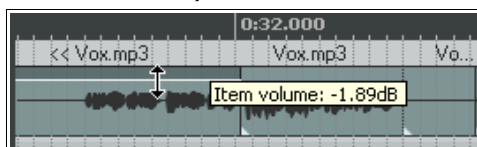
Besides using envelopes (which we'll get to in Chapter 16) there are three methods available to adjust the volume of individual media items. They are:

- Using the item volume handle.
- Using the volume fader in the Item Properties box.
- Normalization

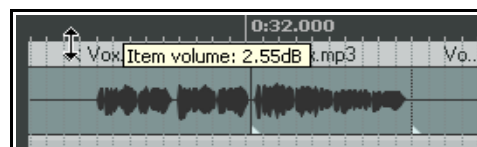
#### 6.15.1 The Item Volume Handle

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.

#### 6.15.2 The Volume Fader

The Item Properties dialog box includes a horizontal fader (to the left of the normalize button) which can be used to raise or lower an item's volume. After adjusting the level, click on **Apply** to apply



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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.

### 6.15.3 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 items** or **Normalize 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 normalised 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.

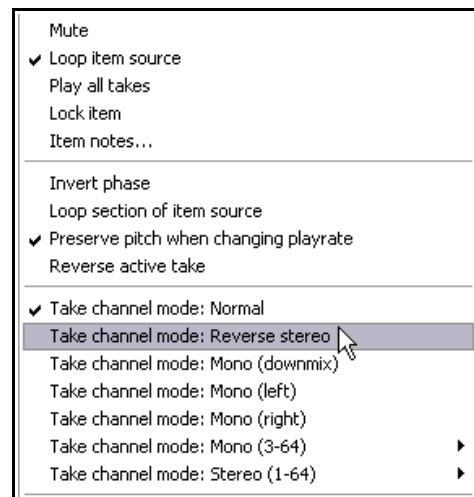
### 6.16 Changing Item Channel Mode

Right clicking over any Media Item and choosing **Item settings** from the context menu causes a sub-menu to be displayed.

Notice in particular that for stereo media items, you have a number of **Channel Mode** options (also available in the Item Properties dialog box). These include:

- **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.

For multichannel items (see Chapter 3) you have also the option of mixing down in mono or stereo to channels other than 1 and 2.

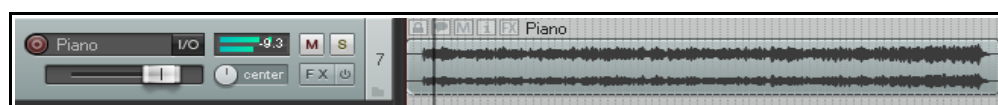


#### Examples

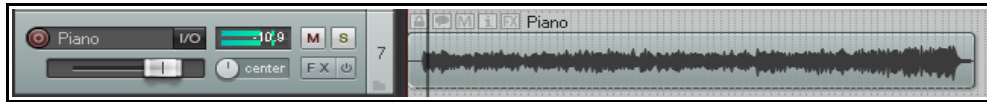
Some examples are illustrated below. Note that these changes are non-destructive. You can switch an item between these different states as often as you wish. For example, to convert a stereo media item to two mono items quickly and easily, you can simply duplicate it, then set one to Mono (left) and the other to Mono (right)



Mode: Normal



Mode: Reverse Stereo

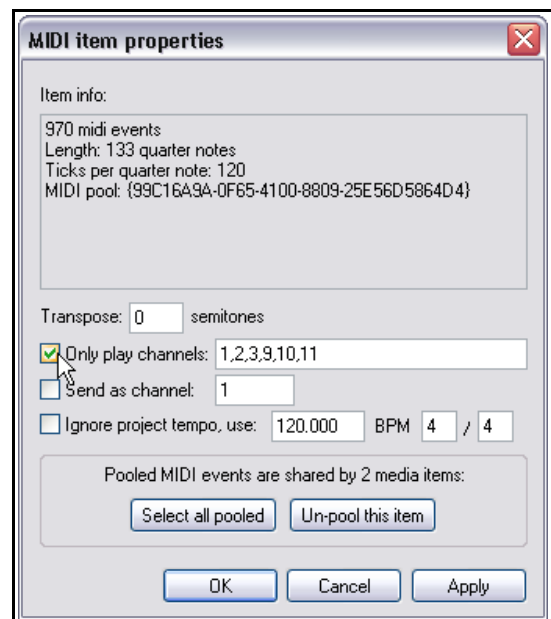
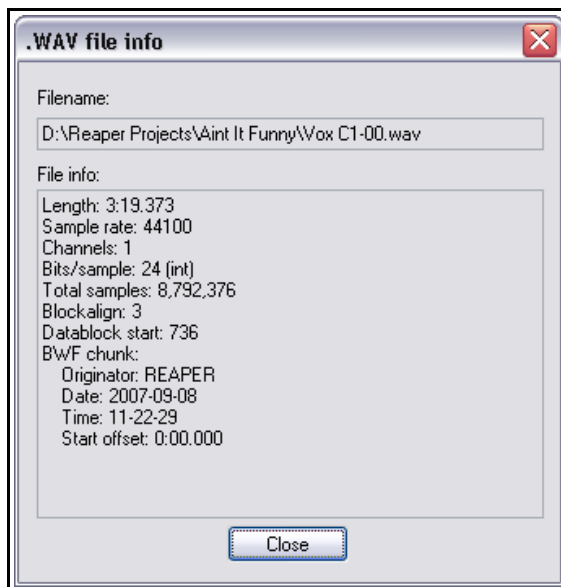


**Mode: Mono  
(Downmix)**

### 6.17 Take Source Properties

The **Take media source** section of the Media Item Properties dialog box can be used to view the properties of the currently selected take, or to change or rename its source file. Where the media item consists of only one take, then the terms “take media source” and “item media source” become synonymous. To change the media item contents click on **Choose New File**, or to rename it use the **Rename File** option.

You can click on the **Properties** button to display 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:



### 6.18 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.

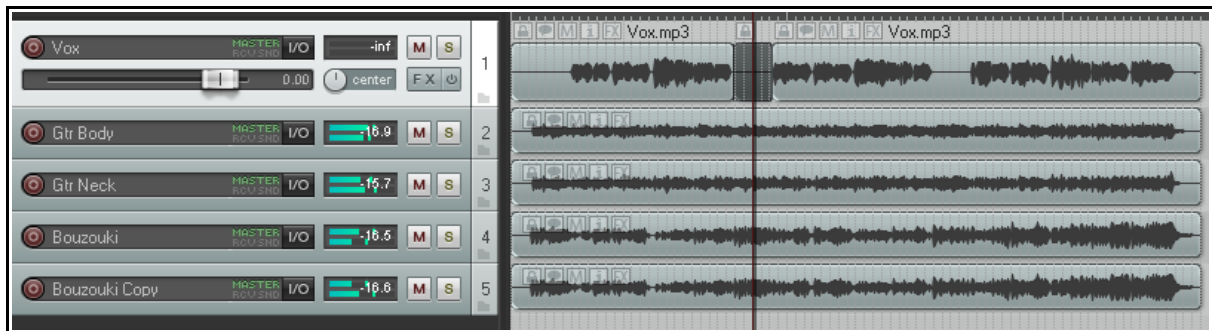
By way of preparation, set pan the two guitar tracks 33% left and 33% right respectively.

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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 tracks**.
2. Change the name of this new track to **Bouzouki Copy**. Press **Ctrl S** to resave the Project File.
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.
4. Click on the **Solo** button for either track – both will be soloed.
5. Use the mouse to lower the volume fader on either track to around -7dB – both tracks will be lowered. As you get near to the -7dB mark, hold the Ctrl key down for more precise movement.
6. 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.
7. Right click over the Media item for the second Bouzouki Track. Choose **Item properties** from the menu. Change **Start in Source** to **0:00.007**. Click on **Apply** then **OK**. This causes this track to be nudged 7 milliseconds to the right. This adds a very small delay effect to make the instrument sound fuller.
8. Press **Ctrl S**. Play the Song.
9. While it plays, hold down **Ctrl** and click on the **Solo** button for either of the Bouzouki tracks. This clears both the Solos.
10. Right click just beneath the **Track Control Panel** area and choose **Show master track**.
11. Adjust panning and volume for the various tracks to get a reasonable mix. You might end up with something similar to that shown above. Press **Ctrl S**.
12. 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.
13. Open the **FX** bin for the Master and insert into it the **JS/Utility Limiter**. Set the maximum volume of the limiter to -0.5. Close the FX window, and make sure the Volume Fader for the Master is set to 0dB. You can now play the song without clipping.
14. 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 (above). Make sure that no track is selected, then press the letter **S** to split all tracks at the cursor mark.
15. 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. If they are not, right-click and drag over them to marquee (select) them.
16. Press **Delete** to remove these items. Press **Ctrl S** to save.
17. Now we're going to mute *part* of an item. We first need to make a separate item containing just the area to be muted.



18. Select the media item for the **Vox** track. Position the Edit Cursor round about the 56 second mark.
  19. 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 to get rid of it.
  20. If you want to hear it first, you can **Solo** that track and play it. Don't forget to **Unsolo** when finished.
  21. View the **Big Clock**. With the edit cursor near the 56 second mark, repeatedly press the **+** key, until the area we want to deal with occupies a large part 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. Press **Esc** to clear the time selection.
- 
25. If the item's mute button is visible, click it. Otherwise, right click on this new item and choose **Item settings** then **Mute**.
  26. Press the **~** key again to return the whole of your song to the display. Adjust track heights as you wish.
  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.

### 6.19 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. You can also specify that the play cursor should be moved when you click on the Time Ruler, an empty area of any track or in the empty area below tracks.

Seek playback when clicked:

- ☐ Top ruler
- ☒ Empty areas of tracks
- ☒ Empty area below tracks

These three options can be enabled/disabled in your **Seek playback when clicked**. (**Options, Preferences, Audio, Playback** settings).

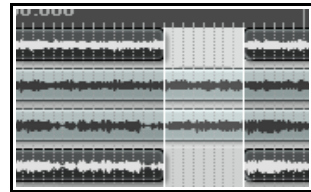
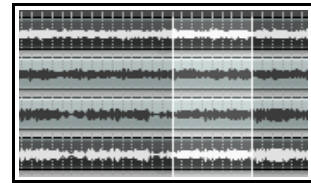


### 6.20 Editing Multiple Media Items

You can use REAPER's various item editing and manipulation techniques (including smart editing) on selections of multiple items. Just make your item selection and then carry out the required action (delete or move, etc).

1. You can do this with more than one adjacent track at a time by using the marquee method (right-click and drag) when making a selection.
2. You can also do this for media items in non-adjacent tracks. Make the time selection, then select the first item, then hold **Ctrl** while you click on each of the other items. In the first picture (top right), 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.

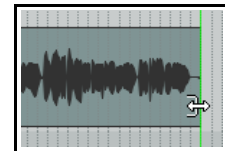
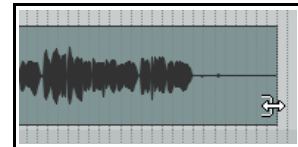
This is an example of where you may wish to customize REAPER's mouse settings to change its default behavior. For example, you might wish to ensure that even when multiple items are selected, only the one item is edited. This can be done on the **Mouse Modifiers** page of your **Preferences** window, a topic covered in Chapter 13.



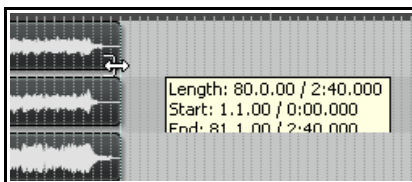
### 6.21 Slip Editing

You can slip-edit unwanted passages from the start or end of a media item by following this sequence:

- Hover your mouse over the lower part of an item's left or right edge so that the mouse appears as a double headed horizontal arrow with a square bracket (as shown right). The direction faced by the bracket will depend on whether you are at the start of the item or the end.
- Click and drag to the right or left (as appropriate), then release the mouse.



#### Slip Editing Multiple Items



To slip edit several items in different tracks, simply select all the media items required (for example, hold the **Ctrl** key while clicking in turn on each item, or use the marquee method), then slip edit any item in the selection. The change will be applied to all items in the selection (see left).

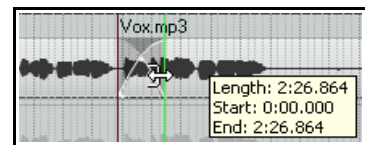
This is another example of where you may wish to customize REAPER's mouse settings to change its default behavior. For example, you might wish to ensure that even when multiple items are selected, only the one item is slip edited. This can be done on the **Mouse Modifiers** page of your **Preferences** window. This topic is covered in Chapter 13.

Take care when slip-editing adjacent items, especially when they are touching each other. If you click and drag on one of the items so as to create a space between the two, then slip editing will take place in the usual way. However, if you slip edit in such a way as to overlap the items, you will create a crossfade. Both items will be heard when the overlapping portion is played.

This is illustrated here, where the end of the first (further left) of the two adjacent items has been slip-edited to the right, overlapping the other item. This behavior can be modified in two ways. Disabling auto-crossfade (on the toolbar) will stop the crossfade, but both items will still be heard.

Enabling **Trim content behind media items when editing (Options**

menu) will ensure that only the slip-edited item (the item on top) will be heard during the overlap.



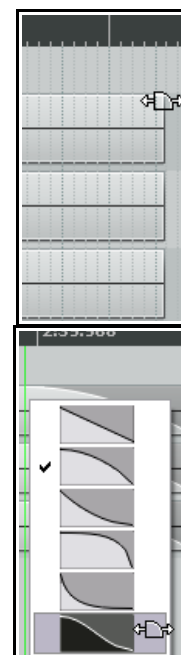
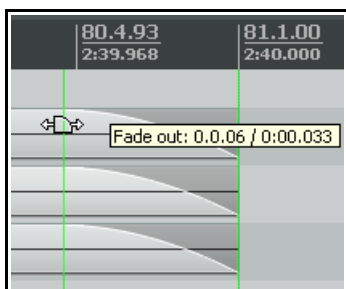
Another technique is to use slip-editing to move the boundary between two adjacent items (perhaps when an original item has been split). Select both items and hover your mouse over the boundary between the items to see the symbol shown here. You can then click and drag left or right to move the boundary.



### 6.22 Adjusting Fades

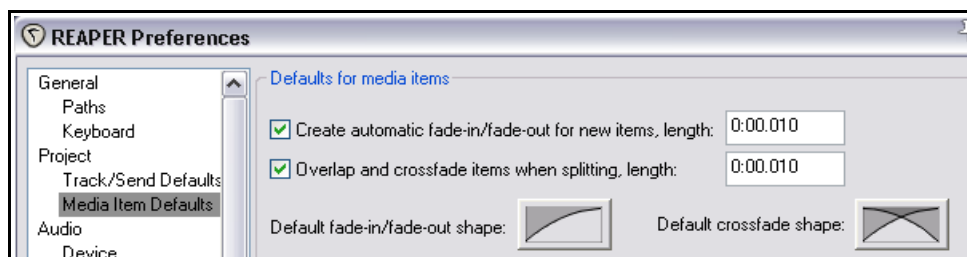
If you select the rightmost clip in a track and zoom in close enough, you will see that there is a fadeout curve at the end of each item. You can change both the shape and duration of this curve, either using the mouse, or thru the **Item Properties** dialog box.

1. Select the rightmost item on one or more tracks. In the example shown (right) three tracks have been selected.
2. Hover your mouse over the vertical white line that marks the start of the fade. The mouse changes to display a curved shape.
3. Click and hold down the mouse button. Drag left to increase the length of the fadeout (see picture left) then release the mouse. Notice that the fadeout curve is now more gradual. If you were to slip edit any or all of these items, the fadeout would keep its shape and duration – it would just begin sooner.
4. Make sure that your media items are still selected.
5. Right-click over the vertical line that marks the start of the fadeout. A menu of different fade curves will be displayed (see right). You can select any of these.



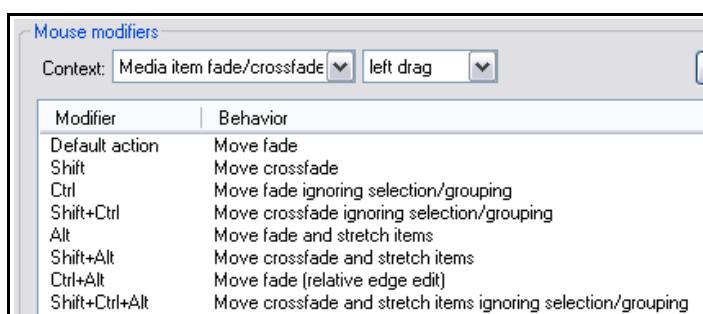
If you prefer, instead of using your mouse, you can press **F2** (with the items selected) to display the Items Properties dialog box. You can make your changes there.

Notice that your **REAPER Options, Preferences** dialog box includes an area on the **Project Defaults** screen where you can specify default fade and crossfade length, overlap, and shape characteristics. See Chapter 19 for further information.



In addition, the Preferences **Mouse Modifiers** page gives you additional functionality by using modifier keys with your mouse when working with fades and crossfades.

For example, holding **Shift** while dragging the mouse left or right will move a crossfade left or right. Other default settings are shown here, but you can change any of them. For information about customizing your mouse modifiers, see Chapter 13.



### 6.23 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.

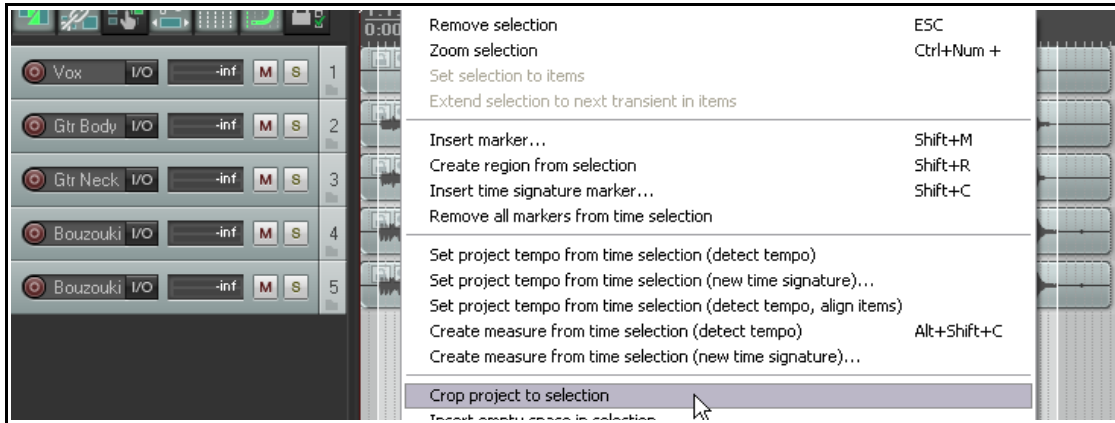
Of course, you can fix this by slip-editing your tracks individually, then dragging and dropping them to the start of your timeline. A quicker way would be to **Crop project to selection**. To crop a project to selection, do this:

1. Click and drag along the background area to mark the area that you want to keep – see picture below.

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2. Right click over the Timeline and choose **Crop project to selection** from the menu. If you wish, press **Esc** when this is done to remove the time selection.

**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 (or use the shortcut keys **Ctrl Numpad Plus** your project will expand horizontally to fit the width of your Track View window.



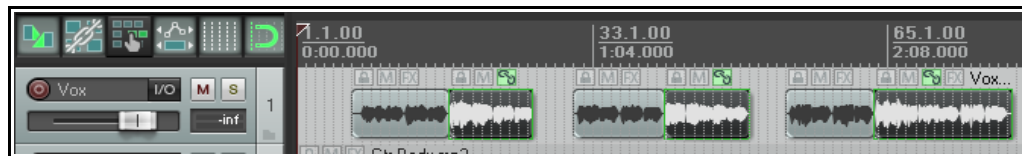
### 6.24 Grouping Items

Provided that Grouping is enabled – **Options, Item Grouping Enabled** command, or **Alt Shift G** – items can be grouped together to facilitate working with them. For example, you can move them together, set them all to a common color, mute and unmute them, and so on).

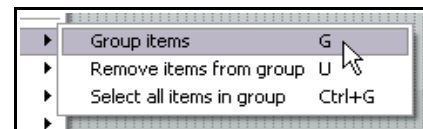
Select the items and use **G** to add them to a group. If you prefer, you can use the **Item grouping** button on the REAPER toolbar to toggle grouping on and off.



In the example shown below, three of the six items have been grouped. Notice that for grouped items a **Grouped** icon will be displayed if this has been enabled in **Preferences, Appearance, Media**. Even when this preference is disabled, you will see a thin colored bar above and below all items that have been grouped (see right).



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 release Ctrl and 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** and save it as **All Through The Night GROUP ITEMS.RPP**

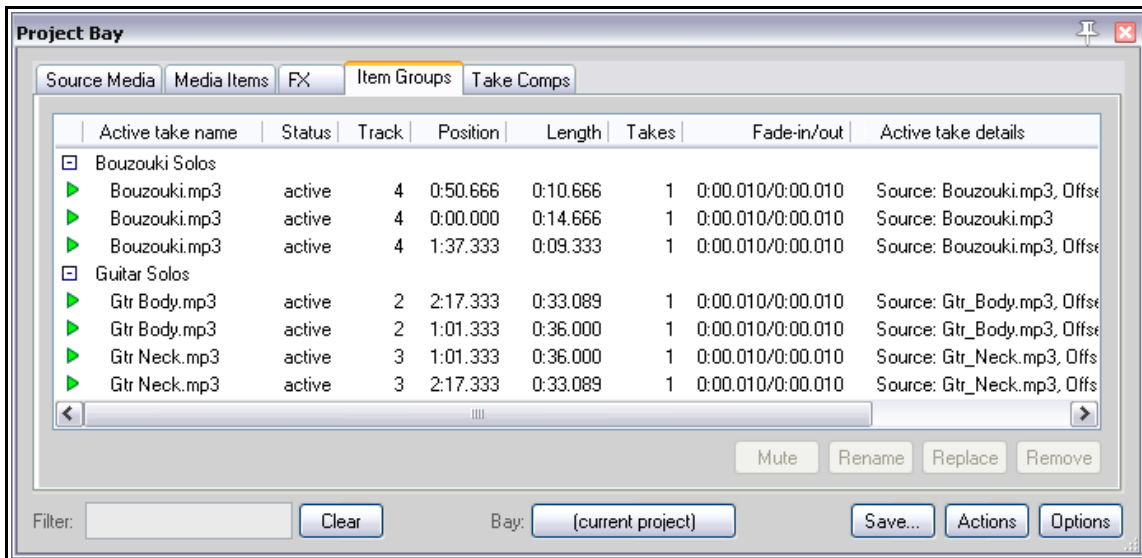
1. Select the **Vox** track, and use the editing techniques that you have already learnt to cut this track into several media items, so that it resembles that shown above. There are a number of ways you can do this – one is to position the cursor at the point that you want to split, then select the item, then press **S**. Repeat this as often as necessary. To remove unwanted items, select them and press **Delete**.
2. Check your **Options** menu to ensure that **Item 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 second of the items in the Vox track. Hold down the **Ctrl** key while you select in turn the fourth and last items for this track.
4. Press **G** to bind them into a group. Select any item in the group and press **Ctrl G** to select them all.
5. If item icons are visible, click on the **Mute** button for any item in the group. Otherwise, right-click and choose **Item Settings, Mute** from the menu. Repeat this to unmute them.
6. With all items in the group still selected, right-click on any of them and choose **Item and take colors** then **Set items to custom color**. Select a color and press **Enter**.
7. Now select the first of the items drag and drop to the right a little. All items in the group will move together. Press **Ctrl Z** to undo this.
8. Now click on any other media item not in the group. This deselects the group. Save the file.
9. Click again on any item in the group and press **Ctrl G**. Again, all group items are selected.
10. Press **U**. These items are now ungrouped. Save the file.

### 6.25 Storing and Recalling Item Groups

Different groups of items can be saved and recalled using the **Item Groups** tab of REAPER's Project Bay. The Project Bay will be explored in more detail in chapter 11. For now, notice that you can open it using the **View, Project Media/FX Bay** command, and then select the **Item Groups** tab. To create and save multiple groups, simply use this method:

- ◆ Open the Project Bay and select the **Item Groups** tab.
- ◆ Select the items for your first group then right click over one of them and choose **Group** then **Group items** from the menu. A group will automatically be created in the Project Bay. You can right click over the group name and choose **Rename group** to give it your own name.
- ◆ Repeat this step to create subsequent groups. The example here shows a project with two item groups.



To select all items in a group, you can now right click over its group name in the project bay and choose **Select group** from the menu. To remove a group, use the **Delete group, keep items** command on the same menu.

**Tip:** To adjust the volume of all items in a selected group, hold **Ctrl** and **Alt** while adjusting the item volume handle of any one of the items in that group.

### 6.26 Glue Selected Items

When you have a number of items in a track that you wish to permanently treat as one, you should consider using the **Glue items** command. When you glue items, they become one and a new media item is created. For example, two MIDI items glued together will automatically and always open together in the same MIDI Editor

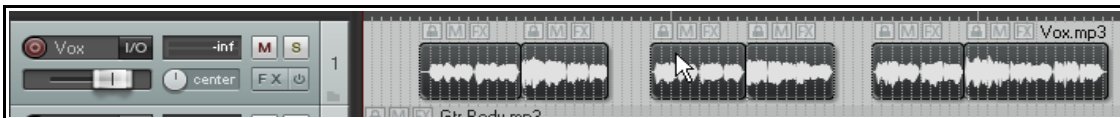
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window. Two audio items glued together will now share one common set of Item properties. Items that have been glued together can be later split up any way you wish. This can be useful if you later realise that you need to adjust one or more properties of a portion of a glued item. To glue together a number of adjacent items in a track, follow this procedure:

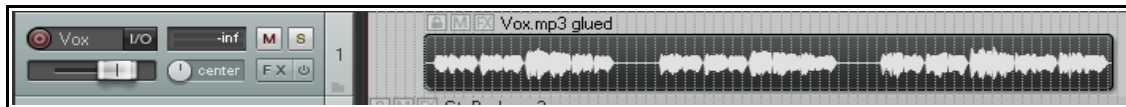
1. Select all of the items that you wish to glue. The easiest way to do this is probably to right click and drag the mouse across the items.
2. Right click over any item in the selection and choose **Glue items** from the context menu.

### Example

In the example shown below, a track is made up of six separate media items (as in the exercise above). 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 any of these items (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.



One application for gluing items is to join several items together into a new loop source. You'll learn more about working with loops in Chapter 8. Another use for glue is to render an item, for example, incorporating item gain and item FX into the new media item and setting the FX to bypass. When a selection of two or more items are glued in this way, the FX and so on will be applied to the appropriate sections of the new item.

## 6.27 Creating and Copying Items in Pencil Mode

REAPER includes an optional pencil mode that can be used to create new media items or make copies of existing ones. How the feature works is determined by your **Track left drag** settings on the **Mouse Modifiers** page of your **Preferences** window.

In Chapter 13 you will be shown how you can change these settings to suit your own custom requirements if you need to. For example, you could assign the **Shift** modifier to be used to draw a new item. For now, we will be looking at the default settings. These default settings are shown here.

By default, the following modifiers can be used with the mouse when clicking and dragging:

Mouse modifiers	
Context:	Track left drag
Reset	
Modifier	Behavior
Default action	Select time
Shift	Move time selection
Ctrl	Draw a copy of the selected media item
Shift+Ctrl	Draw a copy of the selected media item ignoring snap
Alt	
Shift+Alt	
Ctrl+Alt	Draw a copy of the selected media item, pooling MIDI source data
Shift+Ctrl+Alt	Draw a copy of the selected media item ignoring snap, pooling MIDI s...
Shift+Win	
Ctrl+Win	
Shift+Ctrl+Win	
Alt+Win	
Shift+Alt+Win	
Ctrl+Alt+Win	
Shift+Ctrl+Alt+Win	

**Ctrl** – draws a copy of currently selected media item. Snapping will be applied if enabled.

**Ctrl Shift** - draws a copy of currently selected media item , will not snap.

**Ctrl Alt** - draws a copy of currently selected media item pooling MIDI source data. Snapping will be applied if enabled.

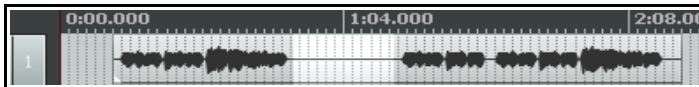
**Shift Ctrl Alt** - draws a copy of currently selected media item pooling MIDI source data, will not snap.



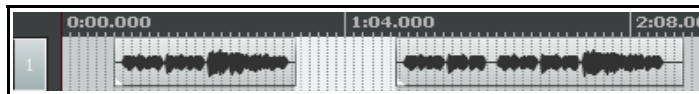
The illustration above is an example of this. The first of two existing media items on a track has been selected. By holding **Ctrl** while clicking and dragging further along that track, a copy of that media item is made.

### 6.28 Ripple Editing

The simplest way to describe ripple editing is this: usually, when you delete part of a media item, a gap is left on the track where the deleted item used to be. With ripple editing, the material on the track is moved over to fill that gap. This is illustrated in the three screen shots below.



This first picture (left) shows a media item selected with a time selection highlighted.

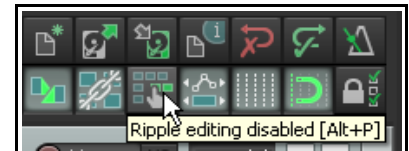


With ripple editing off, deleting the selected area of the selected media item has the effect shown here.



With per track ripple editing enabled, however, deleting the selected area of the selected media item has the effect shown here.

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 edit a track.

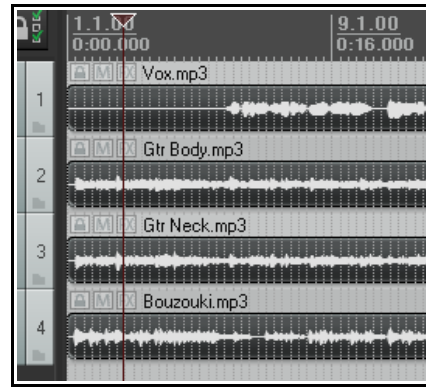
**Per Track:** If you select the ripple editing option once, it will change to per track ripple editing. Ripple editing will then be applied when you are editing the currently selected track(s) but not to any other tracks.

**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. This can be used, for example, 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.





Above is shown one example which uses ripple editing on all tracks. Ripple Editing, all tracks is enabled. In the first illustration, the period of silence before the recorded program starts is selected. The command **Cut selected area of items** is then applied. The selected area is cut from all tracks, and the remaining material is moved to the project start.

### 6.29 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. 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.

### 6.30 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:

1. Select the track (or tracks) for which you wish to allow free item positioning.
2. Right click over the Track Control Panel and choose **Enable track free item positioning** from the context menu.

The following series of illustrations demonstrates an example of how this feature might be used.



In the first screen shot we have a Lead Vocal and a Harmony Vocal on different tracks. We might find it convenient to place these together on the same track.

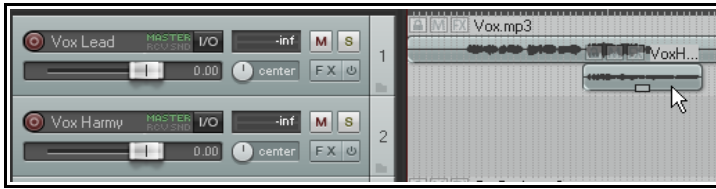
In the second screen shot we have enabled Free Item Positioning for the Vox Main track. Notice that there is a small handle (shown by the mouse cursor) which can be used to adjust the height of this media item.



In the third screen shot the media item for the Vox Hmy track has been dragged and dropped into the Vox Main track.

When this track is played, both of these media items will play together. In fact, in this example, Track 3 can now be deleted.





Each of the (in this case two) items is independent of the other. Either or both can be muted and unmuted, have FX added to them, have changes made to pitch and/or playback rate, and so on. You can use the **Media Item Properties** dialog box (**F2**) and/or the right-click context menu for this purpose.

### 6.31 Mouse Modifiers

You have already encountered many examples of how REAPER uses the mouse with and without modifiers to perform a whole range of tasks. These have so far included making loop and time selections, copying and moving media items, slip editing media items, using item pencil mode, and so on. In Chapter 13, you'll learn more about how you can modify any of these if you wish, and even create your own. Meanwhile, you can find out more about the various Mouse Modifier default settings by browsing thru the **Editing Behavior, Mouse Modifier** section of your REAPER Preferences.

From the **Context** list, select a topic, such as Media item click, Media item edge drag, Track click, Ruler, click, Arrange view right-click, etc. A summary list of all default mouse actions relevant to that context will be shown. You can then double-click on any entry in the Modifier column to assign an action to that modifier.

Shown here (below) is an example of the default actions associated with the various mouse modifiers for when you are dragging media items.

For example, by default, clicking and dragging a media item will move it, ignoring any time selection. Holding **Ctrl** as you do so will copy it – and so on.

There are many more for you to choose from. For example, you could define **Shift Win** as a modifier to restrict item movement to being vertical only, when moved or when copied. You could use **Ctrl Win** for adjusting an item's volume, and so on. To do either of these, you would need to double-click on the modifier in the list, then make your choice from the list of commands and actions offered.

The **Context** drop down list includes the following entries that can be relevant when you are working with media items.

**Media item (left click, left drag and double-click)**

**Media item bottom half (left click, left drag and double-click)**

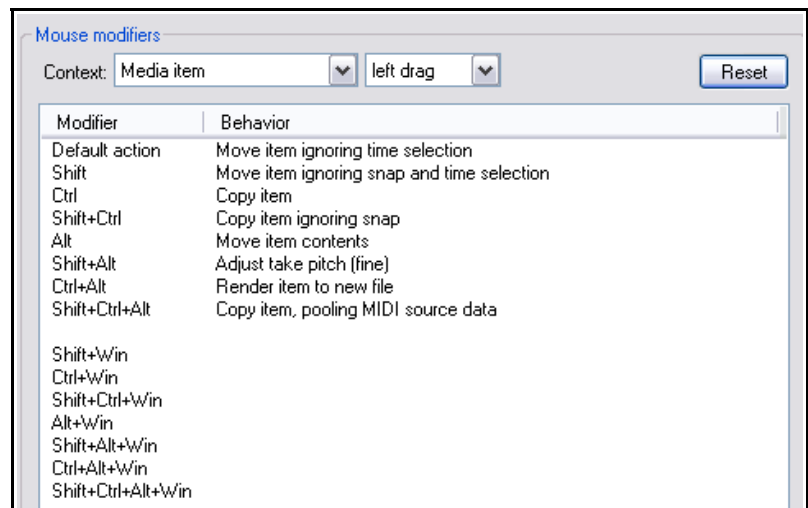
**Media item edge (left drag and double-click)**

**Media item fade/crossfade (left click, left drag and double-click)**

Notice that in many cases different actions can be applied when clicking, dragging or double-clicking on the bottom part of a media item from those applied when doing so on on the top part.

There's a lot to explore here, and how you use these options will very much depend on your own personal needs.

The examples that follow should help to get you started.



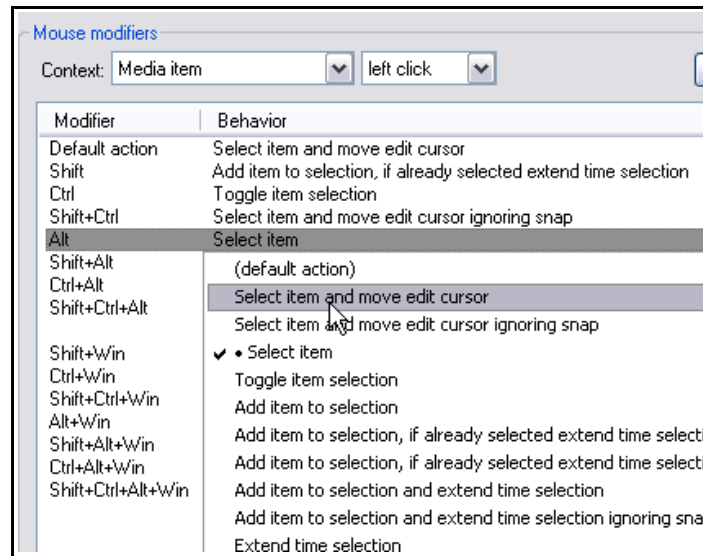
### Media Item Left Click Modifiers

Shown here are the default assignments for mouse behavior when you click on any media item.

Notice that the default behavior for a simple click is **Select item and move edit cursor**. On the other hand, **Alt Click** will select the item without moving the edit cursor.

If you wish, you can swap these assignments over, so that a simple click will select the media item without moving the edit cursor.

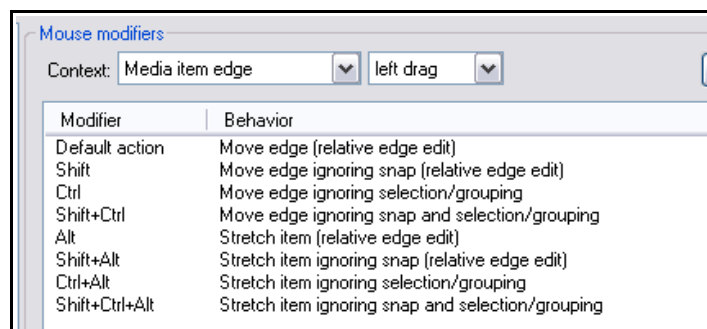
To do this, just double-click in the list on the item that you wish to change, then select your preference from the list (see right). You will find more information about customizing mouse modifiers in Chapter 13.



### Media Item Edge Left Drag

Shown here (right) are the default mouse modifier settings that are used when clicking and dragging on the edge of any media item(s).

Chapter 13 includes a step by step example showing how you can change these.

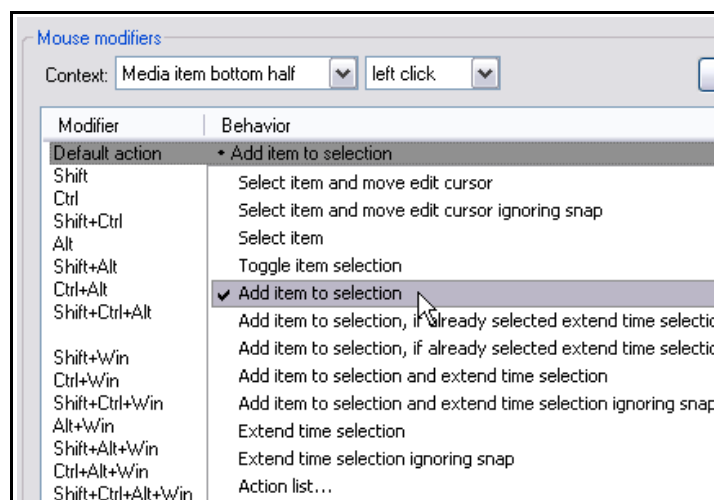


### Other Options

Notice that you can assign different modifiers to be used when clicking on the bottom part of media items from those used when clicking on the top part.

In the example shown here, the default action for a simple click on the bottom half of a media item is being changed to **Add item to selection**.

These are just some of the many possible examples which illustrate how you can use mouse modifiers in various different contexts when editing media items. It's up to you now to explore the many other options for yourself, depending on which aspects and options are most important to you!



### 6.32 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.

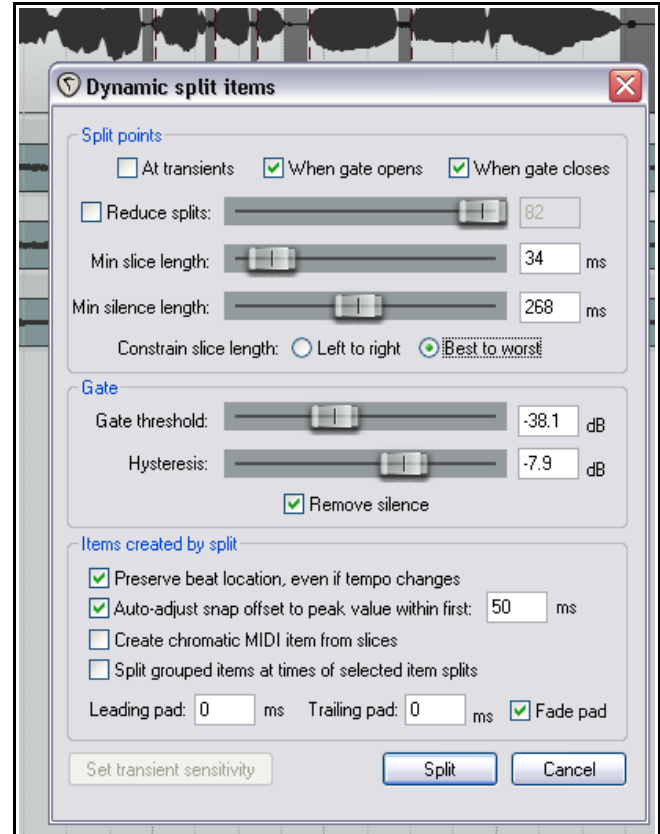
To do this, you first select the media item then right click over it and choose the **Item processing, Dynamic split items...** command. You then need to select the required parameters before splitting.

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 in Chapter 8, 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 here and adjust then as necessary.

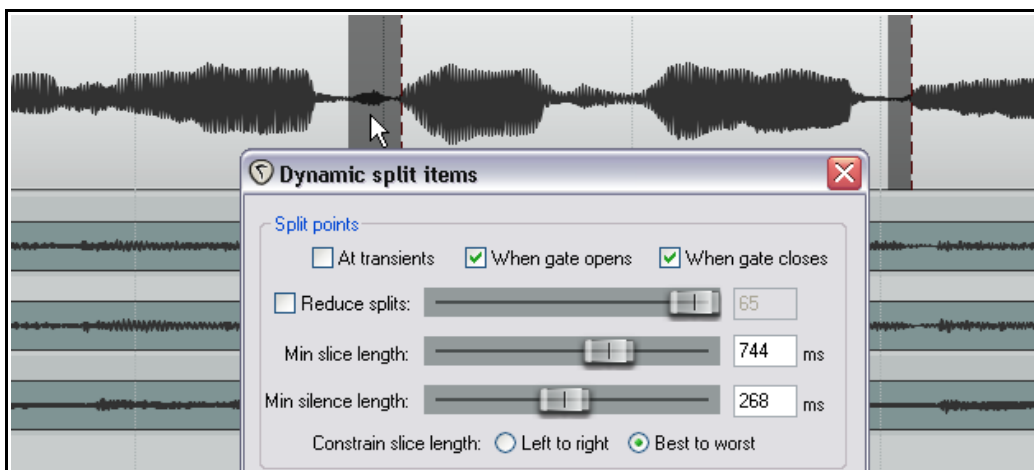
#### Summary of Dynamic Splitting Parameters

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>	You would be unlikely to select one of these options without the other. 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

Dynamic Splitting Parameter	Setting to Remove Silent Passages
<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>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>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.

### 6.33 SWS 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 number of media items with the edit cursor, or setting the volume of an entire selection of media items in one action. You will find that many of these actions – and more - are available as a plug-in to REAPER by downloading and installing the **SWS Extensions** Pack. To do this, you simply follow this sequence:

1. Go to <http://www.standingwaterstudios.com>
2. Follow the instructions to download the correct version for your operating system.
3. After downloading, run the install program, then start REAPER in the usual way.

The contents of this extension pack are by no means lightweight. They include not only hundreds of useful actions for editing and more but also whole modules which bring extra functionality to REAPER, including mixing snapshots and marker management. So comprehensive are they that they come with their own PDF manual.

### 7 Arranging, Comping and Editing Takes

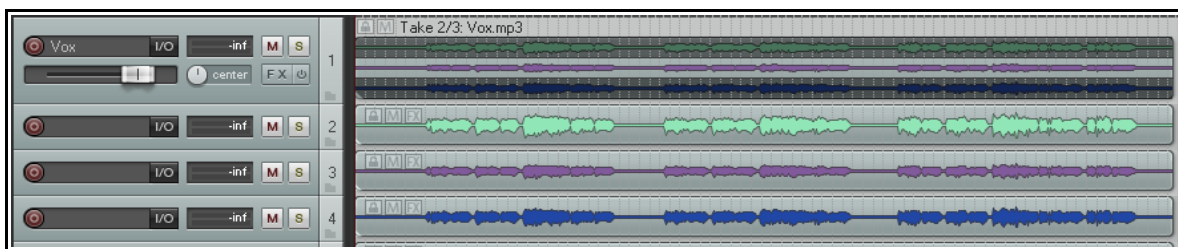
Earlier, in Section 3, we looked at how you can create multiple takes when you are recording. In particular, make sure you are familiar with the sections that cover **Showing Takes in Lanes**, **Using Color Coded Takes** and **Working With Multiple Takes**. The editing and arrangement techniques covered in Chapter 6 can also be applied to editing a project with multiple takes. 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.

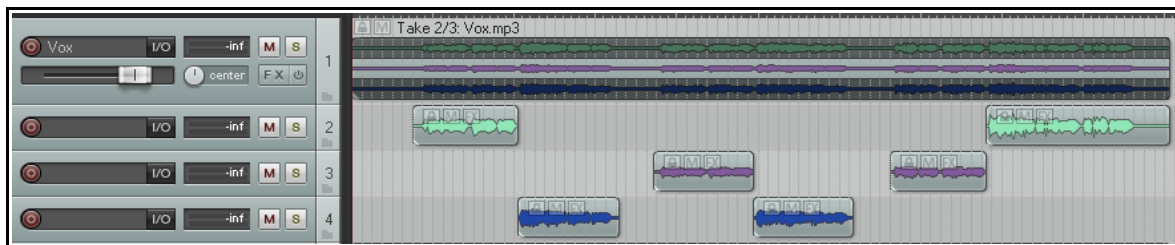
Note that unless specifically stated otherwise, the instructions in this section assume that you have the free item positioning option disabled for the tracks that you are working on. This is the default setting. (For more information about free item positioning, see chapter 6).

#### 7.1 Exploding Takes to Multiple Tracks

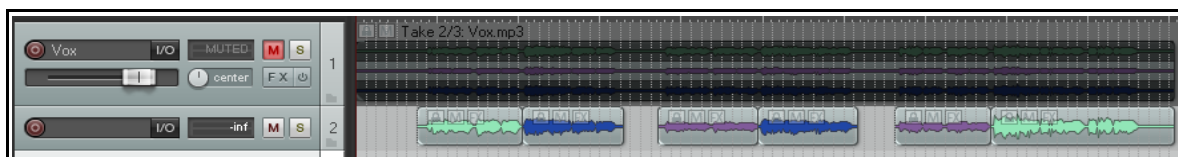
We'll start by looking at the first of these two methods. Let's suppose that we have recorded three takes of a vocal track. We can right click over the item and use the **Take, Explode all takes to new tracks** command.



This command creates (in this case) three extra as yet unnamed tracks – the original track with its three takes is still intact. Now suppose that 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 various editing techniques that have been covered in Chapter 6.



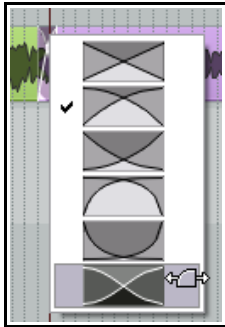
Finally, we select the various items from tracks 3 and 4 and use the **Num Lock 8** key to move them up to track 2. Track 1 is now muted and could of course be hidden if we wish. Tracks 3 and 4 serve no further purpose and can be deleted.



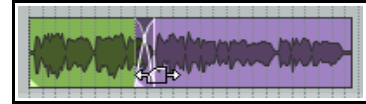
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You could now select all of the items in track 2 and use the **Glue Items** command to bind them together as one media item. Note that the original muted track with the three takes on it is still available. This makes it easy at some later time for us to change our mind about what to include in the vocal track if we wish.

### 7.2 Crossfades



If you intend to arrange your media items so that they overlap, 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**).

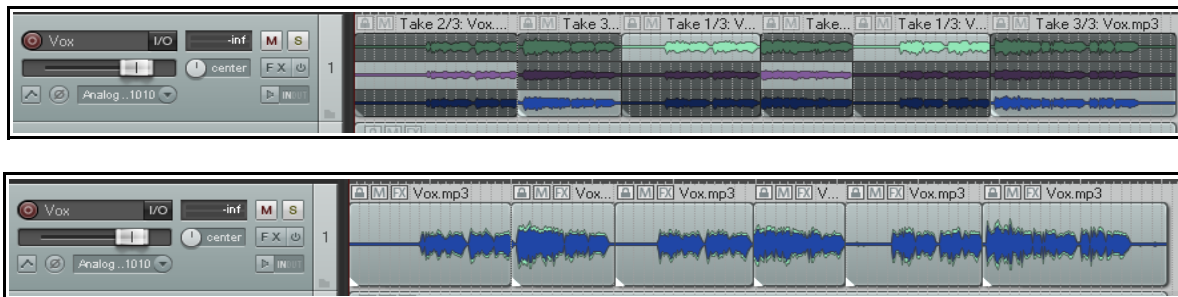


The curves of crossfades can be edited. You can extend the crossfade in either direction by dragging the vertical fade bars. If you hold **Shift** while doing this, you can move the crossfade itself left or right to a new position. Right-clicking over the crossfade reveals a menu of different crossfade shape options (see left).

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

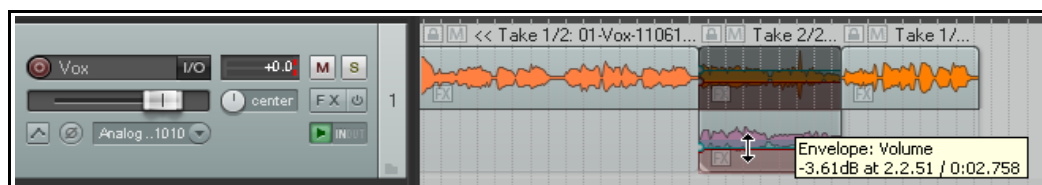
Another option is to use the **Take, Explode all takes (in place)** command. This has the effect of merging all takes on the track into a single lane. Here's an example of when you might wish to do this. The track shown here includes three lead vocal takes. You have made your selection of the best parts of each take. These have had their individual item properties (such as volume) adjusted to give you the sound that you want.



By exploding all takes in place, the selected items are placed over the others takes in a single lane, and are played together.

### 7.4 Play All Takes

Here's a really interesting trick you can do with takes. Shown here is a vocal track with an



overdubbed vocal harmony for just two lines. Both takes at that point have had individual pan and volume envelopes added, and perhaps some FX in their individual take's FX chains.

After selecting both these media items, right-click over either one of them and choose **Item settings** then **Play all takes**. We now have our complete vocal and harmony mix on one single track! This setting is also available from within the Item Properties window.



### 7.5 Editing and Comping Multiple Takes

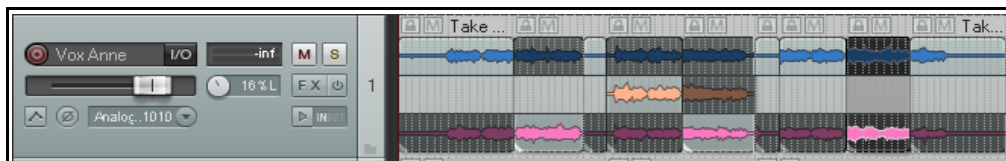
You don't need to explode takes to multiple tracks in order to manage them. In this section we'll see some of the ways in which you can manage your takes all within a single track. In overview, this essentially consists of selecting the best parts of each take and comping them together into a single take of your preferred selections.

#### 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. The different methods that you can use for splitting are explained in Chapter 6.

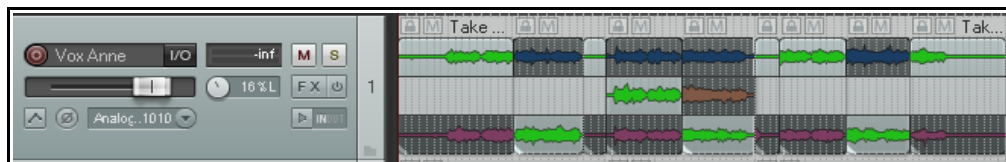
A clever trick is to make all of the items that together make up a complete set of preferred takes a different color from the others. To do this, first choose your takes and select all of the media items (use marquee to do this), then choose from the **Item** menu **Item and take colors**, then **Set active take to custom color** or **Set active take to one random color**. These commands are also available from the media item right-click context menu. An example of how this can be used is shown below.

Notice in this example that the second of these takes consists of an overdub of just a small portion of the song. The



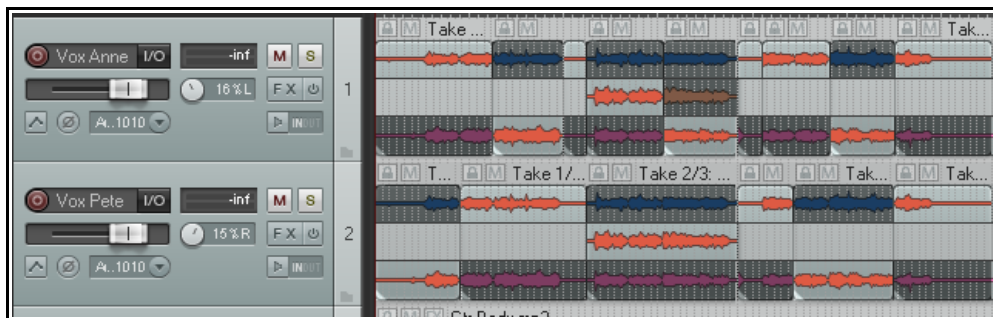
option to **Display empty take lanes (Options, Take lane behavior menu)** is enabled to ensure that your takes are displayed more clearly. An empty part of a take (such as exist in Take 2 here) cannot be selected unless you enable **Allow selecting empty take lanes (Options, Take lane behavior menu)**.

If you prefer not to see the empty take lanes, you can hide them by disabling **Display empty take lanes (Options, Take lane behavior menu)**, as shown above.



#### Comp Sets

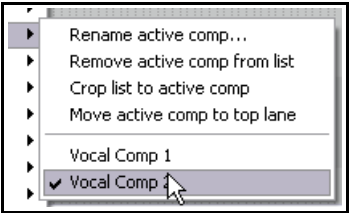
You can save multiple comp sets for individual tracks (as shown above) and even for groups of tracks (as shown right). This is a project with two vocal tracks, each of which has been sliced and diced and the preferred takes colored rusty red.



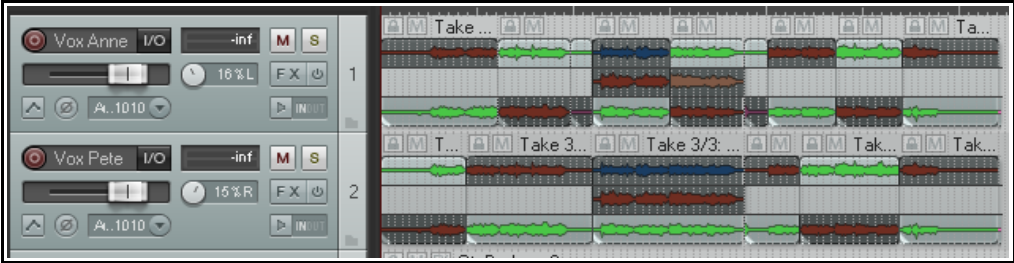
With all media items in this set selected (use marquee for this), you can right-click over the selection and choose **Comps** then **Save as new comp** from the context menu. You will be prompted for a name: this name will then be added to the Comps menu and can be used to recall this comp from the menu at any time.

There is no limit to the number of comp sets that you can save and use. Here is a summary of the commands on the **Comps** sub-menu.

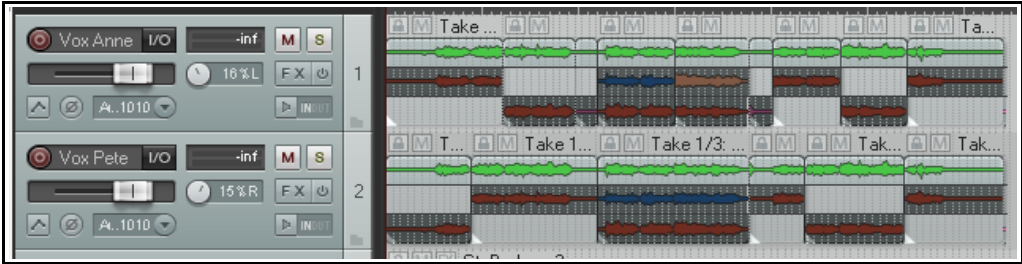
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Command	Explanation
Save as new comp	Saves your current selection of takes on all currently selected tracks as a new comp set. You will be prompted for a name.
Rename active comp	Lets you change the name of current active comp set.
Remove active comp	Deletes the currently selected comp set and removes it from the Comps menu. This does not remove any takes or media items from the project itself.
Crop list to active comp	Removes other comp sets from comps menu list.
Move active comp to top lane	Moves all items in take selection to the top lane of its track.
Comp names	<div>Your comps will be listed at the end of the Comps menu (see example right). Choosing any of these will cause that set of takes to be selected.</div> <div></div>

In this example, we have created a second comp set and colored it green. We can now switch between comp sets at will.

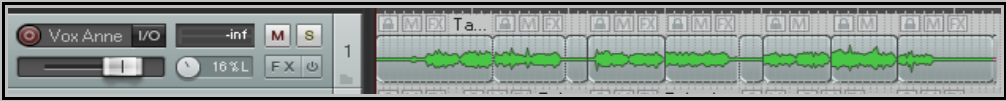


In this example, with our preferred comp set selected we have used the command **Move active comp to top lane**.



Don't forget also that by pressing **Ctrl L** you can toggle lane display on and off, as shown here.

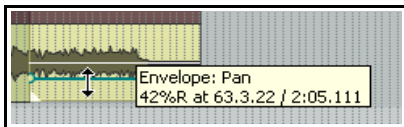
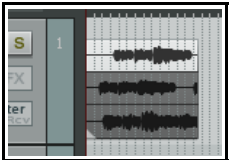
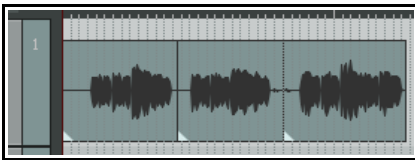
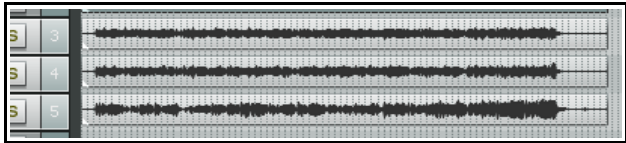
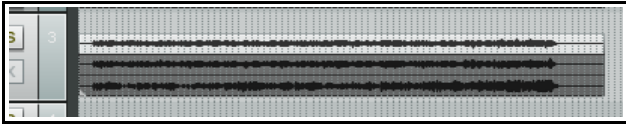
**Tip:** When you use lanes and slice and dice in this way, you can use the **Num Pad** keys 1 and 3 to slide items left or right if their timing is slightly out of sync with other takes. The exact amount by which these keys will slide your selected media item(s) will depend on how closely you are zoomed in or out.

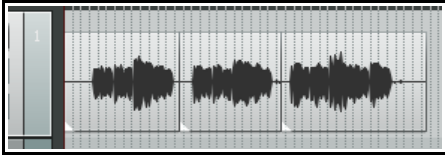
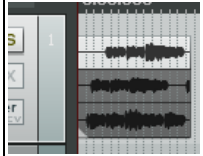


As a rule, you are likely to find that in the earlier stages of post production, you are more likely to want to create and save comp sets for individual tracks, rather than for groups of tracks. This will offer you a great deal of flexibility in how you "mix and match" your various tracks together. However, as your mix progresses towards its completion, you may find that it can be more advantageous to save comped sets for whole selections of tracks, so that they can be recalled and used together.

## 7 - Arranging, Comping and Editing Takes

The table below summarizes other **Take** menu management commands that are available to you:

Command (Shortcut)	Explanation
<b>Next take (T)</b>	Makes next take the active take for all selected media items.
<b>Previous take (Shift T)</b>	Makes previous take the active take for all selected media items.
<b>Delete active take (X)</b>	Deletes currently selected take on all currently selected media items.
<b>Crop to active take (Alt Shift T)</b>	Removes all non-active takes from currently selected media items.
<b>Duplicate active take</b>	Adds a copy of the active take to the item as a new take.
<b>Lock to active take</b>	This is a toggle command. It locks the current active take selection. When take locking is applied to a media item, its active take cannot be changed unless this toggle is unlocked.
<b>Show FX chain for active take</b>	Opens the FX browser to allow you to add FX to the active take for the selected media item.
<b>Remove FX for active take</b>	Removes FX previously added to a take's FC chain.
<b>Take volume envelope</b> <b>Take pan envelope</b> <b>Take mute envelope</b> <b>Take pitch envelope</b>	Adds an automation envelope to the selected take. You'll learn more about automation envelopes in Chapter 16. 
<b>Explode all takes to new tracks</b>	Copies each take to a new track.
<b>Explode all takes in place</b>	Places selected takes on the same track on top of each other, so that all will play at once.
<b>Explode all takes (in order)</b>	Places selected takes on the same track in sequence, one after the other. This command turns this ... into this: <div style="display: flex; justify-content: space-around; align-items: center;">   </div>
<b>Implode items across tracks into takes:</b>	Copies all selected items to a single track as a series of takes. This command turns this ... <div style="text-align: center;">  </div> ... into this: <div style="text-align: center;">  </div>

Command (Shortcut)	Explanation
<b>Implode items on same track into takes:</b>	Moves all selected items to the same start time as a series of takes on the same track. This command turns this ....  ... into this: 
<b>Paste to takes in items</b>	Pastes previously selected and cut or copied takes into selected tracks as a new item.

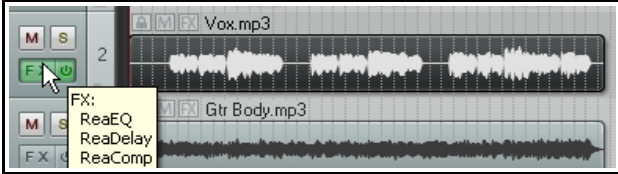
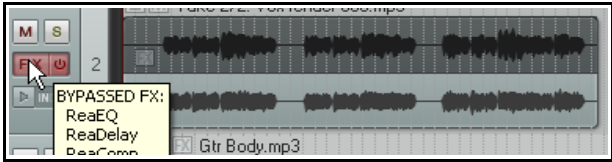
7.6 More Take Actions

The third section of the Items context menu contains a series of commands that involve creating a new take from an existing item. These commands open up for you a number of interesting and creative options.

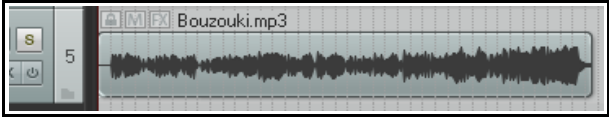

The first three of these involve applying track effects to an existing media item and are essentially similar – one creates a mono item, one a stereo item and the third of these is used with MIDI items.

The table below summarizes these commands and how they are used.

Item settings	
Item properties...	F2
Source properties...	Ctrl+F2
Item and take colors	
Group	
Take	
Comps	
Item processing	
Open items in editor	
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 items	

Command (Shortcut)	Explanation
<b>Apply track FX to items as new take</b> <b>Apply track FX to items as new take (mono output)</b> <b>Apply track FX to items as new take (MIDI output)</b>	One use for this command is to free up CPU if your system is becoming stressed. Consider an example of a track with some FX in its FX chain, say reverb and a compressor:  After applying track FX, we have a new take with the FX applied to it. The original FX chain can now be set to bypass:  This will not only reduce your CPU overload, it also opens up further creative options for you. Try selecting <b>Play all takes</b> then using pan and volume envelopes on both takes to vary their placement and relative volume levels for different parts of the song.
<b>Render items as new take</b>	This command is another CPU miser. It will render the existing media item as a new take.

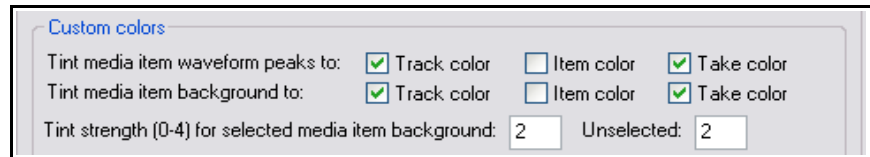
## 7 - Arranging, Comping and Editing Takes

Command (Shortcut)	Explanation
<b>Reverse items as new take</b>	<p>You can have some fun with this one. It does what it says – it adds a new take to the media item with the material reversed.</p> <p>Here's an example. Starting with this ...</p>  <p>... we end up with this:</p> 

Don't forget how many options you now have ... slice and dice, play all takes, volume, pan and mute envelopes, pitch and/or playback rate shifting, take FX ... and so on!

### Footnote: Confused about colors?

REAPER's **Preferences, Appearance, Media** settings includes so many color options that you could be forgiven for being confused as to how they work.



In the example shown here, we have asked for media item peaks and backgrounds to show both track colors and take colors. Clearly to show both of these will not be possible.

In cases like this, the option furthest to the right will take precedence. In other words, for a particular media item, if takes have not been colored then the track colors will be used. If, however, take colors have been specified, then these will take precedence over track colors.

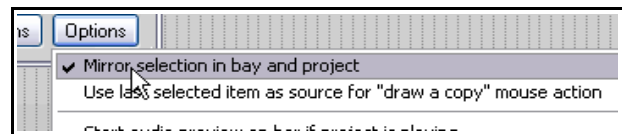
### 7.7 Managing Comps with the Project Bay

Takes and comps can also be managed from within REAPER's Project Bay.

The Project Bay is a one-stop center which allows for the convenient management of a project's media items, FX, item groups, takes and comps. It is explored and explained in detail in Chapter 11 of this User Guide.

To open and display the Project Bay, use the **View, Project FX/Media Bay** command. Click on the tab labeled **Take Comps** to display the takes and comps management section.

Clicking on the **Options** button (bottom right) displays a menu. This menu is explained in detail in Chapter 11. For now, notice the option to **Mirror selection in bay and project**. When enabled, this allows you to select any media item or segment by clicking on it either in the project itself or in the list shown in the project bay.

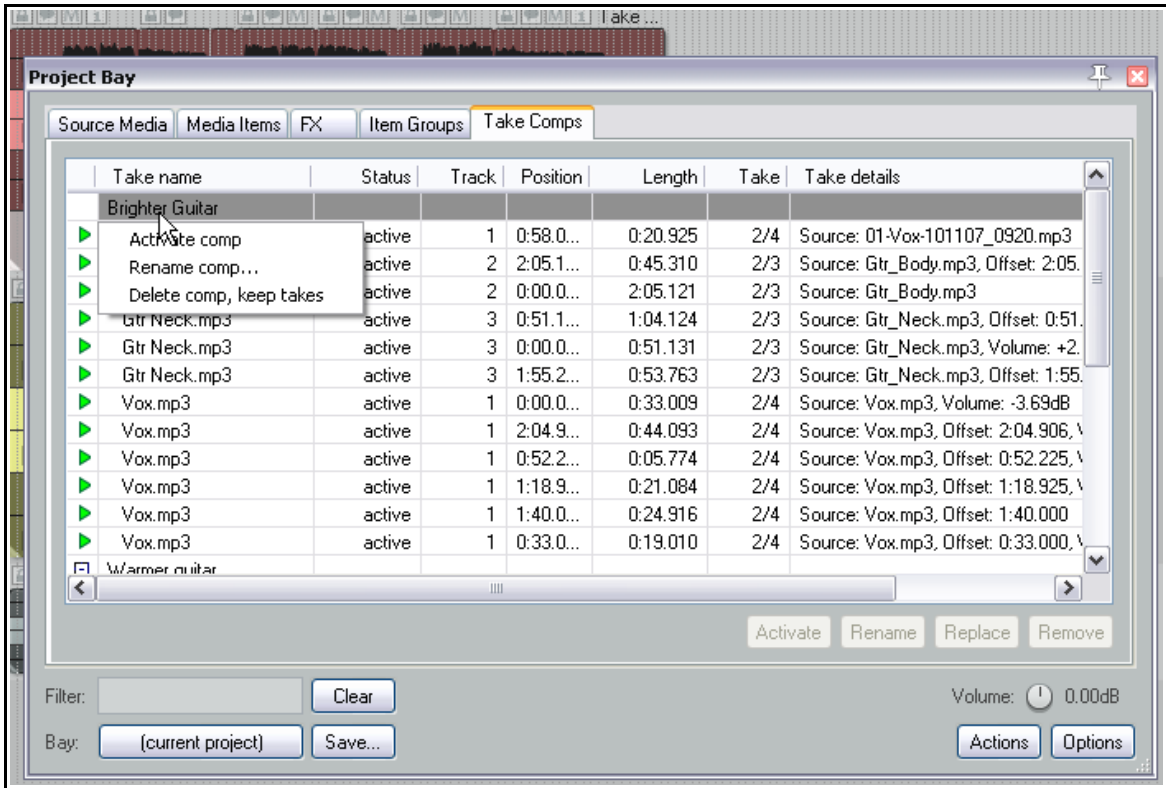


Within the project bay window (see below) you can right click over any listed comp to display its context menu. Choices include commands to **Activate comp**, **Rename comp** and **Delete comp (keep takes)**.

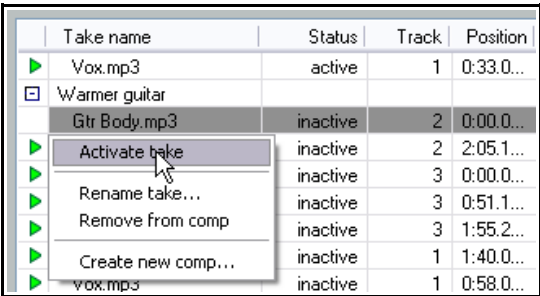
You can also create a new comp from your current take selection by clicking on the **Actions** button (bottom right) and choosing **Create new comp** from the Actions menu.

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An example of a project with the Project Bay open and the Take Comps window selected is shown below:



The illustration on the right shows how within comp sets you can also select and manage individual takes and items. For example, you can activate or deactivate individual takes, or remove them from the comp altogether.





## 8 Loops, Markers and Regions

### 8.1 Creating Loops

Any audio, MIDI or click source Item can be looped. Indeed, by default REAPER media items are loop enabled. You can disable this for individual items in the Media Item Properties dialog box, or globally (for MIDI and imported items) on the **Project, Media Item Defaults** page of your Preferences.



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. Note that in the following examples, if you are using beats for your timebase, the item must be an exact number of beats in length, or it will not loop in sync. If necessary, adjust the playback rate (Media Properties) while preserving pitch, then glue the item to do this.

#### To Loop an entire Item:

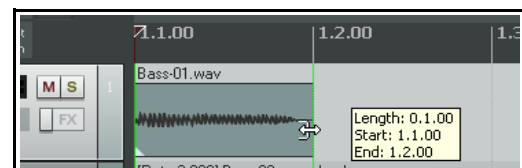
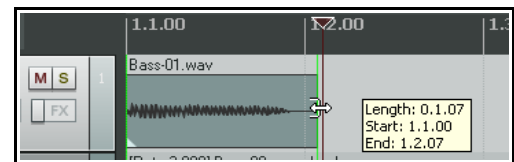
1. Hover the mouse over the edge of an Item until the Cursor changes to a double-headed arrow (see right).
2. Drag the Cursor to extend the Item. Each loop point will be indicated by a notch in the item edges.
3. The length, start time and end time of the looped item will be displayed as you drag the edge of the loop.



#### Cropping and Looping:

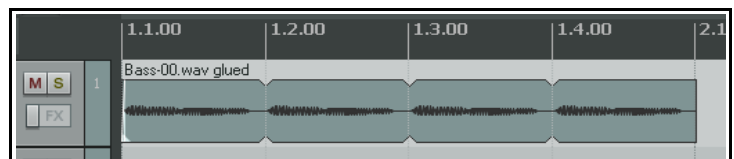
If you wish to loop only part of an item, then the item must first be cropped and glued.

1. Make sure snapping is enabled. 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 choose **Glue items**.
3. Now drag the Cursor to extend the Item. Each loop point will again 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, for example to keep it in sync. Taking the same example as above, you would first display the **Item Properties** box, and most probably make sure that **Preserve pitch when changing rate** was selected. You could then change the **Playback rate** (for example, to 2.0). This would have the effect shown here. The original item (looped) as shown above has had its playback rate modified (right).



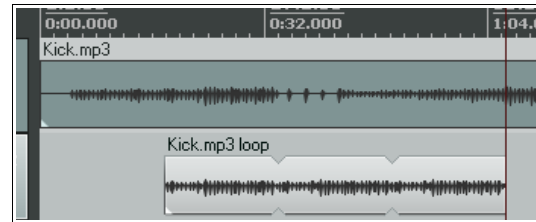
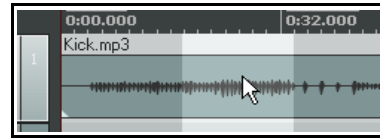
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### Creating a Loop from a Time Selection

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 to be looped (see above). Either press **Ctrl Alt L** or right click and choose **Copy loop of selected area of item**.
2. Select the track and position to which you want the item copied.
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 can be inserted at the current Edit Cursor position, whether or not the project is being played.

Action	Shortcut	Effect
<b>Insert, Marker</b> command	<b>M</b>	Inserts numbered Marker at present position.
<b>Insert, Marker ( prompt for name)</b> command	<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 to Remove Marker or Edit Marker.

### Keyboard and Mouse Shortcuts

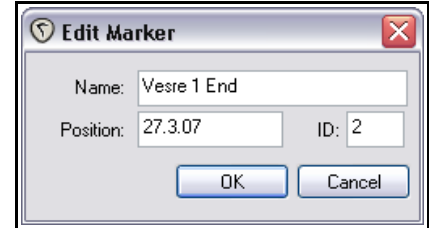
Default Keyboard and Mouse Shortcuts for creating and navigating with markers are:

To do this ...	Mouse/Keystroke
Go to marker 1 thru 10.	<b>1</b> thru <b>0</b> on main keyboard, not Num Pad.
Move marker 1 thru 10 to cursor position, or create new marker if no marker of that number exists.	<b>Ctrl 1</b> thru <b>Ctrl 9</b> and <b>Ctrl 0</b>
Go to next marker/ project end or previous marker/ project start.	<b>]</b> or <b>[</b>
To jump to any marker.	<b>Ctrl J</b> opens Jump To dialog. Type m and marker number – e.g. m2 to jump to marker 2.
Jump to marker using the Transport Bar.	<b>Right click on Transport Bar</b> then <b>Jump to marker</b>
Open Edit marker dialog (e.g. to add or change marker name or change marker color).	<b>Shift double-click on marker number</b> . Type a new name, or click on <b>Set color</b> .
Make loop selection in REAPER's main arrange view or in the MIDI Editor piano roll view.	<b>Double-click on ruler between two markers</b>
Select area between the two markers.	<b>Double click on timeline between markers</b>
Move a marker.	<b>Click and drag marker along timeline</b>
Remove a marker.	<b>Alt Click on marker</b>

### Example

This example illustrates the use of markers. Before you begin, on the **Options** menu, enable the option **Loop points linked to time selection**.

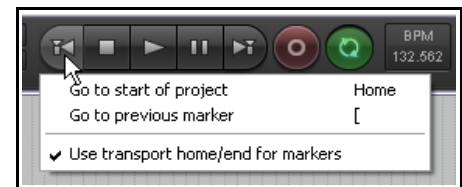
1. Open the sample file **All Through The Night.RPP** and immediately save it as **All Through The Night MARKERS.RPP**
2. Play the song. Just before the place where the vocal starts. Press **Shift M**. When prompted, type as the name **Verse 1 Start** and press **Enter**
3. At the end of the first verse, 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 ruler (not the markers row) between markers 2 and 3. Notice that this area is now looped and will play repeatedly.
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 Time Selection Start/End Markers

REAPER treats the start and end of any current time selection as floating markers. The shortcut keys for **Go to next marker** and **Go to previous marker** are **]** and **[**. These will also find the start or end of the current time selection and move the play cursor there.

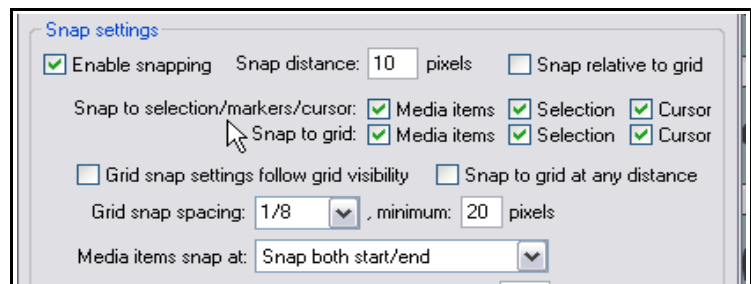
You can also right-click over the **Go to start** button and enable the option **Use transport home/end for markers**. The Go to start and Go to end buttons will now find the start/end of a time selection when one is current.



### 8.4 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 starts or 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.



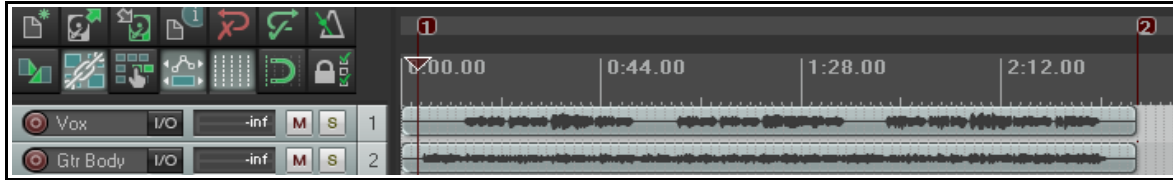
However, in the second example shown, with snapping *enabled* and the settings shown above, if you drag the selection to within 10 pixels of the marker

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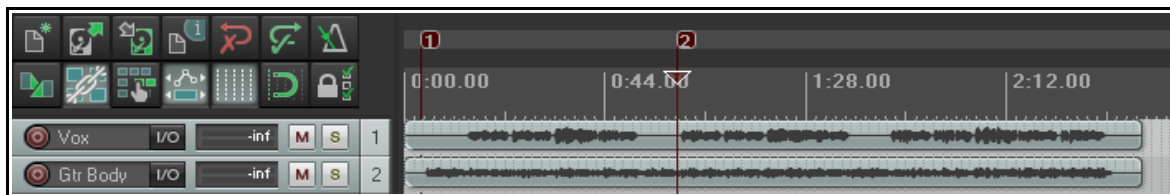
position, the selection will automatically snap to the marker when you release the mouse. Notice the effect of making exactly the same selection with the above snap settings disabled (left) and enabled (right).

### Example

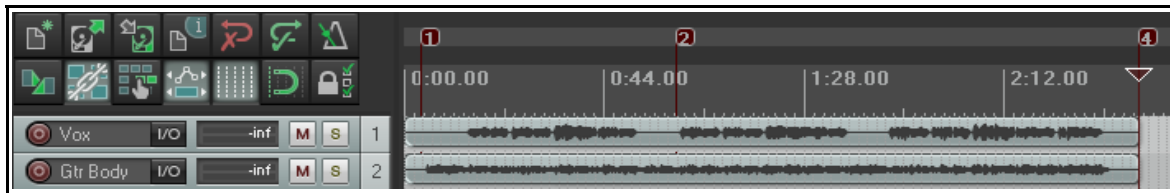
In the first screen shot (below), a project contains two markers, one at the start and one at the end of the project.



Suppose that you wish to reposition Marker 2 at the start of the second verse. You can simply position the edit cursor there and then press **Ctrl 2**.



Now let us suppose that you want to create Marker 4 at the end of the song, reserving Marker 3 for a position as yet unspecified. You 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 ...

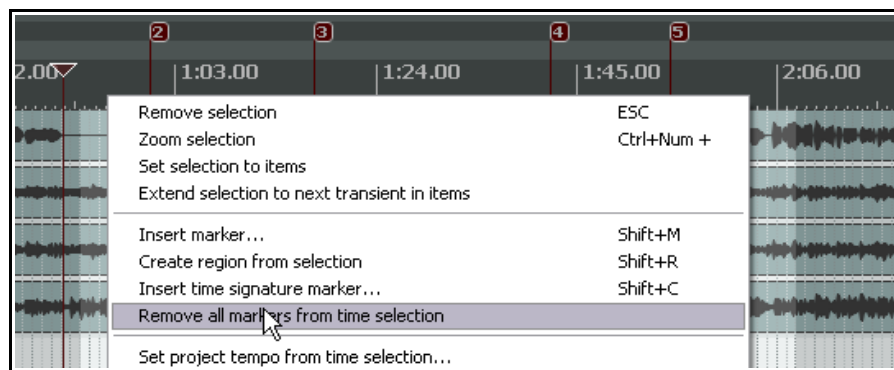
Position the mouse over the marker "flag" and hold down the **Alt** key while you click the left mouse button. Alternatively, you can right-click over the marker flag and choose **Remove Marker** from the context menu.



### 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 Creating and Using 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.

To do this ...	Mouse/Keystrokes/Command
Create a new region from the current selection.	<b>Shift R</b> or right click, <b>Create Region from Selection</b>
To change name or other properties of the region.	<b>Shift Double click</b> on region icon.
To specify a color for a region.	<b>Shift Double click</b> on region icon then <b>Set color</b> .
Make the area of the region the current selection.	<b>Double click</b> on region icon, or right click on region icon, <b>Select Region</b>
Remove a region.	<b>Alt Click</b> on region icon

#### To create a Region from two existing Markers ...

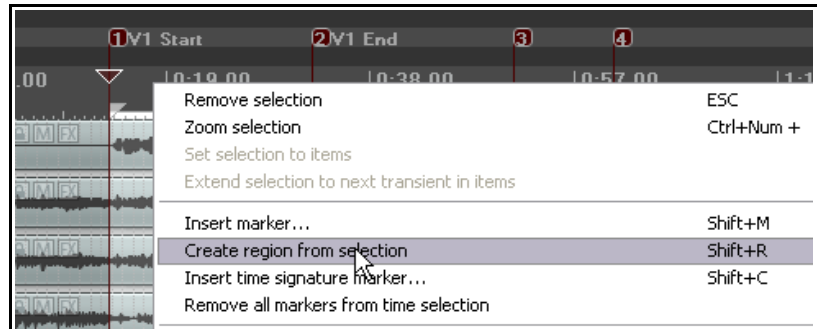
1. Make sure the **Option** for **Looped points linked to time selection** is enabled.
2. Double click on the timeline (not the markers row) between the markers to make the selection.
3. Right click and choose **Create region from selection**.

#### To create a Region from scratch ...

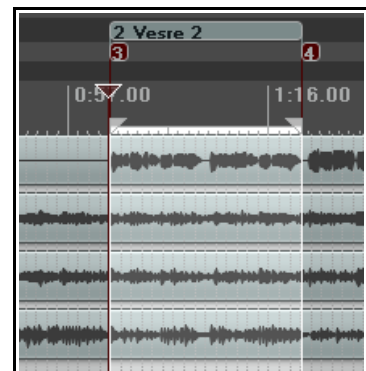
1. Click and drag across the background area of the Track View to make the selection.
2. Right click and choose **Create region from selection**.

#### 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. Hold **Shift** while you double-click on the new region's icon to display the **Edit Region** dialog. 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.

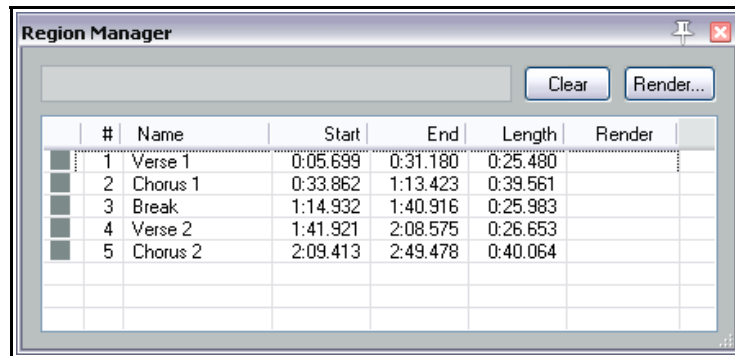


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## 8.7 Managing Regions

Use the **View, Region Manager** command to toggle the display of the region manager window (see right). Here you can:

- ◆ Double-click on any region name to open the **Edit Region** dialog box.
- ◆ Double-click on any region number to zoom to that region in arrange view.
- ◆ Click on the colored icon to the left of the region number to change the region color.
- ◆ Click in the Render column to select any region(s) for rendering to a single file each, then on the **Render** button to open the **Render to File** dialog box to do this. Rendering is explained in more detail in chapter 18.



## 8.8 Project Building with Regions

Regions can be used as a very powerful project building tool, especially when you are constructing a project from samples and/or loops. Two especially powerful features of regions are:

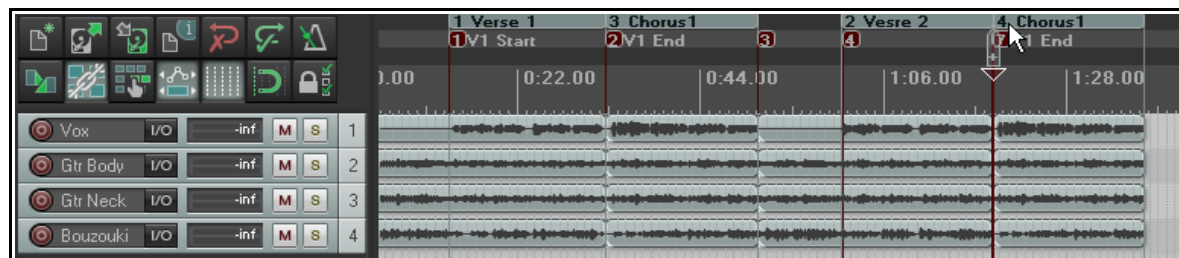
- ◆ Drag and drop a region along the timeline to move a region's entire contents.
- ◆ Hold **Ctrl** while dragging and dropping to copy the entire contents of a region.

To illustrate this, take a look at the first of these images below:

Here we have started building a project. We have an introduction, then a verse (which has been made into a region), a chorus (also a region) and a second verse.



By holding the **Ctrl** key while clicking and dragging the icon for the Chorus region to the right, to the end of verse 2, we are able to copy the entire chorus to that point.





### 8.9 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. Click on the **Project Settings** tab.
2. Make a choice from the **Timebase for items/envelopes/markers** drop down list, then click on **OK**.

You can also change the beat by clicking in the **BPM** box (on the Transport Bar) and entering a number.

### 8.10 Markers and Media Cues

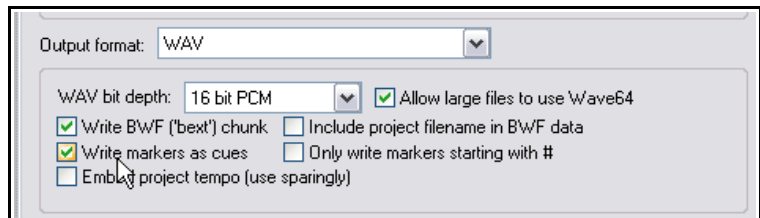
If you need to share your media files with other applications that use media cues (for example, Sound Forge) you can convert your markers to media cues when rendering. File rendering is covered in detail in Chapter 18. REAPER also has an option on the View menu (enabled by default) to show media cues 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

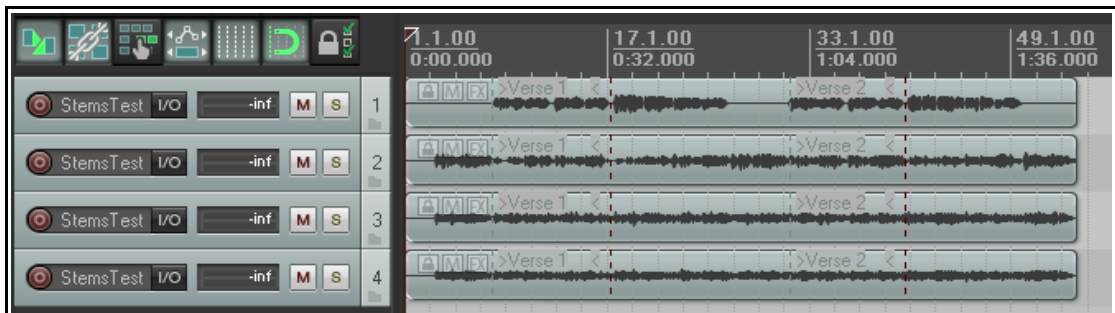


1. In the screen shot shown above, our project includes a number of markers:
2. We can now select the appropriate tracks and render the file (using the **File, Render**) command,

selecting the option **Stems (selected tracks)** from the Render drop down list, **Mono** channels, and ticking **Write markers as cues**.



3. If the rendered files are later imported back into REAPER, 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 any of these media items then right click and choose **Item processing** then **Import media cues from items as project markers** then a set of REAPER markers and regions is automatically created for the project.

### 8.11 Tempo Based Music Production

#### 8.11.1 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.

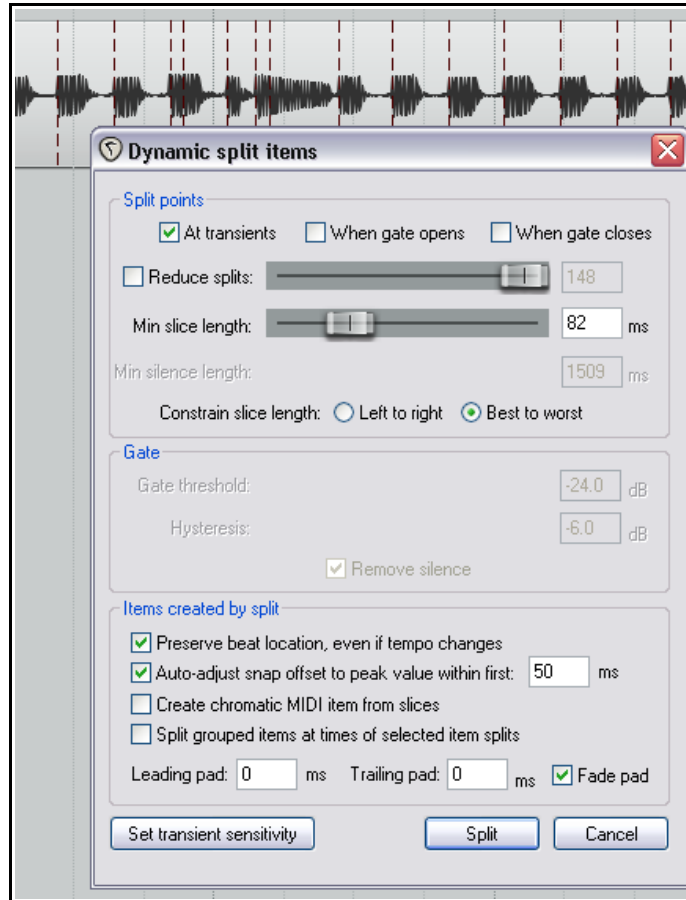
One advantage that sampling has always had over MIDI is sound quality. There are any number of human performance techniques and subtle variations that it are very difficult if not impossible to simulate with MIDI. However, until recently MIDI held one big advantage over sampling. A MIDI track can easily 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 problems 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 at the same time handle the issue of beat changes. It becomes almost impossible to get the exact tempo you want without having to open the sampler and make adjustments to the loops.

Today, however, there are available many tools 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.

Later in this chapter we'll have more to say about ReCycle, 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.



### 8.12 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). The former locks items to the timeline so that changes in tempo will cause items to be resized and their play rate adjusted. With Beats (position only), the start of the item is locked to the beat, but the item contents are not affected or modified by tempo changes.
- Under **Audio Settings**, Default pitch shift mode and parameter.

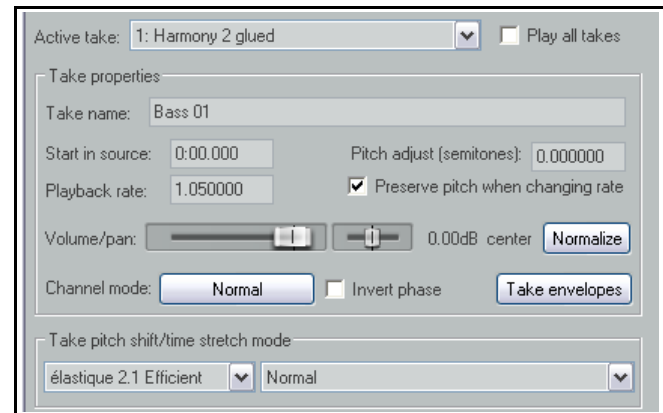
Remember that you can change the timebase for individual tracks (right-click, **Set track timebase**) and for individual media items (**F2**, Item timebase). You can also change properties such as Beats per Minute and Time Signature as often as needed during the song. For example, you can increase the 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.

#### 8.12.1 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.

You can specify parameter settings for individual media items and/or for selection of items. For example, if you wish to change the pitch or playback rate for several items you can select those items and press **F2** (or right click anywhere in the selection and choose the **Item properties...** command).

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 shift mode if you wish. 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**.



#### 8.12.2 Creating a Loop from a Time Selection

Remember that you are able to select any part of an existing media item and use it to create a loop. This subject is covered earlier in this chapter.

Chapter 13 will introduce you to REAPER's actions and the action list editor. This can be used to assign keyboard shortcuts to many actions that can be useful when you are working with loops and time selections. There are actions, for example, to extend the time selection in either direction, to reduce it from either direction or nudge it in either direction. Browsing and searching the action list will help you to identify those which are most useful to you. Chapter 13 will show you how to bind these actions to your own shortcut keys.

#### 8.12.3 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 found within the Action List Editor (Chapter 13). Where no existing keyboard shortcut exists, you can assign your own if you wish.

Item navigation: Move cursor to nearest transient in item	<b>Ctrl Tab</b>
Item navigation: Move cursor to next transient in item	<b>Tab</b>
Item navigation: Move cursor to previous transient in item	<b>Shift Tab</b>
Time selection: Extend time selection to next transient in items	

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Assuming that you are using the default key bindings shown above, and that **Ctrl Alt Tab** has been assigned to **Extend time selection to next transient in items**, you can select the item, navigate exactly from transient to transient and select the exact area required.

You can select the item, copy 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 area of items**

**Trim items to selected area**

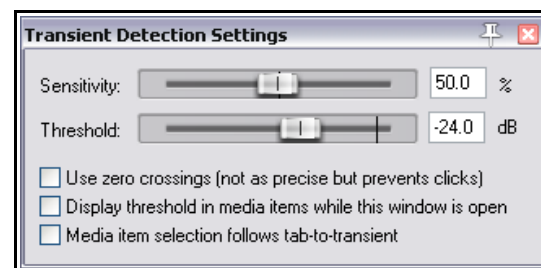
**Split items at prior zero crossings**

Copy items	Ctrl+Shift+C
Copy selected area of items	
Copy loop of selected area of items	Ctrl+Alt+L
Cut items	
Cut selected area of items	Ctrl+Delete
Paste	Ctrl+V
Remove items	
Trim items to selected area	
Nudge/set items...	N
Split items at cursor	S
Split items at prior zero crossing	Alt+Z
Split items at time selection	Shift+S
Heal splits in items	

### 8.12.4 Transient Detection Settings

The command **View, Transient Detection Settings** causes the window shown here to be displayed.

This can be used to make your transient detection sound more natural and human, by introducing subtle variations in sensitivity and/or volume threshold. Enabling the zero crossings option will help to prevent unwanted clicks from occurring.



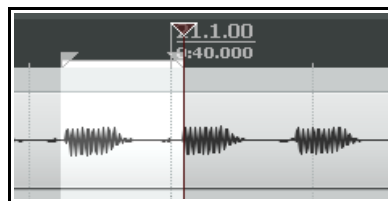
### 8.12.5 Beat Correction

REAPER includes many 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. Some of them are on the context menus and all of them are in the Action List. Any action can be assigned shortcut keys, run from the action list window itself, and/or added to REAPER's **Actions** menu. More information about the Action List can be found in Chapter 13.

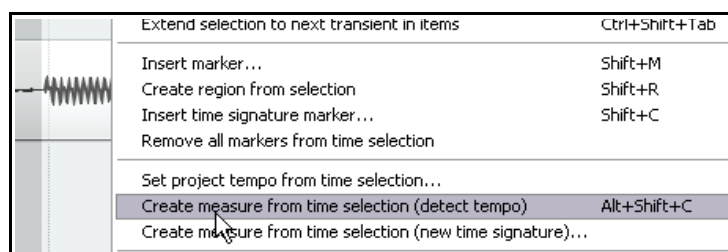
How you string these actions together is up to you. Here is an example. You might have a live performance that was not done to a click. It is a simple process to go thru the track and manually tempo-map the whole performance. We're going to assume that you are using the following keyboard assignments:

<b>Tab</b>	Item navigation: Move cursor to next transient in items.
<b>Ctrl Alt Tab</b>	Time selection: Swap left edge of time selection to next transient in items
<b>Ctrl Shift Alt Tab</b>	Time selection: Extend time selection to next transient in items.

#### Example



In the example shown here, we have used our shortcuts to create and extend the selection out, as required.



We then instruct REAPER to **Create measure from time selection (detect tempo)**.

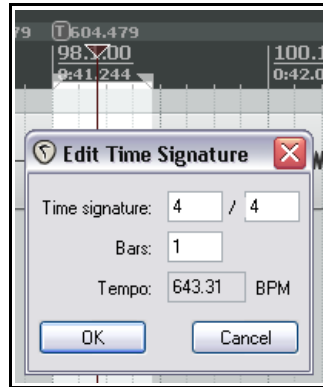
We could do this either from the timeline's context menu or using a keyboard shortcut.



We then use our keyboard shortcuts 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 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.

### 8.12.6 Quantizing Items

REAPER allows you to quantize your audio items. This essentially means lining them up according to the project tempo or time signature.

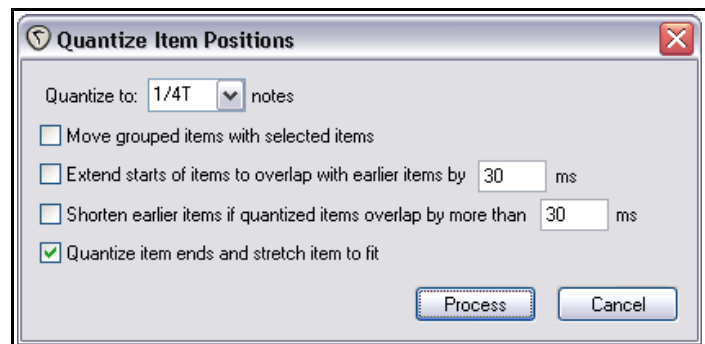
You might have a situation in which you have copied and pasted a sample several times within a track (or across several tracks) and you need to ensure that they are correctly aligned. To ensure that all items are aligned to the beat, you simply do this:

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 marquee or "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.



### 8.13 Dynamic Splitting

Dynamic splitting is a very powerful feature which has a number of applications. You have already seen (in Chapter 6) how it can be used to remove silence. 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 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 satisfied that they are right.
- You tell REAPER to go ahead and split the items.

Once split, each slice of the original item will be set to the current timebase. 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!

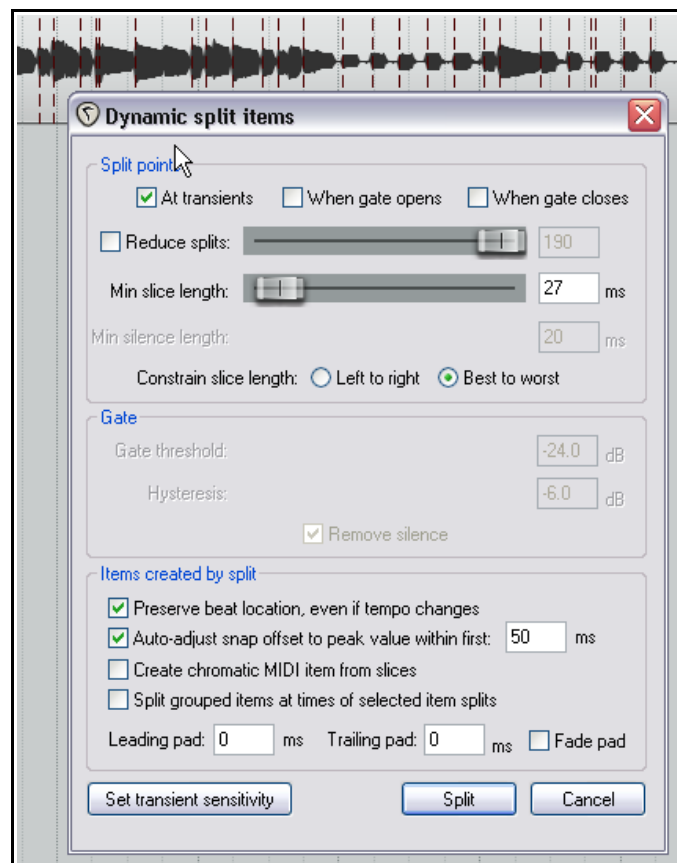
Dynamic splitting is non-destructive. This means that your original audio files (WAV, MP3, AIF or whatever) remain intact. Nevertheless, if you are going to use this method to build a sample library, it's often a good idea to work on a copy of the original track. This just makes it easier to go back 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.

#### 8.13.1 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 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 (right).





## 8 - Loops, Markers and Regions

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 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 selected 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.

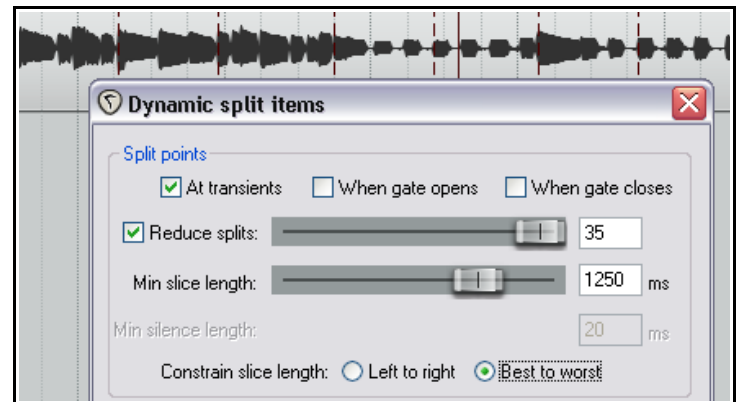
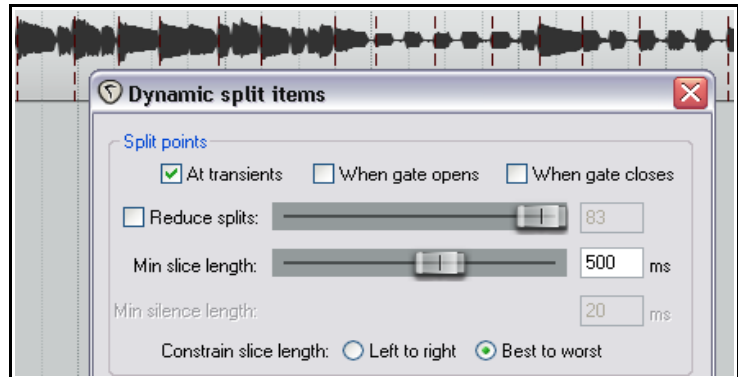
Now let's see what happens when we bring some of the other options into play.

In the second case (above right)) 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 (below right), we have increased the minimum slice length and used the **Reduced splits** option to further reduce the number of splits. In this particular case, these settings might be about right for creating our sample library from this bass guitar track.

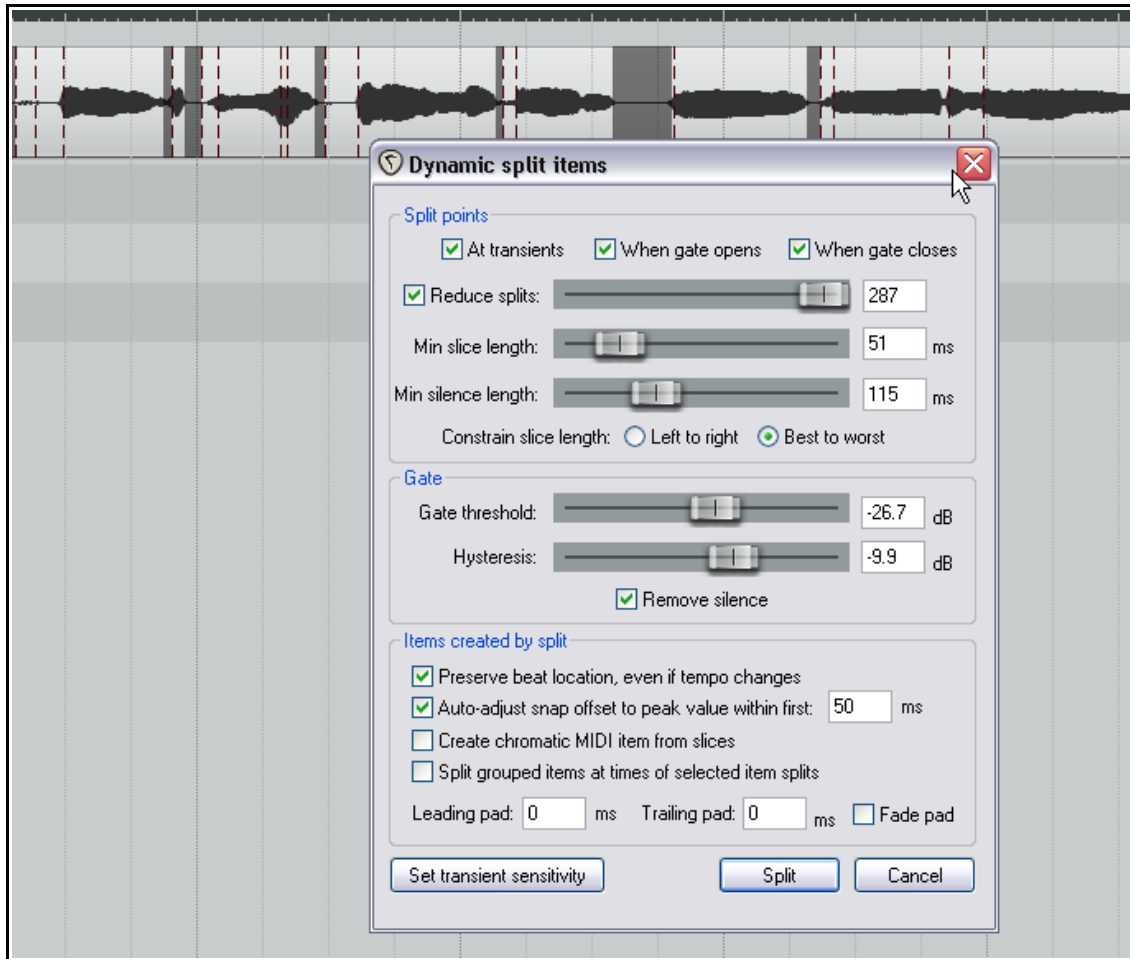
Before splitting it might in some instances be worth considering whether you wish to enable the noise gate settings to allow you to also remove silence. Whether you would do this would depend largely on the instrument in question and the nature of the tune and arrangement. If the instrument is played continuously and produces an audio signal similar to that shown above, then there may be little point in using the noise gate.

Below we can see how part of our original media item now looks after splitting.



This next example (below) 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. You are likely to find that quite a fair amount of experimenting is needed to get the settings just right.

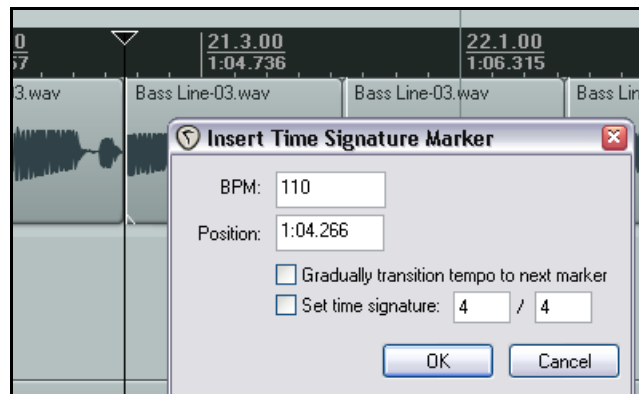


### 8.13.2 Changing the Project Tempo

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:

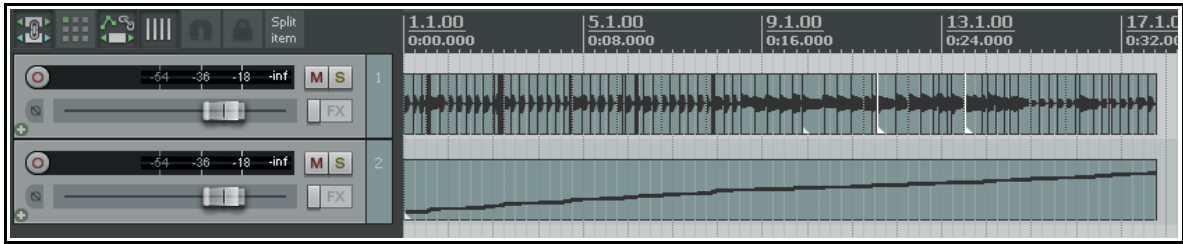
1. Right click over the timeline and choose **Insert time signature marker...** from the context menu.
2. Specify your required changes in Beats per Minute or time signature. If you wish, you can select the option for a gradual tempo transition between markers.
3. Click on **OK**.

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.



### 8.13.3 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, at Chapter 12.

### 8.13.4 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 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.

## 8.14 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 can be made to keep their beat location even if the project tempo is changed.

In your Preferences settings, under **Media, Video/REX/Misc** there are a number of options available for determining how your REX files behave.

You can choose to import REX files as **Beat slices that dynamically adjust to tempo change** or as **A single loopable item at the current project tempo**, or ask REAPER to **Always prompt**.

You can also specify REX tail behavior as any of **Preserve all slice tails**, **Chop all but the final slice tail**, **Chop only the final slice tail**, or **Chop all slice tails**

The Action list also includes a useful action **Item: explode REX item into beat slices**. This can be assigned its own shortcut key if you wish.



## 9 Pitch and Time Manipulation

### 9.1 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, or you can type in a multiplier, such as **x1.5**.

Notice that there is a drop down list that you can use to select your preferred Pitch shifting / Time stretching algorithm. Choices are:

- Project Default.
- Sound Touch.
- Dirac LE (better quality, more CPU intensive).
- Simple windowed.
- Élastique 2.1 Pro (best).
- Élastique 2.1 Efficient (less resource intensive than elastique Pro).
- Élastique 2.1 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. To learn more about these and other features of elastique, go to the zplane web site <http://www.zplane.de/index.php>.

To open the **Media Item Properties** dialog box for any item, first select the item, then press **F2**. The default algorithm is determined by your Project Settings. 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.

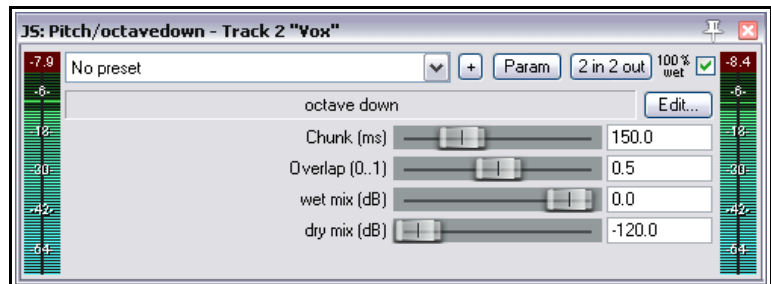
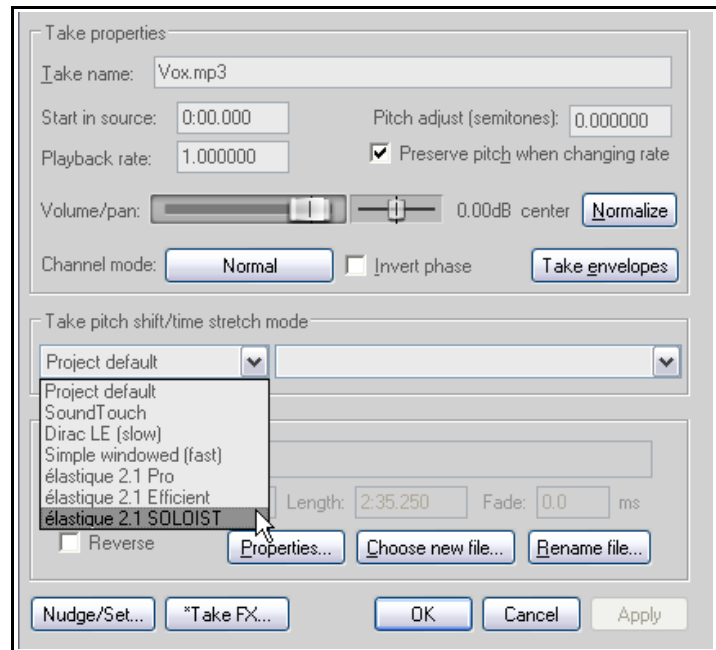
You can also use a take pitch envelope for pitch changes. Right click on the take (or media item if only one take) and choose **Take, Take pitch envelope** from the menu.

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 here is the **JS Pitch**:

**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**.



### 9.2 Using ReaPitch

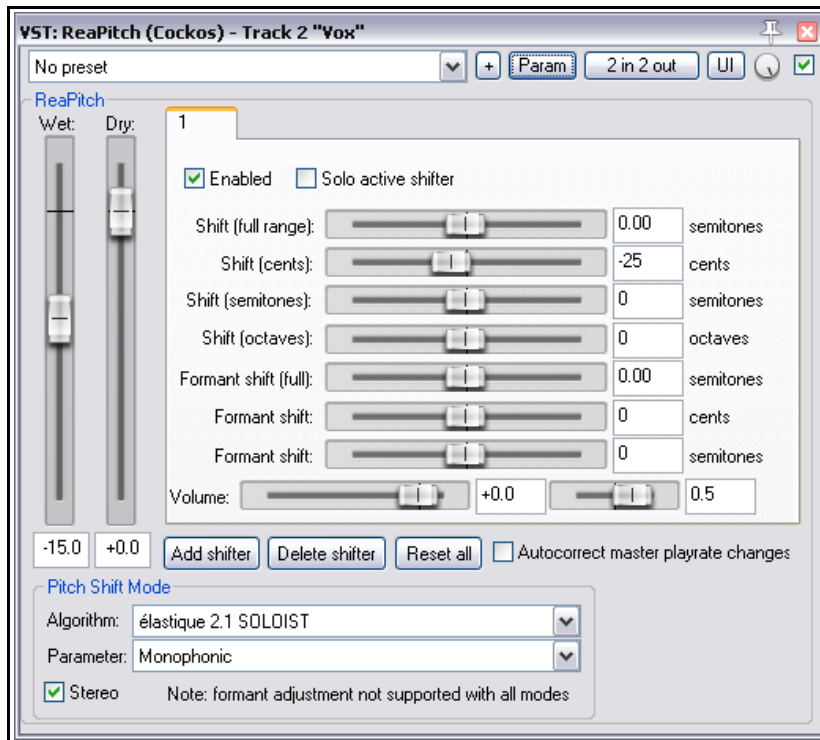
Simply insert the VST ReaPitch plug-in into a track's FX chain and you have a powerful pitch manipulation tool at your disposal.

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 Elastique Soloist algorithm has been selected, together with the Monophonic parameter. Notice that the pitch has been shifted down by 25 cents and the effect panned 50% right.

In the second illustration, you can see that we have added a second shifter, this time taking the pitch up by 25 cents and panning the effect 50% left, thus creating an extra harmony.

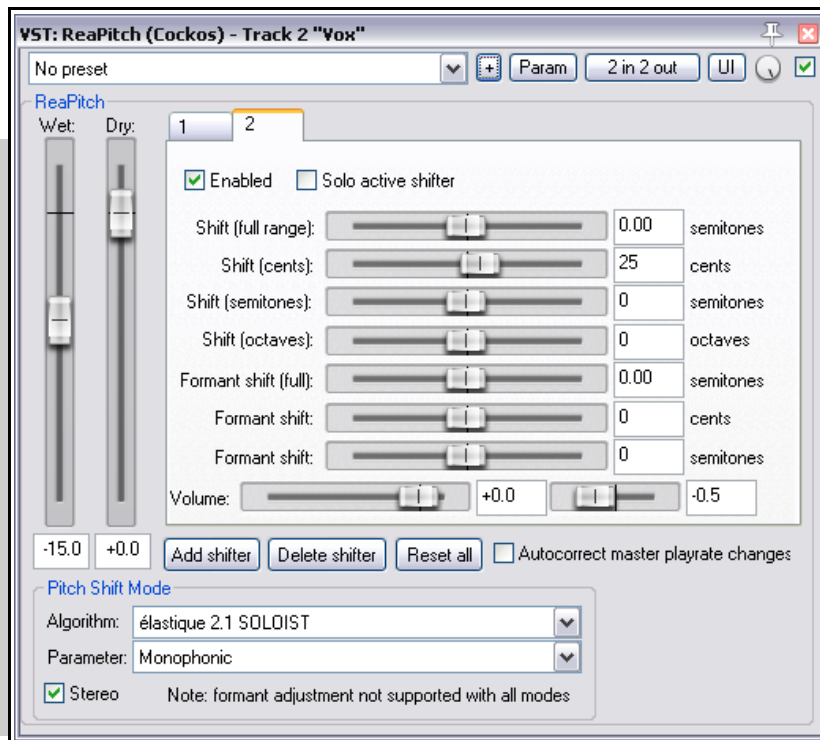
Notice also that in the second illustration we have also adjusted the panning and the mix of the wet and dry signals to produce a more pleasing overall effect.



#### 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**.

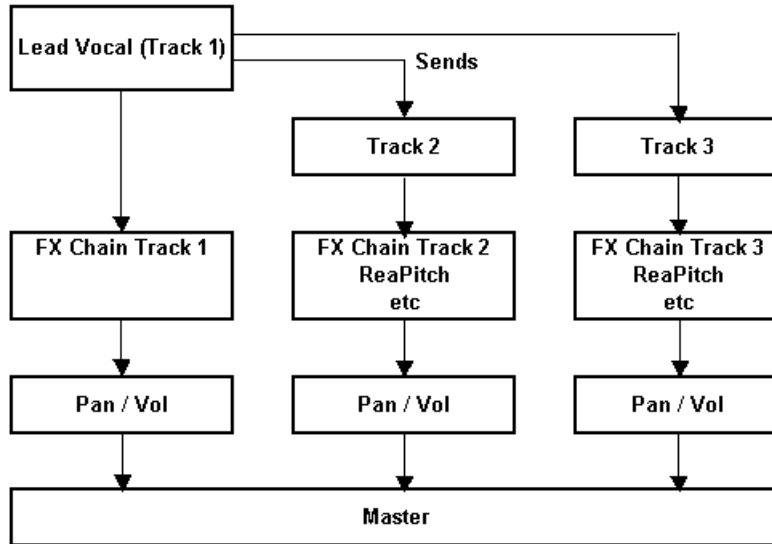
With channel splitting, you can, for example, not only create several vocal harmonies, but also apply different FX plug-ins or plug-in chains (such as Reverb or Delay) to each of your different harmonies.





### 9.3 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.

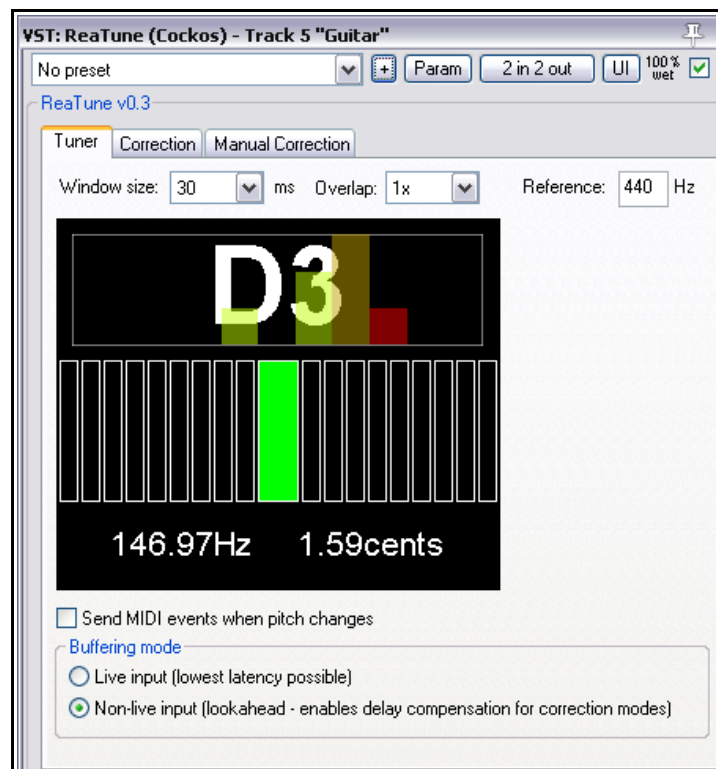
Each of these other tracks has its own FX chain which includes ReaPitch, and of course the pan and volume faders for these tracks can be controlled independently of each other and of the lead vocal.

Chapter 15 will help you to understand how to go about setting up a signal flow such as this.

### 9.4 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.



### 9.5 Pitch Correction with ReaTune

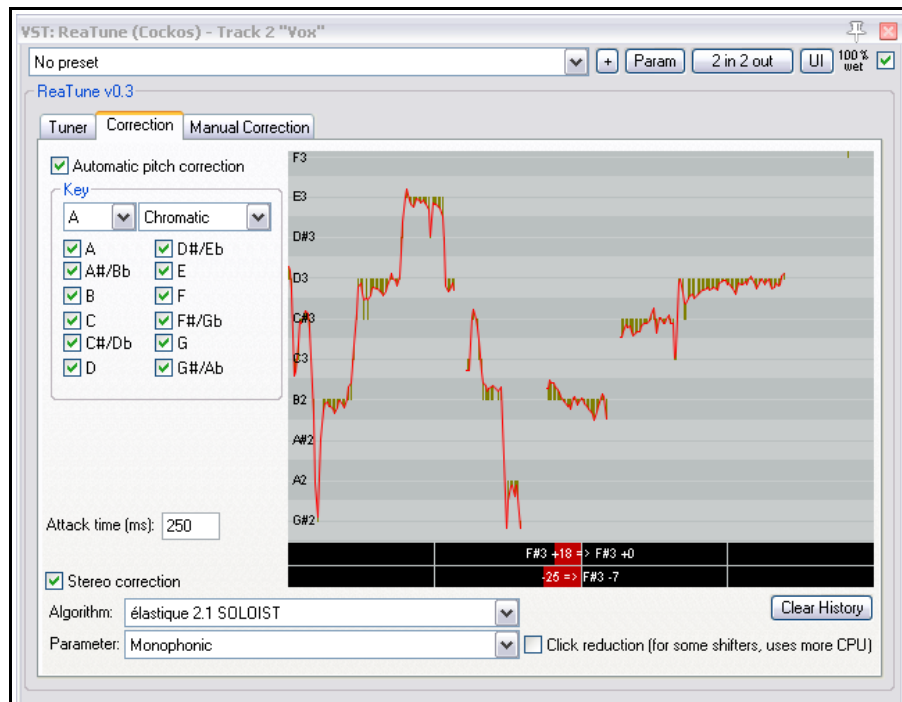
The plug-in **ReaTune** can be used for pitch correction. It can be used in either manual or automatic mode. In either mode, *élastique* SOLOIST is a suitable algorithm.

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.



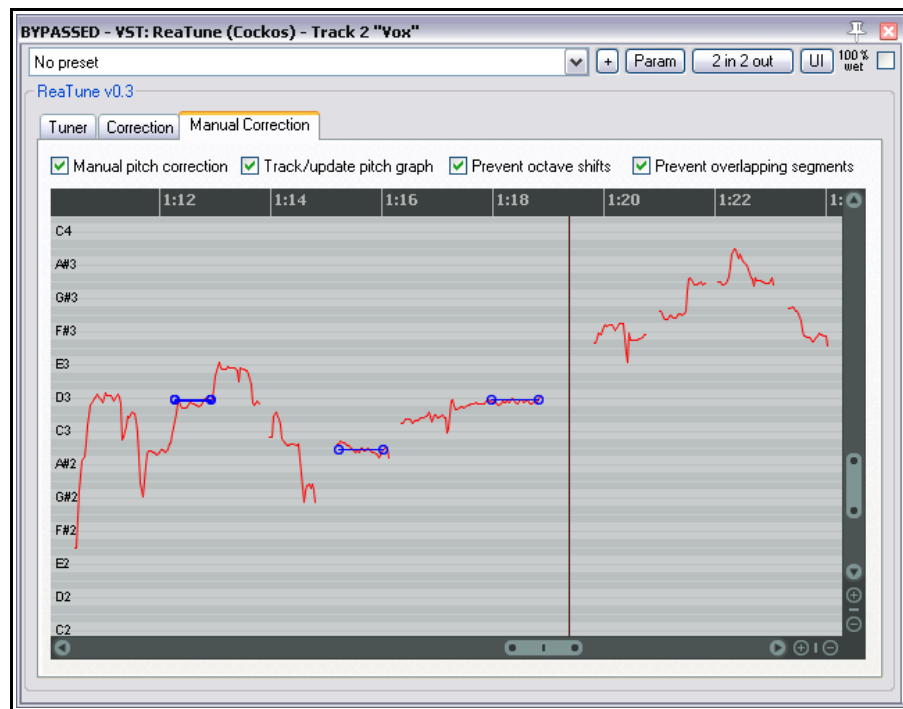
ReaTune will then do the rest for you!

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.



### 9.6 Time Stretching

The **Take properties** and **Take pitch shift/time stretch mode** sections of the **Media Item Properties** dialog box (**F2**) can 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. Élastique 2.1 efficient has been selected for the algorithm to be used.

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:

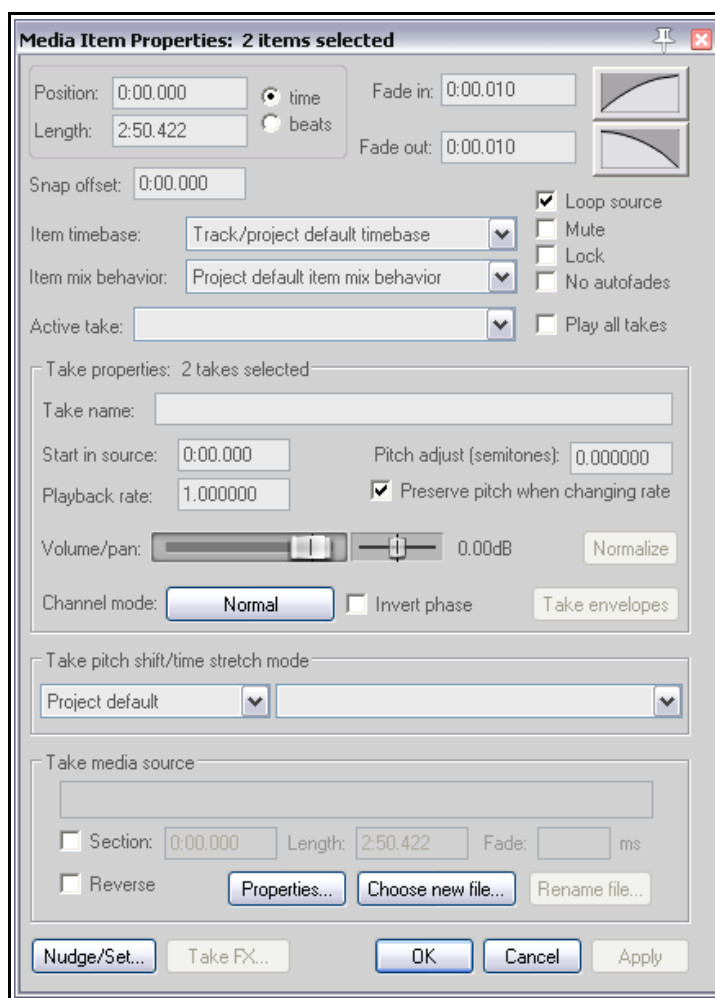
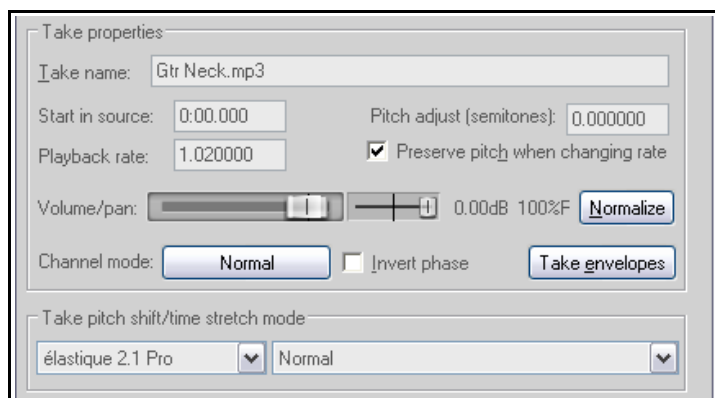
1. Select all of the required items.
2. Press **F2**.
3. When the **Item Properties** dialog box appears, you should easily be able to identify those properties where changes can be made to several items at once. These include pitch and playback rate (see below).
4. Make your changes.
5. Click on **OK**.

The Multiple Media Items Properties dialog box is shown here.

Notice that some of the items have been dimmed and are not available when setting properties for multiple items. Most options, however, are available.

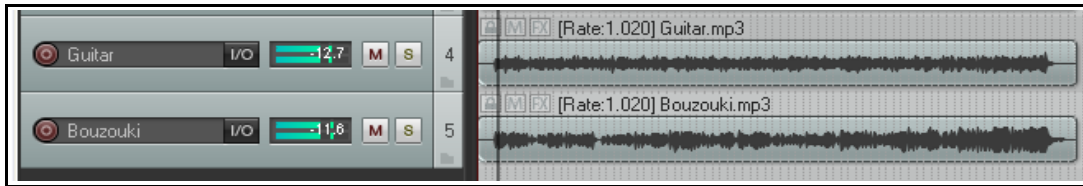
Another method that you can use to adjust the playback rate of any media item (or selected group of media items) is this:

1. Select all the required items.
2. Hover the mouse over the end of one of the 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.



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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.

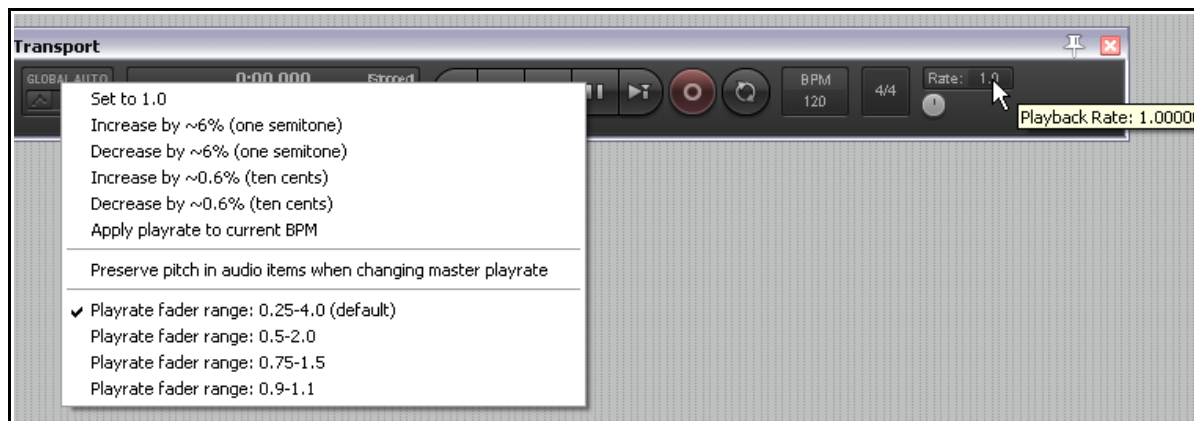


### 9.7 Changing the Project Playrate

You can adjust the play rate for the whole project, using the Transport Bar. The project's default pitch shift mode will be applied. You can use any of these methods:

- Click in the **Rate** edit box and type a new value (e.g., to speed up by 10% type 1.1)
- Hover the mouse over this edit box and scroll the mousewheel, up to increase play rate or down to decrease it.
- Drag the horizontal fader to the immediate right of the play rate edit box.

In addition to these methods, you can right click over the same edit box or the play rate rotary control and select one of the options from the menu.



Notice that from the menu you can:

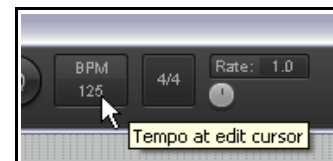
- Reset the playrate to 1.0.
- Increase or decrease the playback rate by any of the values listed.
- Enable or disable the option to **Preserve pitch in audio items when changing master playrate**.
- Apply play rate to the current BPM.
- Set the playrate fader range according to any of the available 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**.

### 9.8 Changing the Time Signature Marker

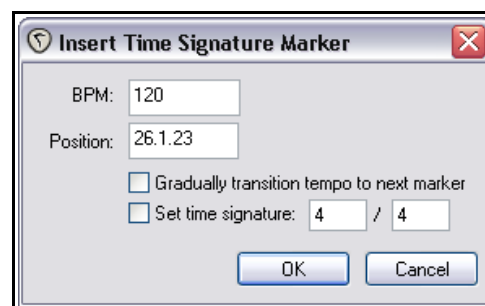
The default project Beats per Minute and Time Signature for any project are determined by the values assigned in the **Project Settings** window. You can change this for the entire song by any of these methods:

- Display the Project Settings window (**Alt Enter**) and change it there, or
- Press **W** to return the edit cursor to the start of the song, then either ...
- Type your new value in the **BPM edit box** on the transport bar, or ...
- Hover your mouse over the **BPM edit box** on the transport bar and scroll the mousewheel up or down (see right).



You can also change these at any point in a song, 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** (or press **Shift C**).
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.

Notice also that your Ruler context menu includes a number of other commands relating to project tempo and measure – these are:

Set project tempo from time selection (detect tempo)  
Set project tempo from time selection (new time signature)...  
Set project tempo from time selection (detect tempo, align items)  
Create measure from time selection (detect tempo) Alt+Shift+C  
Create measure from time selection (new time signature)...

- Set project tempo from time selection (detect tempo)**
- Set project tempo from time selection (new time signature)...**
- Set project tempo from time selection (detect tempo align items)**
- Create measure from time selection (detect tempo), and**
- Create measure from time selection (new time signature ...)**

**Tip:** This process can be automated using the **Tempo Map Envelope** – see **Chapter 16 – REAPER Automation**.





## 10 The REAPER Mixer and Master

### 10.1 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.

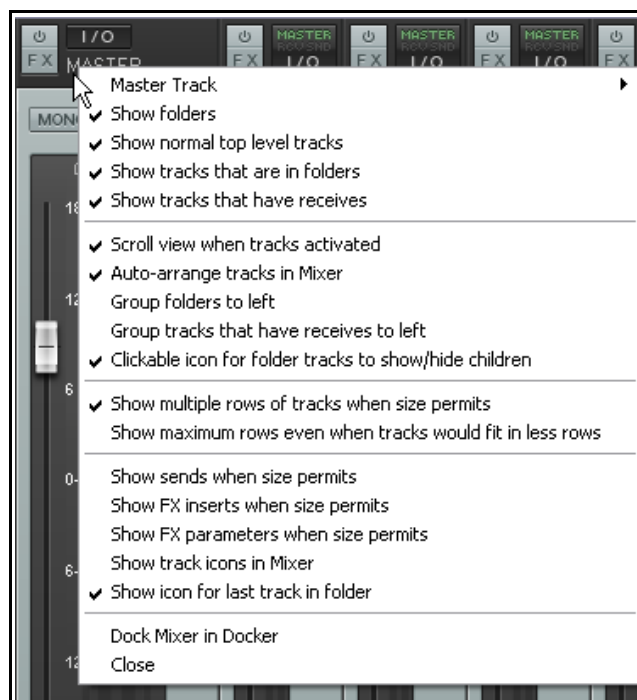
Mixer display is toggled on and off using the **View, Mixer** command (**Ctrl M**).

### 10.2 Mixer Commands

The Mixer menu is shown by right-clicking over the title bar or any vacant area of the mixer window, or by clicking over the word "Master" on the Master track (see right), or (when docked) right-clicking on the Mixer tab in the docker.

This menu offers you a great deal of flexibility as to how the mixer is displayed. For example, you can choose whether or not you wish to display (and be able to manage) your FX and sends in the mixer. The main mixer layout options are summarized in the table overleaf.

You can also access the TCP context menu in Mixer view by right-clicking over any track name or number.



### 10.3 Mixer Layouts and Screensets



If the commands on the Mixer menu let you select *what* is displayed in the mixer, then mixer layouts let you decide *how* it is displayed. The chapter immediately after this one, Chapter 11 - Project Management Features, covers the topic of layouts (TCP and MCP) in more detail, but for now note the following:

- Layouts are created and saved with, and attached to, individual color themes, not within REAPER itself. An example of a compact mixer layout is shown here (left). Keep in mind that the theme that you are using might not include this exact same layout.
- Layouts can be accessed by choosing **Set Track Layout** then **Mixer Panel** from the TCP context menu, or by the **View, Screensets/ Layouts** command, then selecting the **Layouts** tab.
- Layouts within the mixer are assigned on a per track basis. If using the context menu, you should first select the tracks for which you want the layout assigned. If using the Screensets/Layouts window you can choose to apply the layouts globally or to selected tracks only.

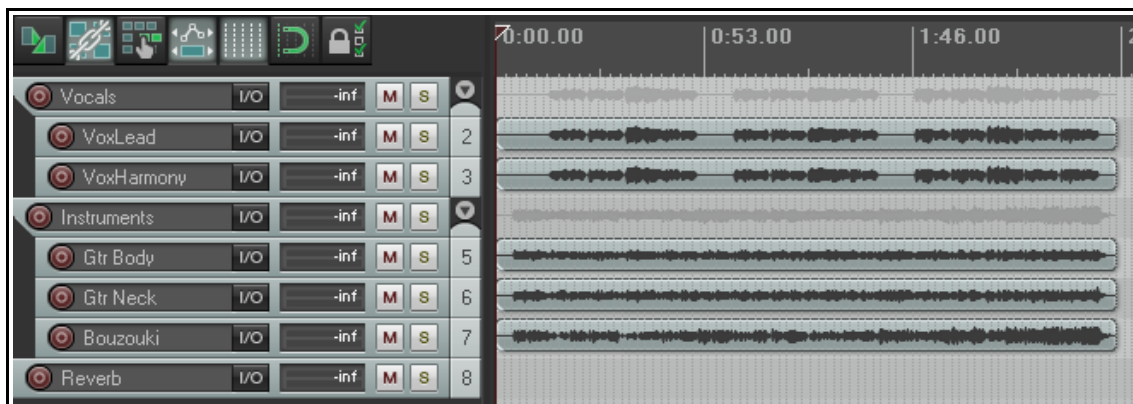
Before getting too involved with using layouts, however, it will pay you to familiarise yourself with the Mixer menu commands and what they do.

### 10.4 Mixer Menu Commands and Options

Command	Description
<b>Master Track</b>	Leads to a sub-menu of toggle options for Master Track: <b>Show in mixer</b> <b>Show on right side of mixer</b> <b>Show in separate window</b> <b>Show in docker</b>  The <b>View, Floating Mixer Master</b> command (from REAPER's main menu) can also be used to toggle the floating of the Mixer Master in its own window.
<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>Scroll view when track activated</b>	If there is not sufficient room in Mixer view to display all tracks, the mixer will scroll to follow the TCP track selection.
<b>Auto-arrange tracks in Mixer</b>	Mixer track order will follow any changes to track order made in the TCP. Disable this if you want to arrange tracks in a different order in the MCP and TCP.
<b>Group folders to 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 left</b>	Places all tracks with receives to the left. Especially useful if the only tracks with receives are all buses.
<b>Clickable icon for folder tracks to show/hide children</b>	Enables folders to be opened/closed to show/hide child tracks.
<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 are.
<b>Show sends when size permits</b>	Displays a Sends bin above the track controls.
<b>Show FX inserts when size permits</b>	Displays an FX chain area above the track controls.
<b>Show FX parameters when size permits</b>	Shows FX parameter controls: right-click on any of these to assign control to an FX parameter.
<b>Show track icons in Mixer</b>	Track icons (if used) will be shown in tracks in the mixer.
<b>Show icon for last track in folder</b>	Displays the last track in folder icon for last track in folder.
<b>Dock Mixer in Docker</b>	Docks the mixer in the REAPER docker.
<b>Close</b>	Closes the Mixer view.

**Tip:** Double-click on any track panel in the Mixer to toggle on and off zoom to track in the TCP. This behavior can be changed on the **Mouse Modifiers** page of your preferences (see Chapter 13). You can also use the **Mouse Modifiers** page to add further actions of your own. For example, you could assign **Ctrl Double-click** to the action **Track: Set to custom color ...** How to assign your own actions is also explained in Chapter 13.

## 10.5 Showing and Hiding Types of Mixer Tracks



Take as an example the above project. It has two folders (or parents) - Vocals and Instruments, containing two and three child tracks respectively - and one top level track, called Reverb. There are sends from the two folders to the Reverb track (which acts as a bus), and most of the tracks have some FX in them.

The first five of the **"Show"** commands on the Mixer menu are used to determine which *types* of track are displayed in the mixer. The sixth "Show" command determines whether the master is shown on the left or the right.

In the example shown here we might have reached a stage in our mixing where we are happy with the balance within our submix folders and want to focus on getting the balance between the submixes and the level of our vocal and instrument folders and our reverb buss just right.

In this case, we would elect not to show tracks that are in folders, but to show only folders, tracks that have receives and our master track (on the right).

The example project shown here is a simple one: imagine how useful this feature might be if you were working on a project with perhaps 60 individual tracks inside perhaps a half dozen submix folders and with maybe another half dozen buses! In that case, you might also find one or more of the "Group to left" commands could also be handy.

The Mixer menu does not have the facility to specifically hide or unhide named individual tracks. However, this can be done using the Track Manager. The Track Manager will be explored and explained in Chapter 11.



## 10.6 Working with FX in the Mixer

If you wish, you can do just about all of your FX management working in Mixer view. You can add FX to tracks, move or copy them from one track to another, open the FX window for any plug-in, or open the track's FX chain for more complete FX control. For this to be possible, though, you need to enable on the Mixer menu the option **Show FX inserts when size permits**. The table below summarizes these and other activities.

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In order to do this ...	... you do this
Change the order of plug-ins in the FX Chain.	Drag and drop up or down the order.
Copy FX from one track to another (similar to Track View).	Drag and drop FX to FX area on another track.
Display FX context menu	Right click on any displayed plug-in name.
Display the Add FX window.	Click in any vacant area of the FX area.
Display the FX chain and the control window for that plug-in.	Ctrl click on any displayed plug-in name.
Move FX from one track to another.	Alt drag and drop to another track.
Open and float a plug-in's control window.	Click on the plug-in name.
Remove a plug-in from FX Chain.	Alt click on plug-in name.
Remove all plug-ins from a track's FX Chain.	Alt click on track's FX button.
Toggle offline status of a plug-in.	Ctrl shift click on plug-in name.
Toggle bypass state for a plug-in.	Shift click on plug-in name.

In addition, right clicking over the FX area of any track in the Mixer produces a context menu as shown on the right. If you click over an empty part of the FX area then some commands (such as **Float FX configuration**) will not be available. If you right click over an actual plug-in name then you will be presented with the full menu. You can use this for any of the following:

**Add FX...** Opens FX browser for you to select and add any installed FX plug-in(s),

**Quick Add FX** Displays a sub-menu of recently used FX: you can select any item from this menu to add to the track's FX chain.

**Add FX Chain** Displays a menu of FX chains, any of which you can select and insert in this track.

**Float FX configuration** Opens the FX window for the selected plug-in.

**Show FX chain** Opens FX chain for the track: same as clicking on the track's FX button.

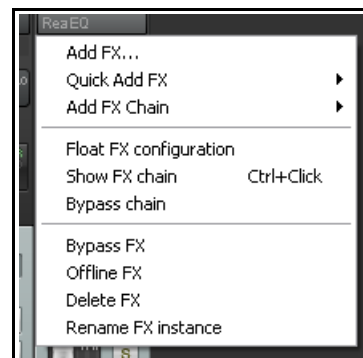
**Bypass chain** Sets FX chain for this track to bypass. Same as clicking on the track's FX enable/disable button.

**Bypass FX** Sets the individual plug-in to bypass mode.

**Offline FX** Sets the individual plug-in offline.

**Delete FX** Removes this plug-in from this track's FX chain.

**Rename FX instance** Allows you to give an individual name to this particular FX instance.



### Track FX Parameter Controls

You can turn your mixer into your own truly customized mixing console by adding controls directly to the mixer track panels for those FX parameters that you find you are most likely to need to tweak most often.

**You'll find more useful information about this in Chapter 11, Project Management Features. Meanwhile, it's easy to get started. Let's see how you would go about creating a console like that shown below.**

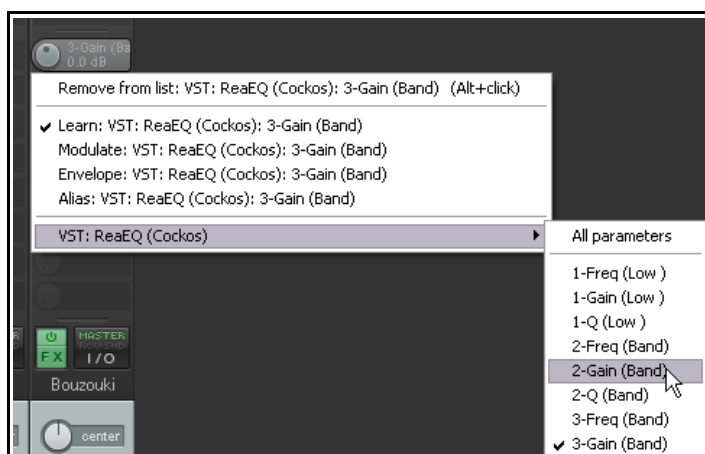
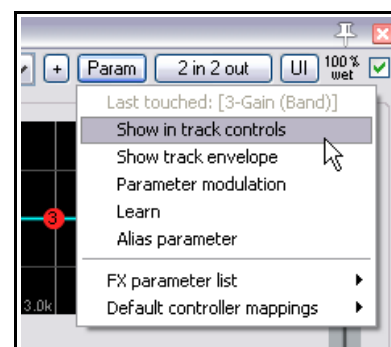


Notice the rotary faders for Band 2 and Band 4 EQ gain on every track.

### Example

You can use one of your existing project files for this example.

1. Open one of your earlier project files, for example, **All Through the Night MARKERS** and save it as **All Through the Night MIXER**.
2. Display the Mixer. Undock it, and adjust the width and height of this window as you prefer.
3. From the Mixer menu enable the options **Show FX inserts when size permits** and **Show FX parameters when size permits**.
4. Insert into the first track an instance of **ReaEQ**.
5. Select the band 3 settings page.
6. Click once on the **Gain** fader control for this band, then click on the **Param** button to display the Param menu.
7. Click on **Show in track controls**.
8. Select the band 2 settings page and click once on the gain fader for this band.
9. Click on the **Param** button to display the Param menu. Click on **Show in track controls** (see above). Close the EQ window.
10. In the mixer, you should now see these two controls displayed for track 1. Drag and drop the ReaEQ from track 1 in turn to each of the other tracks. Save the file.



**Note 1:** These controls can also be assigned within the Mixer. Right-click over the control button, then choose the FX and parameter from the context menu (see above). Choose **All parameters** if you wish to add a control for each of the FX parameters.

**Note 2:** These controls will be added to the track control panel as well as the mixer panel. You could of course have created as many controls as you like, not just these two. This exercise was just an example.

**Note 3:** When we revisit this topic in Chapter 11, you will see that we have a couple of options up our sleeves for making it easy to have controls like this automatically added to new tracks as they are created.

### 10.7 Working with Sends in the Mixer

Enabling the **Show sends when size permits** option from the Mixer menu will cause your existing sends to be displayed, each with a small rotary fader to enable you to adjust the send volume level directly from the mixer panel.

Right clicking over an existing send will cause a menu to be displayed with the options shown on the right. Right clicking over an empty part of a track's sends area will produce a menu with only one command – **Show track routing window**. This can also be displayed by simply left clicking anywhere on the track's empty sends area.

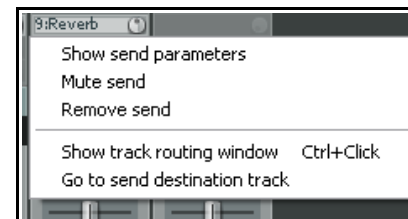
**Show send parameters** Opens a small window with parameters (volume, pan, etc.) for that send.

**Mute send** Toggles the send's mute status.

**Remove send** Deletes the send altogether.

**Show track routing window** Opens the routing (IO) window for this track.

**Go to send destination track** Selects the send's destination track.



As well as this menu, you have a number of other techniques at your disposal for creating, editing and managing your sends. For example, you can create new sends from any track to any other. Full details can be found in the following table:

In order to do this ...	... you do this
<b>Add a send from one track to another and disable send from first track to the master.</b>	<b>Alt drag and drop</b> from one track's send area to the other
<b>Add a send from one track to another and open control window for that send.</b>	<b>Ctrl drag and drop</b> from track's send area to the other
<b>Add a send from one track to another.</b>	<b>Drag and drop</b> from one track's send area to the other
<b>Copy of a send from one track to another</b>	<b>Drag and drop</b> the send to another track
<b>Delete a send.</b>	<b>Alt click</b> on the send
<b>Display a context menu.</b>	<b>Right click</b> on any send
<b>Open entire routing window for a track.</b>	<b>Ctrl click</b> on a send <i>or</i> <b>Click</b> in empty part of sends area
<b>Open the control window for a send.</b>	<b>Click</b> on the send
<b>Raise or lower the send volume level.</b>	<b>Click and drag</b> on a send's control knob
<b>Toggle a send's mute status on or off.</b>	<b>Shift click</b> on the send

### 10.8 Showing Track Icons in the Mixer

The option to **Show track icons in Mixer** (from the Mixer menu) can be enabled to ensure that any track icons that you have allocated will be displayed at the head of the track's mixer panel.

Track icons are inserted using the **Custom track icons**, then **Set track icon...** commands from the TCP menu. This menu can also be accessed from within the Mixer by right-clicking over a track's name.





## 10.9 Managing the Mixer

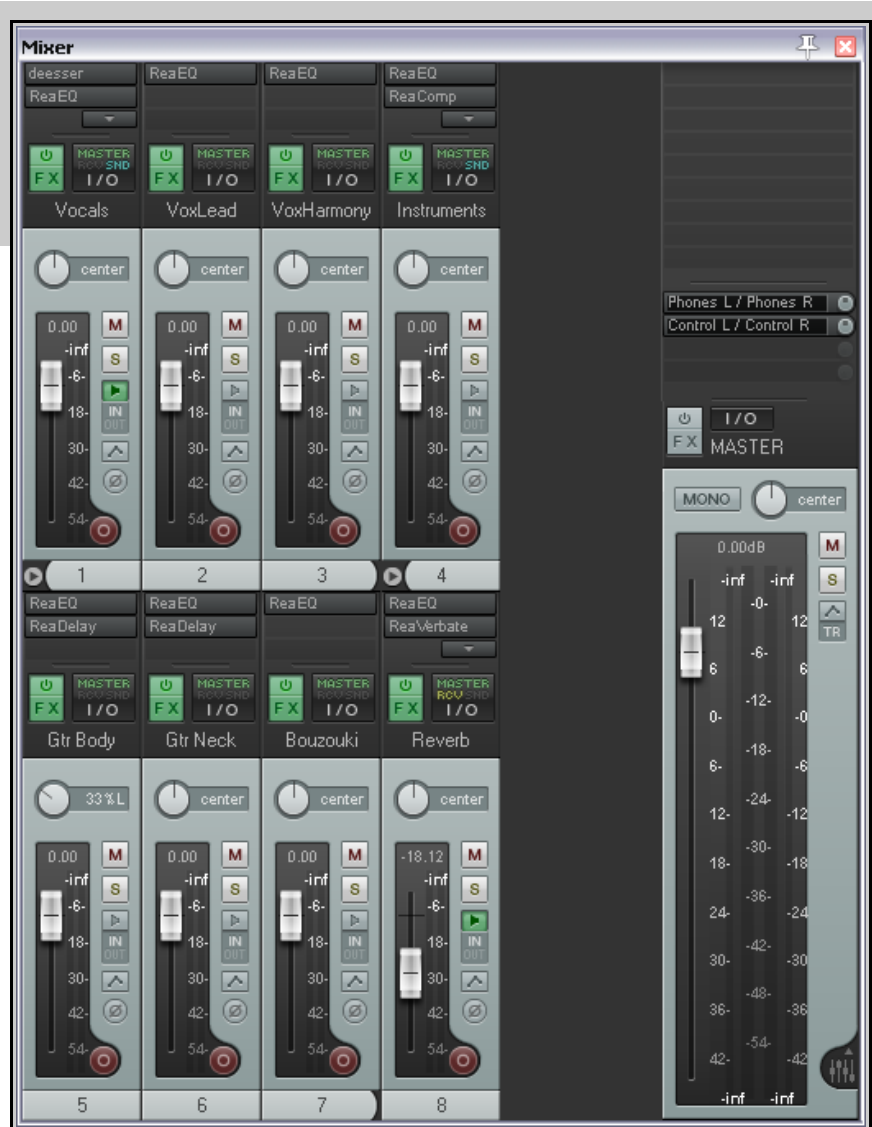
**Note:** The sample layouts used in the illustrations in this section are illustrative only and have been selected for learning purposes. They will not necessarily look *exactly* the same as the layouts that you are using.

You might find yourself faced with conflicting objectives when you want to display track FX inserts, sends and so on all at once and for all tracks, especially if you have a large number of tracks.

One option for displaying more tracks is to enable **Show multiple rows of tracks where space exists**. Shown here is an example of what might happen when you enable this option.

The problem has arisen that all the tracks have been squeezed into the window – but now there isn't enough room to show all the features that we need to see.

In this example, there is not enough room to display all of the track FX (observe the down pointing arrows on tracks 1, 4, and 8). When this happens you have two main options. These are either to make manual on-screen adjustments to the relative size of the different parts of the track panels, or to use a thinner mixer layout.



### Making manual on-screen adjustments.

If, in the example above, you hover your mouse on the boundary between the sends area and the track name for any track, the mouse cursor will change to a double-headed arrow, as shown on the right. Finding the right spot can be a little tricky at first, so be patient.

You can then either click and drag up or down to drag the boundary up or down for that one track or (as in this case) hold **Ctrl** while you drag up or down to move the boundary for all tracks.

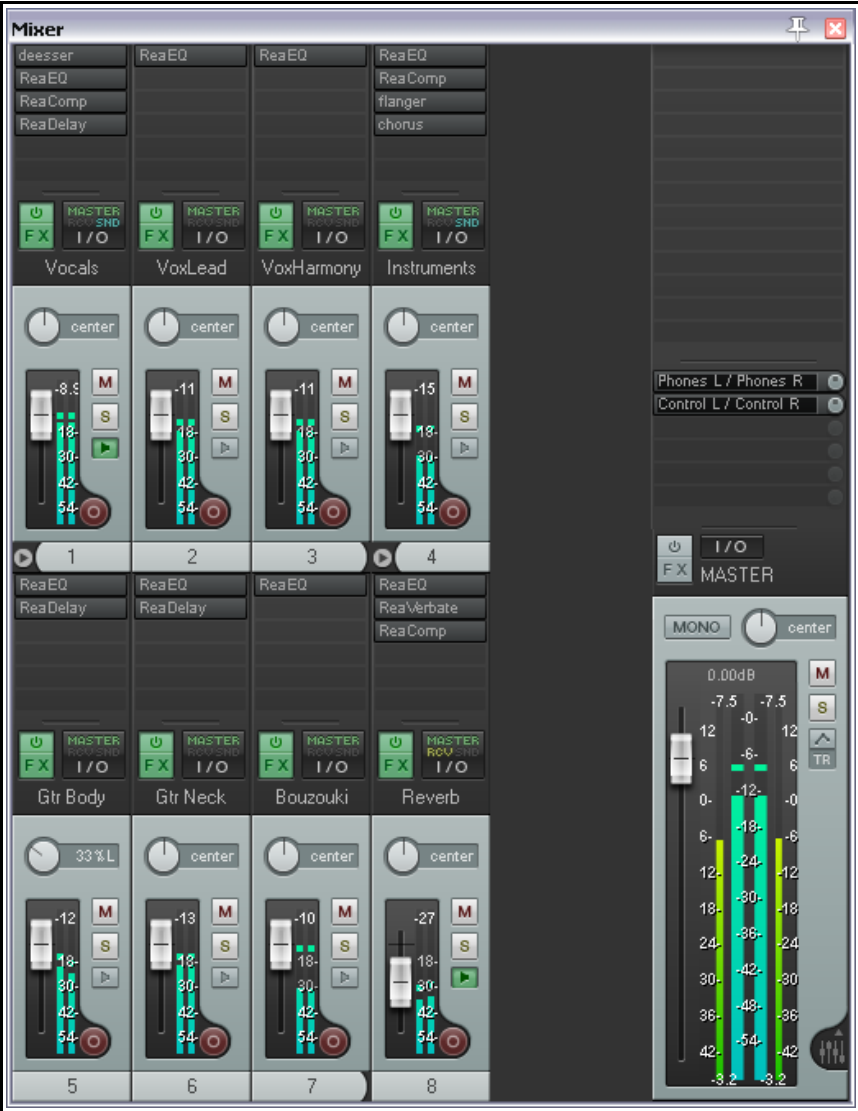
By holding **Ctrl** and dragging down, we are able to make more room to display the FX inserts, as shown below.



In order to do this ....	... you do this
Adjust relative height of elements for the current track only.	Click/Drag up or down
Adjust relative height of elements for all selected tracks.	Alt Click/Drag up or down
Adjust relative height of elements for all track.	Ctrl Click/Drag up or down

Here we have adjusted the boundaries between the different elements (track controls and FX inserts) so as to make all of them visible.

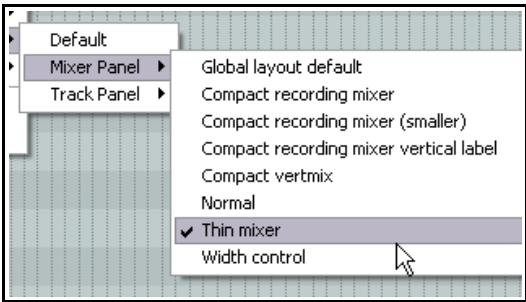
We have then made some manual adjustments - for example, the VU meter on the master has been made taller by dragging up its top boundary (shared in this case with the sends area).

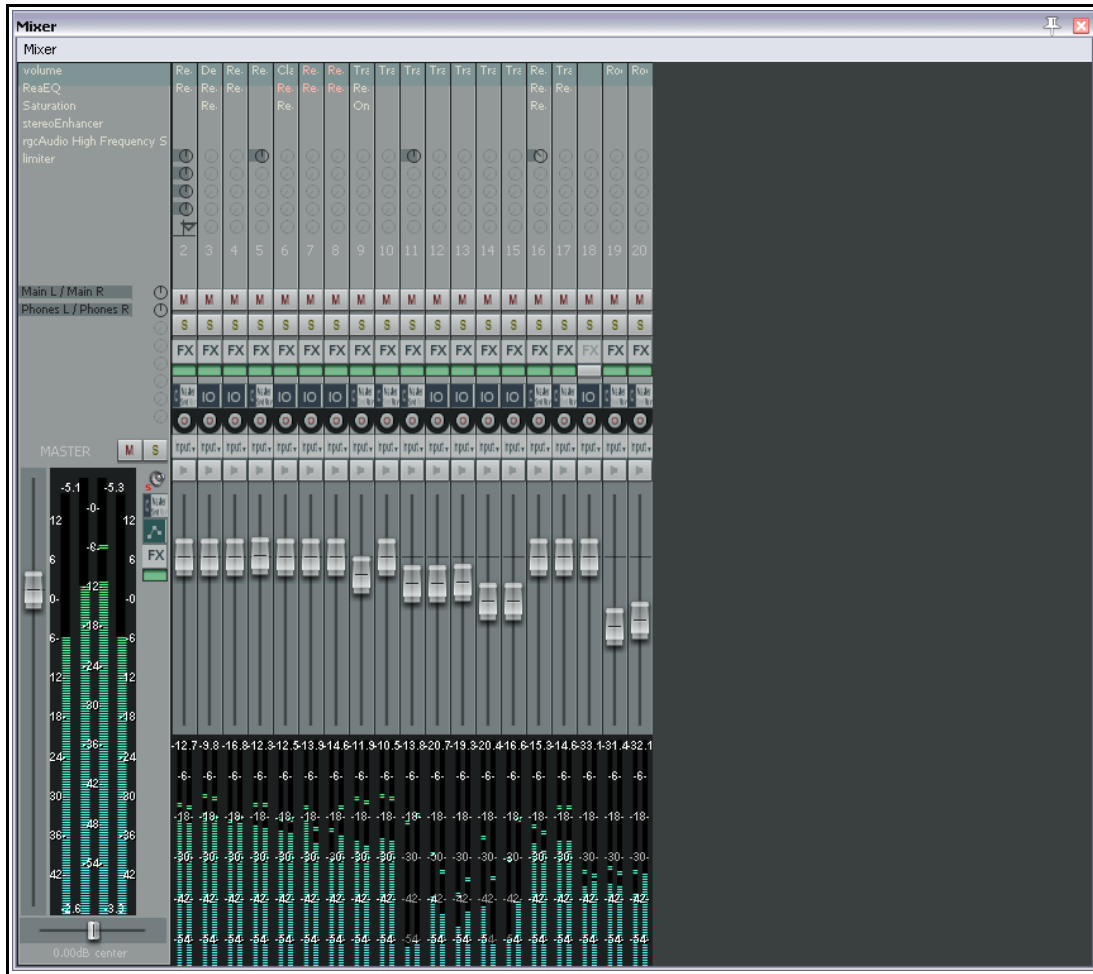


Using mixer layouts.

The illustration below (on the next page) is an example of the other approach, that of using a different Mixer layout. There'll be more about this in Chapter 11. However, to choose a mixer layout for your tracks, you can just do this:

1. Select the tracks whose layout you wish to change. For all tracks, just select one then press **Ctrl A**.
2. Right click over any track name then choose **Set track layout** then **Mixer Panel** then select from the menu. The layouts that you see listed are attached to whichever theme you are using and may not be the same as those shown here.





This is an example mixer layout, which may or may not be available from the theme that you are using. To browse thru, and download, the available REAPER themes go to <http://stash.reaper.fm/>. Sample screen shots of some of the track and mixer layouts supplied with the REAPER 4 default theme are shown in Chapter 11.

### 10.10 Track Control Menus

The same functions that are available in the track control panels of your track view are generally also available in the mixer control panels. These functions are covered in detail in Section 2 of this User Guide. For example:

- Right clicking over the background area or Track Name for any track panel in the mixer produces the track context menu.
- Tracks can be armed in the Mixer for recording.
- Clicking on a track's IO 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 a context menu.
- 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.
- Tracks can also be muted or soloed in the Mixer view. Both buttons use the same mouse modifiers and have the same context menus as they do in the TCP.

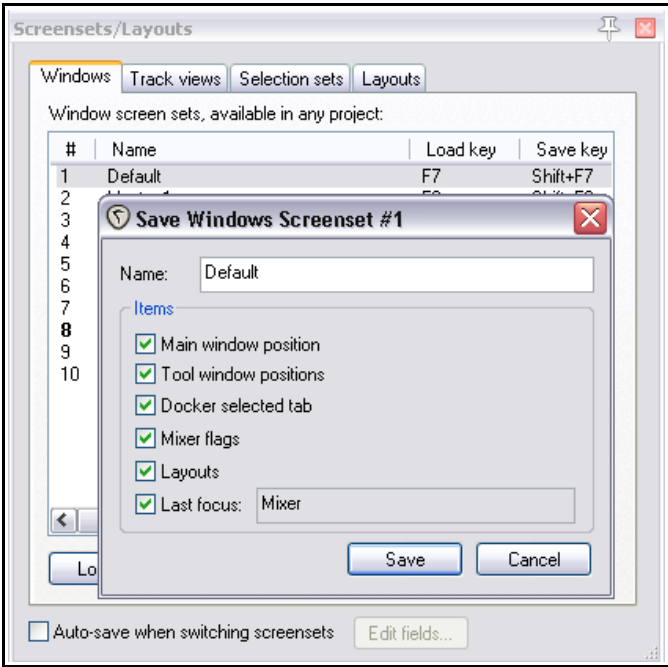
10.11 Introducing Windows Screen Sets

Windows screen sets can be used to save and recall complete on-screen layouts of your REAPER windows, including Arrange view, Mixer view, the Navigator, the Routing/Grouping matrix, and more. We'll examine their capabilities in more detail in Chapter 11, along with some examples in action.

Using Windows screen sets to save different combinations of Mixer settings can be a useful step towards fully understanding what screen sets are and how they work. They can be a great time saver, because the more you use REAPER, the more you will find yourself settling on perhaps three or four different layouts that you prefer for use in different circumstances. This will depend mainly on factors such as:

- **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. For larger projects you are more likely to show multiple rows.
- **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 screen sets are globally available in all projects. They are stored in a screensets.ini file in your \Application Data\REAPER folder. This means that you can use any project to create a screen set, and then use that same screen set with any other project. You should find the following summary information useful.



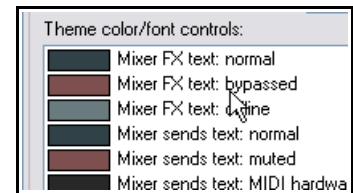
In order to do this ....	... you do this
Create a Windows Screen Set	Arrange your Windows, including the Mixer and its various options and settings, on screen, exactly as you want it. If you want the primary focus to be on the Mixer, make sure that it is selected. Choose the <b>View Screensets/Layouts</b> command ( <b>Ctrl E</b> ). Select the <b>Windows</b> tab. Click on any item number to select it, then on <b>Save</b> to open the <b>Save Windows Screenset</b> window (see above). Select all of the various options, and make sure that <b>Last focus</b> is on <b>Mixer</b> . If necessary, type it in. Click on <b>Save</b> . You can accept any default shortcut Load key that is shown (e.g. F7 for windows screen set #1) or click on <b>Edit shortcuts</b> to open the Actions List Editor and assign your own. The Actions List is explained in Chapter 13.
Load/Recall a Windows Screen Set	Either use the keyboard shortcut (where one exists), <i>or</i> Choose the <b>View Screensets/Layouts</b> command ( <b>Ctrl E</b> ). Select the <b>Windows</b> tab and double-click on the required screen set name.

### 10.12 Mixer Appearance Preferences

REAPER's Preferences window does not have a section specifically labelled Mixer, but there are several places where your choices will affect the Mixer and its appearance.

One of these is the **Appearance, Theme Editor** page of your **Preferences** window. This is another topic that will be examined more fully in Chapter 11, but as far as the Mixer is concerned, you can change the color of any of the elements listed below.

Simply click on the element name in the Theme Editor list, choose a new color from the color picker window and click on **OK**. Use the **Save Theme...** button if you want to save your changes.



Mixer FX text normal color

Mixer FX text bypassed color

Mixer FX text offline color

Mixer sends text normal color

Mixer sends text muted color

Mixer sends text MIDI hardware color

Mixer sends level color

Mixer FX knob text normal color

Mixer FX knob text bypassed color

Mixer FX knob text offline color

Whether you want the VU meters to be interlaced.

VU meter clip indicator color

VU meter top color

VU meter middle color

VU meter bottom color

VU meter interlace/edge color

VU meter show MIDI activity

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 colors** and to **Tint track panel backgrounds**. Any colors selected using the context menu **Custom track colors** command (see Chapter 4) will be applied to the track panels in your Mixer if either or both of these options is enabled. Shown below is an example of this, with **Tint track panel backgrounds** enabled:



One final preference setting to note is the **Show in mixer** option under **Project, Track/Send Defaults**. By default, this option is enabled, which means that new tracks as they are added are automatically shown in the Mixer. You should disable this preference if you wish to change this default behavior.

This setting can be over-riden for individual tracks using the Track Manager. This is explained in Chapter 11.

### 10.13 Stereo and Dual Panning

The stereo panner and the dual panner are designed to give you more control over how you pan stereo tracks. The default pan law (stereo balance/mono pan) gives you a single pan control which moves the sound between the left and right speakers.

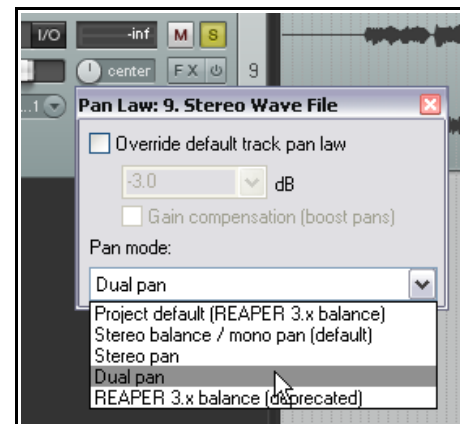
However, a stereo track is made up of two channels – left and right. You can see these on any stereo wave file that you record or import into any project. The output of one channel (the top waveform) is normally routed 100% left, the other (bottom waveform) 100% right. Using the dual panner or the width panner you are able to change this in one of two different ways.



The dual panner is easier to understand. Each of the two pan controls contains one of the channels. Pan the first of these 100% left and the second 100% right and you will hear the first channel thru the left speaker only and the second thru the right speaker only. Reverse these and you will now hear the first channel only thru the right speaker and the second only thru the left channel. Pan both fully left and you will hear both thru the left speaker only. You can adjust both pan controls independently to place each channel exactly where you want it. For example, if you set both controls dead center you will hear exactly the same mix of the two channels thru both speakers.

The stereo panner is in some respects more subtle. You can use the width control to adjust the mix of the two channels within the media item or submix, and the balance panner to position that overall mix further to the left or the right.

To help you understand this, let's work thru a relatively simple demonstration.



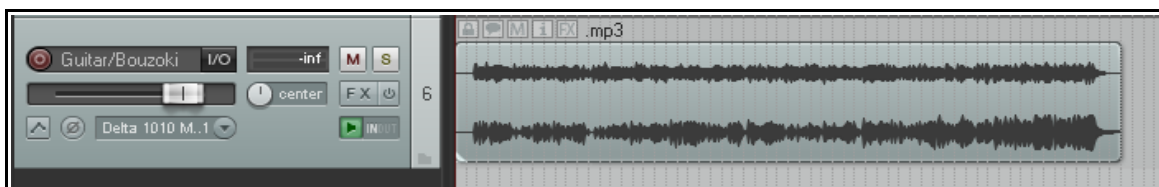
#### Displaying the Dual Panner or Stereo Panner

Any track's dual or stereo panner can be shown by right-clicking over the pan fader and selecting the required pan mode. You are most likely to want to do this for a track which contains stereo media items, or which is a folder, or acts as a bus or submix.

#### Example

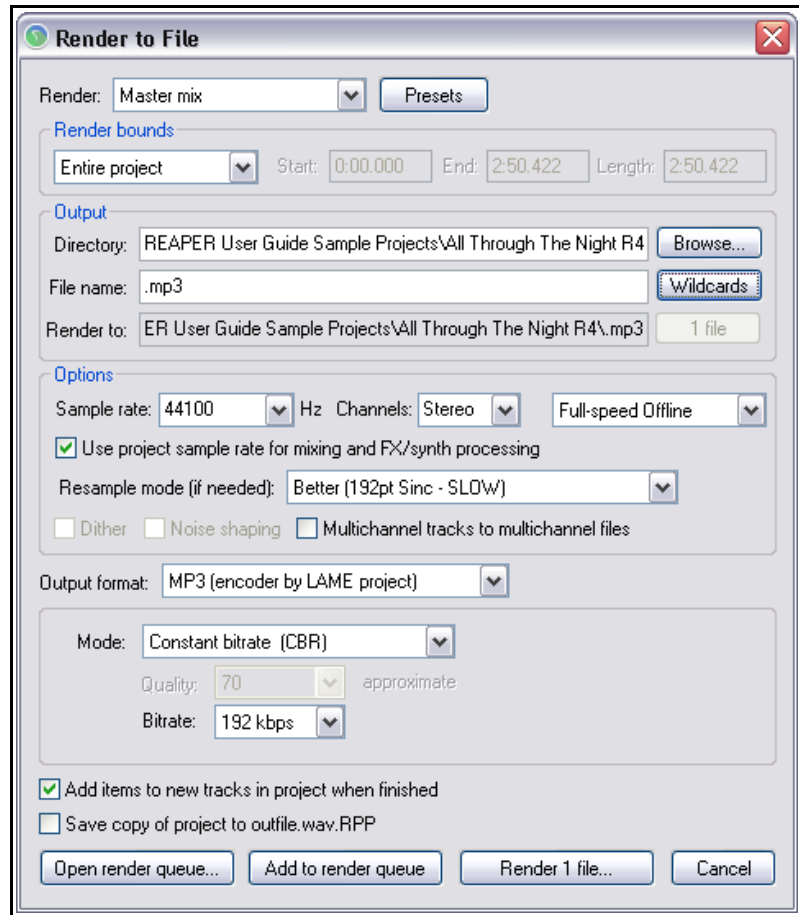
In this example we will first create a stereo file in order to help us experiment with the use of the width panner. We will then get a little more ambitious and use it on a submix. This will include rendering the mono media items on two current tracks a single stereo file. The topic of rendering will be covered in detail in Chapter 18.

1. Open the file **All Through the Night.RPP** and save it as **All Through the Night WIDTH.RPP**.
2. Mute all tracks except the Guitar Body and the Bouzouki.
3. Pan the Guitar Body 100% left and the Bouzouki 100% right.
4. Choose the **Render** command from the **File** menu. Make sure that you set Channels to **Stereo**, and select **Master mix** and **Entire project**. Select output format MP3 and **Add items to new tracks in project when finished** (as shown below).
5. Click on **Render 1 File**.
6. After a few seconds, the rendered file will be added as a new track. Give the track a suitable name. It should resemble that shown here.





7. In this rendered track, the guitar makes up the audio on one channel, the bouzouki on the other channel.
8. **Solo** this track and play the song.
9. Adjust the pan control slowly, first fully left, then fully right, then back to the center. As you do so, one channel will gradually fade away. Panned full left you will hear only the guitar, full right only the bouzouki. Move the pan back to the center.
10. With this track selected in the TCP, right click over the pan control and choose **Dual Pan** option from the pan mode drop down list (these are explained overleaf).
11. Play the song. Slowly move the top pan control to 100% right. You will now hear both instruments in the right speaker only.
12. Move the lower pan control to 100% left. Now you will hear the guitar in the right channel only, the bouzouki in the left channel only – the opposite of what you started with.
13. Experiment moving these faders. When finished, move the top pan control to 100% left and the lower pan control to 100% right. Save the file.
14. Now change the pan mode for this track to **Stereo Pan**.
15. Play the song. At first you will hear only the guitar in the left speaker, only the bouzouki in the right speaker. Slowly move the lower (width) panner from 100% right towards the centre (0W). As you do so, the two instruments will tend to blend more together.
16. With width set at 0W, move the top (pan) control fully left. The mix will now be heard thru one speaker only. Move it back to the center. Save the file.



### Now try this:

1. Unsolo and mute the stereo track.
2. Create a folder called Instruments just after the Vocal track. Change the pan mode for this folder to Stereo.
3. Make the two guitar tracks and the bouzouki tracks child tracks of this folder. Adjust the volumes and pan settings of the individual tracks and the folder to get a nice sounding mix.
4. Add the width control to the folder. Experiment with using this control to improve the sound of your instruments. Compare the results that you get with different pan modes.

**Tip:** This technique can do wonders when you are mixing vocals, including vocal duets and vocal harmonies!

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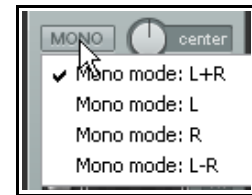
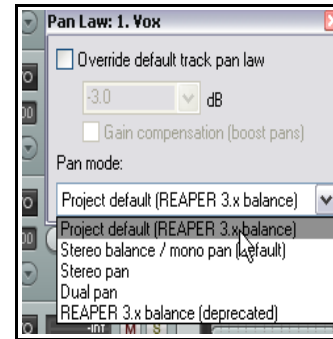
### Pan Modes

By default, the stereo width is applied before the pan/balance control. To select a different pan mode, right-click over either the pan or width control fader and choose from the drop down list. The three modes are:

**Stereo Balance/Mono Pan:** The track is treated as mono, even if it contains stereo media. Set to center, you hear the same signal equally thru both speakers. Set hard right, you hear it in the right speaker only.

**Stereo Pan** Lets you control side (pan) and width separately. Side means that the stereo image is set more to the left or right, and width means how far apart the left and right channel are in the stereo image. With side set to center and width set to 100%, you hear the left channel in the left speaker and the right channel in the right speaker. With side set to center and width set to 0%, you hear both channels equally in the left and right speakers. With side set hard right, you hear both channels equally in the right speaker, regardless of the width setting.

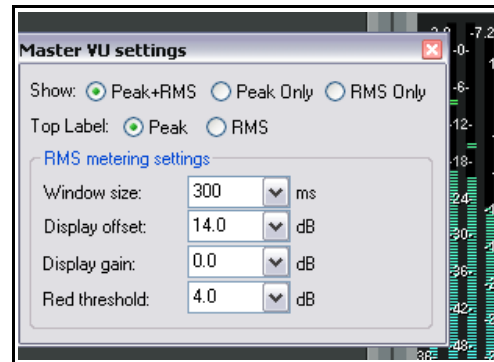
**Dual Pan:** Lets you control both channels separately. The left knob sets the left channel more left or right, the right knob sets the right channel more left or right. With left set hard left and right set hard right, you hear the left channel in the left speaker and the right channel in the right speaker. With left and right both set to center, you hear both channels equally in the left and right speakers. With left and right both set hard right, you hear both channels equally in the right speaker.



### 10.14 Master Track Options and Settings

The mixer Master Track controls has the same functions as when the Master Track when shown in Track View. Note the Output button (above - by default labelled Mono):

- 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 modes.
- Left click on the FX button to display the master FX Chain.
- Right click on the FX button for the Add FX context menu.
- If the FX chain for the Master is displayed, then you can use all and any of the FX management keyboard shortcuts that you can use on your tracks.
- Right click over the VU area to display the settings that you can use to control what is displayed in the VU and how it is displayed (above right).



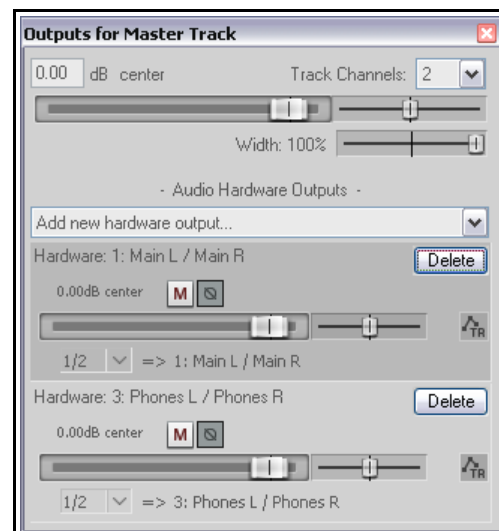
### 10.15 Master Hardware Outputs

Output from the master can be directed to one or more of your available hardware outputs. This can be done using the routing matrix. The master routing (IO) button (in the Mixer) can also be used to set up and manage your hardware output or outputs.

- Right click on the IO button to display a menu of hardware output options. These can be toggled on and off in any permutation that you require.
- Left Click on the IO button to display the master track outputs window. This can be used to control the levels and panning of the signals to the hardware outputs.

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.   |



### 10.16 Master Track Channels

The topic of routing and channel splitting is one 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. You'll find no shortage of examples in Chapter 15.

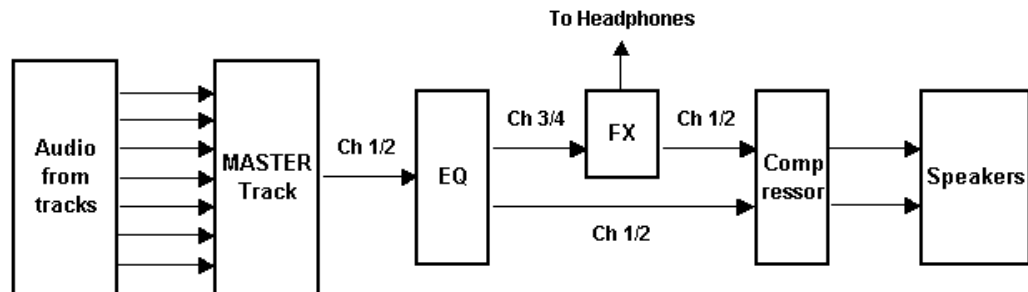
You can use channels to send two copies of the same signal to two different places. You can then do separate things to each signal before joining them up again. Below is a relatively simple example. The example itself may or may not be something that you'll ever want to do, but that's not the point. 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 can use this to feed some effect (such as reverb) into our signal chain, then send the effect (and only the effect) 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.

#### Example

*This exercise will almost certainly be too complex for the novice user, and as such is recommended for the more experienced only. Otherwise, you might wish to return to it after you have completed Chapter 15.*

This diagram shows what we are going to achieve. It assumes that our audio signal flows from left to right.

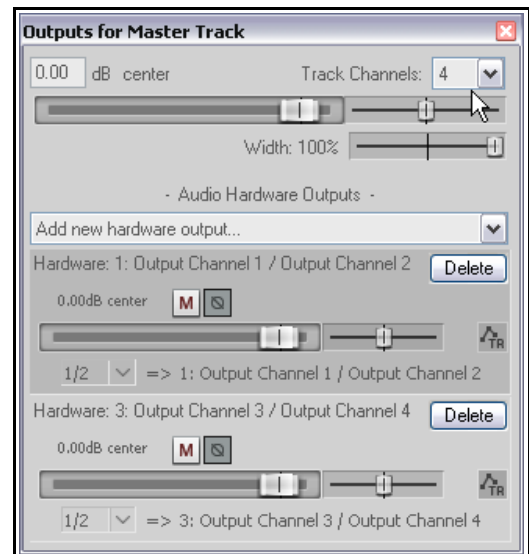


First we will create the

necessary extra Channels for the Master Track.

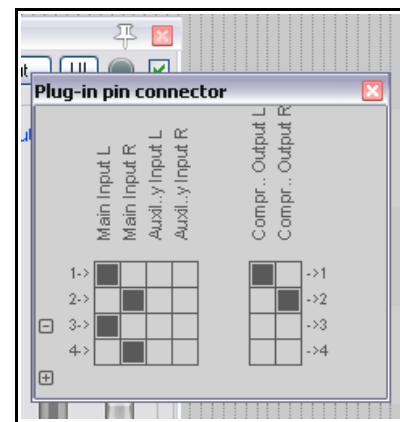
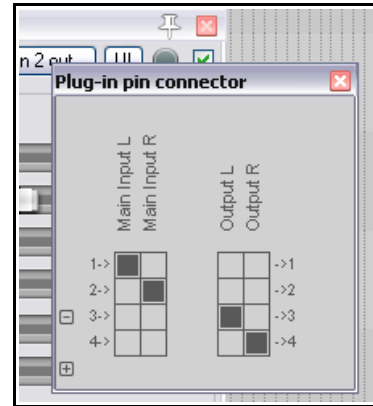
The audio coming into our Master from the mix will be split between Channels 1/2 and Channels 3/4. The signal that is passed to Channels 3/4 will be fed thru a Reverb plug-in then directly out to our headphones. It will also be passed back into a Compressor plug-in, where it will be mixed back into the 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. View the Mixer and enable the options to **Show FX inserts when size permits** and **Show sends when size permits**.
4. Make sure your Speakers and Headphones are each connected to different paired sound card outputs.
5. Right click over the **IO** button in the Master and make sure that output is directed both to your speakers and to your headphone amp.
6. To create the required channels, left click on the **IO** button for the **Master Track** and set the number of channels to 4 (as shown, right).
7. Assign the output of channels 1/2 to your studio speakers and 3/4 to your headphones. Your settings should appear similar, but of course not identical, to those shown here.



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8. Play the song. For now, it should be heard over the speakers, but your headphones should still be silent.
9. In the Master FX chain, 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.
10. In the Master FX chain, click just below the ReaEQ 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 settings for these outputs are illustrated (right).
11. Now play the song. The playback thru the speakers will include the effects of your **ReaEQ** settings but not **ReaVerbate**. In contrast, if you listen thru the headphones, you will hear only the reverb.
12. Now click again in the master FX chain and add **ReaComp** after the reverb plug-in. 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, as illustrated below right.
13. Now play the song. You can adjust the amount of reverb in 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.
14. 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.
15. Save this file.



### 10.17 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 in one or more of your tracks for some other purpose. In that case, if you also used channels 3/4 for the purpose outlined in the above example, then the signal on channels 3/4 of your tracks would also be leaked into the signal being fed to your reverb plug-in.

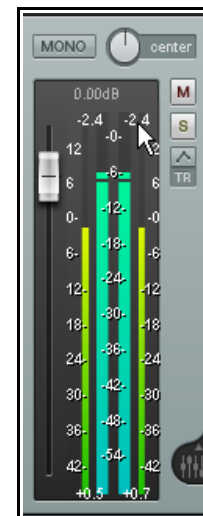
This channel leakage can be avoided simply by reserving for the Master a pair or pairs of channels not used elsewhere in the project – in this example, you might choose to use Channels 5/6 or Channels 11/12. Since you have up to 64 channels available to you, this should not normally present you with any problem.

### 10.18 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). 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, VU Meters/Faders** 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.



### 11 Project Management Features

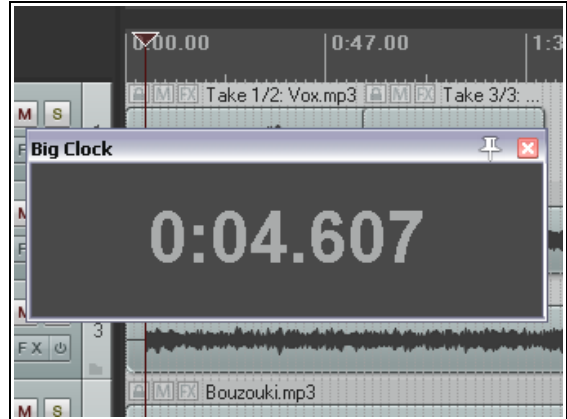
#### 11.1 Introduction

In this chapter we'll be looking primarily at some of those features of REAPER which you are more likely to want to use when you are managing your project as a whole rather than just focussing on individual tracks or items. These include using the Project Media/FX bay, Locking, modifying a color scheme, using the Track Manager, Screen Sets and more. We'll start by looking at how you can change a project's start time.

#### 11.2 Setting the Project Start Time

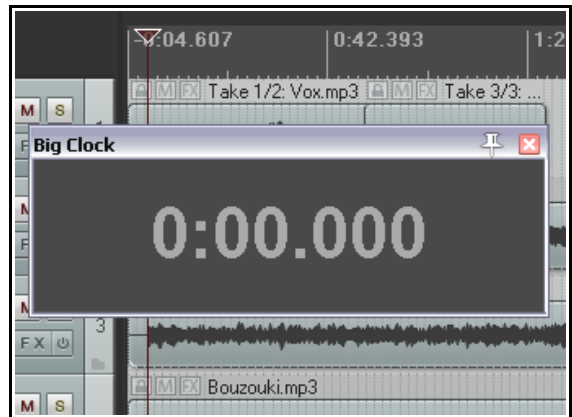
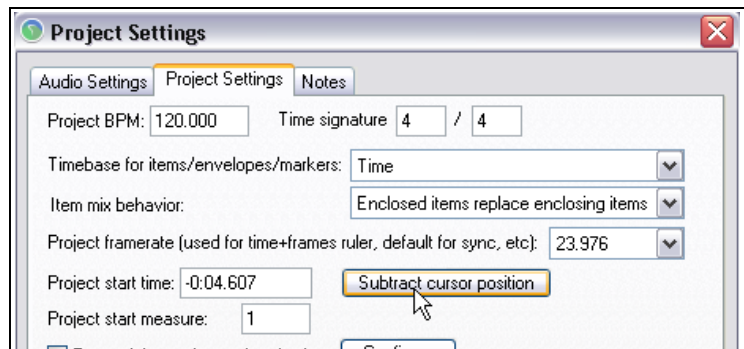
With many projects you will find that you have a few seconds of recorded silence before the program material (instruments and vocals) actually start. This can create two annoying problems:

- Times shown on 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 above the actual start of the song is at 0:04.961. We want to reset this point to Zero. This is how it is done:

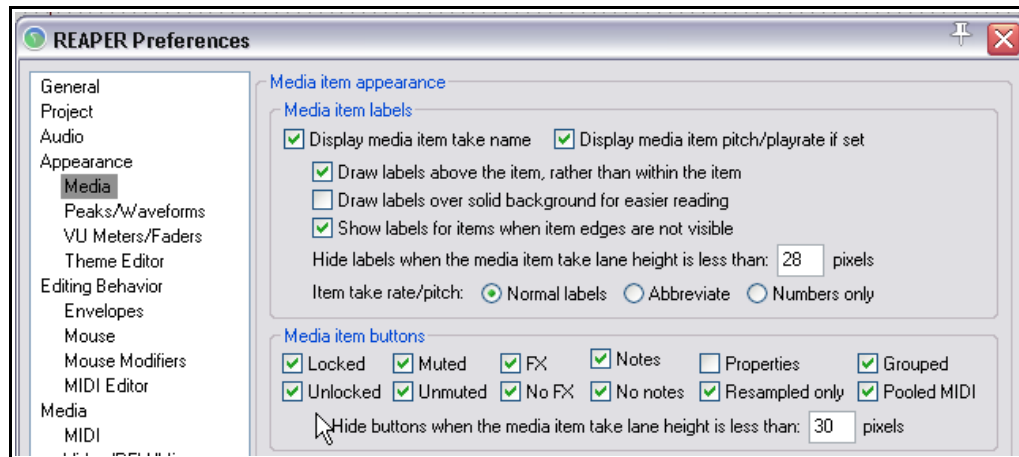
- Place the cursor at the point that you wish to mark as the start of the song - in the example shown this will be 04.607 into the project.
- Press **Alt Enter** to display the **Project Settings** window.
- Select the tab labelled **Project Settings**.
- Click the button labelled **Subtract cursor position 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**.
- If you need to refresh your understanding of markers, look back thru Chapter 8.
- 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 right).
- If you wish, you can double-click on the marker to open up the **Edit marker** dialog box, where you can give it a name.



### 11.3 Locking Media Items

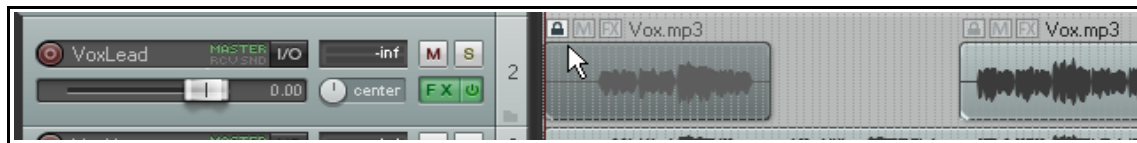
Individual items can be locked into position to prevent their settings from being accidentally changed, such as by being moved or deleted, while at the same time leaving you free to manipulate other items as you wish.

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 right).



Whether the icons are displayed on top of the media items or in a lane above it (as in the example below) 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, nor can it be slip-edited.

You can, however, make changes to most of its settings within the Item Properties dialog box (pitch, play rate, FX Chain, and so on) or using the media item context menu. The second item, however, remains unlocked (notice the open padlock icon). It can (for example) be moved, or deleted, or have a fade out added. You can also open the item for editing, in the MIDI editor (MIDI items) or your installed external editor (audio items).

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.

### 11.4 Locking Track Controls

The toggle command **Lock Track Controls** (from the track control panel right-click context menu) can be used to lock/unlock the controls for any track or selection of tracks. This prevents you from making accidental changes for example to a track's volume or pan setting. In the example shown here the controls of track 1 have been locked.



You can hover your mouse over the control of a locked track to see its current setting displayed as a tool tip.

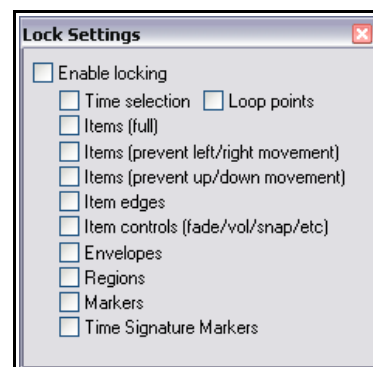


## 11.5 Project Lock Settings

The Locking feature of REAPER can be used to effectively freeze certain aspects of a project file to prevent something accidentally being changed or deleted. There are two aspects to locking:

- Deciding which project elements you would like to be locked.
- Enabling or disabling the locking feature. The keyboard shortcut **L** can be used to toggle this on and off.

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 are 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>	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 or add 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. For more about envelopes see Chapter 16.
<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 then wish to lock their horizontal position.

1. Press **Shift L** to open the Locking Settings window.
2. Tick only **Items (prevent left/right movement)**.

3. If **Enable Locking** is not enabled, click on it to turn it on.
4. Now try to drag and drop any of your items to the left or right. They won't move.
5. Press the **L** key – this toggles locking off again.

### 11.6 Customising Colors and Fonts

Chapter 19 of this User Guide covers REAPER's preferences in detail. However, there is one page of settings that is so widely used that it has been promoted to this chapter! That is the REAPER **Theme Editor**, which lets you modify your theme settings.

This is displayed by choosing the **Appearance, Theme Editor** page within your **Preferences** window (see right).

Themes consist primarily of two sets of materials: image files and color/font definitions.

The image files provide, for example, the track control items and media item icons (pan and volume faders, mute and solo controls, etc.).

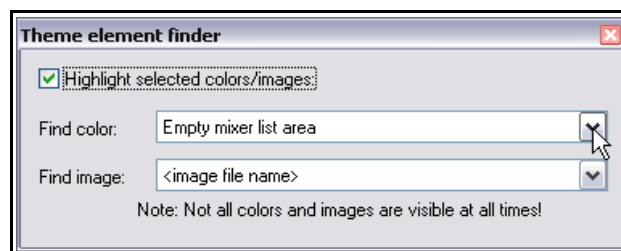
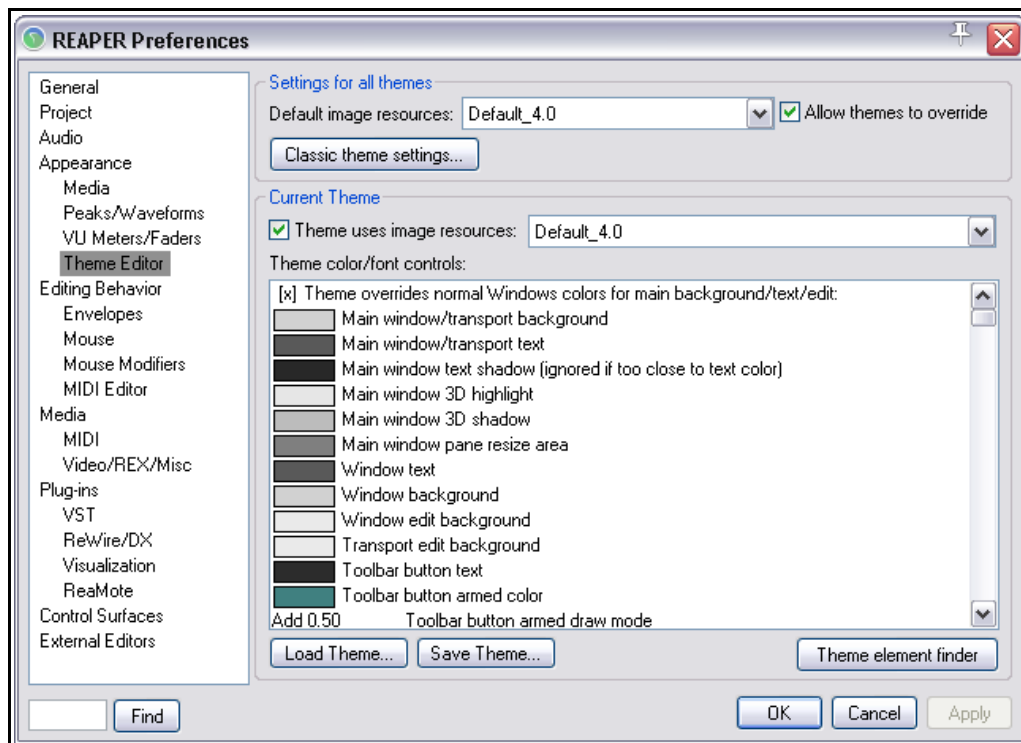
The definitions determine such things as the font used for track names and the colors used for media items, track and mixer panels, edit and play cursors, markers, VU meters, envelopes, and so on. If you are not sure what any of the listed items are, you can use the **Theme element finder** button to identify them (see below).

In addition to those installed with REAPER, many themes are available for download from [stash.reaper.fm](http://stash.reaper.fm). To install a downloaded theme, simply drag and drop the .zip file from Windows Explorer into REAPER's Arrange View (main view).

The **Load Theme ...** button can be used to select any available theme. Scroll thru the **Theme color/font controls** list to see all of the items which you can change. Click on any item to open (as appropriate) the color picker or font dialog box, where you can change its definition.

You can also "mix and match" - that is, use the basic color and font definition set from one theme with the image files of another theme. To do this, use the **Default image resources** drop down list to select the theme whose images you wish to use, unselect the option **Allow themes to override** and click on **Apply**.

Finally, having chosen your fonts and colors and selected your favorite images, you can save them all together into a new theme by clicking the **Save theme...** button and giving your theme a name.



### 11.7 The Project Media/FX Bay

#### Overview

The **Project Media/FX Bay** is a one stop center which you can use for managing and arranging a project's FX and media items. It is opened from the main menu by the **View, Project Media/FX Bay** command. The window contains five tabs (pages). The Item Groups (Chapter 6) and Take Comps (Chapter 7) tabs have already been introduced. The other three are:

- ◆ **Source Media.** This lists the media items that are available for use in, or are already used in, the project. Each item will occur only once in this list. Where it is used more than once in the project, this will be indicated by the number in the Usage column.
- ◆ **Media Items.** This lists only the items that are actually used in the project (i.e., active). An item will appear in this list as many times as it is used in the project.
- ◆ **FX.** This lists the FX plug-ins that are used in the project.

You can drag media files (e.g., from REAPER's Media Explorer or from Windows Explorer) or FX (e.g., from the FX browser) into the Project Bay. Media items inserted in this way are added to the **Source Media** page. If the item is then used in the project, it will be added to the **Media Items** page. FX items are added to the FX bay.

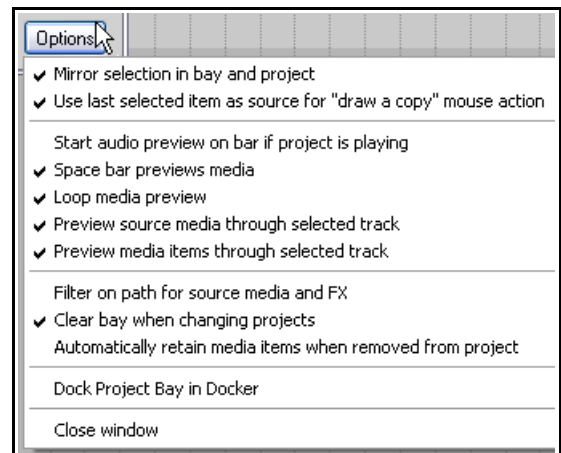
You can rename items within the Project Bay, select all instances of a media file or FX within the project, and replace media/FX in the project with any other media/FX from the Project Bay. You can also mute/solo media items and bypass/unbypass FX.

Both Media pages and the FX page include a Retain column. When you drag media items or FX into the project bay, they are marked with a + in the retain column. This setting means that the entry will remain in the project bay even if there are no instances of that media item or FX in the project.

When you add media (by recording or inserting) or FX to the project, they automatically appear as entries in the media items and source media bays, with the retain status unset. These entries will be automatically removed from the project bay if they are removed from the project itself. If you want the entries to remain in the project bay even after being removed from the project, you should enable retain for those entries in the source media bay.

FX entries in the project bay include a **Preset** column. If you change the value in this column (from the right-click menu), all instances of that FX in the project with the previous preset selected will be changed to the new preset. In addition, you can retain an FX entry with a specific preset, or multiple entries for the same FX with different presets, in the project bay.

The Project Bay includes two buttons (lower right) **Actions** and **Options**. Clicking on either of these to display a menu. As an example, the **Options** menu is shown on the right. Most of these commands require little explanation.



**Mirror selection in bay and project.** When enabled, this causes an item selected in the project to also be selected in the bay, and vice versa.

**Use last selected item as source for draw a copy" mouse action.** This enables you to use pencil mode to create copies of the last selected item.

**Space bar previews media** allows you to use the spacebar to play whichever media or source media item is currently selected. **Loop media preview** will allow any loop marked in the project to be applied. **Preview (source or media items) through selected track** allows you to play back the item with, for example, any FX in a particular track's FX chain, or any track envelopes, being applied.

Make sure the option **Clear bay when changing projects** is enabled if you wish to make each Project Bay project specific. Disable it if you want to carry over items in the current bay to the next project that you open or create. You also have the option to **Automatically retain media items when they are removed from project**. This ensures that retain status is automatically assigned when an item is removed from the project.

The **Dock project bay** and **Close window** commands are self-explanatory.

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The commands on the **Actions** are shown right. They can be used with and applied to the items (media or FX) on whichever bay page is currently selected.

**New project bay window** opens a new project bay window. You can then use this (for example) to load a different saved project bay, whilst keeping the original bay open in the original window.

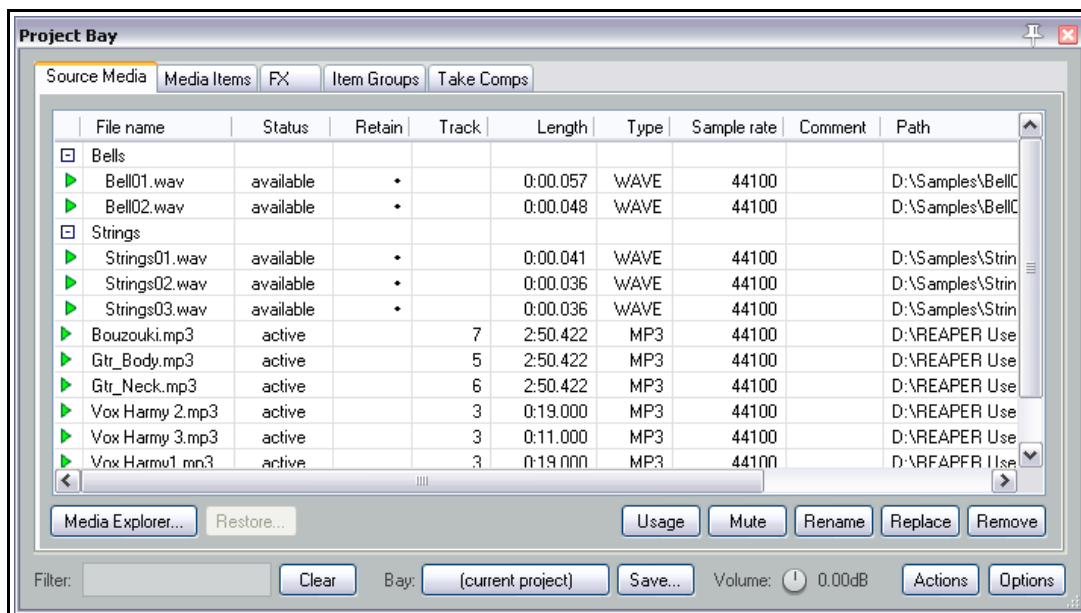
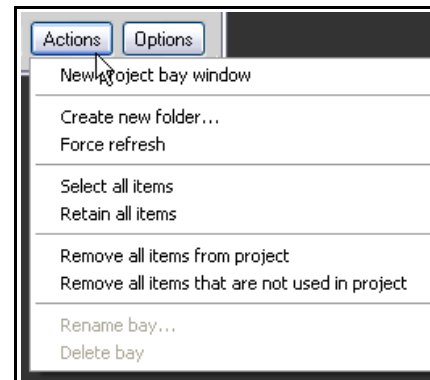
**Create new folder.** Individual project bay entries can be dragged and dropped in or out of the folder (see example below, where two folders have been created, Bells and Strings). Folders can be used for source media items (as shown below), Media Items (in project) or FX. Double click left of the folder name to collapse or expand the folder.

**Force refresh** forces a refresh of the project bay display.

**Select all items** causes all items in the current tab to be selected.

**Retain all items** causes all items in the current tab to be marked to be retained in the bay even when they are deleted from the project.

**Remove all items from project** will remove all items from the project, and **Remove all items that are not used in project** will remove from the media bay all items that are not used in the project, even if they are marked to be retained.



The **Media Explorer** button (lower left) can be used to open the Media Explorer, from where media items can be dragged and dropped into the project bay (as source media) or into the project itself.

The rotary **Volume** control can be used to control the volume of any item being previewed when the option to preview thru selected track has been disabled.

The **Bay** button (bottom center) serves three basic functions. You can use it to create a new project bay, to replace the contents of the current bay with a previously saved one, or to merge the contents of a previously saved project bay into the current one.

### The Source Media Bay and the Media Items Bay

The techniques for working with media items in both of these bays are very similar. The main differences are:

- ◆ Items dragged into the Bay are placed in the Source Media Bay only, until such time as they are actually added to the project. They are then automatically also listed in the Media Items bay.
- ◆ Only items which are active (and therefore included in the project) are shown in the Media Items Bay.
- ◆ Active items can be managed from either of these bays. Available items can only be managed from the Source Media bay.

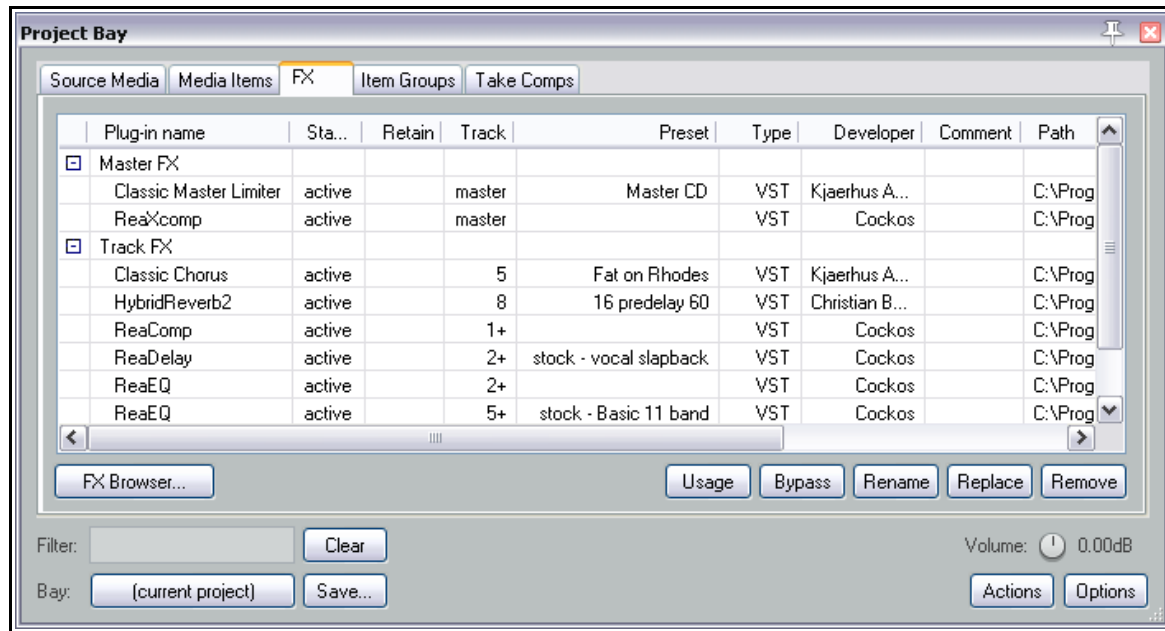
## 11 - Project Management Features

In order to do this ...	... you do this
<b>Add an item to Source Media Bay</b>	Drag and drop from Windows Explorer or REAPER's <b>Media Explorer</b> . You can drag an entire item or (if using Media Explorer) a time selection.
<b>To preview an item</b>	Select the item then press <b>Space</b> .
<b>To add an item from Source Media Bay to a project</b>	Drag and drop from the Bay into the project arrange view window. Its status will change from Available to Active.
<b>To remove an item from within the project.</b>	Select the item and use the <b>Delete</b> key, either from the arrange view window or within the Media Bay.
<b>To remove an inactive item from Source Media Bay</b>	Select item and press the <b>Delete</b> key, or right-click in item row in Retain column (to left of item name), then choose <b>Remove from bay</b> .
<b>To remove all unused items from the Media bay</b>	Right click on title bar, choose <b>Remove all items that are not used in project</b> from the context menu.
<b>To remove the retain status of an active item</b>	Select item in bay, right click in Retain column, choose <b>Remove from bay if removed from project</b> .
<b>To remove all instances of an item from project</b>	Right-click in Retain column to left of item name, choose <b>Remove from project</b> .
<b>To reassign retain status to an active item</b>	Select item in Bay, right click in Retain column, choose <b>Retain</b> from menu.
<b>To locate a Media Items Bay item or Source Media Bay item in the project</b>	Click on the item in the list then on the <b>Usage</b> button.
<b>To mute an item in project</b>	Right-click on item, choose <b>Mute</b> from the context menu (to toggle).
<b>To rename any media item</b>	Select the item in the Bay and either click on the <b>Rename</b> button or use the context menu.
<b>To add a comment for an item</b>	Double click in the comments column of the item row.
<b>To filter the media item list</b>	Type a text string in the <b>Filter</b> box (e.g. vox to see only media items with vox in their name) then click on the <b>Refresh</b> button.
<b>To clear a filter</b>	Click on <b>Clear Filter</b> button.
<b>To replace an item active in the project with another item</b>	Select the item name from the list in the Source Media bay. Right-click and choose from the context menu <b>Replace in project</b> . Then select from the flyout menu <b>All instances</b> or the single instance that you want changed, then choose the replacement item.
<b>To save an item set list from the Bay (for possible use in other projects)</b>	Either select the required items, then click on the <b>Save</b> button and choose one of the available options. You can <b>Save selected items to a new project bay</b> , or <b>Save all items as a new project bay</b> . For either of these, you will be prompted for a new .ReaBay file name. You also have the option to <b>Save and merge selected items to an existing project bay file</b> , in which case you will need to select the required file from the list.
<b>To load a previously saved item set list.</b>	Click on the <b>Bay</b> button, then choose a .ReaBay file from those listed. You have the option to <b>merge</b> the loaded bay with the current one, or to load it in place of the current one.
<b>To sort the list of media items</b>	Click on any column header to sort by that header. Click again to reverse sort order.

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### The FX Bay

Basic FX Bay management commands are the same as those used by the Media Bay – e.g., setting retain status on/off, applying and clearing filters, creating and using folders, and removing items from the media and FX bays are handled in exactly the same way. The example here shows two folders being used to organize the FX.



This table mostly emphasises those aspects more specific to the FX Bay itself.

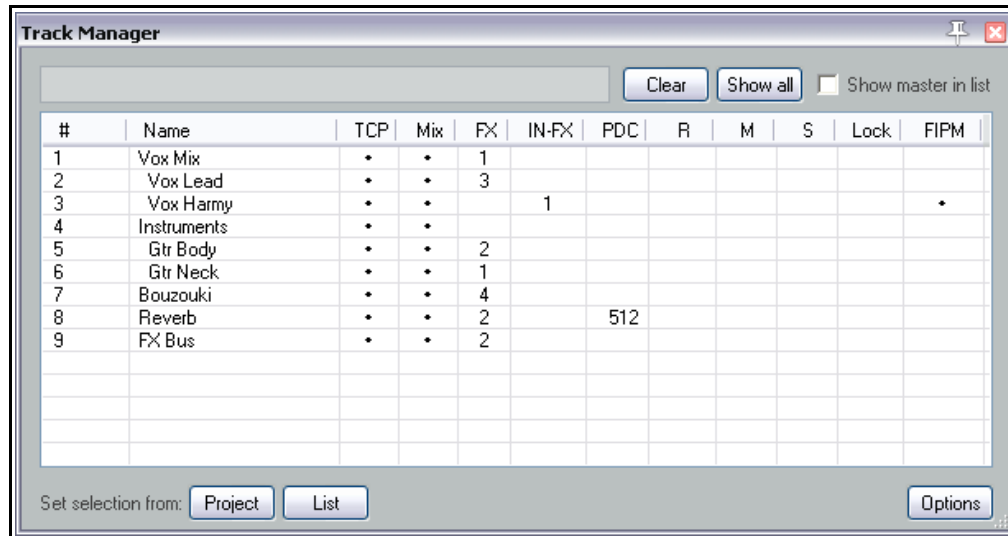
In order to do this ...	... you do this
Open the FX browser window	Click on the <b>FX Browser</b> button.
Add FX to the FX Bay	Drag and drop from FX Browser.
Add FX from FX Bay to track or media item	Drag and drop from FX Bay to track in TCP or MCP, or to the media item.
Locate in project any FX bay item	Track number is shown in Track column. Where an FX is used on more than one track (such as, in the above example, ReaComp) right click over the item in the Track column. <div></div>
Toggle bypass for any FX	Select the FX then either use the <b>Bypass</b> button or right-click over the FX name and choose <b>Bypass</b> from menu. Repeat this to re-enable the plug-in.
Rename any FX instance	Right-click over FX name and choose <b>Rename FX</b> from the menu.
Assign a preset to an FX (see note below table)	Right-click in the Preset column for the FX and select from the menu.
Change the preset assigned to an FX instance.	Right-click in the Preset column for the FX and select from the menu.
Replace one FX with another	Right-click over FX name, choose <b>Replace in project</b> then select from the flyout menu of project bay FX. You can choose to replace all instances or a single instance.



**Note:** You may notice that some FX names may occur more than once in the list. In the example used here, ReaEQ appears twice. This happens when there is more than one instance of an FX in a project and one or more of these instances have been assigned a preset. This enables you to treat each occurrence of the particular FX as an individual instance.

In the above example, the plug-in **ReaEQ** occurs in the project in seven places in total. The preset **stock – basic 11 band** has been applied on two and only two of those instances. Hence these are listed separately in the FX bay from the other five instances.

### 11.8 The Track Manager

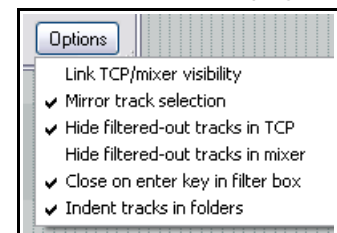


The **Track Manager (View, Track Manager)** is a handy control panel which gives you overview control of your project.

When opened, the Track Manager displays a grid similar to a spreadsheet or table. If the grid is empty, click on the **Show All** button (above the grid) to display a list of the project's tracks. You can now make any selection of tracks in the project and click on the **List** button to select those tracks in the track manager's project list, or make any selection of tracks within the list and click on the **Project** button to select those tracks in the project.

The **Options** button (left click) displays a sub-menu which includes **Mirror track selection**. If enabled, any track selection made in either the Track Manager or in the TCP will be also reflected in the other.

Notice (above) that if your project includes folders with child tracks, then that hierarchy is retained within the track manager's track list. This option to **Indent tracks in folders** can be disabled from the **Options** menu. The other **Options** button menu options are explained in their context in the table below. The table also summarises what you are able to do within the track manager window.



To do this ...	... you do this
<b>Adjust column width in grid</b>	Click and drag left or right on boundaries between column headers,
<b>Show/hide Master</b>	Use <b>Show master in list</b> toggle option (top right).
<b>Show/hide tracks in TCP/MCP</b>	Click in track row in TCP/MCP columns. You can use the toggle option (on the <b>Options</b> button) to <b>Link TCP/Mixer visibility</b> .

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To do this ...	... you do this
<b>Filter the track list by name</b>	Type text in filter box (e.g. vo to list only the vox tracks in the Track Manager). Use the <b>Options</b> button to also apply the filter to the TCP and/or Mixer. The <b>Clear</b> button removes the filter.  If you enable the option <b>Close on enter key in filter box</b> from the <b>Auto</b> button left-click menu, then pressing Enter in the filter box will automatically close the Track Manager.
<b>Open/show track FX chain</b>	The FX column shows the number of FX in each track's FX chain. Double-click on that cell to open the FX chain for that track.
<b>Open/show track Input FX chain</b>	The IN-FX column shows the number of FX in each track's Input FX chain. Double-click on that cell to open the input FX chain for that track.
<b>Monitor plug-in delay compensation</b>	Any plug-in delay compensation used by a track's FX will be indicated (in ms) in the track's PDC cell. Clicking on this cell toggles PDC bypass.
<b>Arm/unarm tracks for recording</b>	Click in the <b>R</b> column for any track(s) to arm for recording. The letter R will be shown for armed tracks. Click again to unarm.
<b>Mute/unmute tracks</b>	Click in the <b>M</b> column to toggle mute status.
<b>Solo/unsolo tracks</b>	Click in the <b>S</b> column to toggle solo status.
<b>Lock/unlock track controls</b>	Click in the <b>Lock</b> column to toggle lock status. Locked tracks display a + sign.
<b>FIPM on/off toggle</b>	Click in the <b>FIPM</b> column to toggle on/off Free Item Positioning. FIPM on shows a + sign.
<b>Toggle several adjacent tracks</b>	For example, to arm several adjacent tracks for recording, or to mute several adjacent tracks.  Click and drag/sweep down the appropriate column in the Track Manager.
<b>Sort Track Manager list</b>	Click on any column header. Click again to reverse sort order.

In this example (right), the **Vox Mix**, **Vox Lead**, **Vox Harmony** and **Bouzouki** are the only tracks shown in the TCP. All tracks are shown in the Mixer.

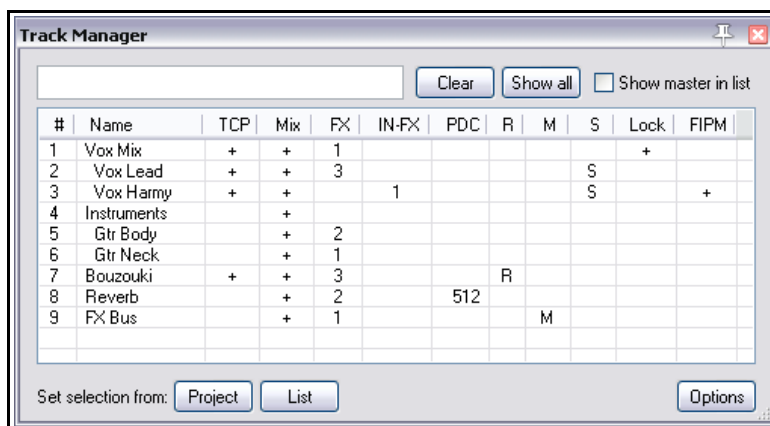
The **Vox Mix** is a folder whose settings have been locked.

Both the **Vox Lead** and **Vox Harmony** tracks are soloed. The **Vox Harmony** track is also FIPM enabled.

The **Bouzouki** track is record-armed.

The **Reverb** track uses plug-in delay compensation of 512 ms.

The **FX Bus** track is currently muted.



**Tip:** You can use the **Screensets** window to save different sets of Track Manager settings as Track Views, any of which can be recalled in an instant. Screen sets are explained later in this chapter.

## 11.9 Track View 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 Set – Track Views and Windows.

**Track Views** are created and saved on a per project basis – the screen set data is stored in the project's .RPP file and can be recalled only when you are working with that project file. Using track view screen sets can be especially useful when you are editing or in some other way working closely with media items.

**Windows** screen sets are global and are stored in the Application Data screensets.ini file. They can be recalled from, and applied to, any project file.

The procedure for creating track views is:

- Use the **View, Screensets/Layouts** command to show the Screen Sets window (the default keyboard shortcut is **Ctrl E**). The Screen Sets window may be docked (or undocked), and (if undocked) pinned to stay on top.
- Adjust your track layouts to suit.
- Select a number from the Track views page of the Screen Sets window.
- Click on **Save** and name the set.

You can create up to 10 track view screen sets per project file. To recall a view, double click on its name.

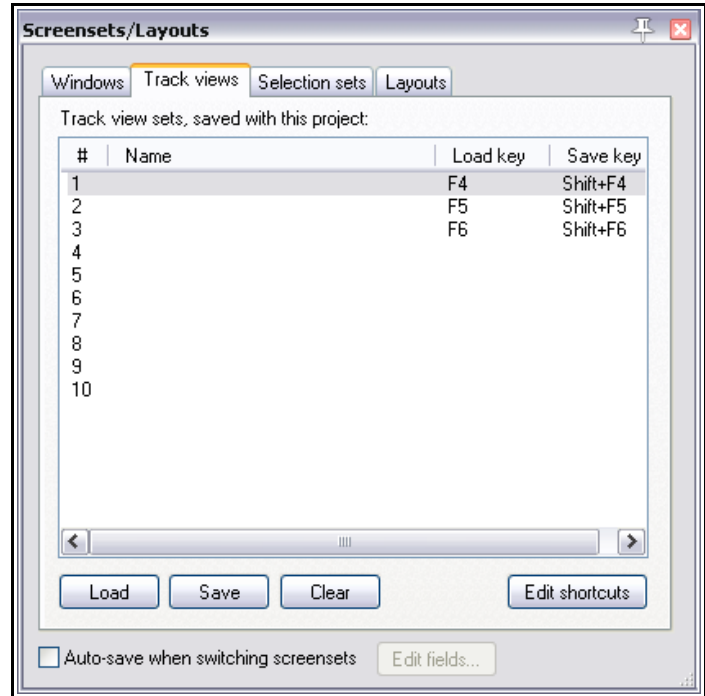
You can also assign keyboard shortcuts to individual screen sets. By default, **Shift F4** to **Shift F6** are used to save your first three track views, and **F4** to **F6** are assigned to load each of these first three track views.

If you want to modify these, or assign shortcuts to other track views, then you should click on the **Edit shortcuts** button in the Screensets window. This opens the **Action List Editor**. For instructions on how to use the Action List Editor, see Chapter 13.

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. The **Edit fields...** button can be used to "tweak" this, so that only certain aspects of your changes are automatically saved.

### Example

1. Open the file **All Through The Night.RPP** and save it as **All Through The Night TRACK VIEWS.RPP**.
2. Adjust the track height of your **Vox** track as shown here.
3. In the Track View page of the Screen Sets window, click on **1**, then **Save** to open the **Save Track View** window.
4. Type: **Vox View** but do not yet press **Enter**.



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- Take a look at the five options that are available. We'll examine these shortly. For this exercise, make sure that only **Track heights** is selected.
- Click on **Save**.
- Now adjust the track heights as shown below.
- In the Track views window, click on **2**.
- Click on **Save** to open the **Save Track View** window.
- Again make sure that only **Track heights** is enabled and type **Guitars View**. Press **Enter**.
- To switch between these track layouts, double-click on their names in the Screen Sets window.

This simple example has introduced you to screen sets and how to use them. Because we selected only the option **Track height** the project track height data was the only information saved with this screen set.

Notice the five options that you may choose to include in or exclude from a track view:

- Track Cursor Position
- Track Scroll Position
- Horizontal Zoom
- Track Heights
- Track Mixer Status

Let's then now work thru a further example which use options other than track height.

### Example

- Horizontally zoom your project so that only the first 45 secs is displayed. Position the cursor at the 46 sec mark.
- In the track view page of the screensets window, click on **3** then on **Save**.
- Make sure that ONLY **Track cursor position** and **Horizontal zoom** are selected.
- Type a name for the screenset: **Verse 1**.
- Click on **Save**.

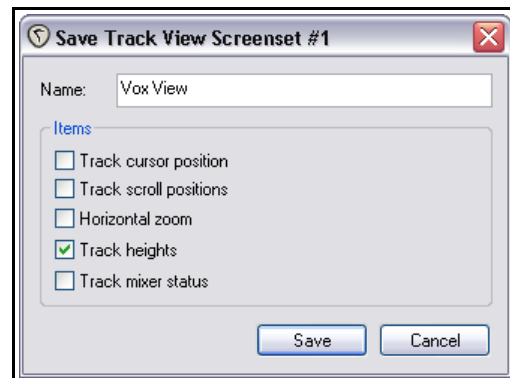
You can now at an time use track view screen set 3 to zoom to Verse 1 and position the play cursor there, and either of the other two screens sets to then zoom vertically to either the vocal or the guitar tracks. To remove any screen set that you do not wish to keep, simply select it and click on the **Clear** button.

### Track Mixer Status

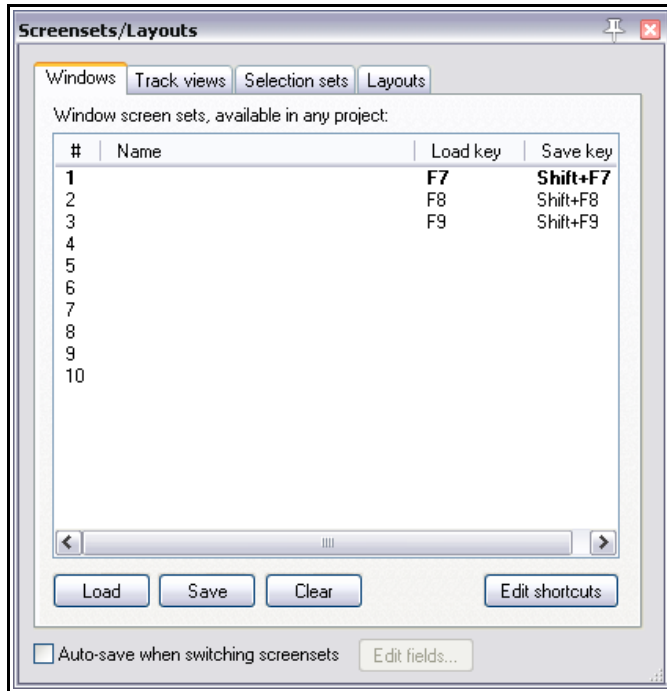
Notice that one of the options that you have when saving track view screensets is **Track Mixer** status. This option can be used to save any **Track Manager** settings regarding which tracks are and are not displayed in the Mixer at any time. Switching between different track views would then automatically select different selections of tracks to be shown in the Mixer.

Do not confuse this with the option **Mixer flags** in **Windows** screen sets, which allows you to select not which tracks but which mixer elements and options (FX inserts, sends, multiple rows, etc.) are applied.

**Note:** As you adjust the height and/or width of your track panel, the display area for track controls will become smaller or larger. Some control will disappear and reappear. An example is shown here.



## 11.10 Windows Screensets



Unlike track view Screen Sets, Windows Screen Sets are not project specific, but can be applied to any project. They are stored in the Application Data folder in a file called screensets.ini.

After opening the Screensets/Layouts view (**Ctrl E**), the procedures for creating Windows screen sets are as follows:

- Decide which windows and views you want displayed, and arrange them on screen as you wish.
- In the Screen Sets window, select the **Windows** page, select a number, then click on **Save**. Type a name, then select as many of the six options as you require (see below). Click on **Save**.
- To recall and open any screen set, simply double-click on its name.
- To change a screen set, open it, make the changes, then save it.

You can also use keyboard shortcuts with Windows screensets. By default, **Shift F7** to **Shift F9** are assigned to saving Windows screen sets 1 to 3, and **F7** to **F9** are assigned to loading them. These assignments can be changed in the Actions List Editor (see Chapter 13).

The options that you may choose to include in or exclude from any screen set are:

- Main Window Position
- Tool Window Positions
- Docker Selected Tab
- Mixer Flags
- Layouts
- Last Focus

Some of these are self-explanatory. In addition, note that:

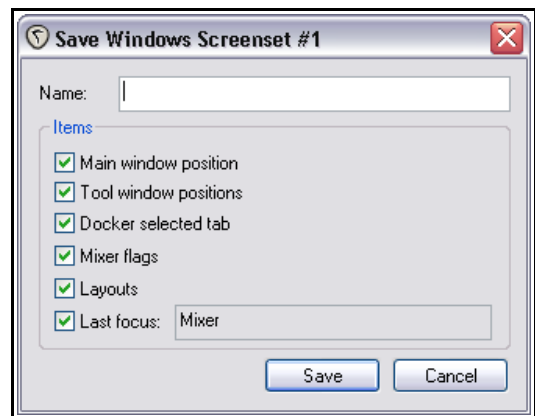
The **tool window position** option will cause the position of those windows which are defined by Windows as tool items (such as VST FX and the MIDI Editor) to be saved and recalled with the screen set. For any particular project, however, this will only be applied if that particular window exists in that project. This option is useful, for example, if you use a set of standard plug-ins in the Master and you want to easily be able to open and close all these FX windows when working with any project.

Enabling **docker selected tab** will ensure that whichever window in the docker is visible when the screen shot is saved will be visible when it is recalled.

The **mixer flags** option, if enabled, will save your various Mixer menu options (FX inserts, sends, folders, top level tracks, position of master, etc.) with the screen set. These options are discussed in detail in Chapter 10.

We encountered **layouts** in Chapter 10, in the context of the Mixer. You'll find more information about Layouts later in this chapter. Enabling this option will ensure that your layouts are saved with the screen set.

The **last focus** option can be selected to ensure that a particular view automatically is given focus whenever the Screen Set is loaded.



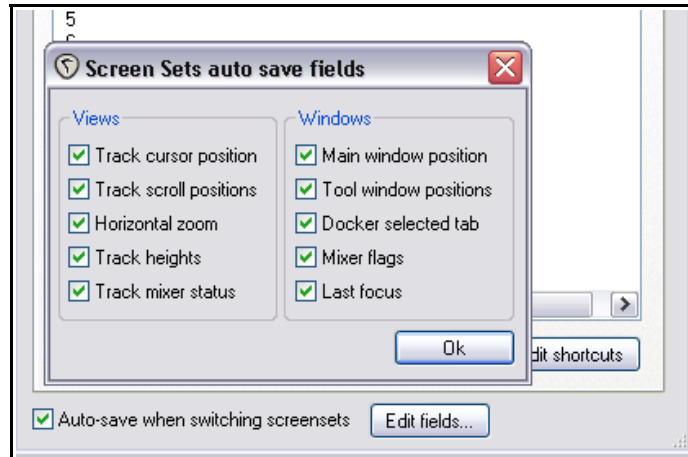
### 11.11 Auto Saving Screen Sets

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 screensets** 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.

If using auto-save, consider using the **Edit fields...** button to decide which elements for which you want changes automatically saved (see right).

The available options are all items that were included in your options when you created your screen sets.



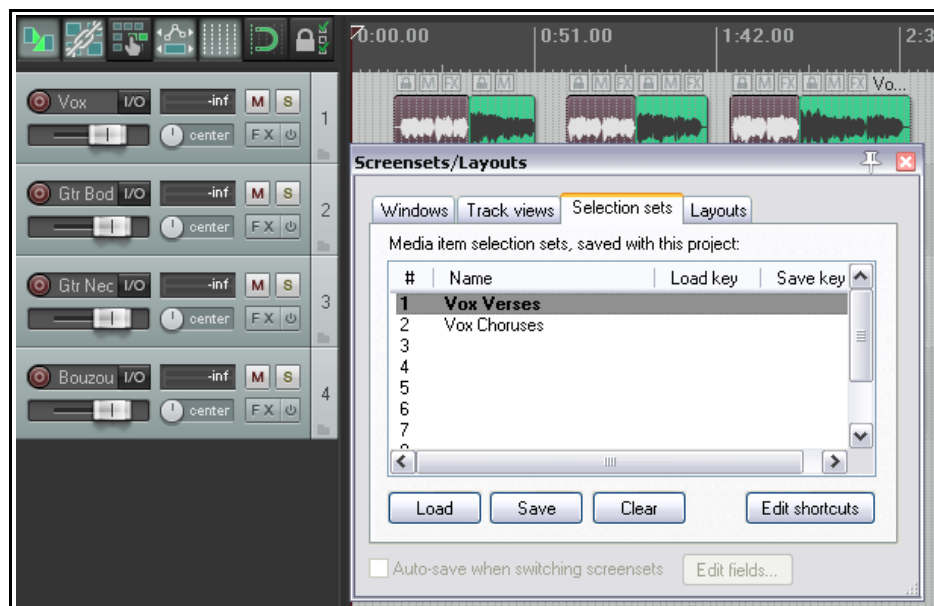
### 11.12 Item Selection Sets

By using item selection sets, you are able to create many different selections of items within a project file and select all of the items in any set simply by selecting that set name. The procedure is as follows:

- ◆ Use the command **View, Screensets/Layouts** to display the Screensets window.
- ◆ Select the **Selection sets** tab.
- ◆ Within your project, select all of the items to be included in the group. These can be on a single track or across any number of tracks.
- ◆ Select a set number, then click on **Save**.
- ◆ Give the group a name and press **Enter**.

At any time you can now recall that group by double-clicking on its name, or by selecting the name and clicking on **Load**.

In the example shown here, two selection sets have been created, one for Vox Verses and one for Vox Choruses. Simply by double-clicking on the required set name, we can select all of the items in either set.





## 11.13 Track, Mixer, Transport and Envelope Layouts

Layouts in general, and mixer layouts in particular, were introduced in Chapter 10. Layouts are created, stored and retrieved with individual themes. Using the **Layouts** tab of the Screensets/Layouts window you can select any theme from the drop down theme list.

Layouts are designed and created using a software tool called WALTER (Windows Arrangement Logic Template Engine for REAPER) and are associated with individual themes.

Any layouts associated with your chosen theme will be available to you from the various drop-down lists in this window, such as track panel layouts and mixer panel layouts. For earlier themes that do not include any layouts, a number of standard layouts are available.

Shown right is an example, in this case double-clicking to display the Mixer Panel drop down list and to select a mixer layout. This is an example only – the exact range of choices available to you may not be

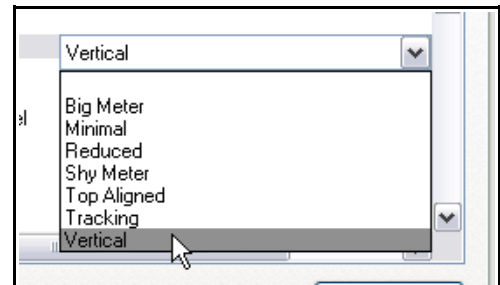
exactly the same as shown here. Note that when one of these drop down lists is displayed. You can hover your mouse over any item to see how it looks, in this example in the mixer.

Here is a summary list of the main layout elements available:

<b>Global Layout</b>	Selects theme defaults for all layout elements.
<b>Transport</b>	Selects a layout for the Transport bar.
<b>Envelope Panel</b>	Selects a layout for track envelope panels. See chapter 16.
<b>Master Mixer Panel</b>	Selects a layout for the Master in the Mixer panel.
<b>Mixer Panel</b>	Selects a layout for all tracks and folders in the Mixer panel.
<b>Master Track Panel</b>	Selects a layout for the Master in the Track control panel.
<b>Track Panel</b>	Selects a layout for all tracks and folders in the Track Control panel.
<b>Selected track panel</b>	Selects a layout for selected tracks in the Track Control panel.
<b>Selected track mixer panel</b>	Selects a layout for selected tracks in the Mixer panel.



Shown here is an example of one possible track layout that you might choose. Notice that this particular layout uses vertical VU meters.

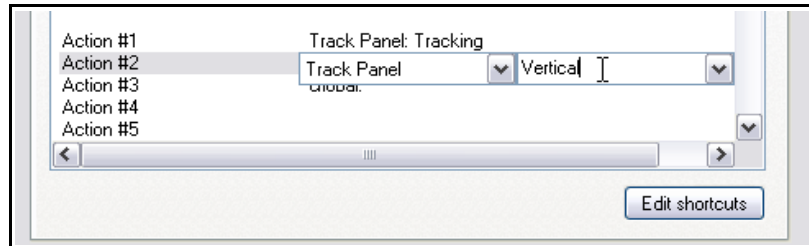


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## Assigning Actions to Layouts

Within the Layouts screen you can assign up to 20 actions to quickly recall any layout. These can be assigned to shortcut keys and/or to custom toolbars.

In the example shown here, Action #1 has been assigned to select a Track Panel layout called Tracking and Action #2 is being assigned to select a different Track Panel called Vertical (vertical meters). You could then click on the **Edit shortcuts**



button and assign shortcuts to the two actions **Layout: apply custom layout #01** and **Layout: apply custom layout #02**. You could also use the **Customize toolbar** editor to create icons for these actions on one of your toolbars. See Chapter 13 for information on both how to assign keyboard shortcuts and how to create custom toolbars.

## Default Theme Layouts

The drop down lists in the various Layouts categories include many options that you can explore. These include **Track Panel** specialist layouts for recording and tracking, and layouts with vertical meters. **Mixer Panel** layouts include narrow channel strips and wider strips with a sidebar to display FX chains, sends, etc. (see example right).



## 11.14 Further Project FX Management

While looking at project management features, it's worth taking an overview of some of the options tucked away behind the **Param** button in REAPER's FX plug-in windows. In chapters 16 and 17 you'll see how this can also be used to create automation envelopes and for parameter modulation. Meanwhile ...

If you touch any FX control (such as a fader) with your mouse and then click on the **Param** button you will see a menu similar to that shown here. In summary, these options are:

**Show in track controls.** Adds a rotary fader to TCP and (optionally) MCP for adjusting that parameter's value. See Chapter 10 and below.

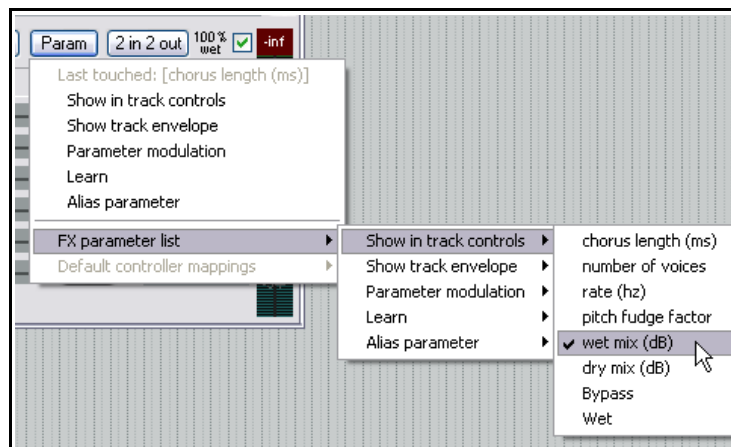
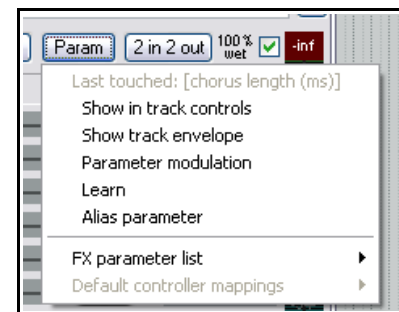
**Show track envelope.** Adds an envelope for automating that parameter – see Chapter 16.

**Parameter modulation.** Enables parameter modulation for this item – see Chapter 17.

**Learn.** Allows you to assign this parameter to an external control device, such as a fader or button on a control surface – see below.

**Alias parameter.** Allows you to assign your own name to this one instance of this parameter. This name will be used, for example, on any track control or envelope that you create for this parameter.

**FX parameter list.** This causes a flyout menu of a list of all parameter controls for this FX to be shown. Using this menu is another method of assigning (or unassigning) any of these options to any parameter, rather than touching it with your mouse – see right.



### The Learn Option

Let's take a closer look at the **Learn** option.

When you touch the control in the FX window with your mouse and then click on **Learn** the Learn window is displayed (see below).

Twiddling the control (such as fader or rotary) on your control surface device will cause information to be displayed in the **Command** window about the channel and CC assignment for this control. This information is picked up from the control surface.

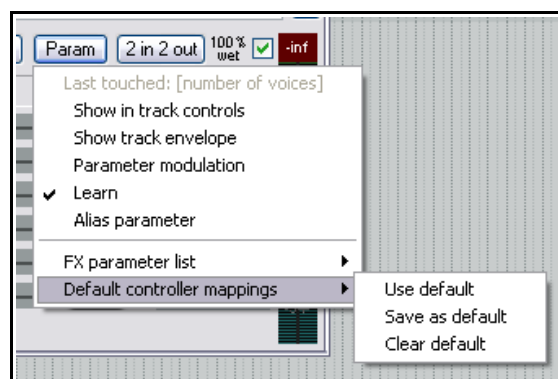
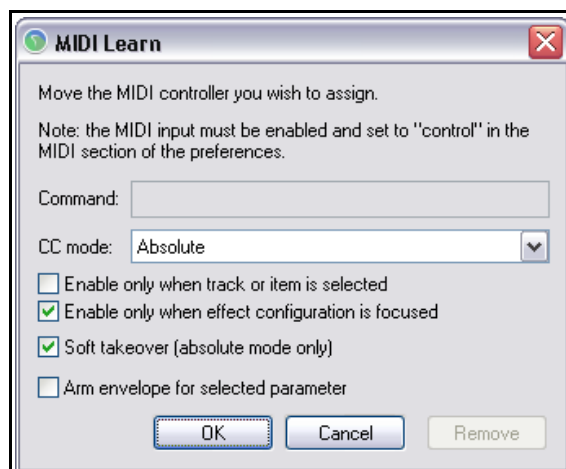
Choice of CC mode (absolute or relative) will depend on the parameter being assigned and your own control device. In many cases, absolute mode with soft takeover will be appropriate, but at first you may need to experiment.

The option to **Enable only when effect configuration is focused** is especially powerful – it means that this control surface assignment will only be used when that particular plug-in has focus. This enables you to assign the same control surface fader to any number of different functions with different plug-ins. For example, the same fader used to control EQ gain in one plug-in could also be used to control the threshold setting on a compressor.

When one or more parameters in a plug-in has been assigned to a control surface, you will see an extra command on the **Param** menu – **Default controller mappings**.

This leads to a flyout menu (right). You can use this menu to save these settings as the default for this plug-in, so that these controls will be automatically made available whenever that plug-in is loaded into other tracks.

Other options on this menu (where a default has previously been saved) are to **Clear default** or **Use default**.



### Show in track controls

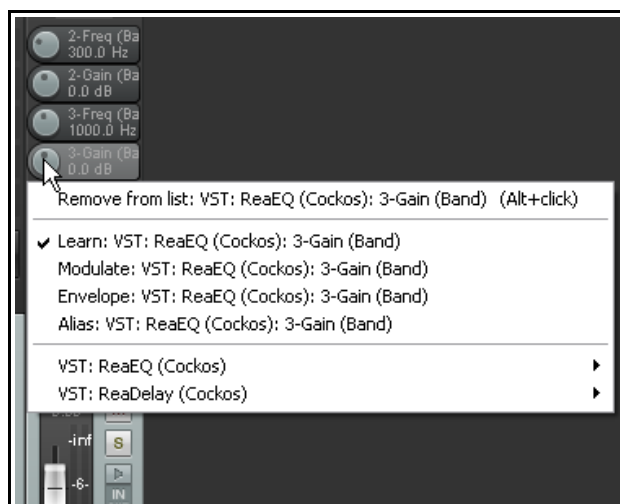
When track controls are displayed in the TCP and MCP, they become more than just controls for individual parameters. They also serve as a gateway to managing your console. To display these in the Mixer, you must enable the option **Show FX parameters when size permits** from the Mixer menu.

Right click over any of the controls in the TCP or MCP for menu (see right). In this menu you can see:

**Remove from list.** This removes the control from the TCP and MCP.

**Learn, Modulate, Envelope** and **Alias.** These four options are the same as on the **Param** button menu in the FX window. For example, from here you can add control surface support to any of your custom track controls by choosing **Learn**.

**Plug-in Menu** (shown in the example below are ReaEQ and ReaComp). This lists the plug-ins in the track's FX chain, together with a flyout menu of all their parameters. You can use this menu to add controls for any of these parameters: the menu includes the option **All parameters**.



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In the MCP, when the option **Show FX parameters when size permits** is enabled, you can right-click in this area for any track to add controls to that track. An example is shown right. The actual menu that is displayed will, of course, depend on which FX are included in the track's FX chain.

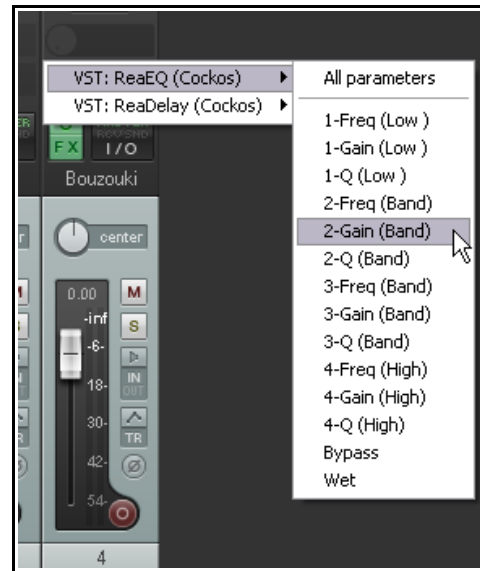
### Track Templates

Back in Chapter 3 when you were introduced to recording, we mentioned track templates and how useful they can be. Now that you have discovered a lot more about REAPER, it's worth revisiting this topic. Arguably, track templates more than any other single feature of REAPER can be your best friend when you are setting up your projects.

A track template can be made up of any track or any selection of tracks. For example, you might have a folder called Drums. This might contain a series of child tracks – Kick, Snare, Toms, Hi hat, etc. – all of which have their own track FX with their own settings, and with volume and pan faders set at their own levels. You could save the entire folder (parent) with its child tracks and all their settings into a single track template called Drum Kit.

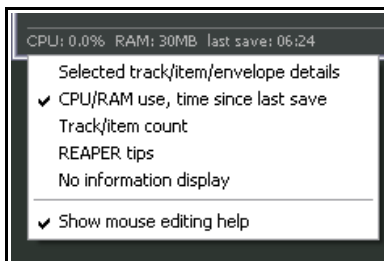
Items that get included in track templates include track name, track control settings, track properties (color, icon, etc.), track FX (together with their parameter settings), track controls, FX alias names and FX parameter alias names, parameter modulation, FX parameters, sends and receives, and more.

To save a track (or selection of tracks) as a track template, choose **Save tracks as track template** from the TCP context menu. To insert tracks from a track template into a project, choose **Insert track from template** from the same menu.



### 11.15 Track Control Panel and Menu Bar Help

A selection of useful information can be displayed below the control panel and at the end of the main menu bar. Right click just below the track control panel and select from these options:

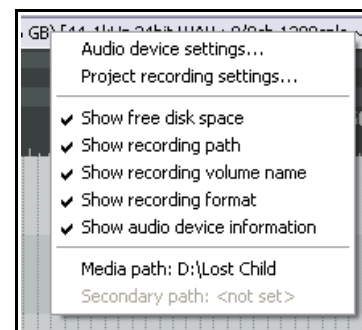


**Selected track/item/envelope details**  
**CPU/RAM usage, Time since last save**  
**Track/item count**  
**REAPER tips**  
**No information display**  
**Show mouse editing help**

The first five of these options are mutually exclusive: that is you can select only one of them. In the case of the menu bar (right hand end), you can select as many or as few of the following options:

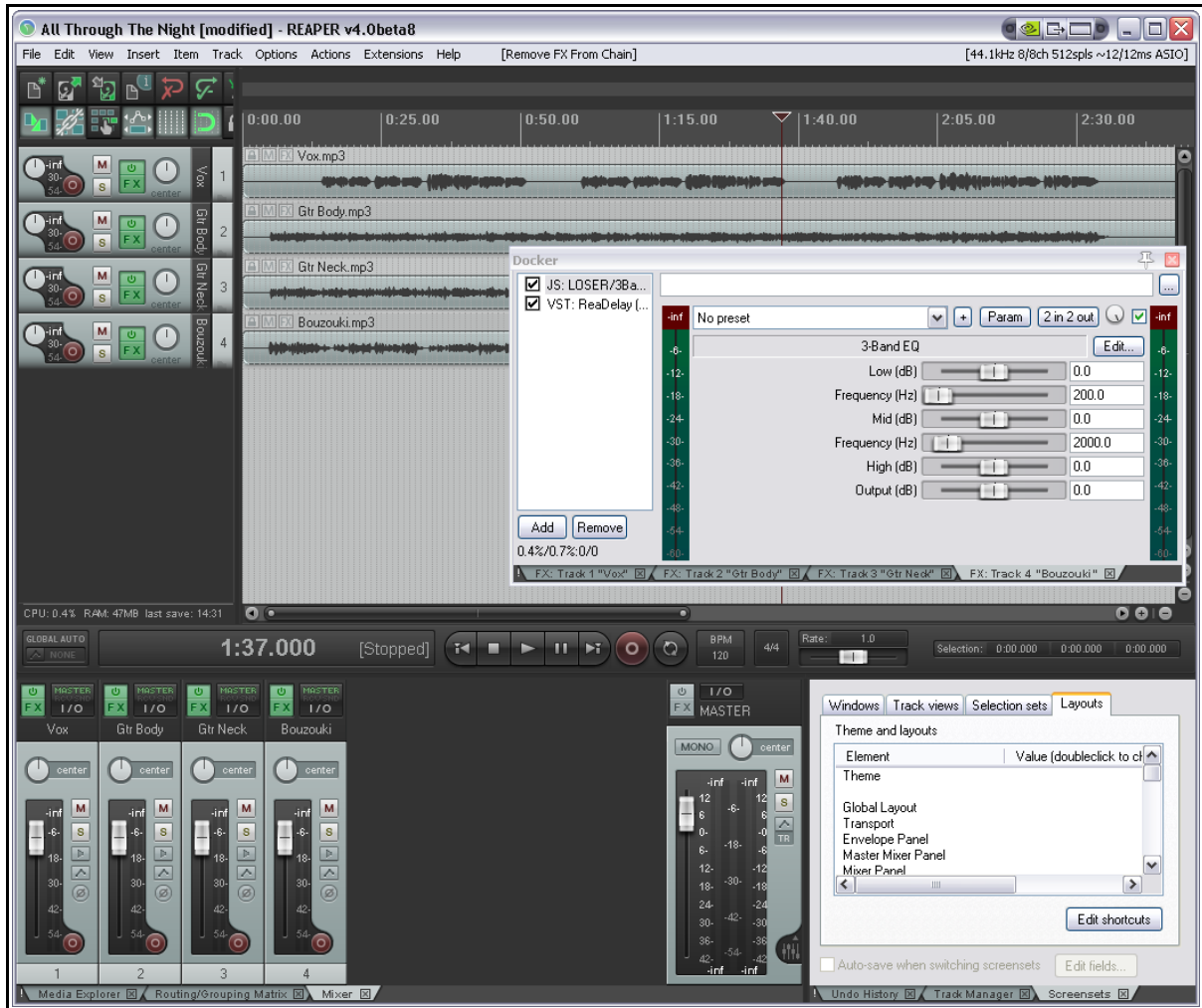
**Show free disk space**  
**Show recording path**  
**Show recording volume name**  
**Show recording format**  
**Show audio device information**

This menu also gives you access to the **Audio, Device** page of your preferences and the **Audio Settings** page of your project settings.



## 11.16 Using Multiple Dockers

In Chapter 2 you were introduced to working with REAPER's docker as an aid to navigating your way thru REAPER's various views and windows. In fact you are not restricted to just one docker: you can create up to 16 dockers if you wish. In the example shown here, we have two dockers attached to the bottom of the main window and a floating docker. The first docker (bottom left) contains tabs for displaying the Routing matrix, the Mixer, and the Media Explorer. The second is used to display at any time the Screensets window, the Track Manager, and the Undo History. The floating window is a third docker, and this contains tabs for displaying the FX chains for four of the tracks in the current project. This is, of course, only an example.



These instructions assume that you are already familiar with the basic techniques for docking and undocking windows, and so on, as explained in Chapter 2. You can attach any docker to the main window in any of the four positions. You can also choose the same position for more than one docker (for example, you might wish to attach two dockers to the right).

To do this ...	You need to do this ...
<b>Dock a window</b>	Right-click on the window's title bar and choose the command <b>Dock ... in Docker</b> .
<b>Create a new docker</b>	Drag and drop any tab from an existing docker into the arrange view area.
<b>Move a window from one docker to another</b>	Drag and drop the tab from its present docker to its new one.

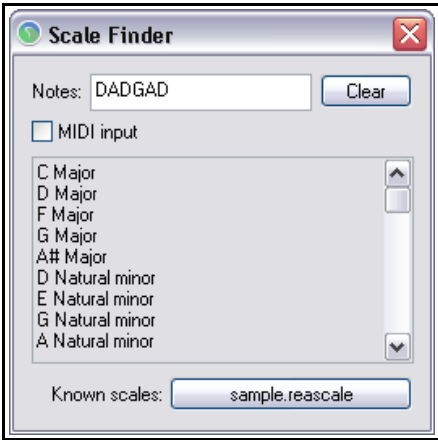
To do this ...	You need to do this ...
Reorder tabs in any docker	Drag and drop tabs left or right.
Attach a docker to the main window	<div>Click on the ! to display the menu, then choose Attach docker to main window, then select a position (bottom, left, top or right). More than one docker can be attached to any of these positions. Click and drag on the boundary between two dockers docked in the same position to adjust the position of the boundary between them (and therefore the relative size of the two dockers). Use this menu also to change the position of a docker, e.g. from bottom to right.</div> <div><div>✓ Attach Docker to main window</div><div>✓ Attached docker position: bottom</div><div>Attached docker position: left</div><div>Attached docker position: top</div><div>Attached docker position: right</div><div>✓ Compact docker when small and single tab</div><div>Set opacity</div><div>Hide dock</div><div>Close all windows in dock</div></div>

11.17 The Scale Finder

The next chapter of this User Guide introduces you to the MIDI Editor. However, REAPER's main Arrange View also includes a feature that MIDI users may find useful – the Scale Finder. It can be used to identify those scales which contain any given set of notes.

The Scale Finder is opened using the command **View** then **Scale finder**. Notes can be typed from the computer keyboard or entered using a MIDI device (including the Virtual MIDI Keyboard).

The file sample.reascale (provided and installed with REAPER) can be used with the scale finder, or you can click on the button at the bottom of this window and use the Load command to import a file of your own choosing.





## 12 Manipulating and Editing MIDI Items

### 12.1 Introduction

REAPER has a number of techniques 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 soon enough.
- 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. This is covered near the end of this chapter.

Before looking at editing, however, we'll resolve a couple of other issues of importance to MIDI users.

### 12.2 Monitoring an External Synthesizer

An external synthesizer can be monitored using MIDI or audio input. Just do this:

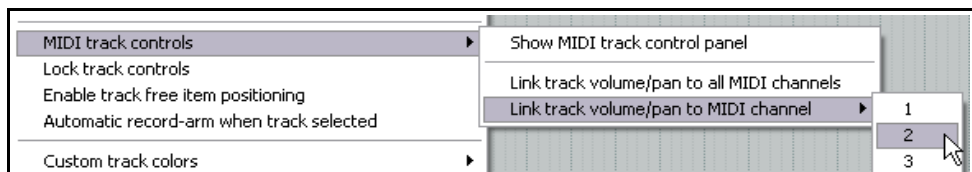
Activity	Procedures
<b>Monitor using MIDI Input</b>	Insert a track and name it. Arm it for recording and turn record monitoring on Set record mode to Disable (input monitoring only) Select Input: MIDI, then the device, then the channel(s) Open the track's routing (IO) window and specify your MIDI interface as the MIDI Hardware Output.
<b>Monitor using Audio Input</b>	Insert a track and name it. Arm it for recording turn record monitoring on Set record mode to Disable (input monitoring only) Select the necessary mono or stereo audio input from the synth's audio interface.

### 12.3 Using Track Controls with MIDI

As mentioned in Chapter 4, REAPER's track volume and pan controls by default control a track's audio signals. If you wish to use these for MIDI instead, you can do so. Right click on the track number in the TCP or MCP and choose **MIDI Track Controls** then select one of the **Link track volume/pan to MIDI** options from the menu. You can choose all channels or any individual channel.

You can also use the plug-in **ReaControl MIDI** with any track.

This is explained in detail in Chapter 14.



### 12.4 Controlling MIDI Data Sends

REAPER's sends and receives can be used with audio items, MIDI items, or both. You have already been introduced to this topic (Chapter 4), and the subject is covered in more depth in Chapter 15. Meanwhile, note that the button indicated on the right can be used to ensure that a send or receive's volume controls are used to control the MIDI data.

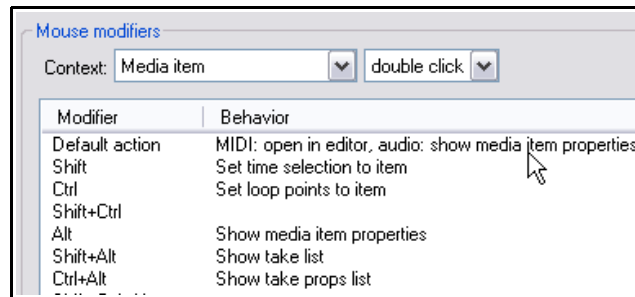


### 12.5 Accessing the MIDI Editor

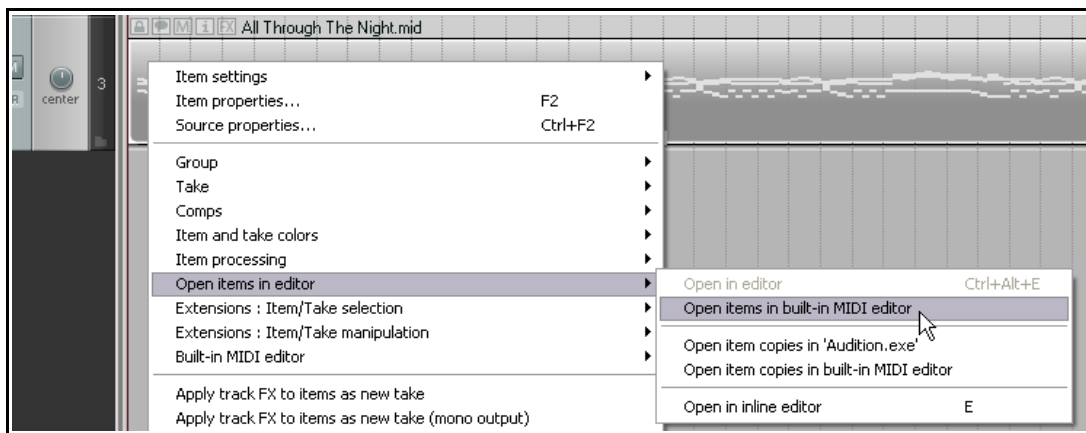
The MIDI Editor needs to be opened from an existing item. If you wish to open it with a “clean sheet” then you must first create a new empty MIDI item. To do this, select the required track and (optionally) make your time selection to define the length of the item. Then choose **Insert, New MIDI Item** from the main menu.

By default, MIDI items created in this way are loop enabled. You can change this for an individual items within its Media Item Properties dialog box, or globally on the **Project, Media Item Defaults** page of your Preferences settings. To open the MIDI Editor with a single MIDI item (either already recorded or created empty), you can use either of these methods:

- ◆ Unless you have changed your default mouse modifier preferences, double-click on the MIDI item in Arrange view, 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.



Modifier	Behavior
Default action	MIDI: open in editor, audio: show media item properties
Shift	Set time selection to item
Ctrl	Set loop points to item
Shift+Ctrl	
Alt	Show media item properties
Shift+Alt	Show take list
Ctrl+Alt	Show take props list



**Important Note!** REAPER's options allow you to change the default behavior when opening an item (or selection of items) in the MIDI Editor. For example, you might (or might not) want them opened in an existing MIDI editor window. These options are explained in Chapter 19, and will also be considered later in this chapter.

To open all of the MIDI items on the same track together in the same MIDI editor window:

- ◆ Select and right-click on one of the required items.
- ◆ Choose **Built in MIDI editor**, then **Open all track MIDI in new editor** from the context menu.

### 12.6 The MIDI Editor Window

When you open an item in the MIDI Editor you will see a display similar to that shown below. It includes:

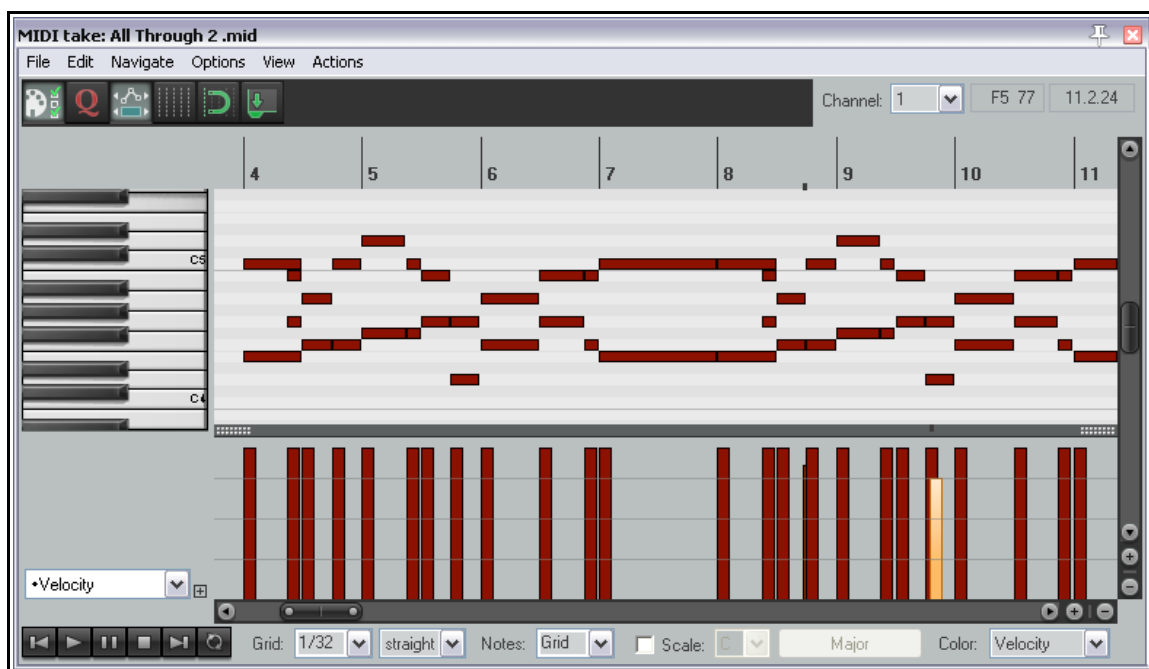
#### The Main Menu.

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 Top Toolbar(below Main Menu)

The various tools shown on the toolbar represent some of the commands that are available from the MIDI Editor menu. Hover your mouse over any of these for a tooltip. Over on the right is a Channel drop down list which can be used to restrict the display to a selected channel. You can also customize this toolbar to meet your own requirements. In particular, notice the **Filter** button. It is the first button on this toolbar.

## 12 - Manipulating and Editing MIDI Items



### Filter Button

This opens up the Filter Events window which allows you a great deal of flexibility in deciding which information you want displayed in the MIDI Editor. (see right). Ticking the Enable Filter box ensures that the options are visible. You can choose to display all channels, or any combination or permutation of channels. The Filter Events window is also useful when you have multiple items and/or multiple tracks open in the same MIDI Editor window – see later in this chapter.

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 Sysex/Meta.

**Note:** The Filter Events window can be used to select which data channels are displayed in the MIDI Editor for editing. If you wish to restrict which channels are actually played back, you can do this in Arrange view by displaying the item's Source Properties window (see Chapter 6).

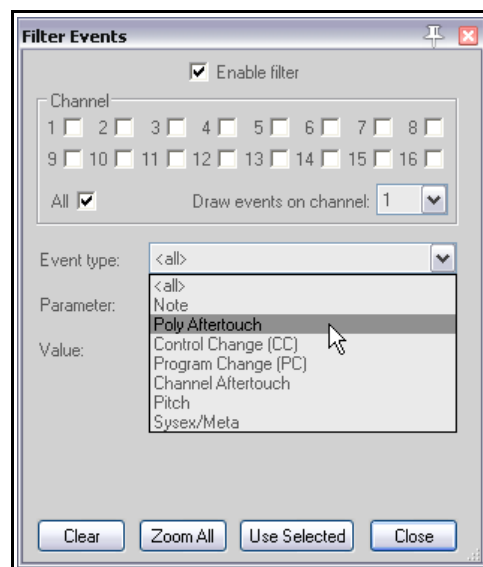
The content of the **Parameter** drop down list will be determined by the type of event. For example, if you select Note, it will show a list of notes, with options to filter on ranges of velocity and/or length. If you select Program Change it will show a list of program numbers.

The 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 also that the filter box has (near the top) an **Enable Filter** option which can be toggled on and off.

To the immediate right of the filter button (on the toolbar) are the four toggle icons, **Quantize** (on/off), **Move CCs with notes**, **Show grid** and **Snap to grid**. The final icon **Dock editor** can be used to dock and undock this window (in REAPER's docker) as required. At the far right of this toolbar is a drop-down **channel filter** list.

### The Ruler

If in REAPER's main window the option to link loop points to time selection is enabled, click and drag along the ruler to define loop and time selection. Otherwise, click and drag along the ruler for time selection or along the boundary between piano roll view and CC lane view to define a time selection.



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## The Transport Bar



This is located at the bottom of the MIDI Editor window. It contains the transport buttons and a number of drop down lists. The first six buttons perform similar functions to the buttons on REAPER's main transport bar. They can be used to rewind, start, pause playback, stop playback, jump to end, and to toggle repeat loop mode on and off. The loop area can be defined on the timeline in either the MIDI Editor or the main project window. In addition, you will see a number of drop down lists. From left to right, these are as follows.

### Grid

This is the grid division box. It 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.

### Grid spacing type

Options here are straight, triplet, dotted or swing. If you choose swing, several other parameters will also be displayed on this bar. These are discussed later in the context of quantizing.

### Notes

This is used to select the default note length (expressed as a fraction of a note) that is used when new notes are added. In the example above, this has been set to be the same as the grid setting. It can be overwritten using the main menu command **Options, Drawing or Selecting a Note Sets Note Length**.

### Scale and Chord

Enabling the snap to scale option allows you to select a scale and a chord from the two drop down lists. You can also use the chords button (here labelled "Major") to load a REAPER .reascale file.

### Color

Use this drop down list to select whether you wish to use color to display differences in **Velocity, Channel, Pitch, Source, Track** or **Media Item**.

**Tip:** The **View, Piano Roll Timebase** menu includes the options source beats, project beats and project time. 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 **Synched**. This synchronizes the timeline of the project and MIDI item together. It also ensures that both windows are synchronized during such actions as zooming and scrolling.

## 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.

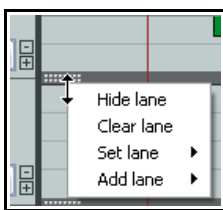
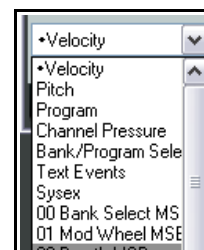
### The Scroll Bars

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 CC Lane(s)

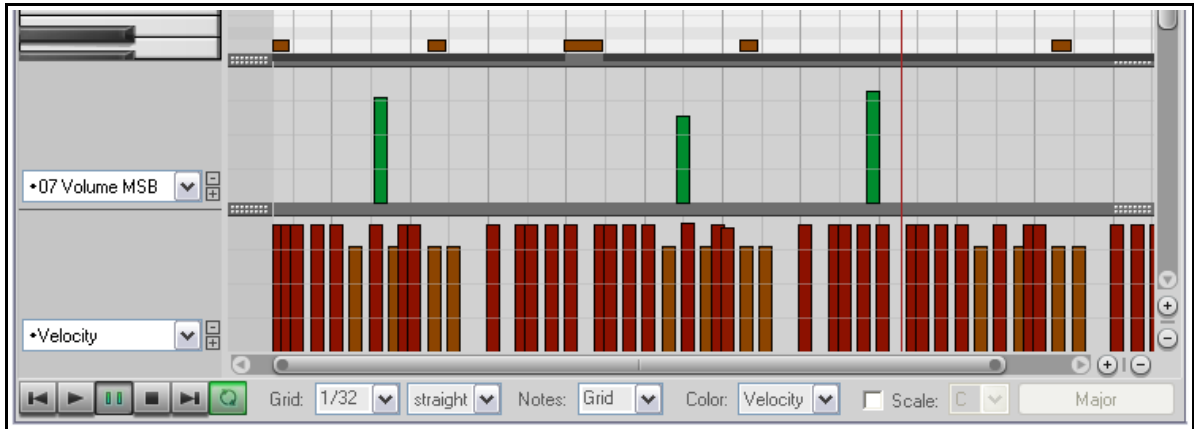
By default, **Velocity** information is shown in the CC lanes. To change this, *either*:

- 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, *or*
- 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.



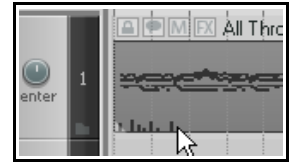
Right-clicking over the shaded area at the edge of the top border of a CC lane will produce a menu that can be used to hide a CC lane, clear it, change its contents (Set lane), or add an extra lane.

Note: Like the other MIDI Editor menus and toolbar, the CC lane menu can be customized. See Chapter 13 for more information about how to customize menus.



To remove a lane from view, click on the small minus sign that appears to the immediate right of its drop down arrow.

Provided the lane height is tall enough, the existence of CC messages can also be seen on the MIDI item in the main window (see right).



### 12.7 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>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 sub sections that follow after this one.
<b>Velocity</b>	The measure of the speed with which a key on a keyboard is pressed.

Parameter	Description
<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".

### 12.8 Control Channel Basics

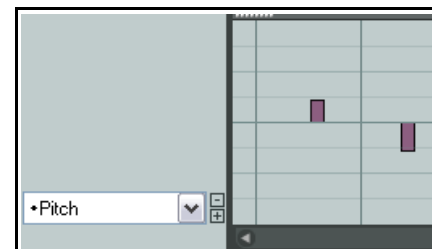
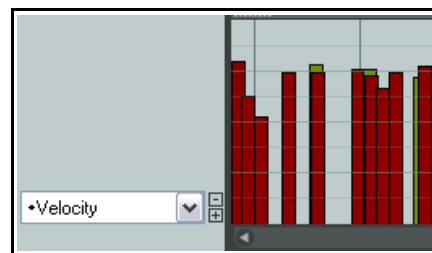
MIDI Data Control Channel (CC) messages can be recorded during live performance, and edited or manually entered using the CC lane in the MIDI Editor. The CC Lane appears at the bottom of the MIDI Editor. Data is displayed horizontally according to its position on the Timeline, and vertically according to the value of the data.

Most 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 include 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 window. CC Data is entered or edited by dragging the mouse to the required value.

- Hold down **Shift** while dragging to adjust the value of a CC event – e.g. down to reduce velocity.
- Hold down **Ctrl** while dragging to make fine adjustments.
- **Right Click** to delete values altogether.

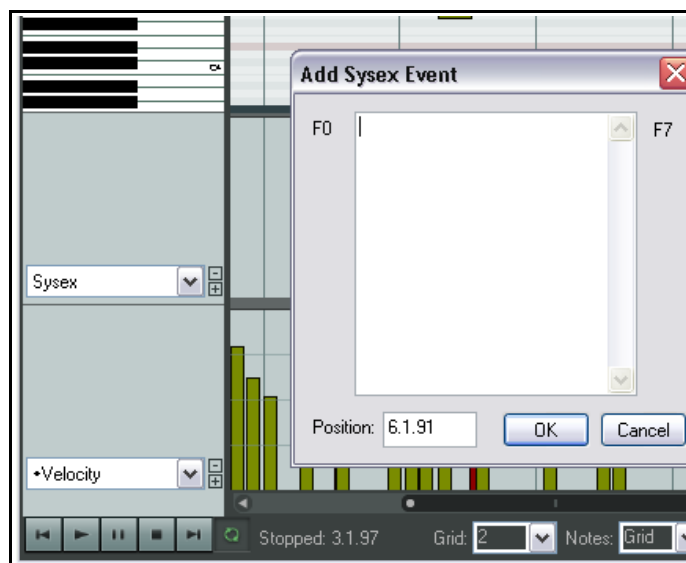


### 12.9 Working with MIDI Editor Lanes

There are a few especially interesting items that you can display in your lane or lanes that are not included in the above table. These are worth a special mention, because they might otherwise slip under your radar. They are System Exclusive messages, Text Events, and Bank/Program Select.

#### 12.9.1 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.





## 12 - Manipulating and Editing MIDI Items

You can add a lane which can be used to manage system exclusive (Sysex) messages, as shown here. In this case, a Sysex lane is displayed in addition to a Velocity lane.

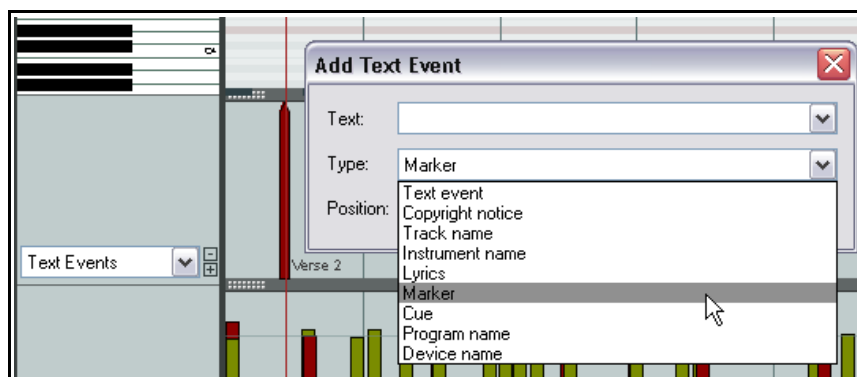
Some MIDI hardware, especially older devices, accept sysex messages as a way to initialize or change settings on the device. Sysex messages are raw MIDI data, represented as a list of hexadecimal bytes.

Sysex events may be added, edited, moved, or deleted in the same way as text events (see below). Double click in the lane to open the **Add 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, or right click to delete it.

### 12.9.2 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**. As with system exclusive events, double click on any existing text event to edit it, drag it to move it, right click to delete it.



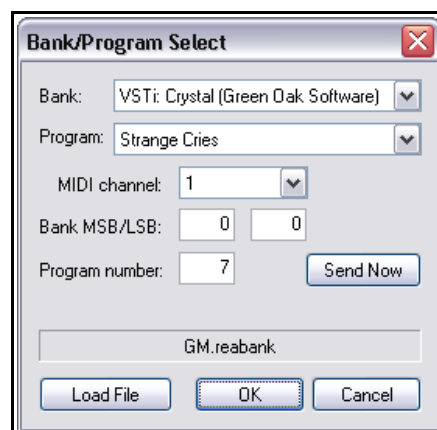
### 12.9.3 Bank Program/Select

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 bank/program combination, and assign it to any channel. The bank/program combinations available to you will depend on what instruments you are using (see example, right).

If using a synthesizer which has its own 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. Also, click and drag to move a program change message, double-click to edit it. To delete it, simply right click over its CC Lane bar.



## 12.10 Using MIDI CC Lanes: Tips and Tricks

REAPER's MIDI CC lanes include a number of additional features. Here are some that you might find useful.

### 12.10.1 General CC Lane Editing Techniques

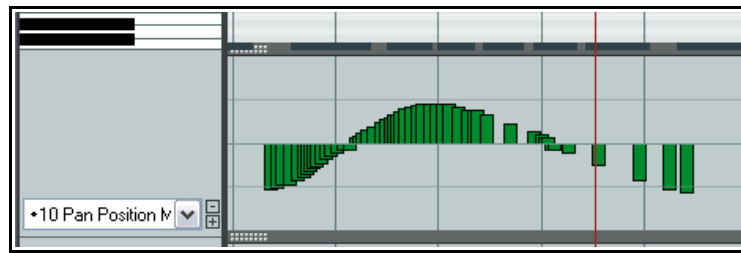
Many of the CC message types – such as Mod Wheel, Breath, Portamento, Pan, Volume etc. – can be expressed as a continuous range of values, rather than as discrete items (in the way that text events, for example, are). For messages of this type there are a number of standard techniques you can use to enter, edit or delete them.

- To enter a single message, click and move (gently push) the mouse in the appropriate CC lane at the required point. The nearer the top of the lane, the higher the value of the message.

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- To change the value of an existing message, click and move (push) 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. Alt right click sweep will delete a series of messages.

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. The faster you sweep, the greater the interval between individual events.



### 12.10.2 Right Click Marquee Selection

You can right-click and drag within any CC lane to make a selection of multiple events. Having made your selection, you can work with them in the CC lane, as well as (if appropriate) in the piano view window. For example, if the CC lane displays Velocity, then there will be one event shown in the CC lane for each note in the piano view. Selecting the events in the CC lane will also select the corresponding notes in the piano roll view.

You could then work with those selected events in the MIDI Editor or work with them in the CC lane itself. For example you can:

- Delete them.
- Adjust their values (up or down).
- Right click over the CC lane for a context menu (see right). This can be used to nudge or move the selected events.
- Click and drag to move the selection left or right, control click and drag to copy.



The exact behavior here will be determined by whether the individual CC events are directly linked to individual note events. In the example shown here, this would be the case with the velocity events but not the pitch change events. Thus, in the former case (velocity) you would need to move the events in the piano view window itself and the velocity events would move with them. In the latter case (pitch changes), you would move the events in the CC lane itself.

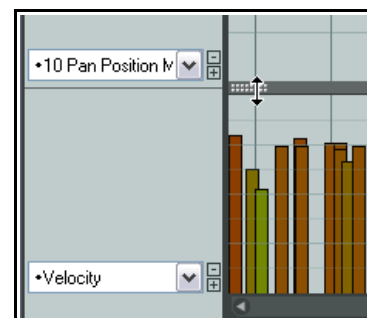
### 12.10.3 Resizing CC Lane Height

You have three options for changing the height of CC lanes. All involve clicking on the dotted "handle" (shown here) on the "ceiling" boundary above the CC lane in question. The mouse cursor becomes a vertical double-headed black arrow. You can then drag the mouse up or down. When you have only one CC lane displayed all three actions do exactly the same thing. However, when there are two or more CC lanes shown, these three actions will behave differently.

**Click and Drag:** Simply click and drag up/down to increase/decrease the portion of the MIDI Editor window used to show the selected CC lane.

Increasing this portion will decrease the height of the piano roll window and vice versa. Other CC lane heights remains unaffected.

**Shift Click and Drag:** Shift click and drag up/down will increase/decrease the height of all CC lanes and compensate by adjusting the height of the piano roll window accordingly.



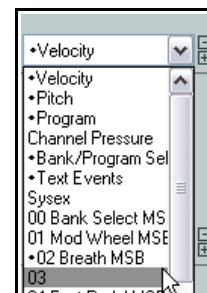
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**Control Click and Drag:** Control click and drag will adjust the height of just the one CC lane, leaving other CC lane heights unchanged.

In addition, you can double-click on the dotted handle (also known as “grippy area”) of any open CC lane to toggle between viewing and minimising it.

### 12.10.4 Intelligent CC Lane Dropdown List

The CC Lane dropdown menu uses markers to show which other lanes already exist and contain data, whether they are currently displayed or not. In the example shown here, this applies to Velocity, Pitch, Program, Bank/Program Select, Text Events and Breath.



### 12.11 Working with Multiple Items

We said earlier that as well as being able to use the arrange view context menu 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 you have a number of options.

The **Built in MIDI editor** command (from the Item context menu) offers a number of choices. For example, if you wish to open together all of the MIDI items on one track then you can right-click over any one of the items and choose **Built-in MIDI editor** then **Open all track MIDI in new editor**. If you wish to open together several items that are on different tracks, then you should select all of the required items (perhaps by the marquee method) before right-clicking on any item in the selection and choosing **Built-in MIDI editor** then **Open in new editor**.

There is a detailed description of each of the command options in Chapter 19, on the page **Editing Preferences, MIDI Editor**. Here you can specify which option you want to be applied when the command **Built-in MIDI Editor, Open in editor (set default behavior in preferences)** is used. Note also that these commands are available as actions for which you can assign your own shortcuts (see Chapter 13).

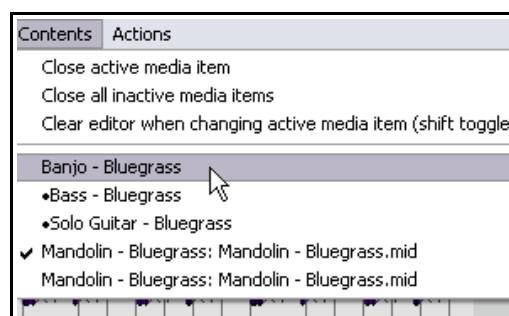
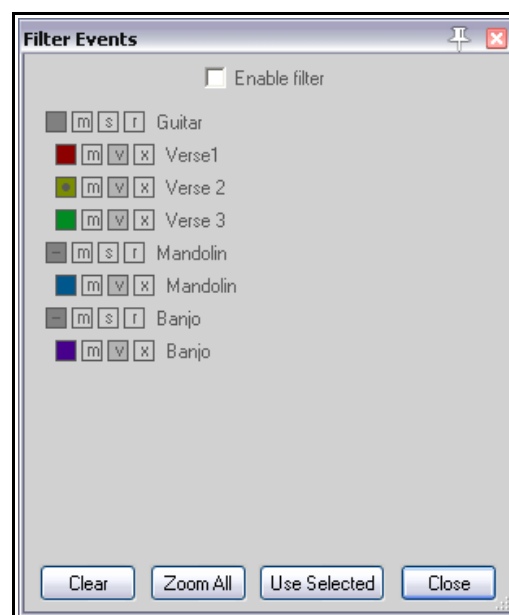
The **Filter Events** window is scrollable and may be left open while you work in the MIDI Editor. It is also dockable.

Unticking the **Enable Filter** option gives you more room for managing the various items.

All open tracks are listed together with (indented) their respective items. In the example shown here there are three tracks – guitar, mandolin and banjo. The first of these tracks comprises three items (Verse 1, Verse 2, Verse 3), the other two tracks one item each. Note that:

- ◆ Each track can be muted, soloed or armed for recording by clicking on its appropriate button.
- ◆ Right click on any colored square to change the color for that item.
- ◆ The gray box to the left of the track name can be used as a toggle to show/hide items on that track.
- ◆ A track can be renamed by right-clicking over its name.
- ◆ An item is selected and made active for editing by clicking on its colored dot. In the example shown here, Verse 2 on the Guitar track is currently active.
- ◆ The item M button toggles mute status; V toggles visibility in the MIDI Editor; X closes it.

You can also use the **Contents** command from the Main Menu to select, open and close items (see right). Select an item from the menu to open it. Holding **Shift** while selecting an item also closes all other items.



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**Tip:** The Media Item left drag context on the mouse modifiers page of your preferences includes the assignable action **Open source file in editor or external application**. If you assign this to one of the available modifiers (e.g. Alt left drag) then you can add any MIDI item to an existing MIDI Editor window by simply using that modifier while dragging the item into the MIDI Editor window!

### 12.12 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 are used for scrolling, and their respective plus and minus buttons can be used for vertical and horizontal zooming. You can also use your mousewheel. This can be customized in the Actions List Editor (see Chapter 13), but by default the settings are:

**Mousewheel:** Horizontal Zoom

**Ctrl Mousewheel:** Vertical Zoom

**Alt Mousewheel:** Horizontal Scroll

**Ctrl Alt Mousewheel:** Vertical Scroll

The keyboard shortcuts **PageUp** and **PageDown** can be used to zoom in/out vertically, and **+** and **-** to zoom in and out horizontally. These too can be changed in the Actions List Editor if you wish.

### 12.13 Loop/Time Selections and Smart Editing

To move the position of the cursor, click on the timeline (ruler) in the MIDI Editor window.

Loop and time selection within the MIDI Editor will behave in accordance with whether or not you have enabled the option **Loop points linked to time selection** on REAPER's main menu. These notes assume that you have this disabled.

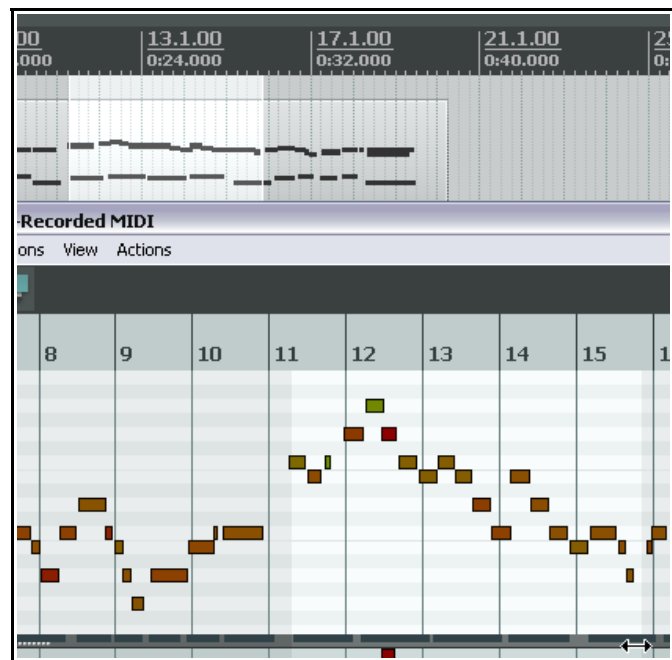
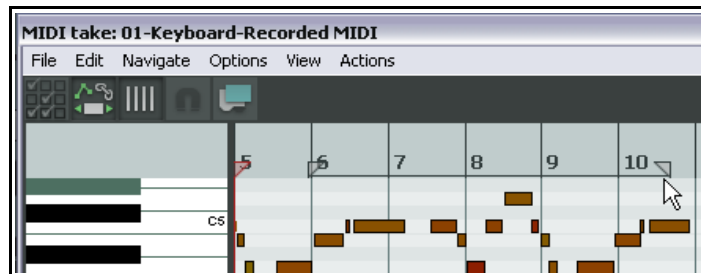
You can select an area to be looped, as in the main REAPER window, by clicking and dragging along the MIDI Editor timeline (see right). You can also use the timeline in the REAPER main window to define and modify loop areas if you wish. Use the **Toggle Repeat** button on the MIDI Editor Transport Bar to enable or disable looping.

A time selection can be made by clicking and dragging along the boundary between the piano roll display area and the CC lane. The mouse cursor becomes a horizontal double-headed arrow (see right). Notice that the time selection is mirrored in REAPER's Arrange view.

This facilitates the use of smart editing (see Chapter 6). For example, within the docked MIDI Editor window you could identify and work on the part of a MIDI item that you wish to copy or move to another track and then, still in the MIDI Editor, mark that as a time selection.

In Arrange view, you could then **Ctrl Click Drag** that area to another track (or elsewhere on the same track) and create your copy.

If using this feature, you should first decide whether or not you wish to enable **Auto-select CC when moving/copying within time selection** from the **Options** menu.



### 12.14 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 drag note to new position then release.

### 12.15 The MIDI Editor Menus

This section is 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 ...

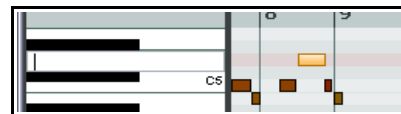
Exports active MIDI track to a file. MIDI events are normally stored in the Project file itself.

##### Customize note names

Displays a sub-menu. **.Load note names from file ...** and **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.



##### Customize note colors

Displays a sub-menu. **Load color map from file .../Clear color map (use 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, Cut, Select all events, Delete event

These features work as expected on all selected MIDI notes. Note that you can cut, copy and paste between MIDI Editor windows, and into some external applications.

##### Paste, Paste preserving position in measure

Paste will paste to the current cursor position. Where a selection of notes (rather than a single note) has been cut or copied, the entire selection will be pasted starting at the current cursor position.

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Paste preserving position in measure pastes to the next measure after the cursor position, retaining the relative position of the item pasted.

### Insert note

Similar to Insert Note at Mouse Cursor (using the I key), but positions new notes at the Edit Cursor.

### 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.

### 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.

### Join notes

Joins selected notes together.

### Mute events

Mutes current note selection.

### Quantize ...

Opens Quantize Events dialog box. See the *Quantize* section and the MIDI Toolbox section for more information about this feature.

### Quantize submenu

**Quantize using last settings, Quantize position to grid**

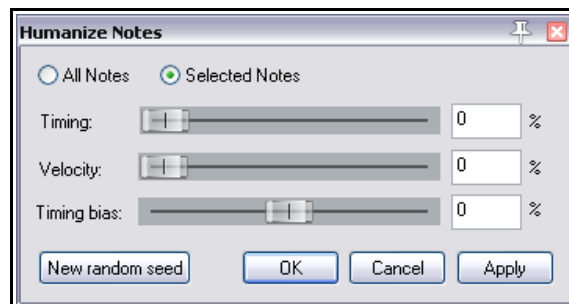
**Unquantize, Freeze quantization**

See the *Quantize* section and the MIDI Toolbox section for more information about these command.

### Humanize ...

Opens the dialog box shown here. Humanizing can make the exact timing of MIDI generated music sound less "clinical" and more realistic.

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.



### Transpose ...

Opens the dialog box shown here, which can be used to transpose all or a selection of MIDI notes. You can transpose by a specified number of semitones, with a snap to scale option, or from one specified key/scale to another.

### Remove selected duplicate notes

Removes duplicate notes (i.e. duplicate notes of the same pitch and same starting position) from selection.

### Set note ends to start of next note

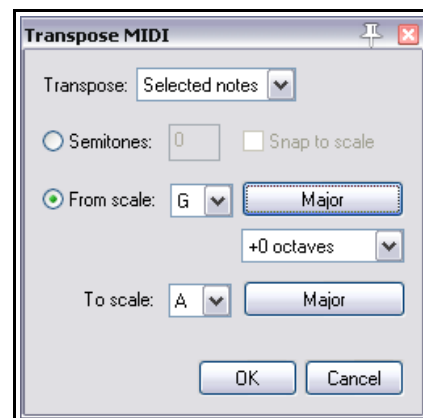
Adjusts the end point of all notes in selected range

### 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:





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### 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			Left
Move cursor right by grid			Ctrl+Num 6
Move cursor up one note			Shift+Up
Move cursor down one note			Ctrl+Num 2
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. When you do this, the MIDI Editor's main menu will not be displayed. The commands on this menu can still be accessed by right-clicking over the window's tab in the docker (see right).

### Sync editor transport to project transport

Synchronizes the transport of the MIDI Editor to REAPER's main Timeline.

### Time format for ruler, transport, event properties

Gives you the choice of Measures.Beats.100ths or Measures.Beats.MIDI\_ticks.

### Multiple media items

When you have more than one MIDI item open in the same MIDI Editor window, this command can be used to **Close all inactive MIDI media items** or **Close active MIDI media item**.

### Preview notes on add/edit

With this option enabled, REAPER plays whatever VSTi or MIDI instrument is assigned to that track through the FX box or hardware routing (providing monitoring is on).

### Always snap notes to left when snap enabled

When enabled, ensures that notes are snapped always to the left.

### Snap note ends to grid when snap enabled

Causes snapping to be applied to the end (rather than beginning) of notes.

### Drawing or selecting a note sets the new note length

Over-rides the default note length set by the drop down Notes box on transport bar.

### Auto-select CC when moving/copying within time selection

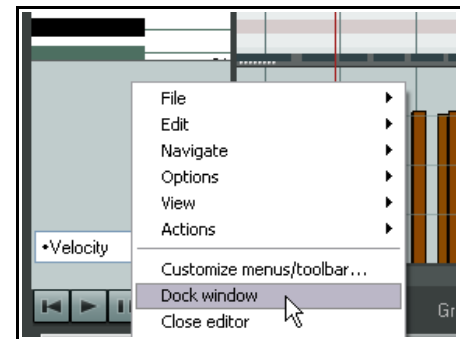
When enabled, ensures CC events are included when a time selection is copied or moved.

### Automatically correct overlapping notes

Toggles on and off the automatic correction of overlapping notes.

### 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 set 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 highlight bar and the Edit

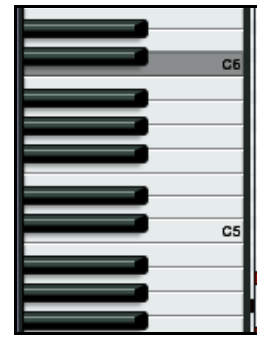


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Cursor, and using the Function keys to enter notes, complete arrangements can be quickly created.

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.



### Use all MIDI inputs for step recording

Toggles the use of MIDI inputs when step recording.

### MIDI editor mouse modifiers

Opens the mouse modifiers page of your preferences window, where you can specify the actions to be associated with mouse behavior in various contexts. This topic is discussed later in this chapter and in Chapter 13. This feature replaces (and is far more powerful than) the various mouse click commands that were on the Options menu of REAPER's MIDI Editor versions earlier than 4.0.

### Customize menus/toolbars ...

Opens the Customize Menus/Toolbars window. See Chapter 13.

### The View Menu

#### Filter events..., Quantize..., Humanize..., Transpose ...

Opens one of these dialog boxes, which have been discussed earlier in this chapter.

#### Event properties ...

Opens the Note properties dialog box. This topic is covered later in this chapter, along with **The Right-click Notes Menu**.

#### Mode: piano roll

Displays a standard, white/black piano key view.

#### Mode: named notes

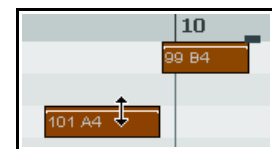
Replaces the Piano Roll view with note names. Note: Only works when using a VSTi that reports note names, such as Expansion's BFD. Check the REAPER forum to see if a note namer plug-in has been posted for the VSTi you want to use. For example there are EZDrummer note namers available.

#### Mode: event list

Displays the event list. These three modes are discussed in more detail later.

#### Piano roll notes

Displays a sub menu of **Rectangles**, **Triangles** and **Diamonds** to determine how notes are displayed. You also have three toggle options to **Show velocity handles on notes**, **Show velocity numbers on notes** and/or **Show note names on notes**. In the example shown here, velocity handles and note names are displayed.



#### Color notes by

This command selects the criteria to be used for coloring notes. The options are **Velocity**, **Channel**, **Pitch**, **Source (using color map)**, **Track** and **Media item**. You can toggle on/off **Show color selector in editor**. You also have options to **Load color map from file** and **Clear color map (use defaults)**.

#### Show/hide note rows

Displays a sub-menu with three mutually exclusive commands to determine which rows are shown. **Show all note rows**, **Hide unused note rows**. or **Hide unused and unnamed note rows**.

#### Piano roll timebase

Sets the timebase for the piano roll. Options are **Source beats** (from media source item), **Project beats**, **Project time**, or **Project synced**. For more information, choose **Timebase help** from this menu.

### The Contents Menu

#### Close active media item

Closes from the MIDI Editor the currently active window.

#### Close all inactive media items

Closes from the MIDI Editor all currently open MIDI items except the current active one.

### List of project tracks/MIDI items

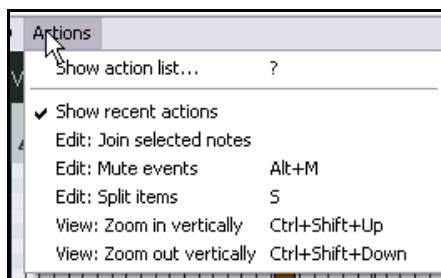
This menu lists all tracks which contain MIDI items and all items themselves. A tick indicates that the item is currently open in this window. Select an item from this menu to open it in the MIDI Editor window: hold Shift while doing so to also close all other items.

### The Actions Menu

This 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.

When **Show recent actions** is enabled, the Actions menu will 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 (see example, right). There are some simple examples showing you how you can use the Actions List later in this chapter. 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.



## 12.16 Note Creating and Editing

### Overview

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. 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.

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## 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

Paste preserving position in measure pastes to the next measure after the cursor position, retaining the relative position of the item pasted.

### 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 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

Here you can alter the various values attributed to a midi note by entering values into text boxes. You can change any of these:

#### note pitch, velocity, position, length, channel

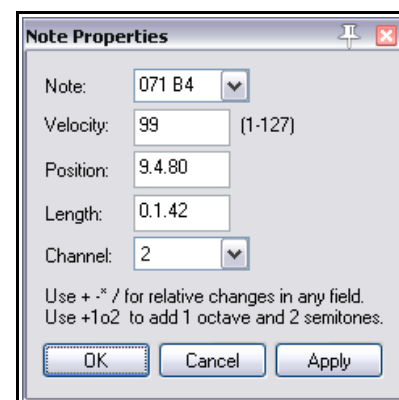
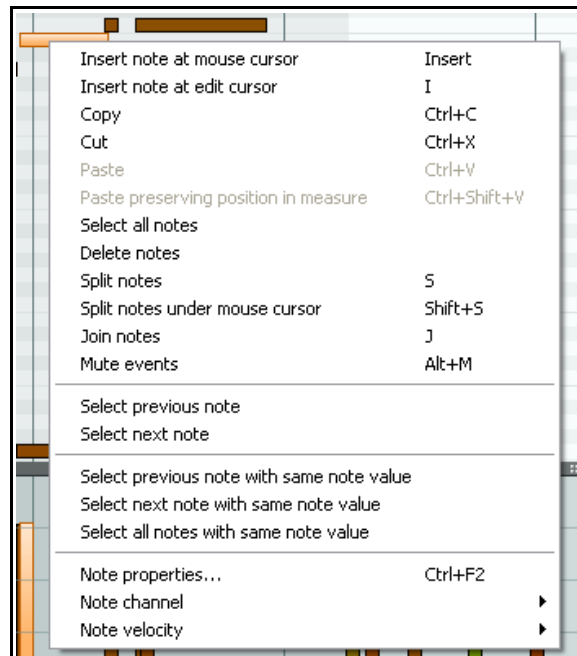
You can use + or – to make relative changes. For example, for note value, entering +1o2 will raise the pitch by one octave and two semitones.

### 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.

### Note velocity (1-16)

Used to change the velocity for a note or note selection to a specified value, within the range 1 to 127.



### 12.17 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.

To do this ...	... use this shortcut
Move edit cursor right by one grid division.	<b>Right</b> or <b>Ctrl Num 6</b>
Move edit cursor left by one grid division.	<b>Left</b> or <b>Ctrl Num 4</b>
Move edit cursor right by one pixel.	<b>Shift Right</b> or <b>Ctrl Alt Num 6</b>
Move edit cursor left by one pixel.	<b>Shift Left</b> or <b>Ctrl Alt Num 4</b>

**Notes** can be **moved** using any of the following Keyboard Shortcuts.

To do this ...	... use this shortcut
Move selected note(s) down one octave.	<b>Alt Num 2</b>
Move selected note(s) down one semitone.	<b>Num 2</b>
Move selected note(s) up one octave.	<b>Alt Num 8</b>
Move selected note(s) up one semitone.	<b>Num 8</b>
Move edit cursor left by one pixel.	<b>Alt Num 4</b>
Move edit cursor left by one grid unit.	<b>Num 4</b>
Move edit cursor right by one pixel.	<b>Alt Num 6</b>
Move edit cursor right by one grid unit.	<b>Num 6</b>

**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 and 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.
- ◆ 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.

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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.

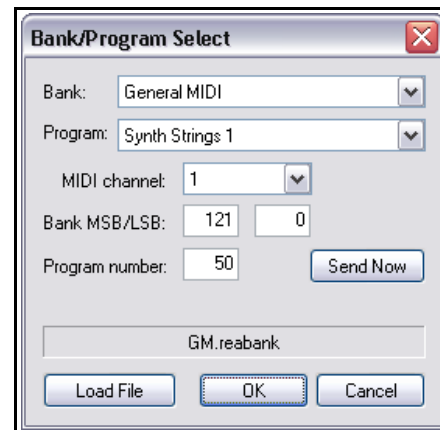
### Scaling Notes

One very handy 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.

### 12.18 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 \Application Data\REAPER\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 REAPER data directory and select the file **GM.reabank**.



### 12.19 MIDI Preview Scrub

Within Piano Roll View and Named Note View you can preview your MIDI material by clicking and dragging the edit cursor along the timeline. This is similar to audio scrub: exact scrub behavior will be determined by the settings under **Options, Preferences, Audio, Playback**.

### 12.20 MIDI Editor Modes and Views

#### 12.20.1 Note Modes

The MIDI Editor has three modes, accessible from the **Views** menu.:

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 are a couple of points that you might find interesting.

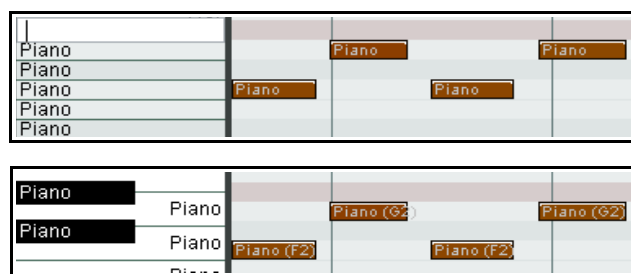
#### Named Notes Mode:

In this mode you can 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 here.

If you leave this option enabled, the names will also be displayed in **Piano Roll View**.

In named note mode, you also 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 is the default.

Hiding unused note rows can make it easier for you to navigate thru the MIDI Editor to work with existing notes. However, problems may occur if you then want to add or move notes to rows that are currently empty. The option to **Hide unused and unnamed note rows** can help you to get round this. By taking

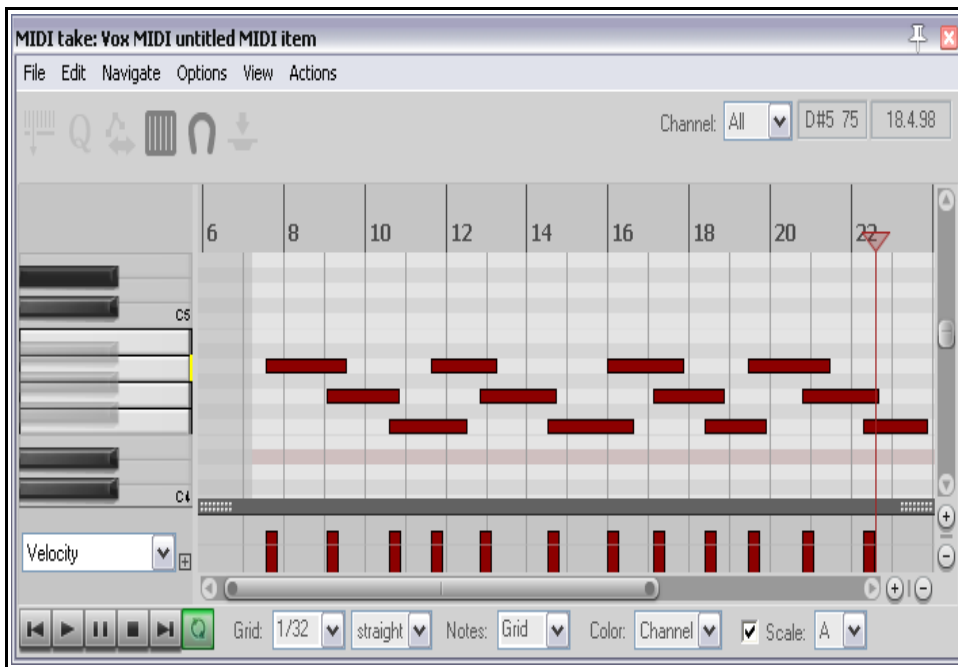




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the time *before* you choose this command to name any empty rows that you are likely to need, you will ensure that these rows will still be available to you.

### Event List Mode:

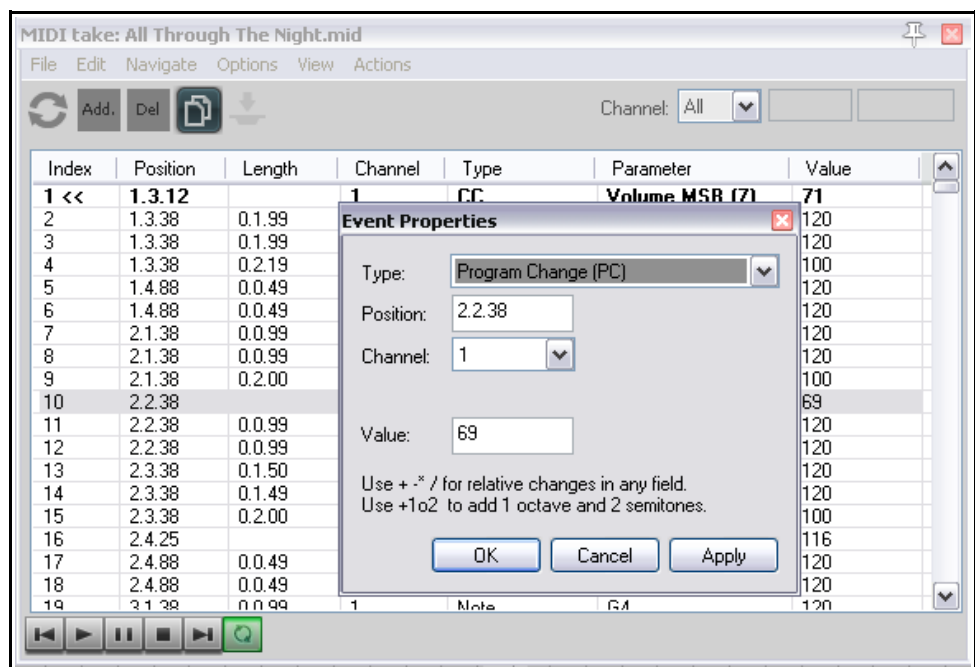


Event List mode displays the MIDI information as a list of events, in tabular form.

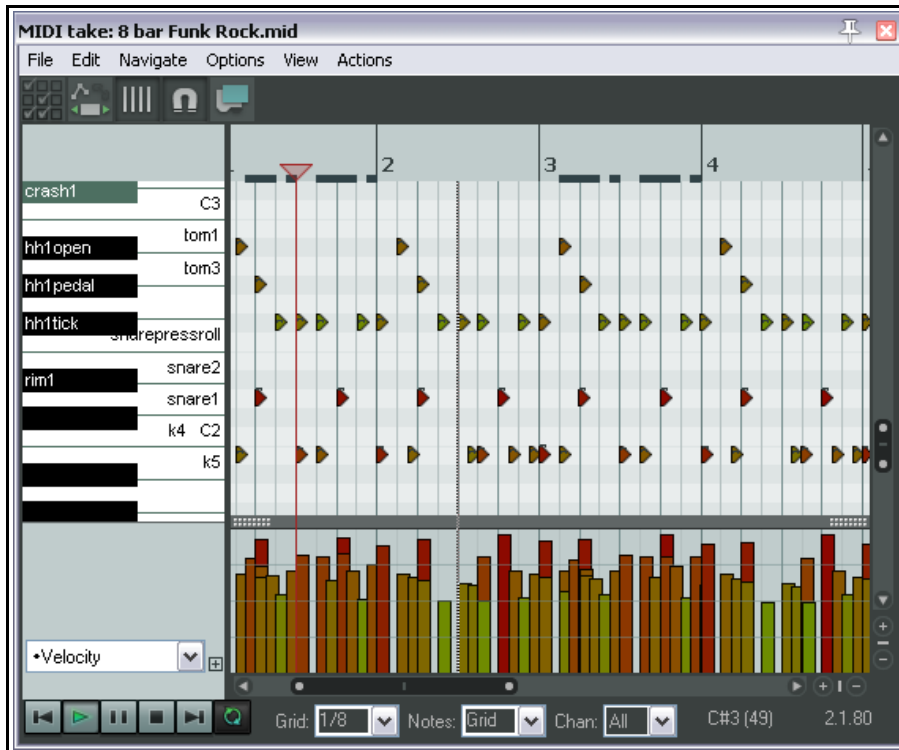
In this mode you can use the right click menu (shown left) to insert, copy, cut paste, delete or mute any events.

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 Toolbars displayed in Event List view are simpler than that used in the other two views. The **Filter** button (top left) and drop down **Channel** list (top right) are used exactly as in the other two views to filter only those events that you want displayed. The purpose of the **Add Event** and **Delete** buttons should be self-explanatory.



### 12.20.2 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, Piano Roll Notes** command and select **Rectangle**, **Triangle** or **Diamond**.

An example which uses triangles instead of the default rectangles is shown on the left.

### 12.21 Quantizing MIDI Data

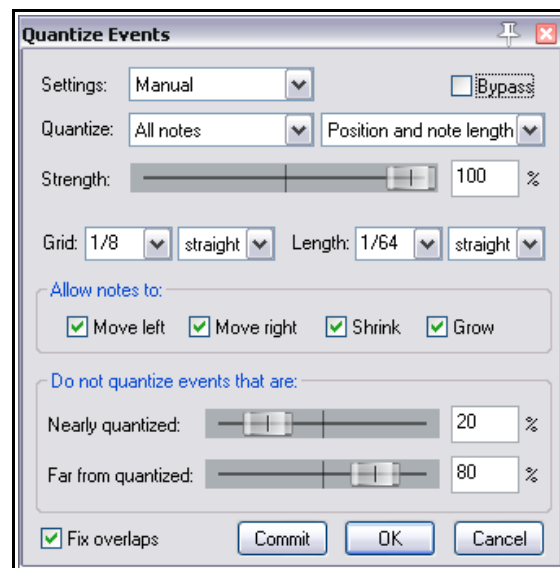
The term **Quantize** refers to a process of aligning a set of musical notes to a precise setting. This results in notes being set on notes and on exact fractions of notes. When you quantize a group of MIDI notes, the program moves each note to the closest point on the timing grid.

The point of quantizing is to provide a more uniform timing of sounds. It is often applied to MIDI notes created by a musical keyboard or drum machine. Quantize is available by choosing the **Edit, Quantize events** command from the MIDI Editor menu. This causes the dialog box shown on the right to be displayed.

The first choice you have is between the **Use Grid** and **Manual Settings** option. We'll come to Use Grid shortly. Shown right is the dialog box interface that appears when the Manual option is selected. The various quantize parameters are explained below.

Notice the **Bypass** option (top right). Disabled it lets you see the result of different quantize parameter settings as you tweak them. Enable this until you are finished if you don't want this to happen. Toggle it if you want to compare how your music sounds with and without quantizing applied.

**All Notes, Selected Notes, All Events or Selected Events.** The first Quantize drop down list allows you to quantize selected notes or events (not just notes) or the whole sequence (all notes or all events). This can come in handy if you just need to quantize a certain off section, or perhaps just a certain instrument, such as the hi-hats of a drum section. The second Quantize drop down list works in conjunction with whatever selection



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you make from the first. You can choose to have the quantizing of notes and/or events applied to the **Position** only, **Position + Note End**, **Position + Note Length**, **Note End Only** or **Note Length Only**.

The **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 **Grid** and (if enabled) **Length** values determine which units (measured as fractions of a note) are used for quantizing. These can be selected from the drop down lists or entered manually in their respective boxes. They act in conjunction with the **Allow notes to** options (see below).

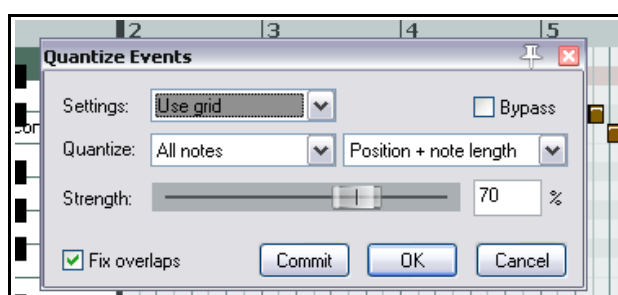
**Move left** and **Move right**. If Quantize Position is enabled, these will ensure that notes are individually quantized to the start or end of the specified note fraction, whichever is nearest. Allow left only will quantize all notes to the start, allow right only will quantize all notes to the end.

**Shrink** and **Grow**. These are applied if Quantize Length is enabled. REAPER will extend or shorten notes by moving the end position of each note. You can enable either or both of these options.

The **Do not quantize events that are** faders allow you to specify a percentage range for quantizing. For example, if you set the top slider to 0% and the bottom slider to 100% then all notes will be quantized no matter how far they are from the grid. At 30% and 100%, only those notes that are at least 30% off the grid will be quantized. At 30% and 70%, those notes closer to the grid than 30% and those notes further from the grid than 70% will be quantized.

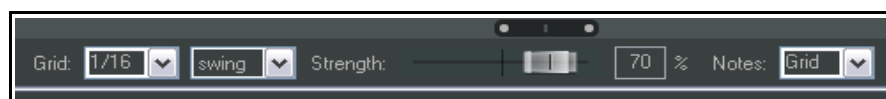
**Fix Overlaps** can be enabled to stop notes from overlapping as a result of being quantized.

When the **Use Grid** Setting is selected, the Quantize Events dialog box will be as shown on the right.



From the **Grid** drop-down list (at the bottom of the MIDI Editor window, next to the transport bar), select a note length value (such as 1/32, 1/16 or 1/8) and then select an item from the **grid spacing type** list. This can be straight, triplet, dotted or swing. If you choose

**Swing** a strength fader is displayed (see below). This can be used to adjust the swing setting within a range of -100% to 100%, or you



can enter a value directly into the **Swing %** edit box to its immediate right. You should also set a **Notes** value: left at Grid, this will take its value from whatever is chosen for the grid. Otherwise you may select any other required value from the drop down list.

Used well, swing 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.

Quantize is non-destructive – that is to say, the process can be reversed at any time. The various other commands on the **Edit** menu that are used with quantizing are:

### Quantize notes using last settings

This bypasses the **Quantize Events** dialog box, making it easier for you to apply the same quantization settings to various disparate selections.

### Quantize notes position to grid

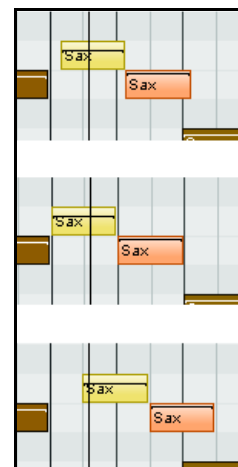
This quantizes notes according to your grid settings.

### Unquantize events

Removes quantization and returns the notes to their previous state.

### Freeze quantization for events

Freezes the quantization for all currently selected events.



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Shown above is an example. The top picture shows two unquantized notes selected. In the second picture they are quantized by moving them left. In the third picture, they are quantized by moving them to the right.

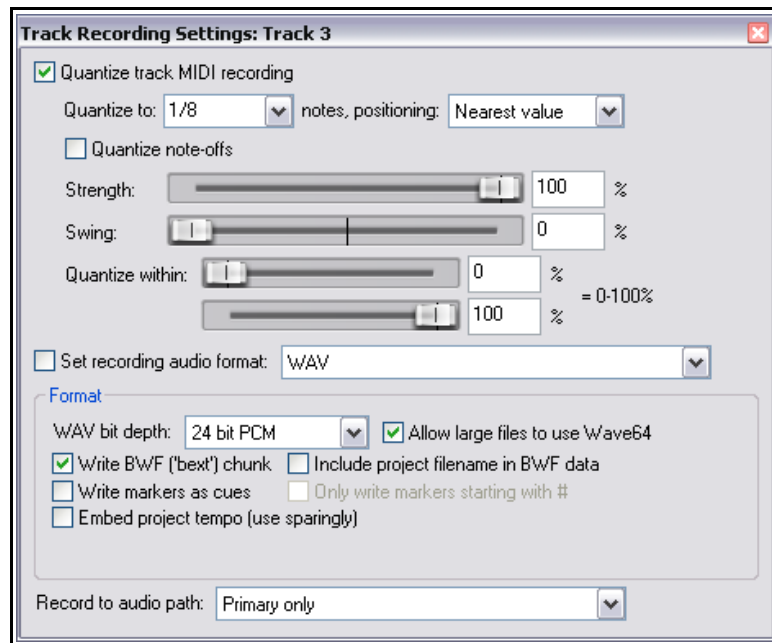
### 12.22 Input Quantization

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 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:

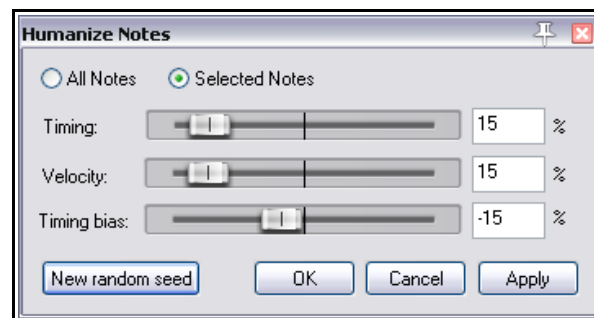
- The note length to be used for quantization (e.g. 1/8).
- Your quantize positioning preference. Options are **Nearest value**, **Previous value** and **Next value**.
- Whether to quantize note-offs.
- Quantization strength. A lower setting will allow more subtle variation, creating a more "human" effect 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. These are similar to the Nearly Quantized and Far From Quantized faders in the Quantize Events dialog box (see previous section).



### 12.23 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. 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!



### 12.24 F3 - The Panic Button

The **F3** key can be your best friend when you are working in the MIDI Editor (and also when you are playing back MIDI items in REAPER's main Arrange View). Pressing F3 will set all notes to all MIDI outputs off, until you stop and recommence playback.

### 12.25 Using the MIDI Editor: an Exercise

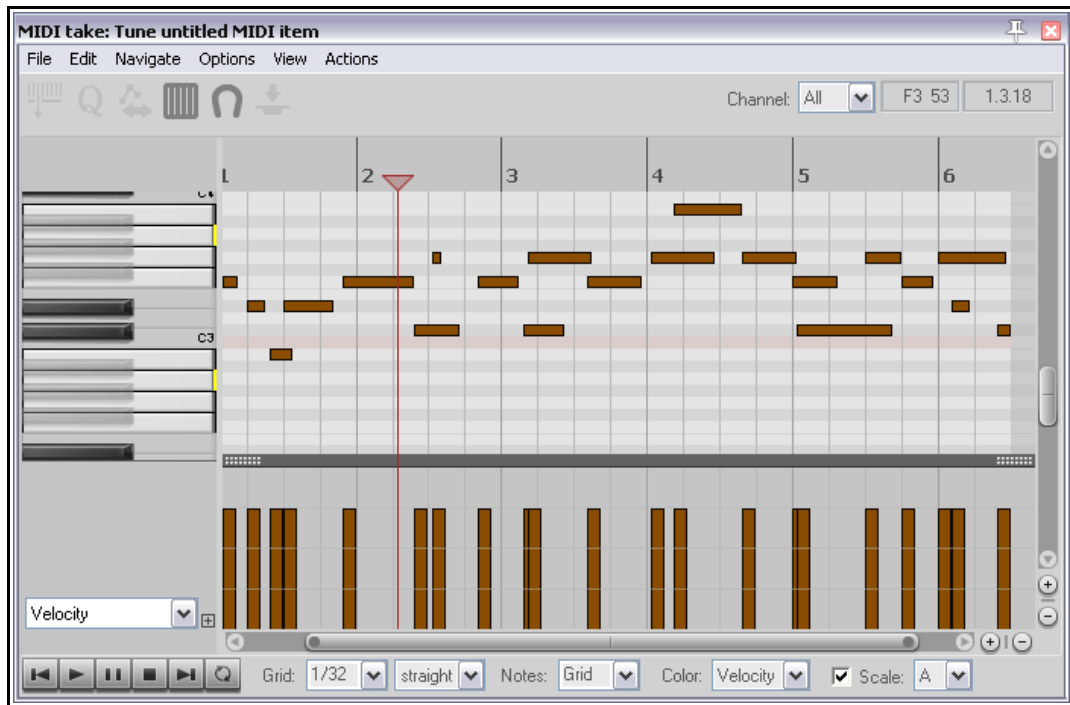
In this example, you will be introduced to some simple examples which involve working with the REAPER MIDI Editor. The objective of this is not to produce a stunningly brilliant piece of music, but to help you to become familiar with the MIDI Editor. The step by step instructions assume that you are using a PC with Windows. OS/X users will need to adapt some of the steps to suit their own environment.

#### 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:



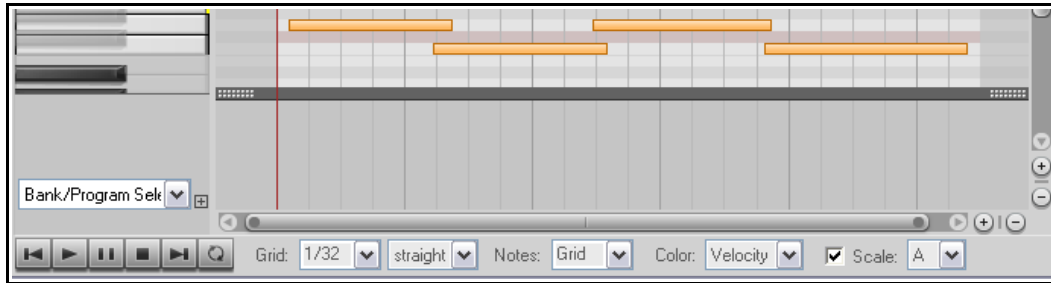
3. If you are using Windows, display the track's **IO** (Routing) window and add a MIDI Hardware Output to **Microsoft GS Wavetable SW Synth**.
4. Play the tune. It should play with a piano sound.
5. Double click on the item to open it with the MIDI Editor.
6. Display the drop down note-length list and 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 see something like this.



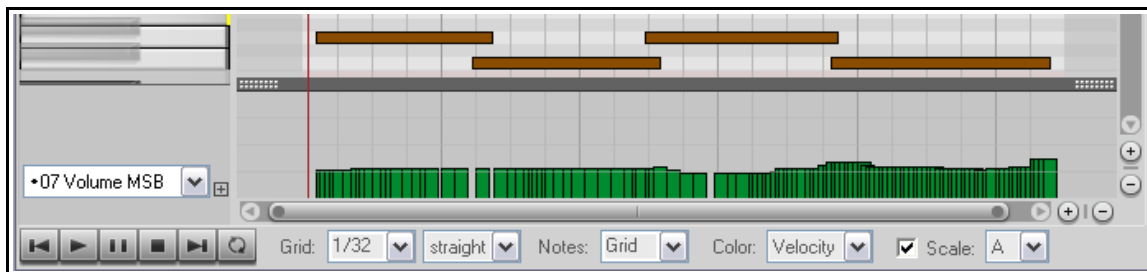
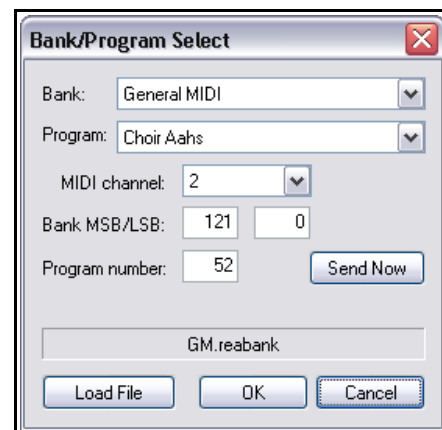
8. Just for fun, draw in a few more notes by clicking and dragging in the edit window. Experiment with using your mouse to move them about and change their length (by clicking and holding over a note's right edge and dragging left or right). Delete any that you do not want to keep.

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9. Now Zoom out horizontally to see the entire length of the item.
10. Display the **CC Lane List** and choose **Bank/Program Select** (as shown right).
11. At the very start of the song, double click in the CC Lane. Select the bank **General MIDI** and the program **Church Organ**. Click on **OK**.
12. Return to the start of the timeline and play the tune. It should sound like a church organ.
13. 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).



14. Right click over any of the selected items, choose **Note Channel** from the menu, then channel **2**.
15. Double click in the CC Lane, at the start of the song. Select **General MIDI**, **Choir Aahs** and **Channel 2** (see right). Click on **OK**.
16. Play the song from the start. You should hear an organ with a choir. The choir may seem too loud.
17. Change the CC lane to display **07 Volume MSB**.
18. Click on the Channel Filter List (on the toolbar) and choose Channel 2. Now only your Aahs are displayed.
19. Click, hold and drag your mouse as you sweep along the CC Lane with a fairly low volume setting, as shown below.



20. Remove the channel filter and restore all channels to view.
21. Display the Color drop down list and choose Channel.
22. Close the MIDI Editor and save the file.
23. Play it. The choir should now sound a lot quieter.
24. Continue if you wish to further explore the MIDI Editor on your own.



### 12.26 MIDI Editor Mouse Modifiers

The Mouse Modifier page of your Preferences window can be opened by the **Options, MIDI editor mouse modifiers** command. It includes several areas in which you can modify mouse behavior within the MIDI Editor. These are **MIDI note**, **MIDI note edge**, **MIDI CC lane**, **MIDI CC event**, **MIDI ruler**, **MIDI piano roll** and **MIDI editor**. In many cases, separate contexts are also available for click, drag and double-click behavior. You can define how you want your mouse to behave when it is being used in any of these contexts.

Moreover, within most of these contexts you might have several different types of mouse action. For example, when working with MIDI notes, a different action will be required when (say) dragging a note than when double-clicking on it. Thus, within the Mouse Modifier page of your preferences, you can select not only a context but also a type of mouse action.

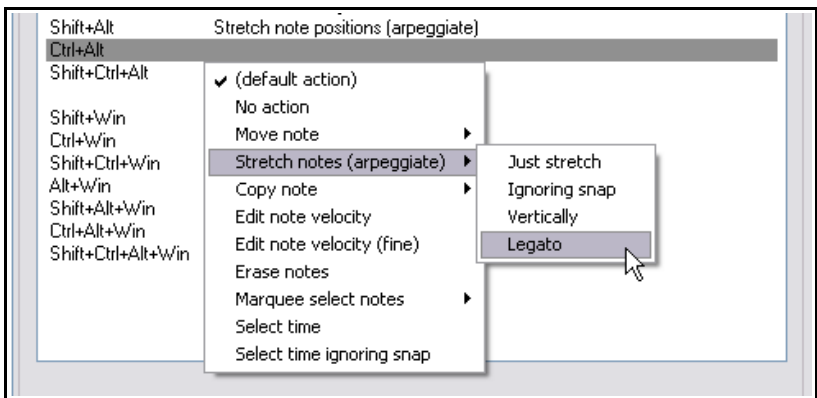
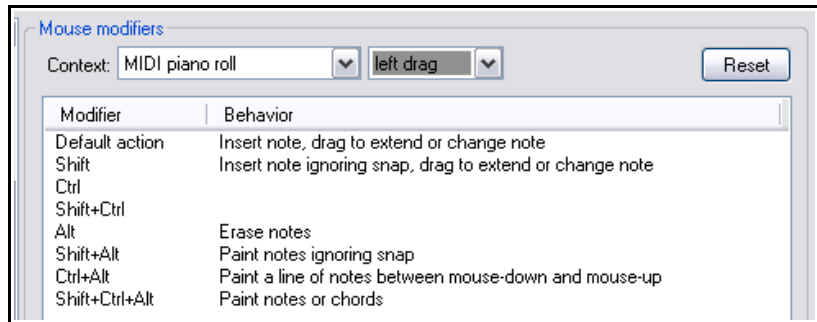
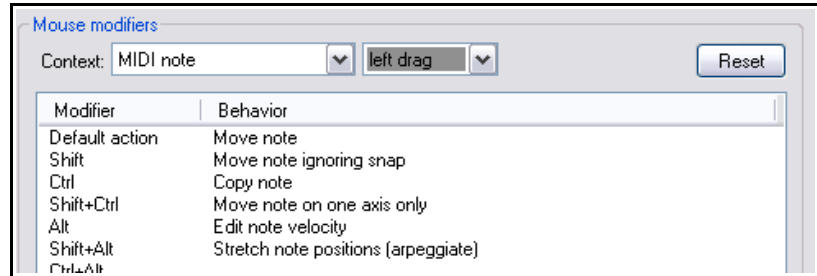
Shown right are two examples: the default actions for the contexts MIDI note left drag (above) and MIDI piano roll left drag (below). You can see that by default many actions are already defined. For example, simply dragging a MIDI note (or selection of notes) will by default move the note(s), whereas holding Ctrl while you do this will copy them. As you go down the list some of these defaults become quite interesting. For example, holding Shift and Alt while dragging a marquee selection of notes will stretch the selection out horizontally so as to arpeggiate the notes.

On the other hand, click and drag in the empty piano roll area will initially draw a note, then extend it as the mouse is dragged. Various keys can be used with this for more sophisticated actions. For example, holding Ctrl and Alt while dragging will paint a straight line of notes between mouse up and mouse down.

Notice that many of the possible assignments are not used. For example, Shift+Click+Alt in the above example is not used, neither are any of the permutations that include the Win key. You can click on any of these for a list of assignable actions that you can use for any of these. You can also use this method to change any existing assignments.

Shown above right are some of the actions which are available to be assigned to any modifier in conjunction with left click/drag with MIDI notes. If you use the MIDI Editor a lot, you should take the time to explore just what is available for the different contexts.

You'll find more information about mouse modifiers in Chapter 13.

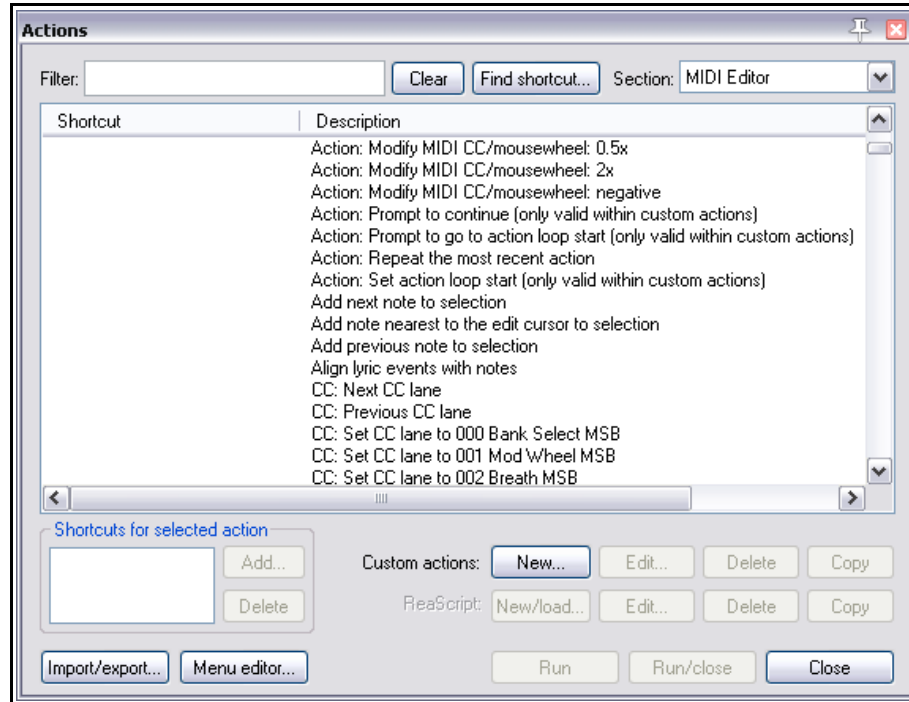


### 12.27 MIDI Editor Actions

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 those keys 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. You could now move these notes together, or assign them to a different channel, or delete them, or perform any other editing action.

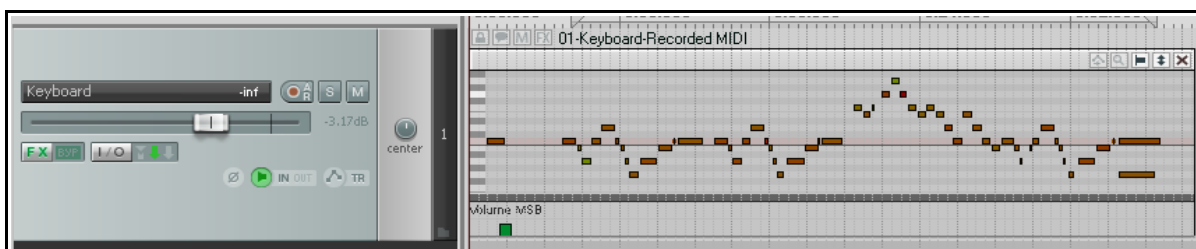
That's about as simple as it gets. As you'll see in Chapter 13, the Actions List Editor lets you do much more than just this. For example, you can:

- Add selected actions to the Actions menu.
- Chain together any sequence of actions so that the sequence can be executed with a single keystroke.
- Add actions and custom actions to your MIDI Editor toolbar.

### 12.28 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.



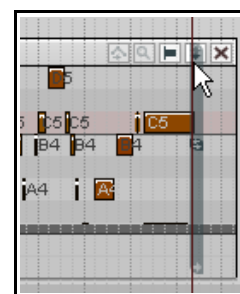
The in-line editor displays piano roll view only, and the contents of CC lanes will be determined by whichever lanes were selected last time the item was opened in the MIDI Editor. If it has never been opened in the MIDI Editor, the Velocity lane will be selected by default. You can adjust the boundary 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 and insert.
- 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. You can run your MIDI Editor custom actions within the in-line editor. The in-line editor also displays a small toolbar in its top right corner. From left to right, the function of these tools is:

- The **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 Scroll/Zoom** tool. Click and hold on this and drag vertically up or down to scroll vertically up and down, left and right to zoom vertically in and out (see example, right).
- The **X** tool. This closes the in-line editor and restores normal display.



The MIDI Editor and In-line Editor are designed for editing your MIDI *events*. Remember also that many of the *item* editing tasks, functions and activities that you discovered in Chapter 6 can also be applied to MIDI *items* as a whole. For example, in arrange view items can be dragged and dropped, split, copied, muted, grouped in selection sets, locked and so on. Plug-ins can be added directly to an item's FX chain. Selecting a MIDI item in Arrange view and pressing **F2** will display its Item Properties window where you can shift pitch, change play rate, loop enable/disable, and do much more.

The remainder of this chapter is mostly devoted to MIDI-specific item tasks that are performed in Arrange View.

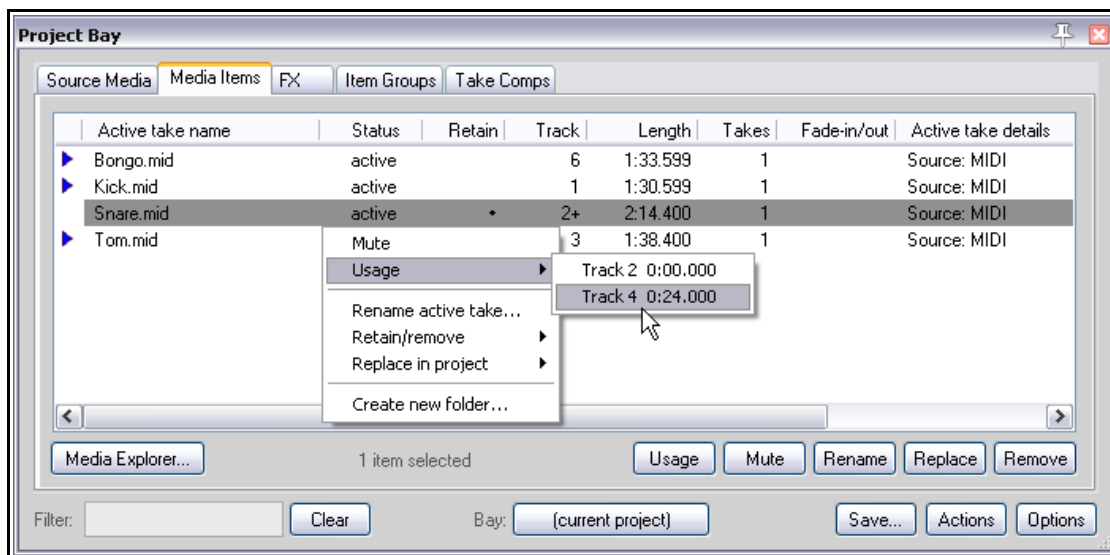
### 12.29 Copying MIDI Items in Arrange View

When you make a copy of a MIDI item in arrange view, then depending on your preferences and on how you make the copy one of two outcomes will occur:

The first of these is that the new item will be created as a new instance of the original item, and as such will use the same source data as the original. In this case, any changes made to either item will be applied to the source data, and therefore also to the other item. This might be what you want, for example, if 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, and you wish to do this in such a way that when you make these changes to any one item they will automatically be applied to all of the others.

In the alternative scenario, the new MIDI item becomes a discrete item in its own right, so that you can independently edit either item without affecting the other.

By default, when you copy and paste items using the menus or keyboard shortcuts (such as **Ctrl Shift C** and **Ctrl V**), the former method (with common source data) is applied. The items are also added to the Project Media Bay (see Chapter 11) where they are listed as MIDI pool items.



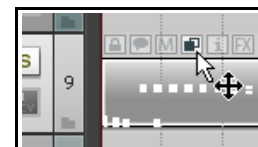
If you wish to change this default behavior, you should disable the preference (under **Options, Preferences, Media, MIDI**) to **Pool MIDI source data when pasting or duplicating media items** (see also Chapter 19). Items will then by default be copied as discrete items. Note that a new MIDI pool item is never created when an existing MIDI item is split. Note also that by default MIDI items added to a project from the Project Media Bay are not pooled.

The default behavior when you copy an item by dragging with the mouse depends on your mouse modifier settings for the context **Media item drag**. By default, the following apply when dragging MIDI items:

- |  |                                      |
|--|--------------------------------------|
| <b>Drag and drop</b>                     | Move item ignoring time selection    |
| <b>Ctrl with drag and drop</b>           | Copy item as discrete item           |
| <b>Shift Ctrl Alt with drag and drop</b> | Copy item, pooling MIDI source data. |

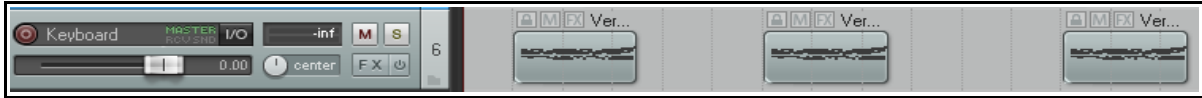
For a complete list of mouse modifiers, see the Editing Behavior, Mouse Modifiers page of your Preferences. Select **Media item left drag** from the context list. You can change any assignments if you wish. The method is explained in Chapter 13.

You can remove any individual MIDI item's pooled status and convert it into a discrete item. To do this, either display the item's source properties window (**Ctrl F2** or use the context menu) and click on **Un-pool this item**, or click on the item's pooled status icon (see right).



### 12.30 Joining MIDI Items

There may be times when you wish to join a number of MIDI items together. This might, for example, be to create a single loop enabled item, or simply so that you can edit them as one item, or perhaps to be able to export the MIDI data as a single MIDI file. 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.



You can select all of the items (right-click and drag is often the easiest way to do this) and glue them together: right-click anywhere on the selection and choose **Glue items** from the context menu.



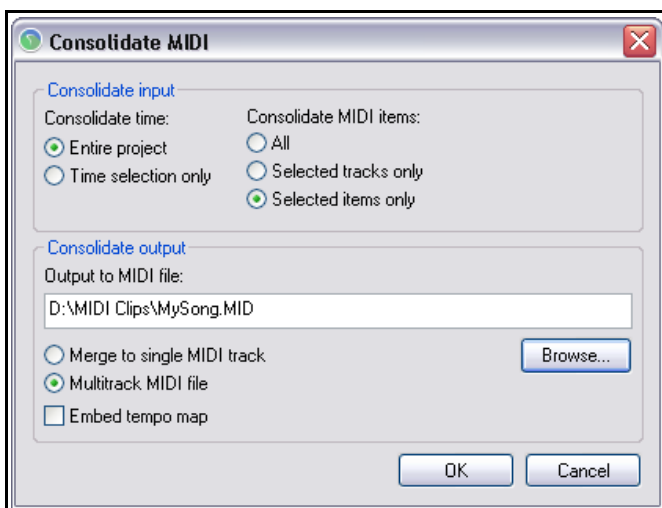
You can then double-click on the glued item to open the MIDI Editor, from where you can export it as a single MIDI file (**File, Export to new MIDI file ...**).

### 12.31 Exporting Project MIDI

Within REAPER's Arrange view, the **File, Export Project MIDI ...** command can be used to export either an entire MIDI project or selected items or tracks within that project to a single MIDI file.



An example of such a project file is shown here. It includes six tracks with MIDI events ( a different channel for each track), enclosed in a folder whose FX chain includes a virtual instrument.



For the most part, the options shown here require little explanation.

You can choose to export the **Entire project** time or the current **Time selection only**.

You can include **All** media items within the project, or **Selected tracks only** or **Selected items only**. In the example shown, **All** has been chosen. The MIDI data in the six MIDI tracks will be exported, but not of course any record of the contents or settings of the folder or the VSTi.

You can merge the various MIDI tracks to a **single MIDI track** in the output file or export it as a **multitrack MIDI file**, with the integrity of the different tracks maintained in the output file.

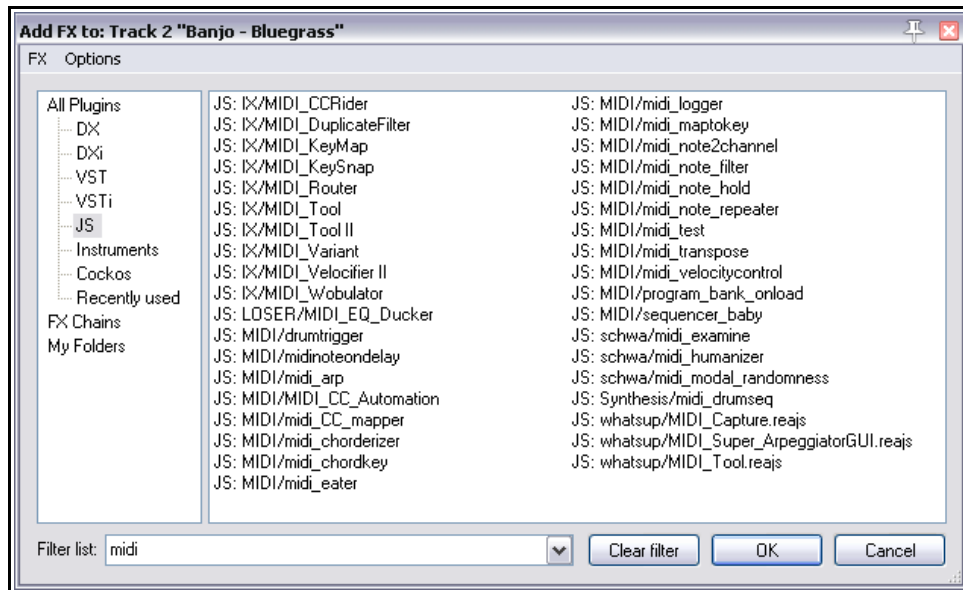
You also have the option to **Embed the tempo map**.

## 12.32 Some MIDI Plug-ins

REAPER includes a good selection of plug-ins that can be placed into the FX chain 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. Now is a good time to take a 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 here), 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_CCRider</b>	A LFO Controlled CC generator.
<b>MIDI_DuplicateFilter</b>	Blocks duplicate notes.
<b>MIDI_KeyMap</b>	A MIDI key mapping utility.
<b>MIDI_KeySnap</b>	This is a good cheat for bad pianists.
<b>MIDI_Router</b>	Routes events from one channel to another.
<b>MIDI_Tool</b> and <b>MIDI Tool II</b>	These do interesting and fun things to MIDI note events.
<b>midi_transpose</b>	Transposes a note or a range of note.
<b>MIDI_Variant</b>	A pattern based, musically aware, randomification monster.
<b>MIDI_Velocifier II</b>	This is a pattern based velocity modifier.
<b>midi_velocitycontrol</b>	Used to vary and control velocity on a MIDI track.
<b>MIDI_Wobulator</b>	A LFO Controlled automatic pitch wobulator.
<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.

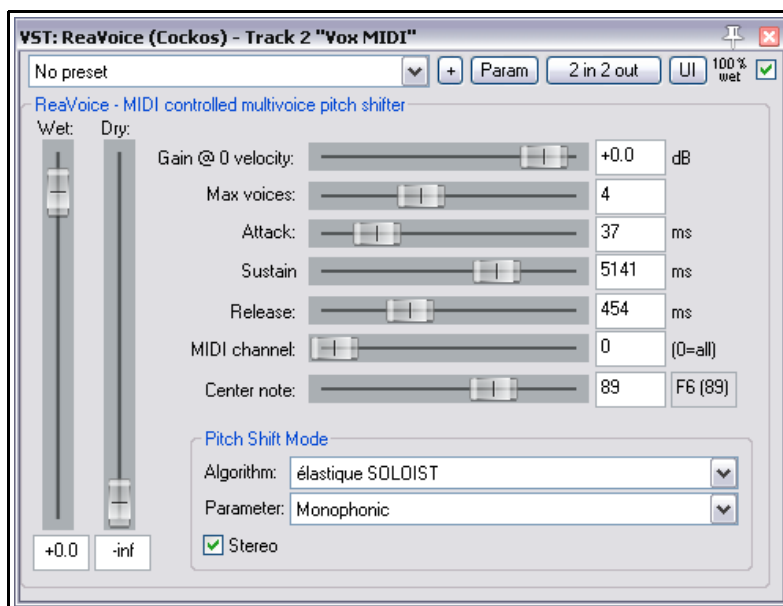
For more information about how to use these and other MIDI plug-ins, visit the Cockos web site, and in particular [http://www.cockos.com/wiki/index.php/Jesusonic\\_Effects\\_Documentation#MIDI](http://www.cockos.com/wiki/index.php/Jesusonic_Effects_Documentation#MIDI)



### 12.33 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:

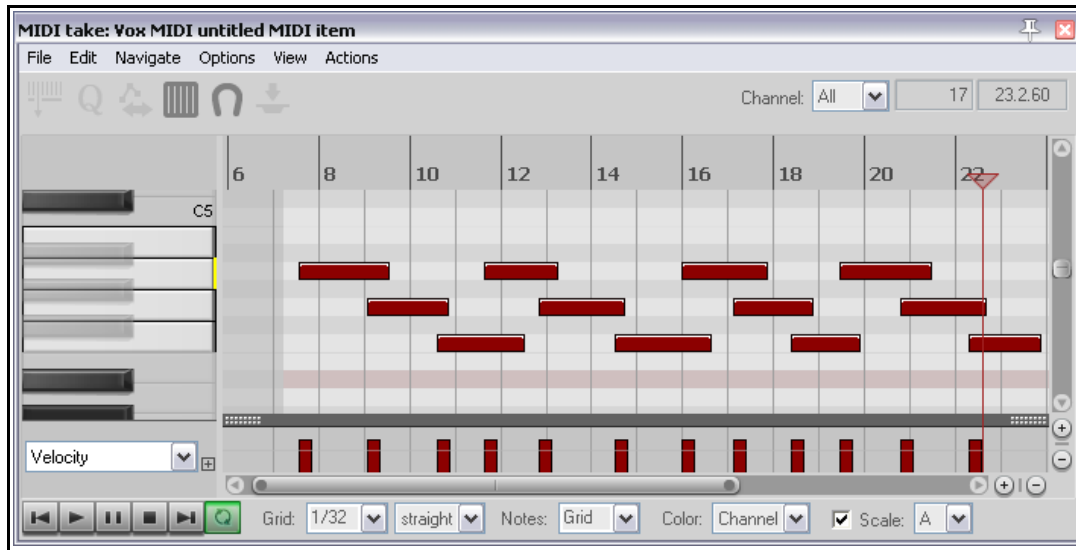
- Record the Vocal Track.
- Insert a new track immediately below the Vocal Track.
- Create a send from the Vocal Track to the new track. Initially at least, this should be Pre FX.
- Insert ReaVoice into the FX Window of the new track.
- Arm this track for recording. Select your MIDI keyboard as the Input Device and turn Input Monitoring on.
- Mute all tracks except these two.
- Play the song. As you do so, play the keyboard, experimenting until you find an appropriate range of notes.
- Work 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 take, selecting **Play All Takes** for the MIDI track items.
- After you have finished recording, you can use the MIDI Editor to polish up your work.



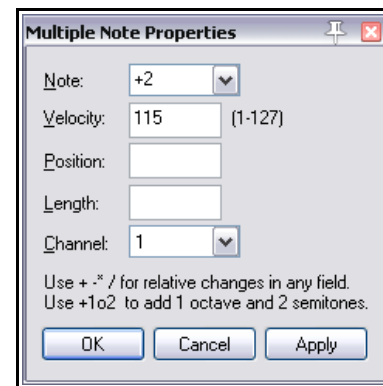
### Example

In this example, you'll have some fun and explore 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 **IO** window for the **Vox MIDI** track and add a new **Pre FX Receive** on **Audio 1/2** from the Vox track.
6. Insert the **ReaVoice** plug-in into the FX Window for this track. For now make its settings as shown above. Note in particular the number of voices and the long sustain setting.
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.



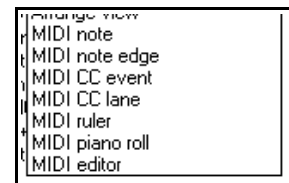
10. As you play the song, make sure that the two vocal tracks are soloed. You can of course edit any individual note or notes, for example, by moving them up or down, by lengthening them or shortening them, or by changing their pitch. Here are some more possibilities, just for fun and to give you some 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 **+2** (as shown) then click on **OK**. This raises the entire selection by two semitones.
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.



### 12.34 MIDI Preferences Settings

To specify your MIDI preferences, choose the **Options, Preferences** command (**Ctrl P**) and then select the **Media, MIDI** page. You'll find these shown in Chapter 19, but for now the following are worth noting.

- ◆ You can specify whether by default new MIDI items are created as REAPER media items (the default) or .MID files.
- ◆ You can specify how your edits to imported .MID files are to be interpreted – that is, whether to apply your edits only to the item in the REAPER project file or also to the original file on your disk.
- ◆ You can set the default behavior for imported multichannel MIDI files – as multichannel on a single track, as single-channel items on multiple tracks, or always prompt to ask.



There is also a page of MIDI Editor Editing Behavior preferences (see Chapter 19). In particular, this lets you determine REAPER's default behavior when you wish to open the MIDI Editor with multiple items.

In addition, the **Editing Behavior, Mouse Modifier** pages contains several contexts in any or all of which you can assign commands and actions to be executed when various modifier keys (Shift, Ctrl, Alt, etc.) are used in conjunction with your mouse.

Mouse modifier customization is covered in Chapter 13. In addition, the section immediately after this one contains a brief overview of the topic and some examples of how you might wish to use this.

### 13 Customisation: Actions, Mouse Modifiers, Menus and Toolbars

#### 13.1 Introduction

Customisation is the key to unlocking REAPER's real power and making the program work for you. The more you use the program, the more you will benefit from customising its many features. Even occasional users will find that they can benefit from taking the time at the very least to tweak some of REAPER's mouse modifiers and keyboard shortcuts. That's what this chapter is about.

By now you should already have come across some of REAPER's options and preferences settings and it's quite likely that you might have already changed some of these to suit your own workflow. This chapter really lifts the lid on customisation and will guide you thru the following:

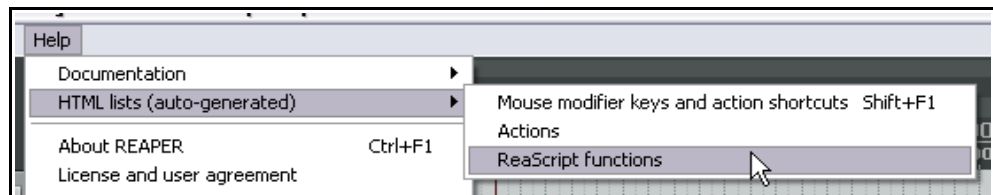
- **Actions.** REAPER makes extensive use of keyboard shortcuts. In addition, it has a library of hundreds of actions that you won't find on any of its menus, actions which can help you with any number of tasks. Moreover, you can string whole sequences of these actions together to make your own custom commands which can then be triggered off by a single keystroke.
- **Mouse Modifiers.** REAPER uses the mouse for plenty of activities, some of which you have already encountered (like moving and copying media items and making time and loop selections), some of which you have not yet encountered (like editing automation envelopes). Some of these you will use a lot, some you will use a little, and some you will only use rarely, if ever. Any of them can be changed.
- **Menus.** Most REAPER menus can be edited to suit your own requirements. You can move to the top the commands most important to you. You can hide the ones you never use. You can even add your own custom actions and commands to these menus!
- **Toolbars.** REAPER's toolbar might not be much to look at, with its lonely collection of just fourteen tools. Did you know, though, that you can add your own tools to it, as well as create your own extra toolbars?

These are the topics that will be covered in this chapter. Spend as much time as you need to get to understand it. It will pay you dividends.

#### 13.2 REAPER Actions Essentials

Before we look inside REAPER's Action List Editor to explore the world of shortcut keys, custom actions, control surface assignments and more, it's worth taking stock of a couple of useful resources that are available to you.

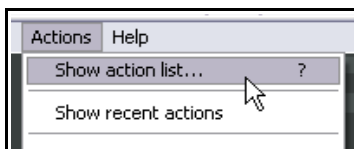
Choose the **HTML Lists (auto-generated)** command from REAPER's **Help** menu and you are presented with two useful choices.



**Mouse modifier keys and action shortcuts** opens your default web browser with a list of all current keyboard shortcut and mouse modifiers. This list is searchable and may be printed.

**Actions** opens your default web browser with a list of all of REAPER's many available actions, any of which can be assigned to a keyboard shortcut and/or combined with other actions into your own custom actions. This list is also searchable and may be printed.

Just what **ReaScript** is will be explained later in this chapter.



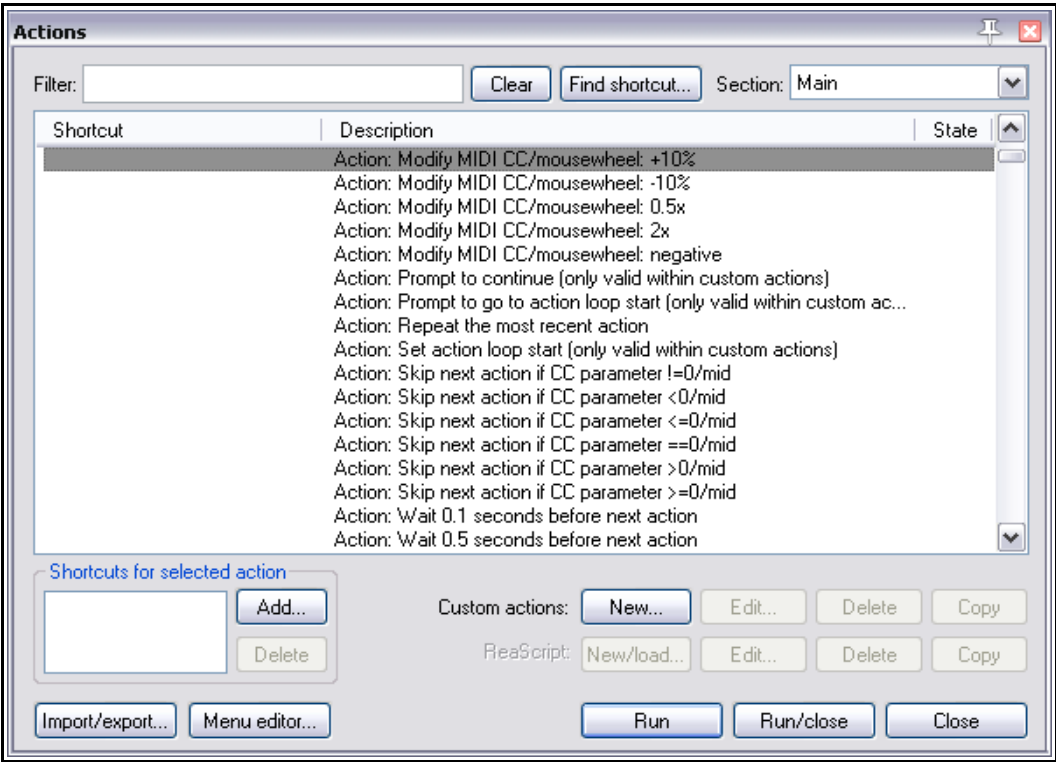
Before you rush off to print anything, keep in mind also that this information is also contained within the Action List Editor itself, and that this editor is searchable.

The editor is opened by choosing the **Actions** command from REAPER's main menu, then **Show action list...**, or simply by pressing the **?** Key.

Let's take a look inside ...

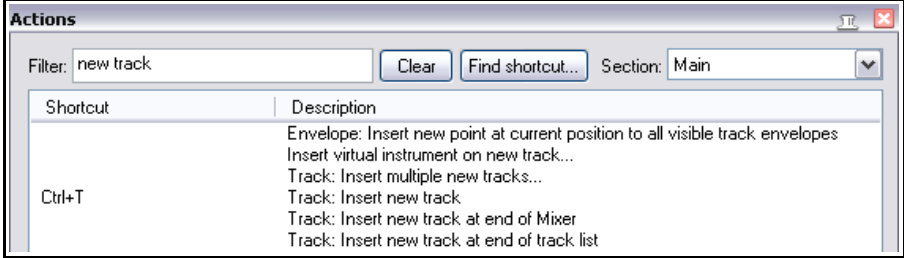
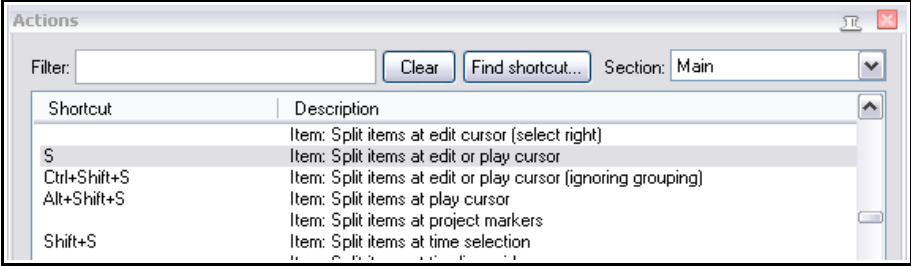
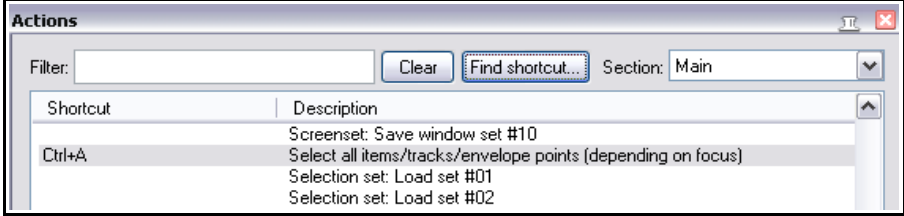
13.3 The Action List Editor Environment

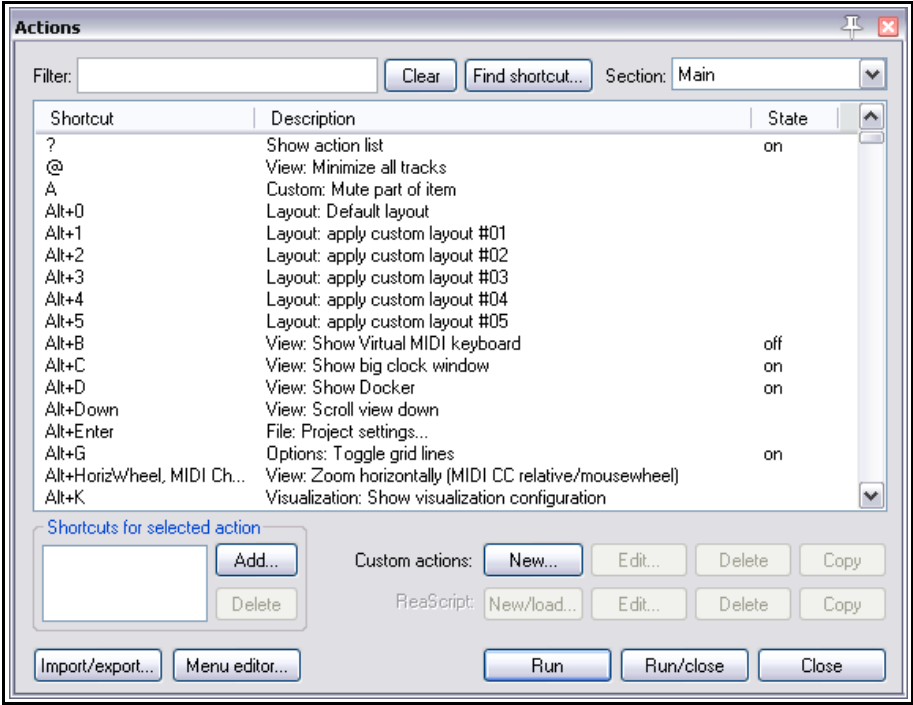
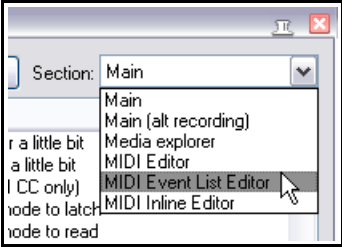

You'll get more out of REAPER's Action List Editor (shown below) if before trying to use it you take a little time getting to know its interface, its structure and how you can navigate it.



Item	Comments
Filter	<p>You can filter the list of displayed actions using any text string or strings that you like. For example, in this screen shot the list has been filtered to show only those actions that relate to track height:</p> <div></div> <p>Notice that where an existing keyboard shortcut exists it is shown to the left of the action. For example, the <b>!</b> Key is used to toggle the action <b>View: Expand selected track height, minimize others</b>.</p> <p>Similarly, you can see that <b>Ctrl Shift Mousewheel</b> can be used to adjust the height of any track selection.</p>

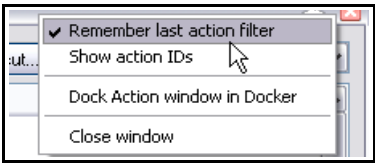
## 13 - Customisation: Actions, Mouse Modifiers, Menus and Toolbars

Item	Comments
Filter (cont.)	 <p>In this second example, a filter is used to list all actions relating to new tracks. The only one of these that currently has an assignment is <b>Track: Insert new track</b>. This is assigned by default to <b>Ctrl T</b>.</p>
Clear	The <b>Clear</b> button clears any current filter and restores all actions to the list.
Find shortcut...	<p>The <b>Find shortcut...</b> button is used to see if a particular keyboard shortcut has already been assigned to any action.</p> <p>When you click on this button, you are prompted to type the key or move a MIDI controller. We'll come to MIDI controllers later in this chapter. If the key that you type is already in use, then its assignment will be displayed (see below).</p>  <p>In this example above, we have searched to see if an assignment exists for the letter <b>s</b>. For this kind of search, you should only type in upper case if you really are searching for the combination of Shift with the letter. For example, in this case, a search for <b>Shift S</b> would have produced <b>Item: Split item at time selection</b>.</p> <p>In this second example, we have searched for <b>Ctrl A</b>:</p>  <p>If no shortcut exists for the key or key combination for which you are searching, then a message <b>Shortcut not found</b> will be displayed.</p>
Column headers/ Sort keys	<p>The <b>State</b> column indicates for toggle actions whether their current status is <b>on</b> or <b>off</b>.</p> <p>By default, actions are listed in alphabetical order of their action name. You can click on the <b>Shortcut</b> column header to sort instead on current keyboard assignments. This causes them to be sorted instead by keyboard assignments, with special characters and numbers at the top of the list (see below).</p>

Item	Comments
Column headers/ Sort keys (cont.)	<div></div> <p>This can be especially helpful if you wish to familiarise yourself with REAPER's current keyboard shortcut assignments. Click on the column header again to reverse the sort order. Click on Description to sort them back into alphabetical order.</p>
Sections	<p>The Action List is divided into a number of sections, shown here. The Main section is the one that is used most of the time (for example, when you are working in Arrange view). There are different sections, for example, for actions and shortcuts for use with the Media Explorer and the MIDI Editor. If you open the Action List from within one of these environments, the correct Action List section will automatically be selected for you.</p> <p>Otherwise, you can select any section from the drop down list and that section's actions will also be selected and displayed in the action list.</p> <div></div>
Run	<p>Any action that is on the action list can be executed from within the action list whether it has a shortcut key assigned or not. Simply select the action, then click on the <b>Run</b> button.</p> <p>If the option <b>Show recent actions</b> is enabled on REAPER's main menu (above) then any actions that you execute in this way during your current work session will be added to REAPER's Action menu and can be executed from there for the rest of that work session. When you close REAPER, these actions will be cleared from the menu.</p> <div></div>
Run/Close	<p>This button is similar to the <b>Run</b> button, the main difference being that after running the selected action it closes the Actions window.</p>



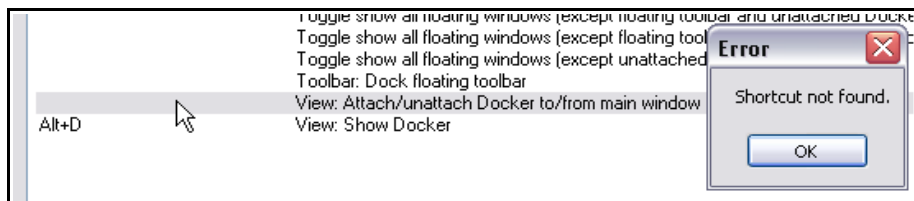
## 13 - Customisation: Actions, Mouse Modifiers, Menus and Toolbars

Item	Comments
Close	This closes the Actions window.
Remember last filter	If this option is enabled (from the Action window right-click context menu) then REAPER will remember your most recent filter and apply it next time the Actions window is opened, even in a future work session. 
General	The Action window exhibits the basic characteristics of other REAPER windows. For example, you can use the pin symbol (top right) to keep it on top, or you can dock it in the docker (from the right-click context menu).

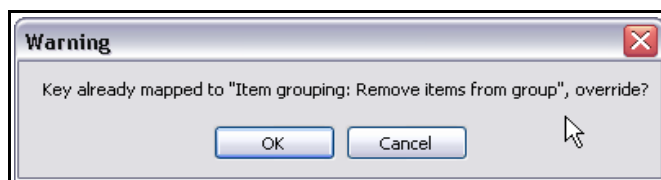
You'll have noticed several other features inside this window, including a number of additional buttons, some of which are currently dimmed. We'll get to these in due course.

### 13.4 Creating a New Keyboard Shortcut

In this next example, we will create a new shortcut. Let's take the example of the docker. Filter the action list on "dock" and you will see that **View: Attach/unattach Docker to/from main window** does not yet have any shortcut key assigned to it. Likewise, if you use the **Find shortcut ...** button to search for lower case **D**, you should find that this letter does not have any action currently assigned to it.

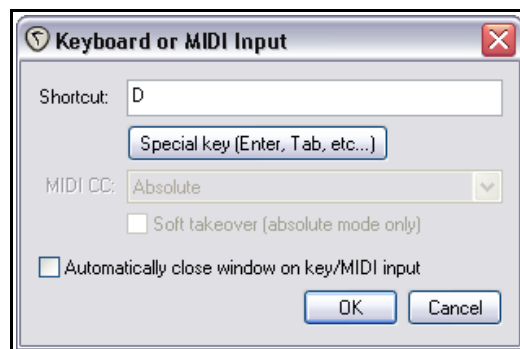


Incidentally, REAPER will not let you accidentally override an existing keyboard assignment. If you try to use a key that is already assigned elsewhere, you will see a message similar to that shown here (right). Trying to assign lower case **U** to an action would produce this exact message. You would then have the option as to whether to change the assignment for this key or leave it as it is.



#### Example

1. From the **Actions** menu, open the **Actions** window (**Show action list ...**)
2. Let's see if we can use **D** for docking. Click in the **Find shortcut ...** window. Type lower case **D** and observe the response. You should see a message **Shortcut not found**. We therefore know that this keystroke combination is available. Click on **OK** to close this message box.
3. In the **Filter** box type **dock** then select from the list of actions **View: Attach/unattach Docker to/from main window**.
4. 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.
5. Press lower case **D** – you will see **D** displayed in the **Keyboard or MIDI Input** box (see above).
6. Click on **OK**. You can see that this keyboard shortcut has now been assigned.
7. Close the **Actions** window.

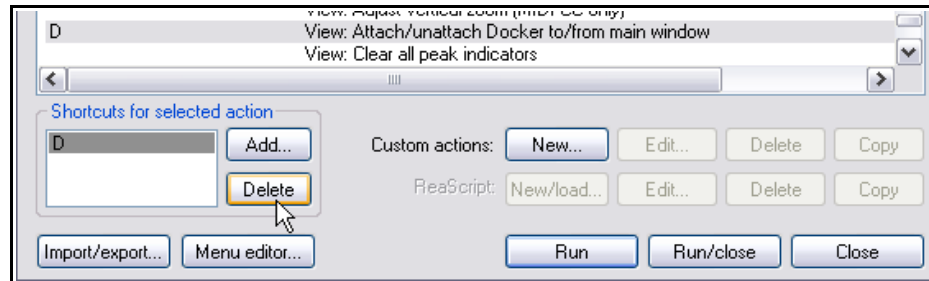


8. You can now use the shortcut key lower case D to attach/detach the docker to/from the main window.

### 13.5 Removing an Existing Shortcut

Removing an existing shortcut is easy. For example, you might like to remove the shortcut that you just assigned to the action **View: Attach/unattach Docker to/from main window**. Follow this sequence:

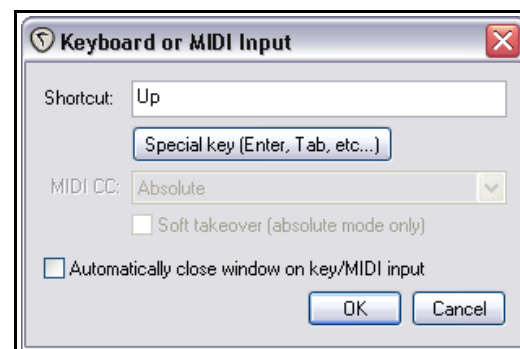
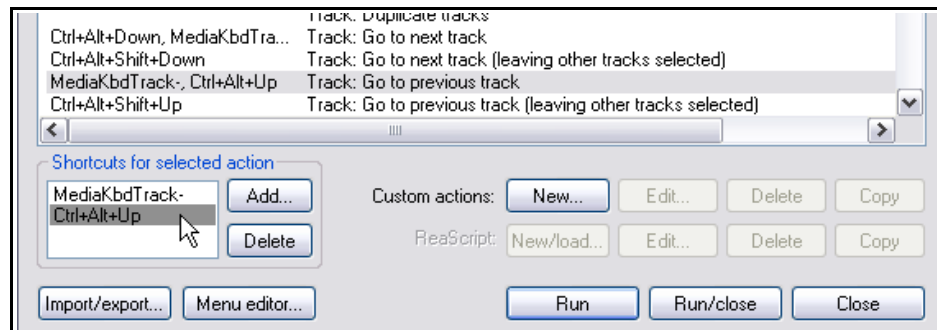
1. In the Action List, find and select the action from which you wish to remove the shortcut. The current shortcut(s) will be displayed just below the list. (see right).
2. Click on the shortcut shown in the window (in this example, the letter D).
3. Click on the **Delete** button. The shortcut will be deleted.



### 13.6 Changing an Existing Key Assignment

The procedure for changing an existing key assignment combines the two techniques of creating a new shortcut and removing an existing one. Let's take as an example assigning the **Up** and **Down** arrow keys to the actions **Track: Go to previous track** and **Track: Go to next track**, instead of **Ctrl Alt Up** and **Ctrl Alt Down** (the default assignments).

1. Find and select the action **Track: Go to previous track**.
2. In the displayed list of shortcuts, select **Ctrl Alt Up** (see right).
3. Click on **Delete** to delete this shortcut.
4. Click on **Add...** to display the **Keyboard or MIDI Input** window.
5. Press the **Up** arrow (see right), then click on **OK**.
6. When asked if you wish to override the current assignment to View: Zoom in horizontal, choose **OK**. You will still be able to use the Plus key to zoom in horizontal.
7. Use the same techniques as at steps 1. to 6. to change the shortcut key for **Track: Go to next track** from **Ctrl Alt Down** to just **Down**.



### 13.7 Examples of Possible Simple Keystroke Assignments

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.

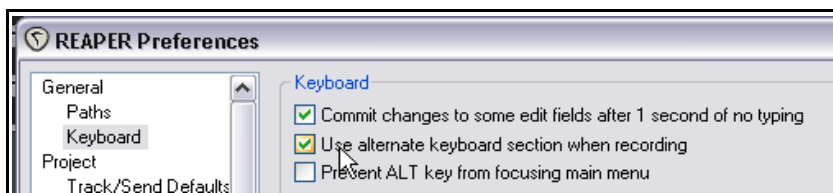
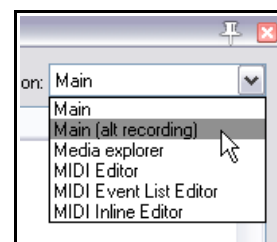
Task	Possible Shortcut Key
Track: Toggle bypass FX for currently selected track(s)	<b>B</b>
Track: Toggle bypass FX for all tracks	<b>Ctrl B</b>
Track: View FX chain for current track	<b>Ctrl F</b>
Track: View IO for current track	<b>I</b>
Track: View envelopes for current track	<b>K</b>

### 13.8 Keyboard Shortcuts for 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 prompts you to confirm whether you want to save or delete the new media items. The Main (alt recording) section of the Action List gives you the opportunity to bypass this prompt by assigning keyboard shortcuts for those options that you use most often – **Save All** and **Delete All**. As with the earlier examples, it is only an example. You'll probably find the exercise worth completing even if you don't want to keep these keyboard shortcuts assignments.

1. In the Actions List Editor, select the section **Main (alt recording)** – see right.
2. In the filter box type **stop save**. You should see the action **Transport Stop (save all recorded media)**
3. Select this action.
4. Click on **Add ...** and type lower case **S** then click on **OK**.
5. Clear the filter box, then type in it: **stop del**
6. Select the action **Transport: Stop (DELETE all recorded media)**.
7. Click on the **Add** button then type lower case **D** to assign this shortcut to the letter D. Click on **OK**.
8. Clear the filter box again.
9. Close the **Actions** window.
10. Make sure that the option to **Use alternate keyboard section when recording** is enabled. You'll find this under **Options, Preferences, General, Keyboard**.
11. Click on **OK** to close the Preferences window.



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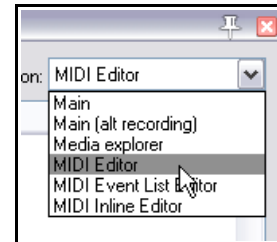
From now on whenever you are recording, you will have the option of using the shortcut keys **S** or **D** to stop recording, automatically saving or deleting the newly recorded media items. You can still use **Enter** if you wish to be prompted. Remember too that when you are not recording, the keys **S** and **D** will revert to their normal functions. For example, **S** can still be used to split media items when working in arrange view.

**Tip:** If you wish, you can assign macros such as these to an external device such as a keyboard pedal. We'll look at this when we look at Using a Control Device with REAPER.

### 13.9 Keyboard Shortcuts for the MIDI Editor

Editing is one area where assigning actions to shortcuts can be especially useful, and nowhere more so than when you are using the MIDI Editor. Take the trouble to familiarise yourself with the contents of the MIDI Editor section of the Action List and you should be well rewarded. Notice also that there are separate sections for the MIDI Event List Editor and the MIDI Inline Editor.

The method used for assigning shortcuts to actions, changing or removing existing assignments, etc. is exactly the same as that used in the Main section. For that reason, this section of the User Guide does not contain any step by step examples. However, below are listed some examples of some actions that you might find useful when working in the MIDI Editor. Special thanks go to Susan G for compiling these lists.



#### To do this ....

##### Managing Notes

Insert notes of a specific length  
Make notes legato  
Transpose notes  
Adjust note lengths slightly  
Adjust velocities  
Display only notes matching specified criteria

#### Use an action such as ...

Insert note .... [range from 1/128 to 1/2 to whole note]  
Set note ends to start of next note  
Edit: Move notes up/down one octave/semitone  
Edit: Lengthen/Shorten notes one grid unit/pixel  
Edit: Note velocity +/-01, 10  
Filter: Toggle filter on/off

##### Channels Management

Specify a channel for new notes and events  
Show all or specified channels  
Change the channel for selected notes

Action: Set channel for new events to 01 ... 16  
Channel: Show all/only/toggle channels 01 ... 16  
Edit: Set notes to channel 01 ... 16

##### Cursor/Grid Management

Advance the cursor by a note value  
Move the cursor by specific amount  
Change the grid divisions

Cursor: advance ... [range from 1/128 ... to whole note]  
Edit: Move edit cursor right/left by grid/measure/pixel  
Grid: Multiply grid size by... or Grid: Set division to...

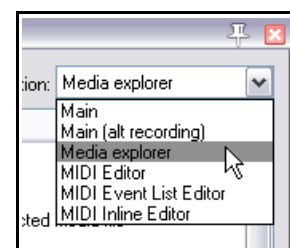
### 13.10 Keyboard Shortcuts for the Media Explorer

If you work extensively with imported samples and so on, you should definitely take the time to get to know the range of actions available within the media explorer. By now you should be developing enough confidence to explore this for yourself, but to help you here is a summary of some of the most useful groups of actions you will find there:

**Browser actions:** these are used to navigate your folders. For example, by default **Backspace** will take you to the parent folder (relative to the current folder).

**Preview actions:** actions exist for a host of tasks, including play, pause, stop, toggle repeat on/off, rewind a little, fast forward a little, stop preview when inserting media, and many more.

**Tempo match actions.** These include tempo match off, tempo match on, toggle on/off, and tempo match/2.



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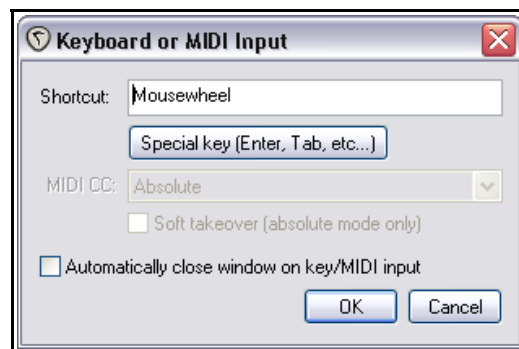
### 13.11 Assigning Actions to the Mousewheel

One special type of action assignment that you can make is to the mousewheel, optionally also using modifier keys. This way you are able to 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. Here's a reminder of the default mousewheel assignments:

<b>Mousewheel alone</b>	View: Zoom horizontally
with <b>Ctrl</b>	View: Zoom vertically
with <b>Alt</b>	View: Scroll horizontally
with <b>Ctrl+Alt</b>	View: Scroll vertically
with <b>Ctrl+Shift</b>	View: Adjust selected track heights

Again, the method for changing these is essentially the same as that which you have already used. Suppose, for example, that you wish to use the mousewheel by itself to scroll horizontally.

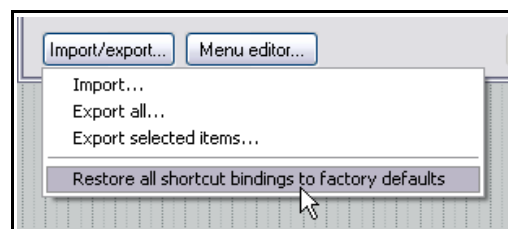
1. In the action list, find the action **View: Scroll horizontally**.
2. In the shortcuts list, select **Alt + Mousewheel** and click on **delete**.
3. Click on the **Add** button, then scroll the mousewheel. The text Mousewheel will be displayed, as shown on the right.
4. Click on **OK**.
5. If you wished, you could now use the same method to assign **Alt + Mousewheel** to the action **View: Zoom Horizontally**.



### 13.12 Exporting and Importing Keyboard Shortcuts

The **Import/export** button near the bottom left corner of the Actions window can be used to backup or restore any or all of your keyboard assignments. Exported keymap sets are saved as .ReaperKeyMap files in the \KeyMaps directory of your \Application Data\REAPER folder.

This feature can also be used to copy keyboard assignments from one computer to another. The options on the menu are for the most part quite self-explanatory:



**Import ...** Imports keyboard assignments from an existing .ReaperKeyMap file.

**Export all ...** Exports all your current keyboard shortcut assignments to a .ReaperKeyMap file.

**Export selected items ...** Exports only those items currently selected to a .ReaperKeyMap file.

**Restore all shortcut binding to factory defaults** Removes your custom keyboard assignments and restores all REAPER defaults.

### 13.13 Creating Custom Action Macros

You can assign an entire 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 custom action, or macro.

As you browse the actions list, you might at first be somewhat puzzled at some of the items that are there. You might wonder, for example, why would anybody need an action for **Item: Select item under mouse cursor** when it is surely easier just to click on the item.

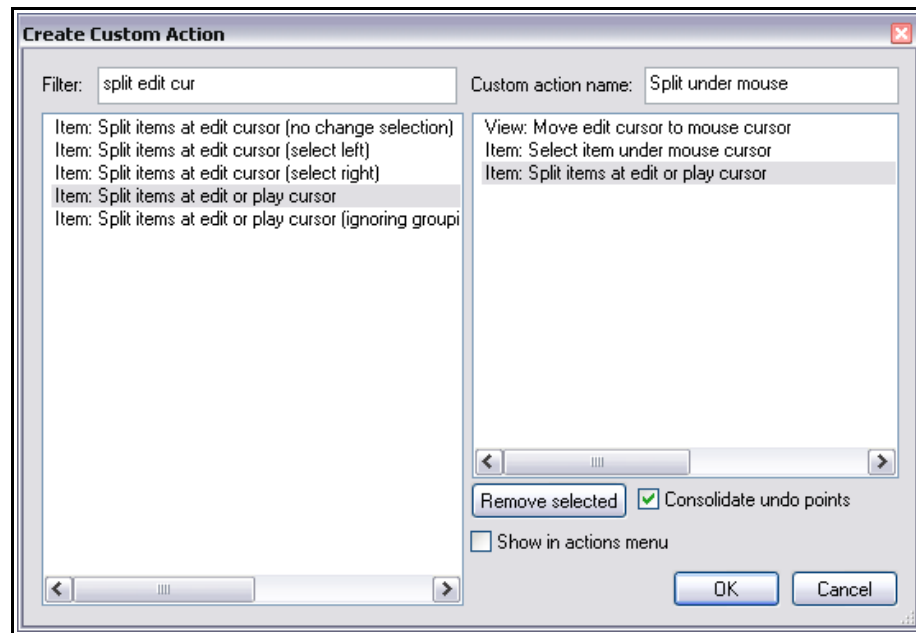
Often with actions like this, the answer is that the real power of these actions comes not from using them on their own, but in combination with other actions.

Managing Custom Actions (Macros) – Summary Table	
In order to do this ...	You do this ...
Create a new macro	Click on <b>New...</b> button. Type a name for your macro.
Add actions to a macro	Drag and drop from action list, or double-click.
Change order of actions	Drag and drop up or down the list.
Remove action from macro	Select action in macro action list, click on <b>Remove</b> .
Add macro to main Actions menu	Enable the option <b>Show in actions menu</b> .
Consolidate macro into a single undo point	Enable the option <b>Consolidate undo points</b> .
Save macro	Click on <b>OK</b> .
Assign shortcut key to a macro	Select the macro in the Action List. Click on <b>Add</b> .
Edit an existing macro	Select the macro in the Action List. Click on <b>Edit</b> .
Copy an existing macro	Select the macro in the Action List. Click on <b>Copy</b> .
Run an existing macro	Use shortcut key (if assigned), or select the macro from REAPER's Actions menu (if this option is enabled), or select macro in Action List and click on <b>Run</b> option.
Delete an existing macro	Select the macro in the Action List. Click on <b>Delete</b> .

Let's take a simple example. Normally, to split an item you would need to select the item, position the edit cursor at the required position, and then press S to split it. By creating a custom action, we can combine this sequence of activities into a single keystroke.

### Example

1. In the Actions List Editor, click on the **New** button. This will cause the **Create Custom Action** window to open (see right). Type a name, such as **Split under mouse**.
2. In the list of actions shown in the left panel. Find the action **View: Move edit cursor to mouse cursor**. Double-click on this action.
3. In the list of actions shown in the left panel. Find the action **Item:Select item under mouse cursor**. Double-click on this action.





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4. In the list of actions shown in the left panel. Find the action **Item:Split items at edit or play cursor**. Double-click on this action.
5. Click on the option **Consolidate undo points** to enable this option.
6. Click on **OK**. You will be returned to the main Action List with your new custom action selected.
7. Click on **Add** and type lower case **C** to assign this keystroke to your macro. Click **OK**.
8. **Close** the Actions List Editor.
9. Hover your mouse over any media item and press lower case **C**. The item will be split at that point. One of the split items will still be selected. If you don't like this, you can edit the macro.
10. Open the Actions List Editor, find your macro **Split under mouse** and select it. Click on **Edit**. Add to the end of this macro the action **Item: Unselect all items**. Click on **OK**.
11. Now test the macro again. This time it will split items without leaving anything selected.

This is of course just one example of a custom action macro in action. Think about those sequences of actions and commands that you use together a lot ... think actions, think macros! You'll also find plenty of ideas and inspiration on **The Useful Macro Thread** on REAPER's **Q&A, Tips, Tricks and How To** forum – at [forum.cockos.com](http://forum.cockos.com).

### 13.14 MIDI Editor Custom Macros

If you use the MIDI Editor a lot, then you should find that this is a good area in which to be looking for macros which will speed up your editing and make it simpler. The examples below were supplied by Bevosss. They show that a macro doesn't have to be lengthy and complicated to be useful

This custom action ....	... does this
Navigate: select next note right with same note value Navigate: move edit cursor to start of selection	This will find the next note with the same value as the current one, select it, and move the edit cursor there.
Navigate: select previous note right with same note value Navigate: move edit cursor to start of selection	This will find the previous note with the same value as the current one, select it, and move the edit cursor there.
Edit: Select all Remove selected duplicate events Edit: Unselect all	This macro removes all duplicate events from the current item.
Grid: Set grid division to 1 Edit: Insert note at edit cursor Edit: Unselect all	Creates and inserts a semibreve (or whole note).  The note duration sets the grid. Thus, you could have equivalent actions for any other fraction of a note or multiple of a note available in the actions list.

### 13.15 Importing Scripts

For more advanced custom programs which go beyond chaining together actions, you can import into REAPER any custom Perl scripts or Python scripts that you may have written or obtained and which add extra functionality to the program. For ReaScript to be available, at least one of Python or Perl will need to have been installed on your computer. Otherwise, these controls will be dimmed (see above).



The topic of writing scripts is outside the scope of this User Guide. If you are interested in learning more you should visit the REAPER web site, and in particular: [www.cockos.com/reaper/sdk/reascript/reascript.php](http://www.cockos.com/reaper/sdk/reascript/reascript.php)

### 13.16 Using a Control Device with REAPER

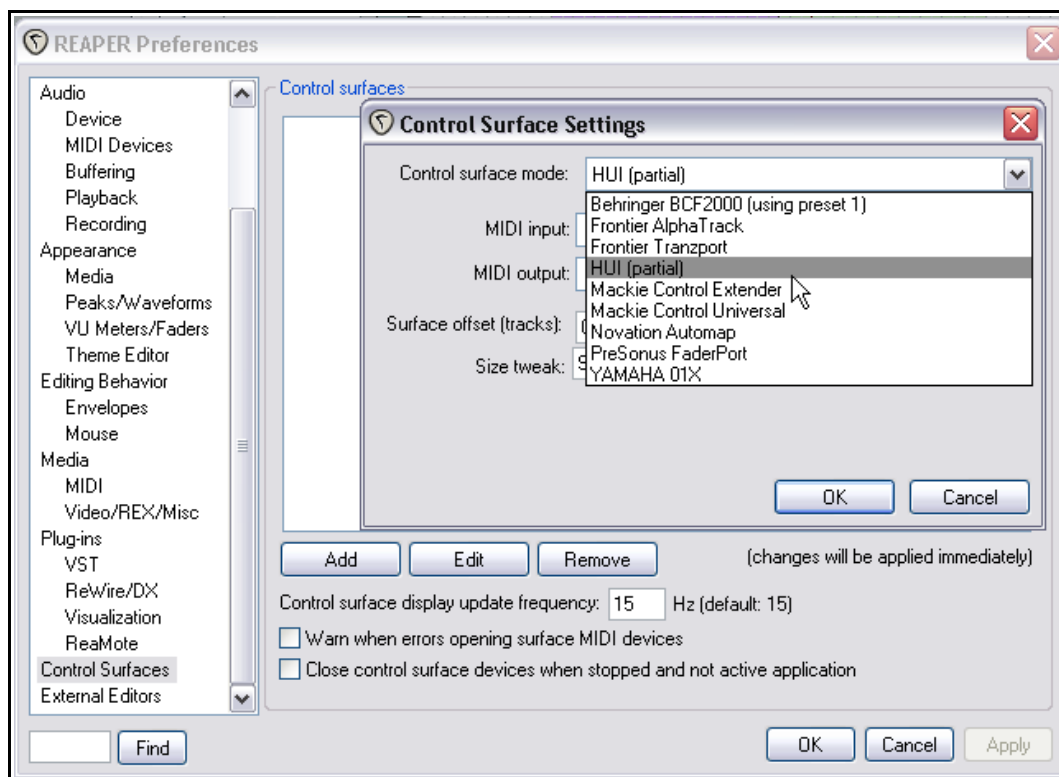
If you have a control surface such as a Behringer BCR2000 or a Novation Nocturn then you can use it to control some of REAPER's actions. Quite possibly you might be able to use your pedals and other controls on a MIDI keyboard in a similar way.

Examples 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.

If you are using any of the devices listed in the illustration shown here, 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. You should check the manufacturer's documentation and web sites.

In every case, make sure that you choose the options that are correct for your device from the various **Control Surface Settings** options. Shown below is one example of such settings, with a Novation Nocturn. This sample screen is not intended as a model for you to use with any particular product.

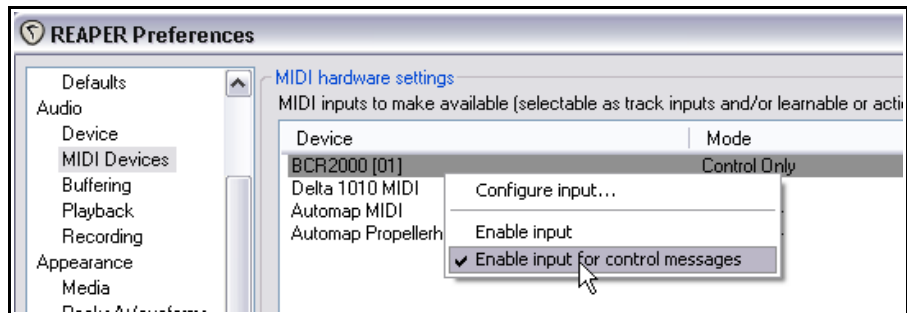
## 13 - Customisation: Actions, Mouse Modifiers, Menus and Toolbars

You might wish 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.

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 for control messages only. An example of this is shown here. You can double-click on the device name to open the **Configure MIDI Input** dialog box. What you do next will depend on the device.

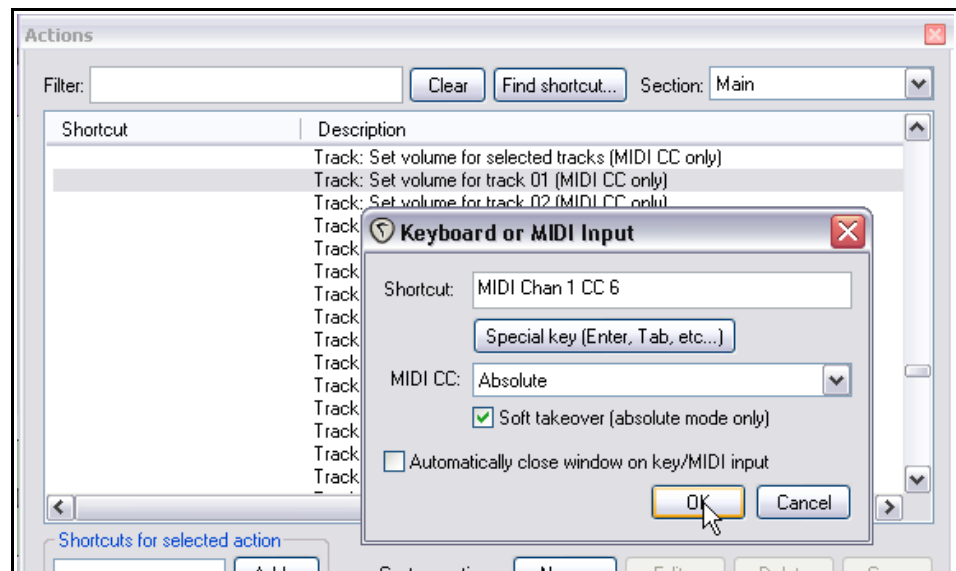


Once such a device is installed, you can then assign any action listed as supporting midi CC control to one of the knobs, faders, buttons or rotaries on your control device.

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 volume of track 1.

For further information, including about the various settings, you should consult the documentation supplied with your device, the manufacturer's web site, or one of the REAPER forums.



### 13.17 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. When you create the macro you don't know how many times you will need to repeat the actions - 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

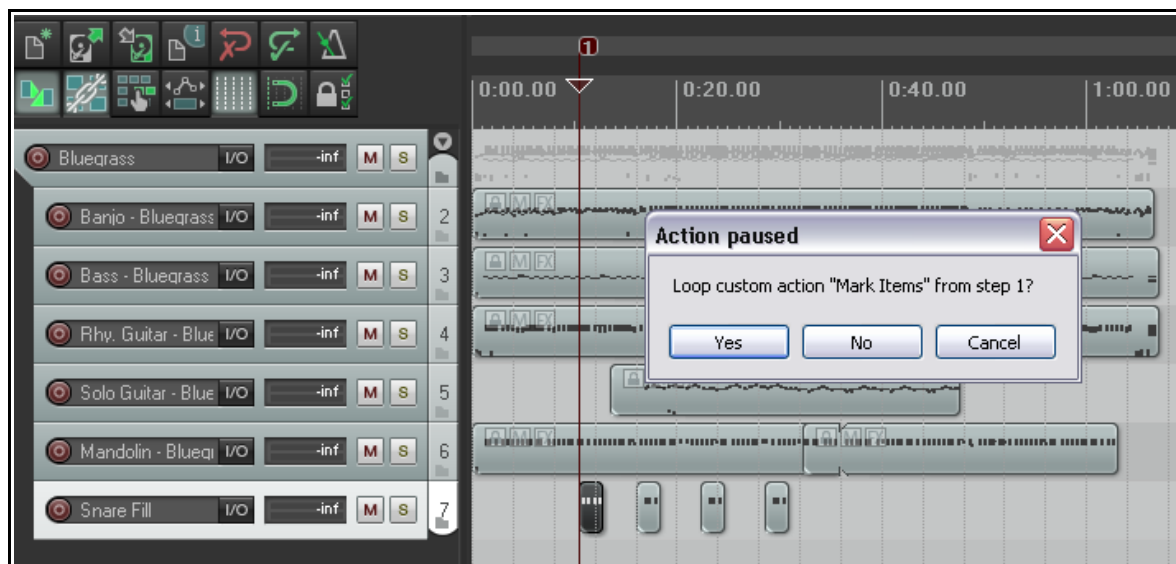
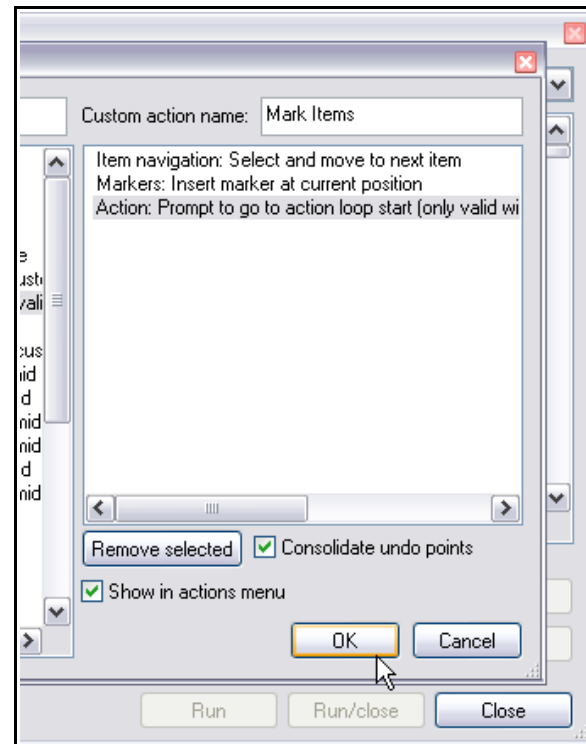
Action: prompt to go to action loop start

#### 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.

### 13.18 Mouse Modifiers

We've come across the mouse modifiers page of REAPER's preferences settings several times already. You can use this page to change any of REAPER's default mouse modifier controls and also to add more of your own. Some pointers to keep in mind:

- **Modifier keys.** Windows users can use any of the following modifier keys, in any combination, for any mousewheel action:

**Shift, Ctrl, Alt, Win**

Mac users may use any of these modifier keys, in any combination:

**Shift, Command, Option, Control**

- **Contexts.** The Contexts drop down list on the Mouse Modifiers page of your preferences window lists the contexts in which you could use your mouse and for which you could need modifiers (see right). When you select an item from this list, current mouse assignments for that context are displayed.

For most contexts you will find a number of variations, depending upon the exact kind of mouse action being undertaken. For example, separate mouse modifiers can be applied to media items depending on whether the mouse action being applied is a simple left click (which by default selects the item), left click and drag (which by default moves the item) or a double-click (which by default opens MIDI items in the MIDI editor, or displays media item properties for audio items).

You aren't going to learn all of these at once, and some of them you may never need. For example, if you never do any work with MIDI then the various MIDI contexts are unlikely to be important to you. Take the time to identify those which you are likely to use the most and think about how you can improve them.

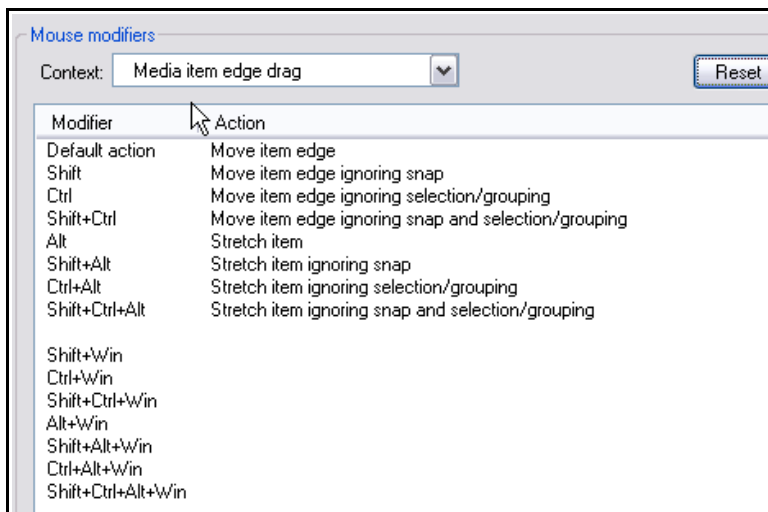
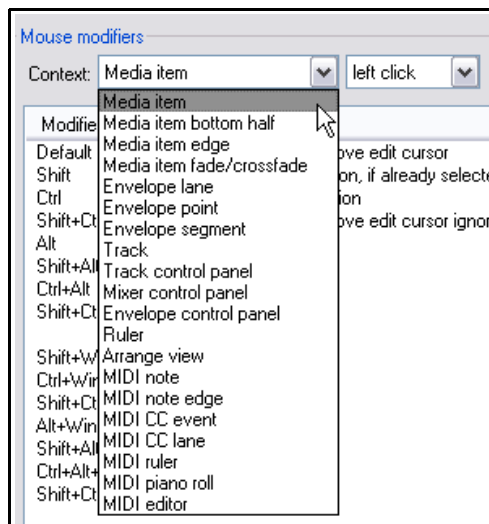
The procedure for customising REAPER's mouse modifiers is as follows:

1. Display the **Mouse Modifiers** page of REAPER's Preferences Window.
2. Display the Context drop down list and select an entry from that list. A list of current modifiers for that context is then shown. An example of this is shown here, for **Media item edge drag**.

3. In the Modifier column, double click on the item that you wish to change. A list will be displayed which shows *suggested* actions that you might wish to assign to that modifier. You now have a number of choices:

- ✓ Select any item from that list, or
- ✓ Select No Action to disable that modifier, or
- ✓ Select the item marked with a bullet to restore REAPER's default action for that modifier, or
- ✓ For some items only (including double-click items), use **Action List ...** to open the Action List editor so that you can assign one of REAPER's actions, or one of your own custom actions, to that context.

4. Click on **Apply** to apply your changes.
5. Repeat steps 1. to 4. as often as needed. When finished, click on **OK** to close the Preferences window.



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If you get into trouble, the **Reset** button can be used to restore factory defaults.

The examples that follow have been selected with the aim of helping you to understand how REAPER's mouse modifiers work and how you can benefit from using them. Don't be concerned if not all of the actual examples themselves mean a lot to you right now: try to stay focused on the technique. Let's suppose that there are certain editing and other activities that you use a lot in REAPER. Let's also suppose that these include the following:

- Creating empty MIDI items on tracks.
- Slip editing media items.
- Adding FX to media items.
- Toggling mute status of media items.
- Setting and removing loop points.

That's (intentionally) a fairly mixed bag of activities. All of these are examples of activities that can be made easier and/or faster and/or smarter by modifying REAPER's mouse modifiers.

### Examples

This exercise will step you thru the above examples in the same order as they are listed.

1. Choose the **Options, Preferences** command, then select the page **Mouse Modifiers**.

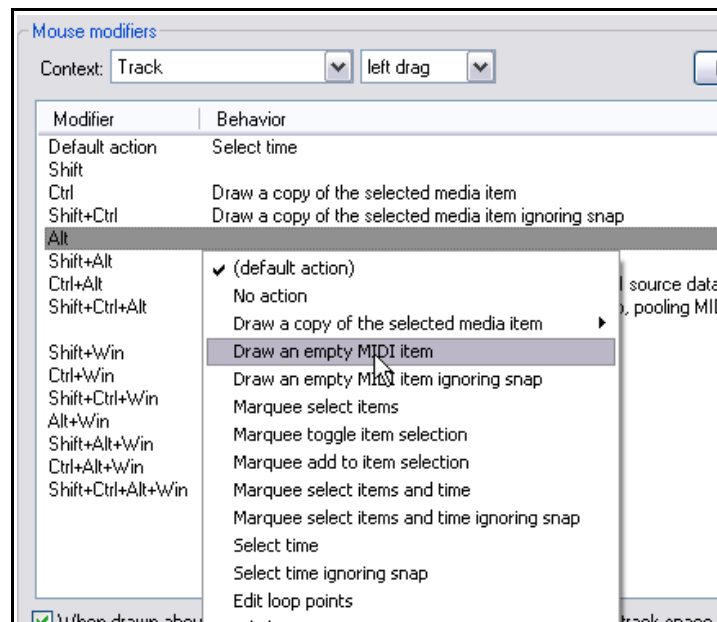
2. Select **Track left drag** from the context menu. REAPER's default mouse assignments for pencil drawing copies of items will be shown. Notice that **Alt** and **Shift Alt** are currently unassigned.

3. Double click on the word **Alt** in the Modifier column. A list of possible suggested actions will be shown.

4. In this list, click on **Draw an empty MIDI item**. This action is now assigned. The small dot shown next to this Action on the list indicates that this is a custom change that you have made yourself.

5. Click on **Apply** to apply the action.

6. Now select **Media item edge drag** from the context list. Let's suppose that we want to make **Move item edge ignoring snap** the new default behavior when clicking and dragging from the media item edge.

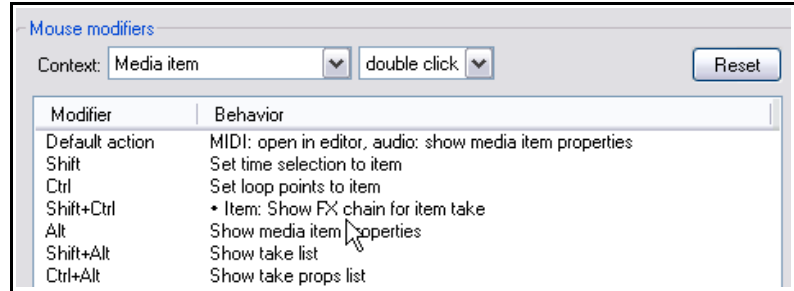


7. Double click on **Default action** and select **Move item edge ignoring snap** from the menu. Now double click on the modifier **Shift** and select **Move item edge** from the menu.
8. Click on **Apply**. These two items have now been swapped over.
9. Now select **Media item double-click** from the context drop down list. Modifiers for this context will now be displayed. Suppose that we want to create an action which can be used to open the item's FX chain window, and that we wish to assign **Shift Ctrl** for this.
10. Double-click on the text **Shift+Ctrl** to display a menu of choices. Click on **Action List ...** and the Action List Editor will open. If you have worked thru the earlier examples in this chapter, this will be a familiar sight! Find the action **Show FX chain for item take** and select it. Click on **Select/Close** to return to the Mouse Modifiers window. Click on **Apply**. This action is now your default media Shift Ctrl double-click action (see below).
11. Repeat this procedure to apply the action **Item properties: Toggle items mute** to the modifier **Shift+Win**. Click on **Apply**.

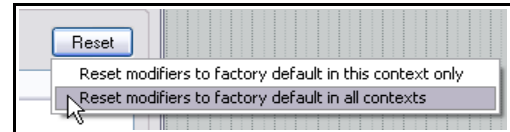


## 13 - Customisation: Actions, Mouse Modifiers, Menus and Toolbars

12. Finally, we can add an action to the **Ruler double-click** context so that the **Shift** modifier will remove any current loop points.
13. Select **Ruler double-click** from the context drop down list. Double click on **Shift** in the modifier column and select **Action List...** from the menu. Find the action **Loop Points: Remove loop points**, select it then click on **Select/Close** and then **Apply**.
14. Close the Preferences window.



If after completing this exercise you decide that you do not wish to keep these modifier assignments, you can use the **Reset** button to restore factory defaults.



**Remember!** When you are assigning actions to mouse modifier keys you are not limited to using REAPER's single actions. Provided that you have installed the SWS extensions you can use any of the SWS actions. You can also use any custom actions that you have created yourself.

### 13.19 MIDI Editor Mouse Modifiers

Using mouse modifiers in the MIDI Editor is a topic that merits a section of its own. Nowhere is this more true than when you are editing MIDI notes and CC events.

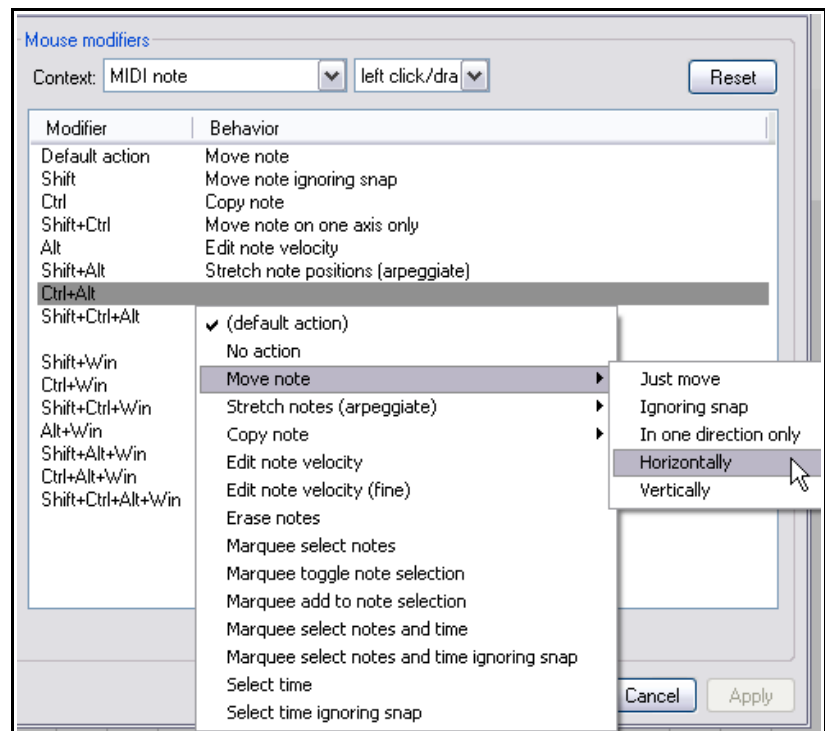
A large number of actions are available for use in the **MIDI note left click/drag** context (see right). If you use the MIDI Editor a lot then you should definitely take some time to investigate and to identify which of these actions are most useful to you.

For example, you could reassign **Shift Alt** to be used when clicking on any note to erase it.

Remember that all actions in REAPER's Action List MIDI Editor and MIDI Event List Editor categories (including any custom actions of your own) are available to be assigned as a mouse double-click modifier in most contexts within the MIDI Editor.

MIDI Editor mouse modifier contexts include:

**MIDI note left click/drag**  
**MIDI note double click**  
**MIDI note edge left click/drag**  
**MIDI note double click**  
**MIDI CC event left click/drag**  
**MIDI CC lane left drag**  
**MIDI CC event double-click**  
**MIDI CC lane double-click**  
**MIDI ruler left click**  
**MIDI ruler double-click**  
**MIDI piano roll left click/drag,**  
**MIDI piano roll double-click,**  
and **MIDI editor right drag.**



13.20 Customizing the REAPER Menus

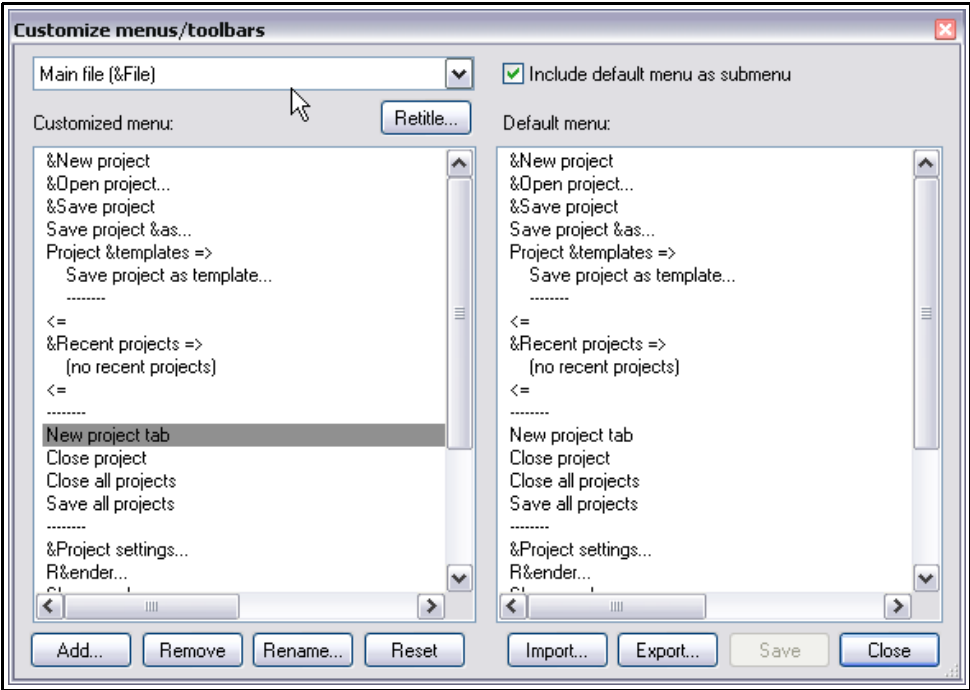
You can customize REAPER's main menu and many context menus in a number of ways, including:

- Removing from view commands that you never use.
- Changing the order in which commands are listed.
- Adding your own custom actions to an existing menu.

To open and display the **Custom Menu** interface, choose from the main menu the command **Options, Customize Menus/Toolbars**. This causes the Customize menus/toolbars window to be displayed. By default, it will open with the Main File menu displayed.

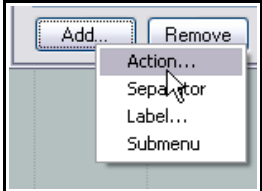
The table below summarizes the main tasks that can be carried out within this window.

The **&** sign displayed before any letter indicates that when the menu is displayed, that letter can be typed to select that command. On the menu itself, the letter will appear underscored. Thus, in the example shown above, when you display REAPER's main file menu, the letter **N** in **New project...** will appear underscored, and you can therefore type **N** to select this command.



In order to do this ...	... you need to do this.
Select a menu for customization	Display the drop down list (top left of window) and select the required menu.
Change the name of a currently selected main menu command	Select the command. Click on the <b>Retitle...</b> button. Type the new name and press <b>Enter</b>
Remove a command from the currently selected custom menu	Select the command in the left hand column (click once). Right-click and choose <b>Remove</b> from the menu, or click on the <b>Remove</b> button located below the customized menu pane.
Change the position of a command on the custom menu	Either ... in the left column, drag and drop the command up or down to its required position. Or ... in the left column select the command that you wish to move. Press <b>Ctrl X</b> . Click at the position where you wish the command to be placed. Press <b>Ctrl V</b> .

## 13 - Customisation: Actions, Mouse Modifiers, Menus and Toolbars

In order to do this ...	... you need to do this.	
<b>Copy a command from one main level menu to another</b>	<p>Select the first main menu from the menus drop down list. Select the required command and press <b>Ctrl C</b>.</p> <p>Select the second main menu from the menus drop down list. Click at the required position in the customized window (left) pane and press <b>Ctrl V</b>.</p>	
<b>Add a REAPER action or a custom action to the current custom menu as a new command</b>	<p>In the left column, click to select the existing command above which you wish to insert your custom action. Click on the <b>Add</b> button, then choose <b>Action</b> from the menu. Select your item from the list then click on the <b>Select</b> button.</p>	
<b>Rename a command on the custom menu</b>	<p>In the left column, select the command, click on <b>Rename</b>, then type the new name and press <b>Enter</b>.</p>	
<b>Add a separator to the current custom menu</b>	<p>In the left column, click to select the existing command above which you wish to insert the separator. Click on the <b>Add</b> button, then choose <b>Separator</b> from the menu.</p>	
<b>Add a label to the current custom menu</b>	<p>In the left column, click to select the existing command above which you wish to insert the label. Click on the <b>Add</b> button, then choose <b>Label</b> from the menu.</p>	
<b>Add a submenu to the current custom menu</b>	<p>In the left column, click at the position you want the submenu inserted. Click the <b>Add</b> button, then on <b>Submenu</b>. Type a name then press <b>Enter</b>.</p>	
<b>Save changes made to the current custom menu</b>	<p>Click on the <b>Save</b> button.</p>	
<b>Restore the one or all custom menus to the default settings</b>	<p>Click the <b>Reset</b> button, then choose either <b>Reset Current Menu</b> or <b>Reset All Menus</b>.</p>	
<b>Export the current custom menu or all menus as a ReaperMenuSet</b>	<p>Click on <b>Export...</b>, choose <b>Export All</b> or <b>Export Current</b>, then type a name and click on <b>Save</b>.</p>	
<b>Replace the current custom menu or all menus with a previously saved Reaper Menu Set</b>	<p>Click on <b>Import...</b> then select the required menu set file, then click on <b>Open</b>. You can also drag and drop .ReaperMenu and .ReaperMenuSet files into REAPER from Windows Explorer.</p>	
<b>Include REAPER's default menus with your custom menus</b>	<p>Tick the <b>Include default menu as submenu</b> option (top right of window). This is recommended especially if you are removing any default commands from the menu.</p>	

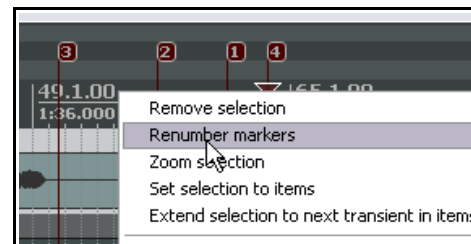
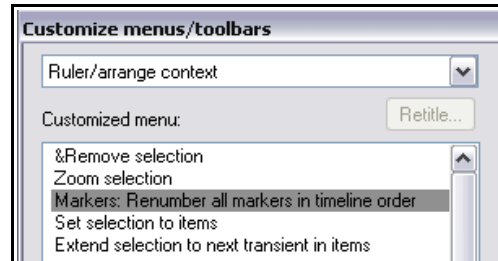
### Example

In this example you will learn how to add an action to a REAPER menu as a new command, and how to remove an unwanted command. You'll also change the order of some commands. As with many other exercises in this User Guide your main focus should not be on the example itself but more on the technique.

Suppose that you do a lot of work with markers, and that you would like to renumber markers in timeline order quickly and easily without having to remember a keyboard shortcut. You could add the action to the Ruler context menu. While you're about it, you can also remove the command **Insert empty space in selection** (assuming for the sake of the example that you think you do not need this command). Follow these instructions.

### Example

1. From REAPER's **Options** menu, open the **Customize menus/toolbars** window.
2. Display the drop down menu list and choose **Ruler/arrange context**.
3. Click on any one of the commands in this menu – for example **Set selection to items**.
4. Click on the **Add...** button, then choose **Action...** This causes the Actions List Editor window to be opened.
5. In the filter box type: **mark renum** – this should find the action **Markers: Renummer all markers in timeline order**.
6. Select this action then click on **Select/close**. The Actions window will close and you will be returned to the Customize menus/toolbars window. This action has now been added to the menu and is selected (see right).
7. With the item still selected, click on **Rename...**
8. You will be prompted for a new name. Type: **Renummer markers** and press **Enter**.
9. To move this up the menu, drag and drop it above **Zoom selection**.
10. Now select the item (lower down the list) **Insert empty space in selection**. Click on **Remove** to remove this from the menu.
11. Make sure you have enabled the option **Include default menu as submenu**.
12. Click on **Save** then **Close**.
13. Create some markers in this project, out of timeline order.
14. Now right-click over the ruler/timeline (see right). Choose **Renummer markers** from the menu: your markers will be renumbered.
15. Notice at the bottom of this context menu the item **Default menu: Ruler/arrange context**. This can be use to access the original context menu.
16. If you wish to restore this menu to its original state, open the **Customize menus/toolbars** window again and with the **Ruler/arrange context** still selected, click on **Reset** then **Reset current menu/toolbar to default**. Click on **Save** then **Close**.

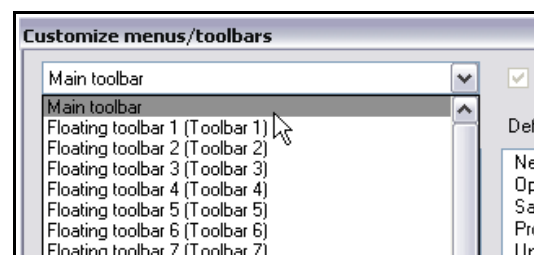


### 13.21 Customizing the REAPER Toolbars

Customizing REAPER's main toolbars (including the MIDI Editor toolbars) can make it easier to make REAPER work for you to work the way that you would like it to. For example, you can:

- Remove 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 procedure is similar to that used for menu customisation. Make your changes to the existing default toolbar layout thru the **Customize menus/toolbars** dialog box. This can be displayed by right-clicking over the empty area of the toolbar background, or by choosing **Customize menus/toolbars** from the **Options** menu. When the Customize menus/toolbars window is displayed, choose **Main Toolbar** or one of the **MIDI View** toolbars from the drop down list in the top left corner. We'll get to **Floating toolbars** a little later in this chapter.

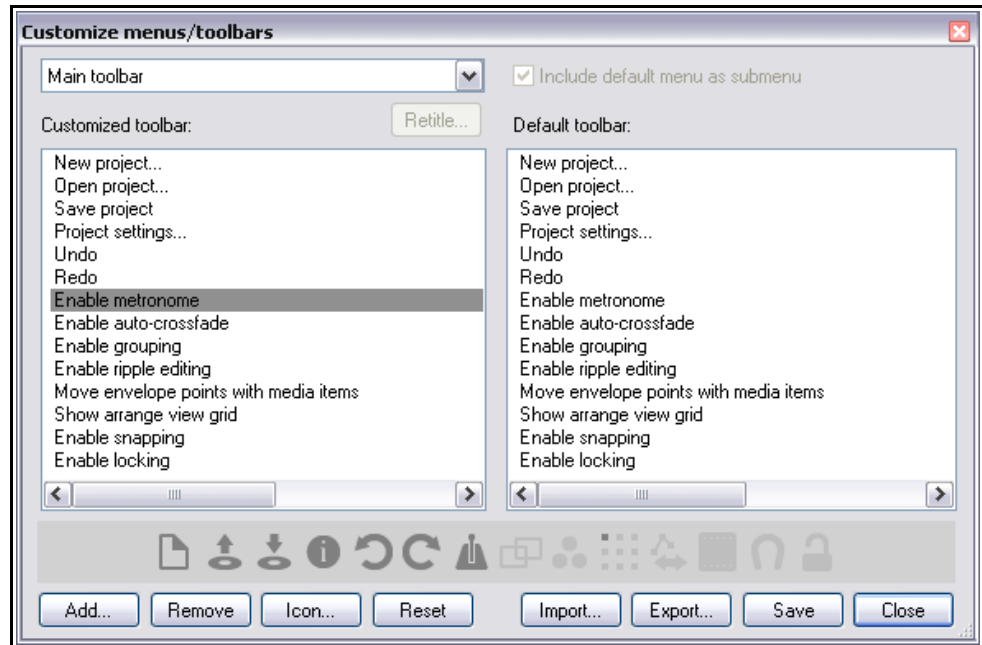


## 13 - Customisation: Actions, Mouse Modifiers, Menus and Toolbars

The table below summarizes the main tasks that can be carried out within this window.

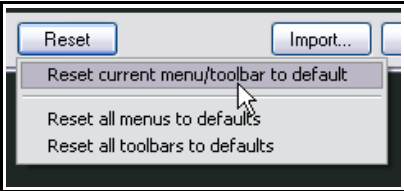
After the table there is an example in which you can add to the toolbar an item of your own.

Purely as an example, we'll use the action **View: Toggle master track visible** for this.



In order to do this ...	... you need to do this.
<b>Remove an item from the toolbar</b>	Click on either the item name in the left panel, or on the icon itself in the display just above the window's command buttons. In the example shown, Enable Metronome has been selected. Click on the <b>Remove</b> button.
<b>Assign a different icon to an existing toolbar item</b>	Right click over the icon in the display at the bottom of the Customize menus/toolbars window to open a window with a selection of icons. Select the icon of your choice.
<b>Add a new action or command to the toolbar</b>	In the customized toolbar area (left panel) select the item before which you wish to add your item. Click on the <b>Add</b> button. This causes the Actions window to be displayed. From the list of actions, select the REAPER command, action or custom script or action. Click on <b>Select/Close</b> . REAPER will add this to your toolbar and assign an icon.
<b>To add a separator space between two toolbar items</b>	In the customized toolbar area, right-click over the second of these items and choose <b>Add separator</b> from the menu.
<b>To change the icon used for any toolbar item (including an item that you have added)</b>	Right click over the icon in the icon display near the bottom of the Customize Menus/Toolbars window, just above the command buttons. This causes the Select toolbar Icon to be displayed. Select your required icon then close the Select Toolbar Icon window.
<b>Replace a toolbar icon with text</b>	Right click over the item in the customized toolbar list in the left panel. Choose <b>Text Icon</b> from the menu, type the text then click <b>OK</b> .

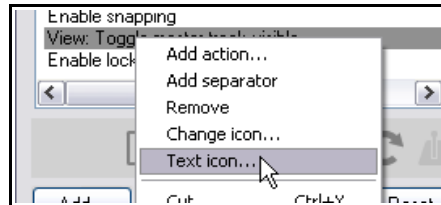
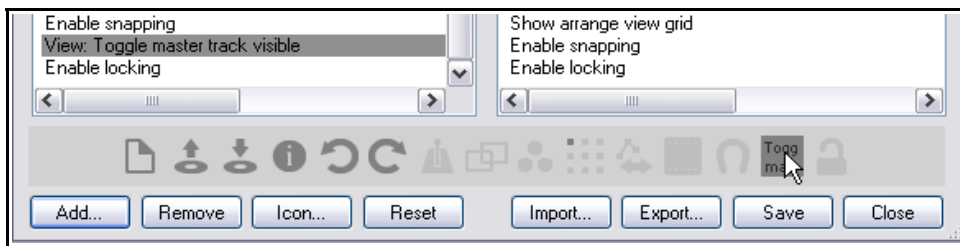
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In order to do this ...	... you need to do this.
<b>Change the position of an item on the toolbar</b>	Use the mouse to drag and drop up or down the list shown in the customized toolbar list. Ctrl X / Ctrl V may also be used, as can Cut and Paste from the right click context menu.
<b>Close the Customize Menus/Toolbar Window without saving your changes</b>	Click on the <b>Close</b> button. Choose <b>No</b> when asked if you wish to save your changes.
<b>Save the toolbar with your changes</b>	Click on the <b>Save</b> button.
<b>Restore the toolbar to its default status</b>	Click the <b>Reset</b> button. Choose <b>Reset Current Menu/ Toolbars to Defaults</b> from the menu. Select <b>Yes</b> to confirm' 
<b>Export the current custom toolbar or all toolbars/menus as a ReaperMenuSet</b>	Click on <b>Export...</b> , choose <b>Export All</b> or <b>Export Current</b> , then type a name and click on <b>Save</b> .
<b>Replace the current custom toolbar or all toolbars/menus with a previously saved Reaper Menu Set</b>	Click on <b>Import...</b> then select the required menu set file, then click on <b>Open</b> .

### Example

The real benefit of this exercise will come from it teaching you a technique, not from the actual example.

- Right-click over the toolbar area (but not any specific tool) and choose **Customise toolbars...** from the context menu.
- Click on the last item on the toolbar (Enable locking) then click on **Add...** to open the Actions List.
- Find the action **View: Toggle master track visible**. Select this, then click on **Select/close**. This item will now be added to the list of toolbar items. In the icon display, it will be labelled something like "Tog Mast".
- Drag this item up or down the list to whatever position you want it to take.
- If you do not like the text **Togg Mast** you can right-click over the item in the list and choose either **Change icon** (to select an icon) or **Text icon** (to type a different text label). If you choose **text icon**, you may also select a **Double width toolbar button** option for better text display.
- Click **Save** and then **Close**. If you don't want to keep this icon, access the **Customise menus/toolbars** window again and simply remove it.



**Tip:** The command **Position toolbar** can be used to change the position of or float the main toolbar: see section immediately below this one.



## 13 - Customisation: Actions, Mouse Modifiers, Menus and Toolbars

### 13.22 Creating Additional Custom Toolbars

REAPER can display up to eight general, four MIDI only and one MIDI piano roll only additional toolbars that you can customize to suit your particular requirements. By selecting which items are added to these toolbars you are able create one click access to your most important commands and actions. To toggle the display of any floating toolbar, right-click over the empty area of your main toolbar and choose the **Open toolbar command**, then select a toolbar. You may display as few or as many of these toolbars as you wish. By default, each toolbar contains one icon, labelled "Edit Me". To change this, you will need to customize the toolbar (see below).

Each toolbar window can be dragged, resized and positioned anywhere on your screen. It can also be kept on top (using the pin symbol). Right click over the empty area of any custom toolbar to again display the menu shown (right). This offers the following main options:

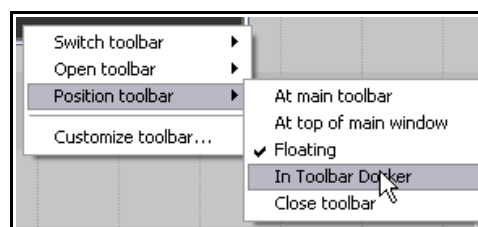
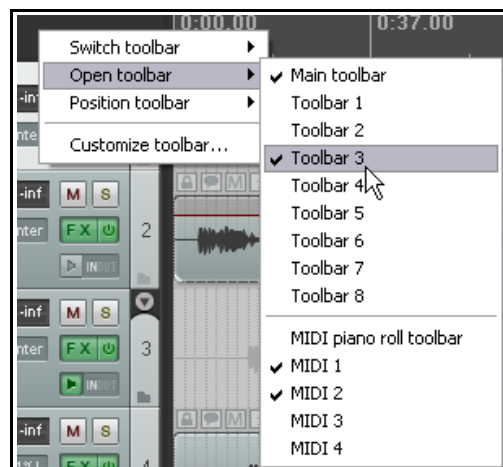
**Switch toolbar:** selects another toolbar to display in its place.

**Open toolbar:** use this to open another toolbar.

**Position toolbar:** used to dock the toolbar at the main toolbar, at the top of the main window, in the toolbar docker, or to float.

**Customize toolbars:** use this to open the **Customize menus/toolbars** window to enable you to customize the contents of any of the toolbars. By default, the currently displayed toolbar will be selected for editing.

You can add commands to each or any of these toolbars as you wish. To select a different toolbar for editing after opening the **Customize menus/toolbars** window, display the drop down list from the top left corner of the Customize menus/toolbars window. The following table summarizes the main editing options.



In order to do this ...	... you need to do this.
<b>Change the name of any tabbed toolbar</b>	Select toolbar in the Customize Menus/Toolbars window, click on <b>Retitle...</b> then type the new name then click on <b>OK</b> .
<b>Add an action or command to a custom toolbar</b>	Click on <b>Add...</b> to display the Actions List. Select the command or action and click on <b>Select</b> .
<b>To edit a custom toolbar button label</b>	Right click over the item in the customized toolbar panel (left) and choose <b>Text Icon...</b> Type the text then click <b>OK</b> .
<b>To assign an icon instead of text to a custom toolbar button</b>	Right click over the item in the customized toolbar panel (left) and choose <b>Change Icon...</b> Select the required icon from those displayed, then close the <b>Select Toolbar Icon</b> window.
<b>To remove an item from a custom toolbar</b>	Select the item in the Customized Toolbar (left) panel and click on <b>Remove</b> .
<b>To change the order of icons on a custom toolbar</b>	Drag and drop items up or down the list displayed in the customized toolbar (left) panel.
<b>To save a custom toolbar set</b>	Click on the <b>Save</b> button in the Customize Menus/Toolbars window.
<b>To export a custom toolbar set</b>	Use the <b>Export...</b> button and choose <b>Export current menu/toolbar to ...</b> Type a name and click on <b>Save</b> .
<b>To import a toolbar set</b>	Use the <b>Import...</b> button, select the file name, click on <b>Open</b> .
<b>To dock/undock the floating toolbar</b>	Right click on floating toolbar, choose <b>Dock floating toolbar</b> then select one of the three options.

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Shown here is an example of custom toolbars, used to give easy access to various track and windows screen sets. Let's see how this was done.

### Example

1. With the **Customize menus/toolbars** window open select **Floating toolbar 1**.
2. Click on **Retitle...** and type **Screen Sets**. Press **Enter**.
3. Use the **Add...** button to open the Actions List window. Select **Screenset: Load window set #04**, then click on **Select**.
4. With the Actions List window still open, select the action **Screenset: Load window set #03** and again click on **Select**.
5. Repeat step 4 several times to select the other actions required for this toolbar..
6. Select the action **Screenset: Load track view #01** then click on **Select/close**.
7. If necessary, drag and drop any of these items up or down the list to put them in your preferred order.
8. If necessary, remove any unwanted items on this toolbar.
9. Right-click over each item in turn and choose the **Text icon** command. Enter a label, such as **Track Set 1** and enable the option **Double width toolbar button**.
10. **Save** and **Close** the **Customize menus/toolbars window** when finished.



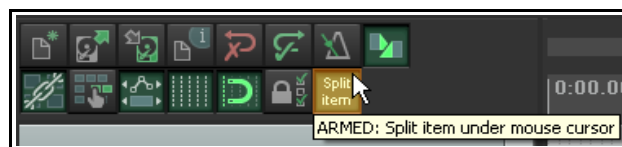
This exercise has shown you *how* to create a custom toolbar. Only you can decide, however, *when* you should create them. Use them for those activities that you use the most. For example, if you find yourself getting frustrated when navigating and zooming, then make a zoom/navigate toolbar. If you spend a lot of time editing media items, make an item edit toolbar. In Chapter 16 you'll find a custom toolbar for working with envelopes.

### 13.23 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. Without arming, any tool which makes reference to the mouse cursor, for example, would otherwise be useless – because the mouse cursor will be over the toolbar, not any media item, when the tool is clicked! By using smart tools we solve this problem.

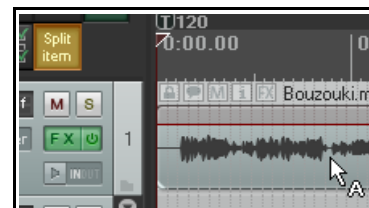
To create a Smart Tool for any action or custom action, you first need to assign the action or custom to the toolbar, as explained in the section before this one. In this example, we have created a button to



**Split Item Under Mouse Cursor**. Then, to use it as a smart tool, simply do this:

1. Right click over the tool. If you hover the mouse there long enough, a tool tip will be displayed. Move the mouse over any media item and it will change to a letter **A**.
2. Left click on (in this example) the item to which you want the action applied, at the exact position that you want the action to occur. In this case, the item beneath the mouse cursor will be split.

Once a tool is armed it will remain armed until you “unarm” it. To do this, either right click on the armed tool. or press Esc immediately after using it.



**Tip:** A floating toolbar can be sized (made larger or smaller) by dragging its lower right hand corner in or out – look for the small dotted triangular area. If you want to restrict just how large the icons may become when you do this, enable the option Don't scale toolbar buttons above 1:1 on the Appearance page of your preferences window. There is also an option Don't scale toolbar buttons below 1:1.

### 14 REAPER Plug-ins in Action

#### 14.1 What Are Plug-ins?

There's a wonderful assortment of plug-ins supplied with REAPER - over 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 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 concert hall, rather than in a boring old studio.

#### 14.2 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. Presets just reflect someone else's idea of how something ought to sound, not the quality of the plug-in, nor its potential. You will almost certainly never learn how to get the best out of any plug-ins, be they EQ, compression, reverb or anything else unless you take the trouble to understand their various parameters. And that takes time.
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.

#### 14.3 The Five Types of Plug-in

Especially when you are new to digital audio, when you start to explore the world of plug-ins you might find yourself feeling 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. Learn in steps as you go. 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 such as routing. Routing is generally beyond the scope of this chapter: we'll get to it in Chapter 15.
- **Analytical Plug-ins:** these display information, but don't in any way alter the sound of the track.

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.

### 14.4 Adjusting Plug-in Parameter Controls

Plug-in faders can be adjusted using any of four main methods. These are:

- ◆ Hover your mouse over the fader and scroll the mousewheel. Use **Ctrl** for finer adjustments.
- ◆ Click on a fader and drag the mouse. Hold the **Ctrl** key for finer adjustments.
- ◆ Click on the fader then use the **Up** and **Down** arrow keys.
- ◆ Click in the parameter value window (in the first example show below, this will be to the immediate right of the fader) and type a value.

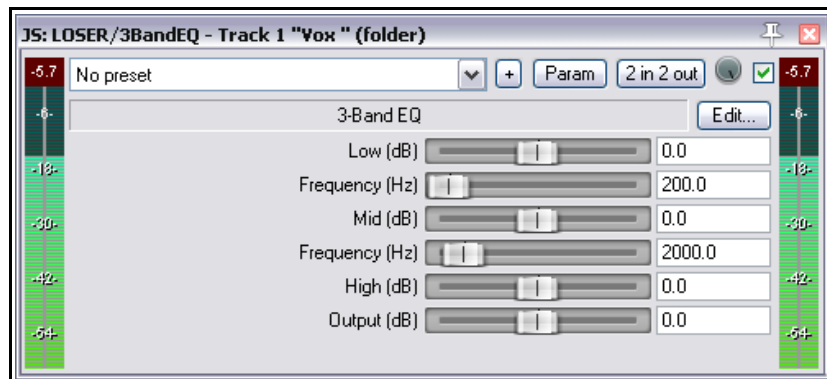
If you prefer not to use the first of these methods (for fear of making accidental adjustments), you can enable on the Editing Behavior, Mouse page of your Preferences the option **Ignore mousewheel on all faders**.

### 14.5 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. To understand how these plug-ins work, let's take 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** (above).
4. Play the song. As you do so, fade the **High (dB)** 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 (dB)** fader all the way to the left. Now *slowly* move the **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:

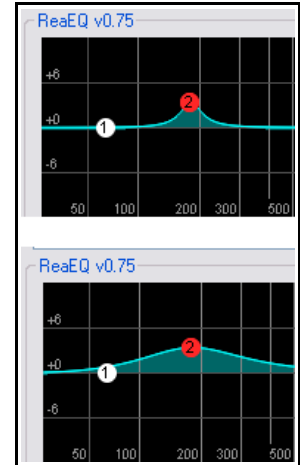
Frequencies	Comments
<b>16 to 60 Hz</b>	<b>Very Low Bass.</b> These frequencies are felt rather than heard.
<b>60 to 250 Hz</b>	<b>Bass.</b> Herein dwell the fundamental notes of the rhythm section. A modest boost here can help make a sound fuller, but too much gain will make it boomy.
<b>250 to 2000 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.

Frequencies	Comments
<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 in Hz (and kHz), and that we can increase or decrease the volume at any level, to shape the sound. The sound level itself is measured in decibels.

We need to understand one more term – band width. This particular JS plug-in does not include a bandwidth control, but more sophisticated EQ plug-ins (like ReaEQ) do.

A narrow bandwidth setting means that you will raise or lower the sound over a very small part of the spectrum relative to your selected frequency. A wide setting means that you will be working on a much wider part of the spectrum. An example of the difference in how a narrow bandwidth (top) and a wide bandwidth (bottom) can shape a sound is shown here. In the next example, however, you won't need to worry about this.



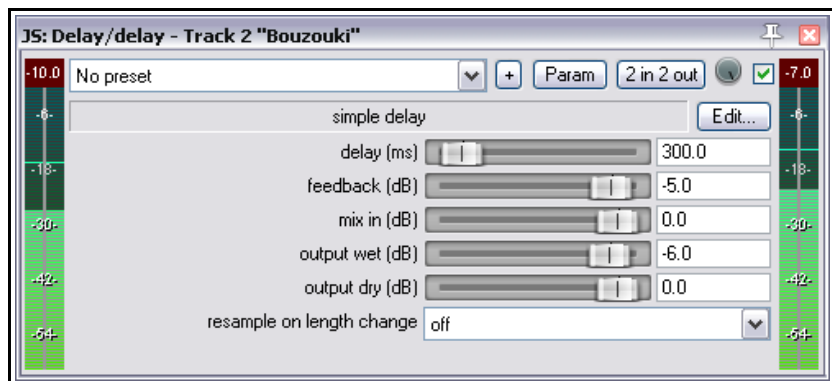
### Example

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 – as explained in Chapter 10.

## 14.6 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.

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Parameter	Description
<b>Feedback</b>	Determines the amount of the delayed signal that will be fed back into the delay itself. This helps to prevent the delay from just being an echo.
<b>Mix in (dB)</b>	Determines the overall output level.
<b>Output wet (dB)</b>	Determines the Output level of the Post FX signal. Lowering this relative to the dry output will make the effect more subtle.
<b>Output dry (dB)</b>	Determines the Output level of the Pre FX signal

In this example, we will use the **JS: Delay/Delay** to add a touch of delay to the Bouzouki.

### Example

1. Unsolo your Vox track and solo the track Bouzouki.
2. Display the FX Window for this track and add the JS:Delay/delay.
3. Play the song. Experiment with adjusting the FX 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.
5. Save the file.

## 14.7 Volume Changing Plug-ins: the Limiter

In this next 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:

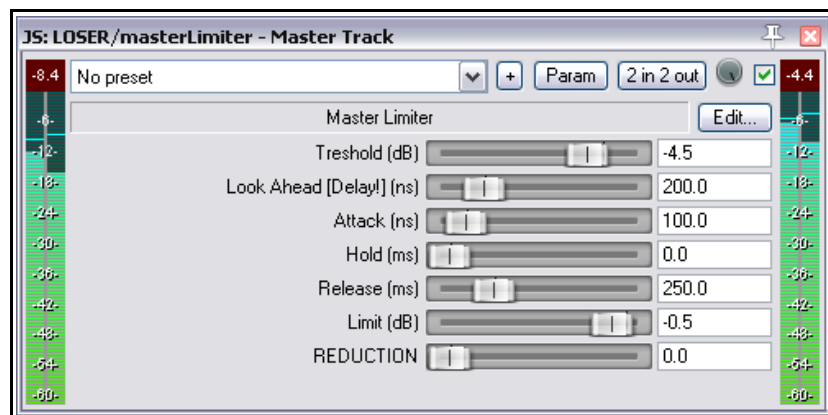
- To raise the overall volume of the mix, but at the same time ...
- To prevent the mix from "clipping", i.e. getting too loud at any point.

We will be using the **JS:Loser/masterLimiter** which includes the following controls and parameters:

Parameter	Description
<b>Threshold</b>	Determines the level at which the other limiter settings will be applied. It may seem paradoxical, but the lower the threshold, the higher will be the perceived overall volume. As you lower the threshold, more of the song is lifted to the limit specified.
<b>Look Ahead</b>	Determines how far ahead the limiter looks – this helps smooth out sudden peaks.
<b>Attack</b>	Determines how quickly the limiter kicks in as the signal increases.
<b>Release</b>	Determines how quickly the limiter recovers 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, the volume will get louder, but the maximum (limit) volume is never exceeded.
4. As you lower the Limit, the song gets quieter.





- 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.

### 14.8 Analytical Plug-ins: the GFXAnalyzer

Shown on the right is a **JS: Analysis/GFXAnalyzer** plug-in.

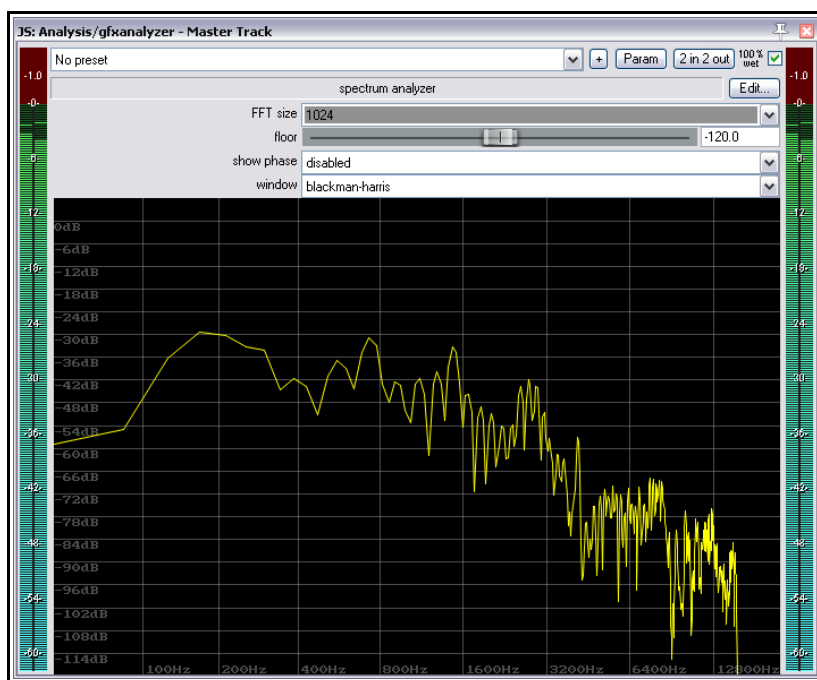
Insert this into any track's FX chain (or the master's FX chain and as the project is played you are given visual feedback as to the level of output at different frequencies.

This can sometimes help, for example, in identifying which frequencies might need attention.

Three of the Cockos plug-ins – ReaEQ, ReaFir and ReaXComp – all include an analytical display similar to that shown here as part of their standard interface.

Now that you've had a look some examples of different types of plug-in. We can go on and examine some more.

First, though, another word or two about presets ...



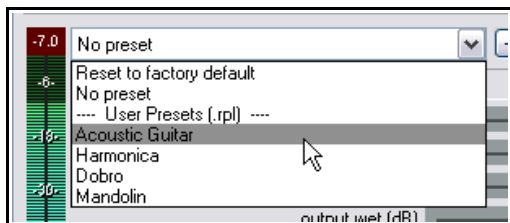
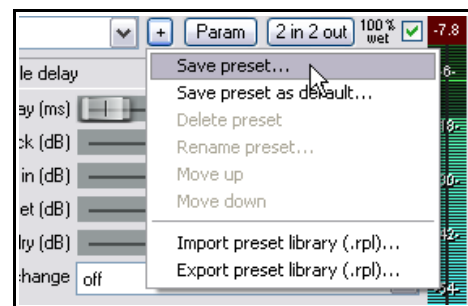
### 14.9 Using FX Presets

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 want to use it on another track:

- Click on the **+** button just above the JS Delay/delay plug-in when this plug-in is selected.
- Choose **Save preset** from the menu.
- Type a name and click on **OK**.

To save these as default parameter settings for the plug-in when it is used in the future, use the **Save preset as default...** command from the same menu.

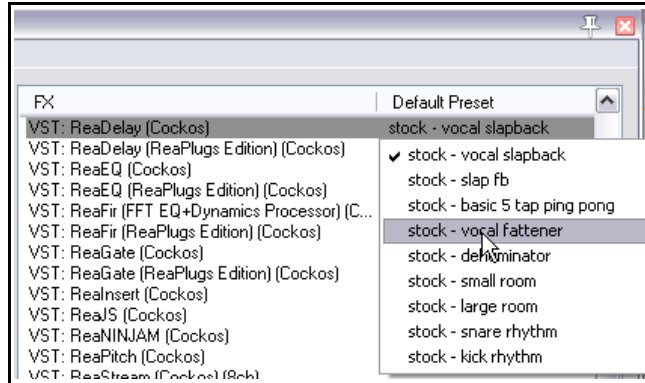
To import an existing preset library (such as you might be able to download from the REAPER web site) you would choose **Import preset library....** To export your presets to a file (for backup purposes, or to use on another computer) you would choose **Export preset library ...**



**To choose an existing preset** (from those you have previously saved or imported, or which were supplied with the plug-in), simply insert the plug-in into that track's FX window, display the drop down list of presets (see left), then select the one that you want.

Within the FX Browser, the **Options, Show default FX presets** can be used to list any default preset in the browser window alongside the plug-in name.

You can then double-click on the preset name to select a different default preset for that plug-in if you wish (see right)



### 14.10 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. The characteristics of reverb plug-ins vary enormously, not only in their essential quality but also in the scope of their applications.

With convolution reverb, 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

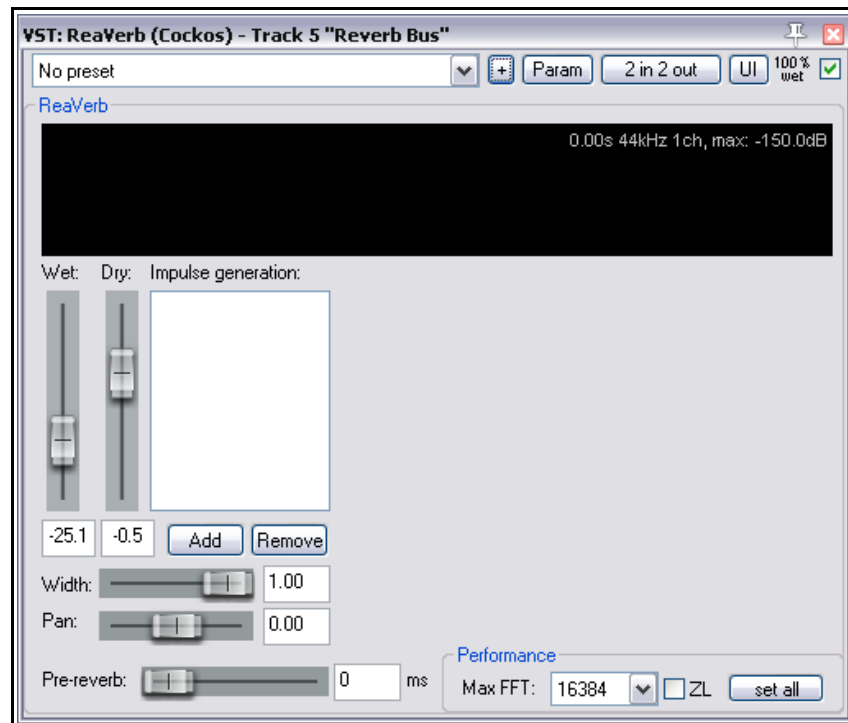
from real environments to create your reverb, but also to use something closer to more traditional reverb methods to then modify that sound further, should you wish to do so.

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/>

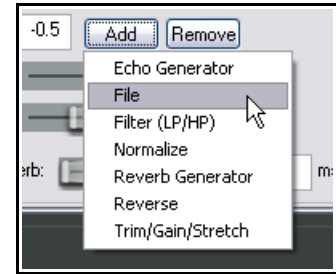
In the example that follows, these files have been downloaded and stored in a folder that we have created and named **C:\Program Files\REAPER\Reverb Impulses\Voxengo\**

#### Example

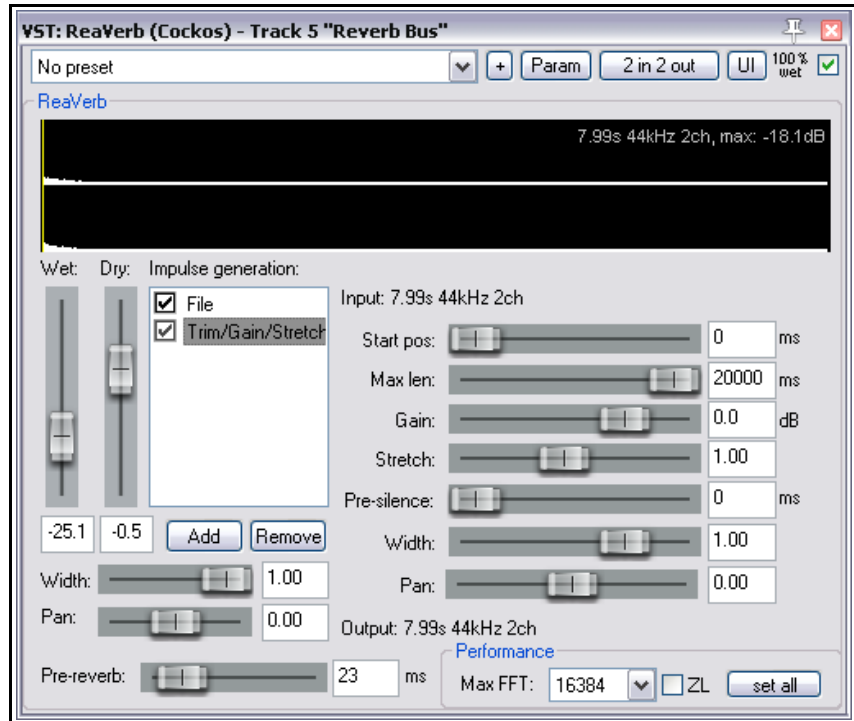
1. Open the file **All Through The Night.RPP** and save it as **All Through The Night REVERB.RPP**
2. Add a new track after the last track, and name it **Reverb Bus**



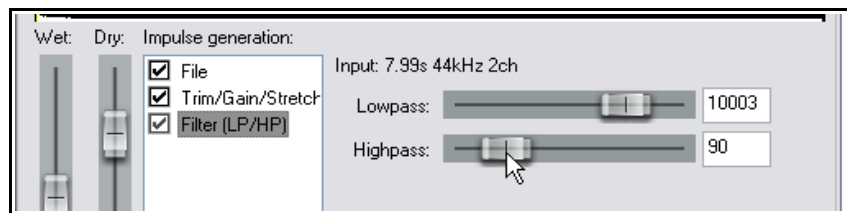
3. Create Receives into this track from all of the instrument tracks and the Vox track. This will later enable you to feed different levels of signal, panned as required, from different tracks into your Reverb Bus.
4. Display the **FX Window** for the **Reverb Bus**.
5. Add **ReaVerb** into this FX Window.
6. Fade the **Wet** level down to around **-60** and the **Dry** level down to about **-0.5**, as shown above. 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 example, 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 **-10dB**. Lower the fader on the Master to about **-6dB**. 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 for yourself.



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 stop the reverb impulse from being added to very low and/or very high frequencies.
14. When you have your sound right, 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**.

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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** – trim or stretch the impulse (make it shorter or longer), add in some graininess.

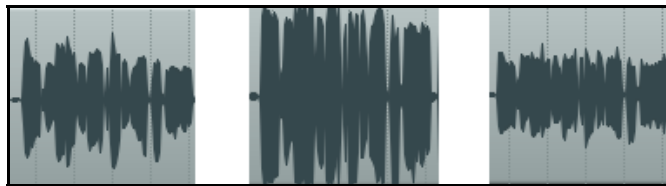
**File** - use this to insert an impulse file. You can insert as many files as you want!

### 14.11 Volume Control with Compression

Earlier in this chapter, we encountered a **Limiter**. You can think of a limiter as being like imposing a ceiling – it stops the volume of a signal from going above whatever level you set.

Because limiting can be harsh, it is often better to use a compressor on individual tracks. Think of it this way – a simple 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).

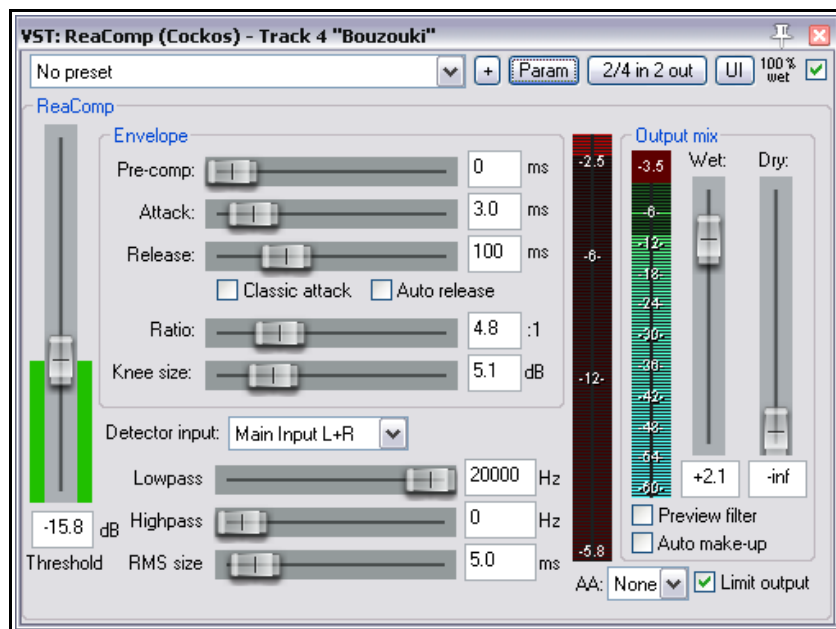
Notice that on the original waveform the volume varies quite considerably from time to time. Applying a limiter (near right) can lift the quieter passages, but may make the overall effect too loud. The dynamics have been largely squeezed out of the song. The illustration far right shows the same waveform after carefully 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 five 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 relatively 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. The gain control in **ReaComp** (above) is labelled **Wet**.
- **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. When this is ticked (as here) the plug-in is active. When unticked it is set to bypass. 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: ReaComp (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 -16 on the Threshold and a ratio around 4:1 or 5:1 (see picture).
8. Now save this file.

### 14.12 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.



### 14.13 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

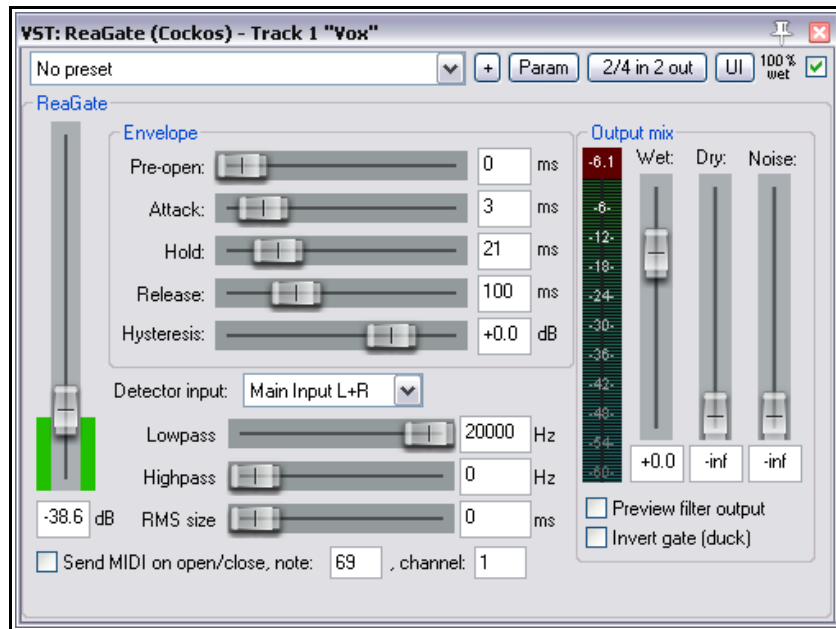
## Up and Running: A REAPER User Guide v 4.00

- **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.



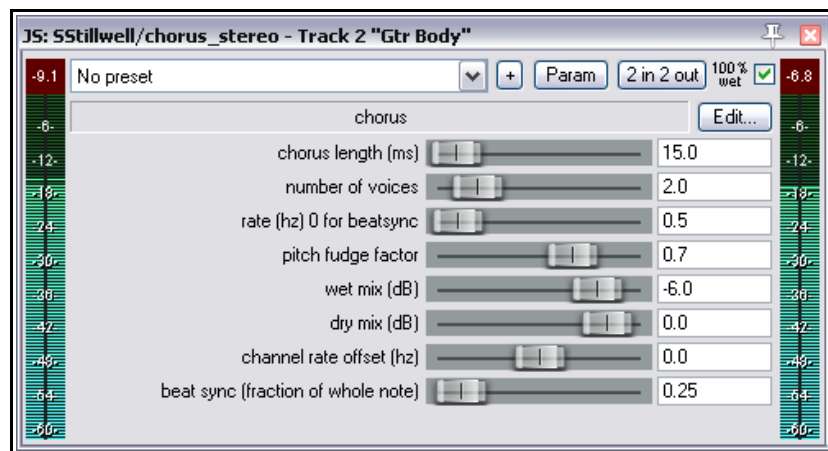
You have just seen here a simple example of using a noise gate. Noise gates can be used to great effect and for a large number of applications (including with a drum kit to cut out the bleed between mics). Applications like that are more complicated and require a greater understanding of the noise gate's many parameters.

### 14.14 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 **Sstillwell'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.

### 14.15 Noise Reduction with ReaFir

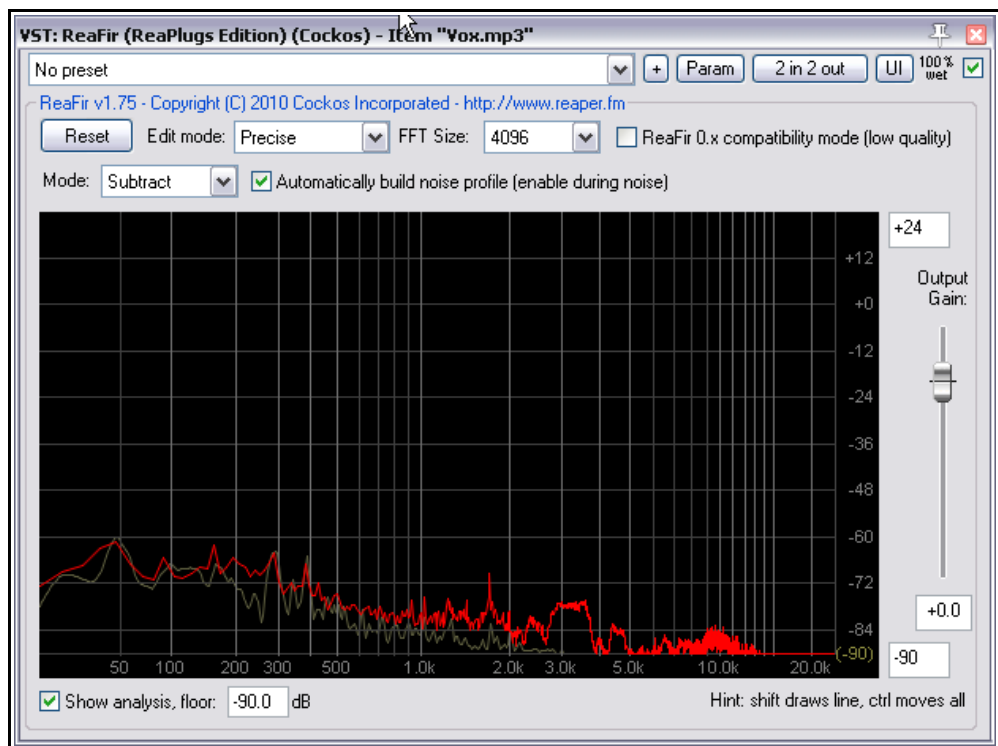
**ReaFir** is a multipurpose dynamics plug-in that almost defies categorisation or description. It can act as an EQ, a Compressor, a Noise Gate, and more. In this example, you will see how it can be used for noise reduction. The need for a noise reduction plug-in can arise when an otherwise good track 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 from your output..



**Note:** You might be a little puzzled as to when to use a noise gate and when to use noise reduction software such as ReaFir. The answer is usually quite simple. Noise reduction is suitable for removing a background noise that is fairly constant, such as an electrical hum, whereas a noise gate is better at dealing with occasional noise, such as a vocalist's breathing sounds.

### 14.16 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.

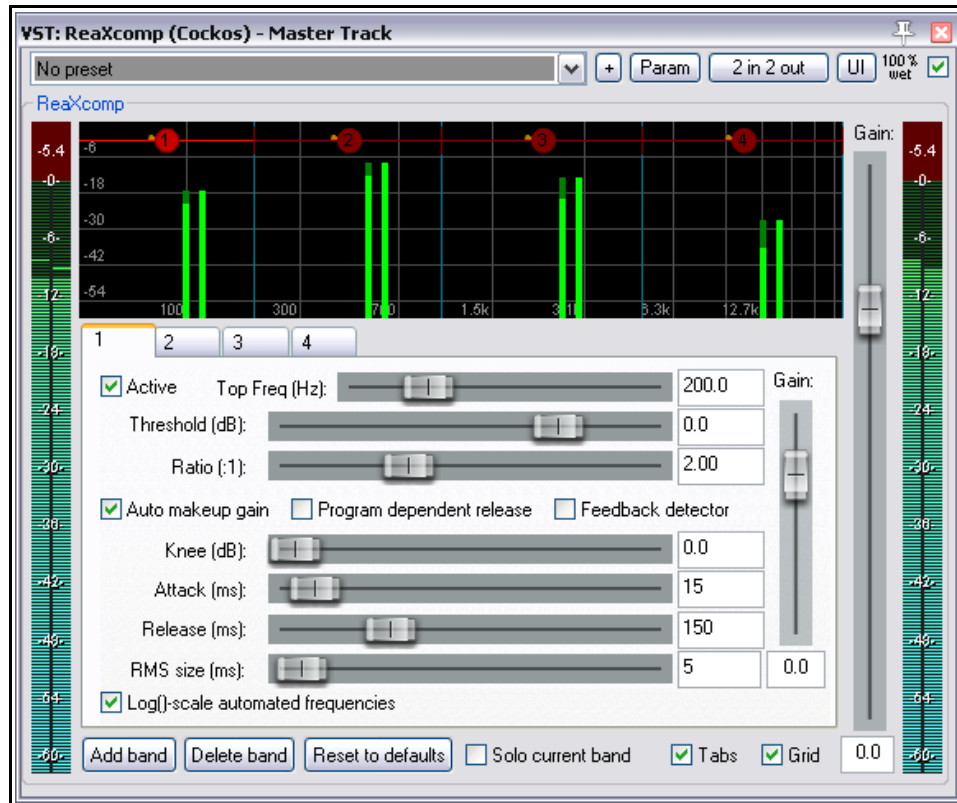
Be that as it may, a multiband compressor works by applying different rates of compression to different frequency bands. This lets you shape the sound much more precisely than is possible with a simple compressor.

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

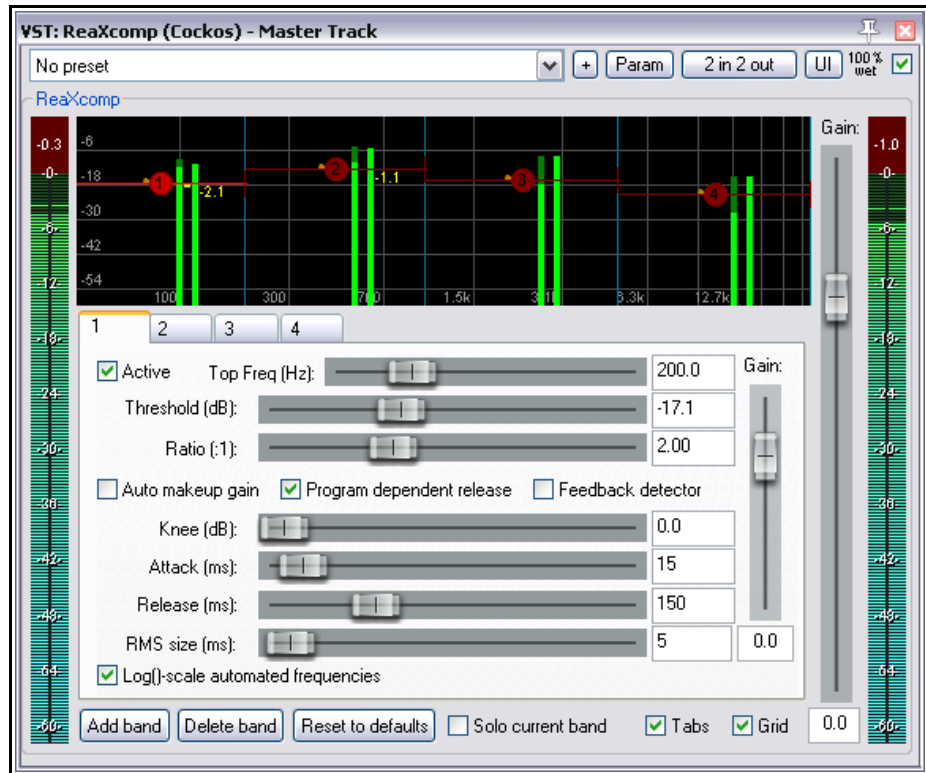
1. Open one of your sample project files.
2. Insert **ReaXComp** in the FX window for the Master.
3. Play your project from the beginning.
4. It is quite likely that at this stage ReaXComp will have no effect on the sound. This will be the case if, as shown right, the peak levels (green vertical bars) fall short of the threshold settings (red horizontal lines) for each band (see example above) 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**. This will need to be done individually for each of the four band. If **Auto makeup gain** were to be left enabled, the volume of our mix would be pumped up after we make our other changes.



8. As the song plays, adjust the threshold for each of the bands 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 a "safe" level. Try increasing the ratio for each of your thresholds up to around 4:1. If you find this makes the sound too compressed, ease the levels back towards 2:1. Remember, this is an example, not a model!

10. Even now, with these fairly conservative settings, you should notice the difference with ReaXComp enabled and set to bypass.



When enabled, the different tracks should bind together better into a mix.

11. 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.
12. You can also experiment with the **Gain** controls if you wish, both for individual bands and for your overall mix, but don't overdo it.

### Using ReaXComp: Some Tips

- Don't use too many bands. Too many independently compressed bands can make your mix sound disjointed. Many of the best mastering engineers use only 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 adjusted 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.

### 14.17 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 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.

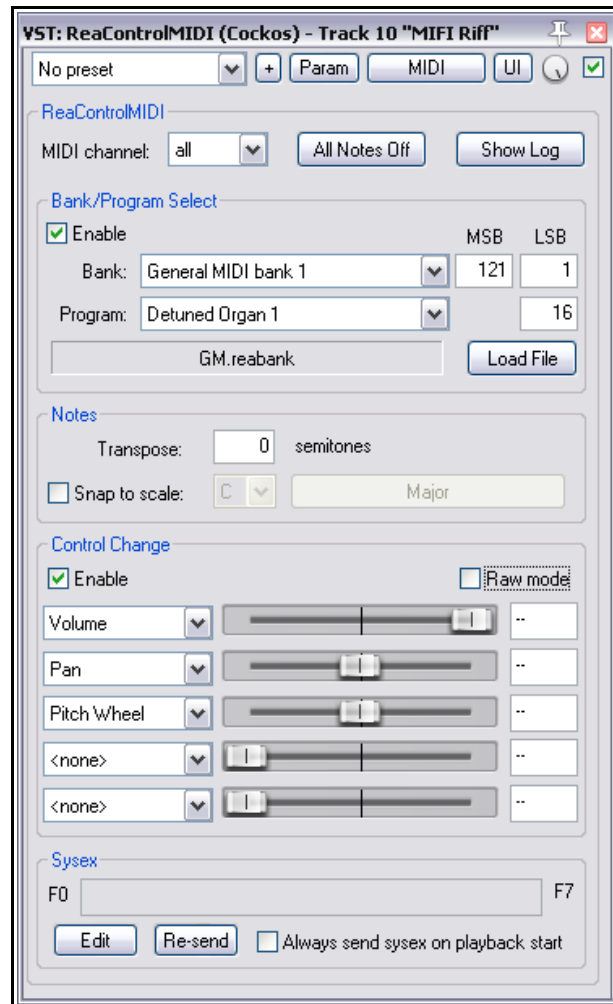
Notable features of ReaControlMIDI include:

**Load File:** You can load a REAPER .reabank file or Cakewalk .ins file of instrument definitions and then select a preferred bank/program combination.

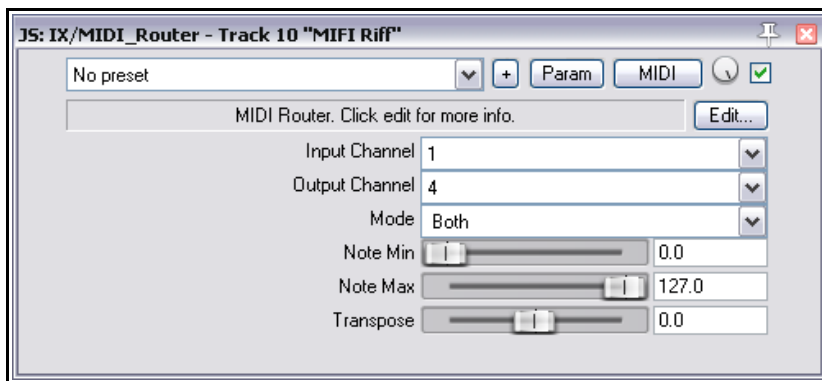
**Control Change:** Up to five CC items can be selected from the drop down lists. Any and all of the items available for CC lanes in the MIDI Editor are available here.

ReaControlMIDI also gives you a vehicle for creating MIDI CC track envelopes, by allowing automation of any of the plug-in's enabled CC sliders. Automation will be explained in Chapters 16 and 17.

You can also assign track controls to the TCP and/or MCP to manage its parameters where you think it appropriate. This is explained in Chapter 11.



### 14.18 JS: IX/MIDI\_Router



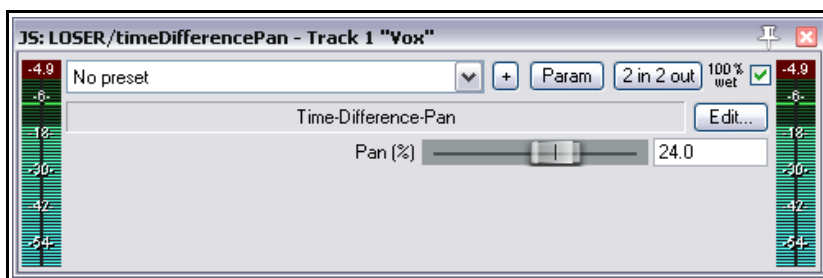
This plug-in is used to redirect MIDI data from one channel to another.

You can choose whether to send notes, non-notes, or both.

### 14.19 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.



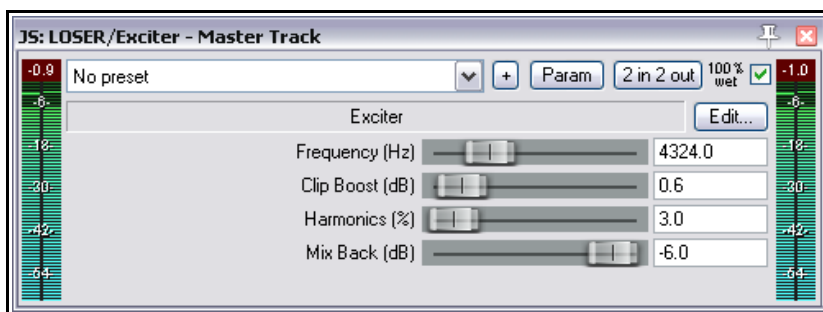
LOSER's TimeDifference Pan plug-in effectively does all this for you – with much less time and trouble on your part, and with very, very little CPU overhead.

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.

### 14.20 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

Where possible, it is usually better to fix such problems on the 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.

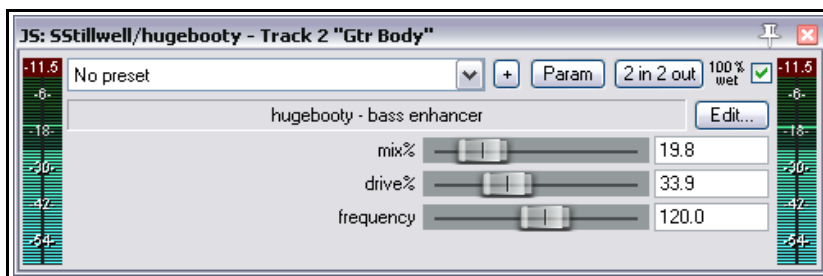
**Harmonics** – the amount of Harmonics you want to add to the mix (go easy on this one).

### 14.21 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.

These are just a handful of the many imaginative and innovative JS plug-ins that are there for you to enjoy.



### 14.22 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> <b>JS Guitar/amp-model-dual</b>	Lets you select an amplifier to be simulated, such as a Fender or a Marshall. Lots of parameters for you to tweak!  The dual version of this plug-in lets you choose different left-right speakers!
<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)

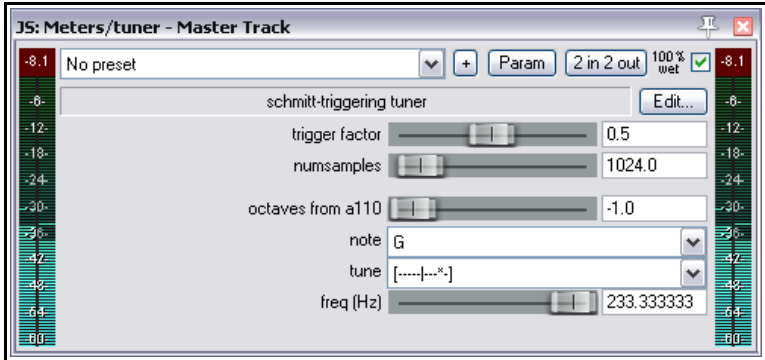
**Echo** (such as Reverb)

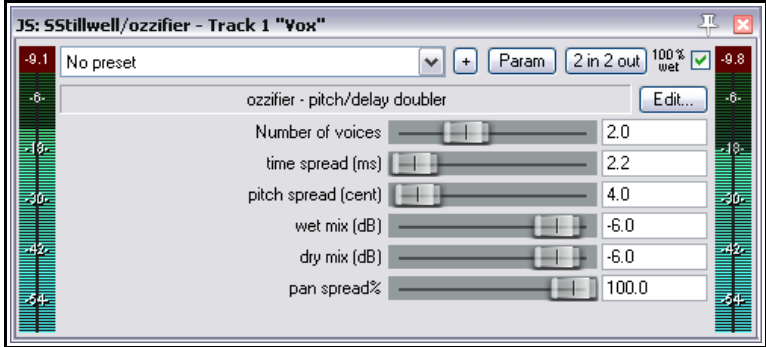
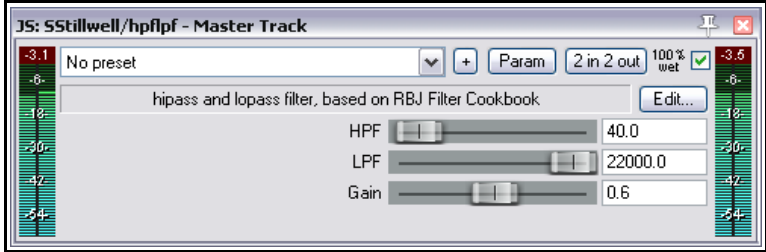
Of course, we are not suggesting that you will want to use all these effects at once! If you do use more than one effect, however, the above is a good starting order. This does not mean that you shouldn't hold back from experimenting with other FX ordering, to see what creative sounds you can produce!



### 14.23 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.

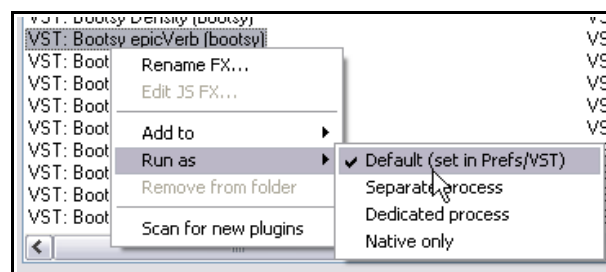
Plug In	Description
<b>JS Filters/dc_remove</b>	A DC offset removal plug-in.
<b>JS IX/StereoPhaseInverter</b>	Offers four choices, Normal Phase, Invert Left, Invert Right or Invert Both.
<b>JS IX/PhaseAdjustingRouter</b>	A stereo phase inverter with the addition of selectable input and output channels. 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/louderizer</b>	A simple plug-in with two controls, used to make a track or mix louder.

Plug In	Description
<b>JS SStillwell / ozzifier</b>	Especially good for fattening or doubling a vocal track. 
<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.

## 14.24 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.



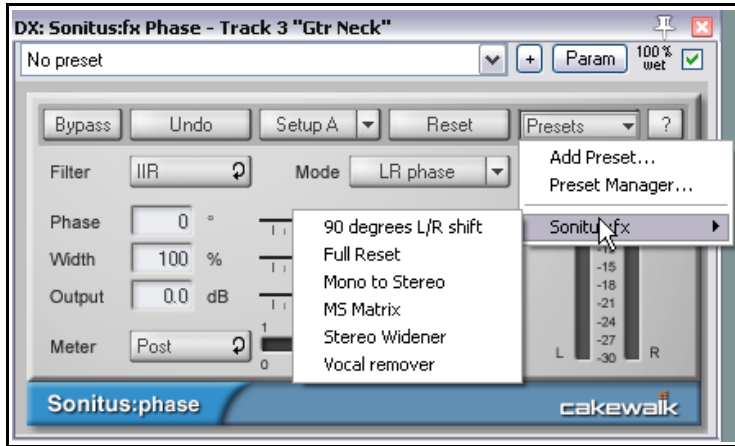
## 14.25 Third Party Plug-in Presets

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. You'll need to understand 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 (below) is of a popular DirectX Sonitus plug-in, Phase.



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.

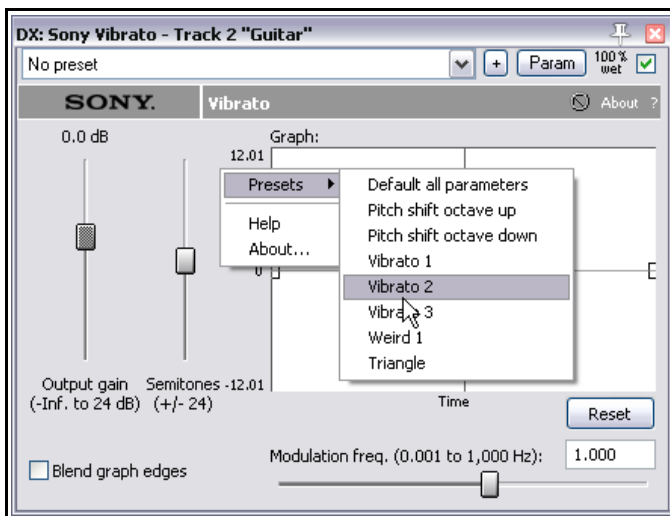
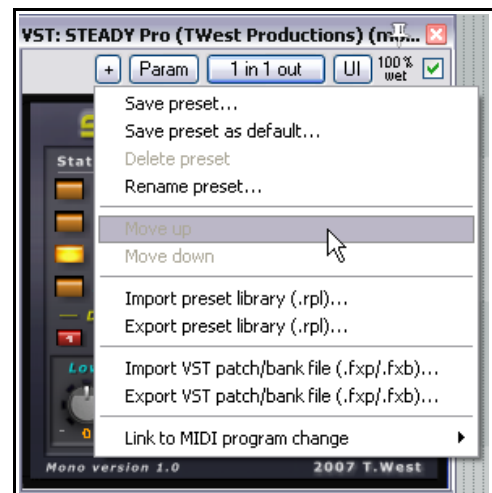
Notice that you can also use REAPER's own Preset Library to store your presets with REAPER rather than with the plug-in. This is accessed by clicking on the small **+** button shown just to the left of the Param button.

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 and manage your own presets.



### Example 3

A Direct X plug-in this time, Sony's Vibrato.

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.

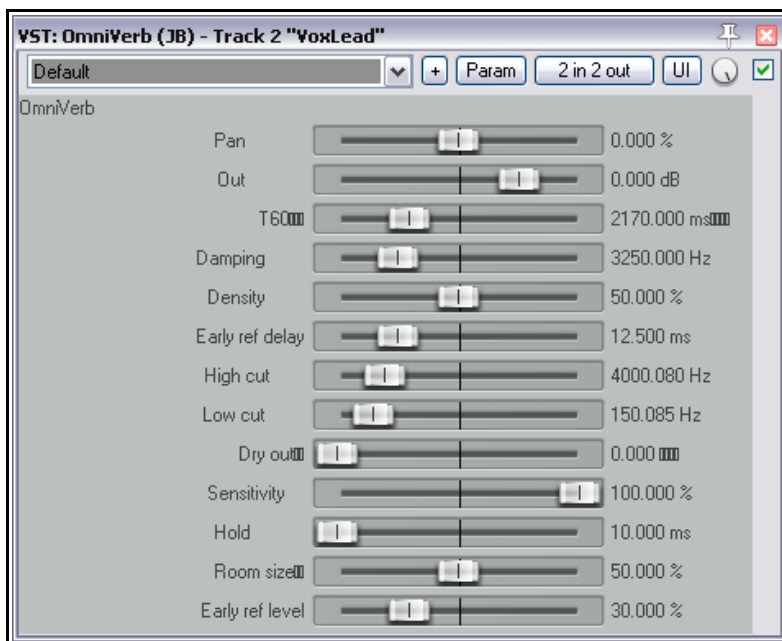
### 14.26 Losing the Graphic User Interface (GUI)

There might be times when you might want to lose a VST plug-in's graphical user interface (GUI) and instead display its parameters as a simple series of faders. This is when the **UI** button in REAPER's plug-in interface comes in. Clicking this button causes the plug-in and its various controls to be displayed in a simpler format.

Here's an example, using the VST OmniVerb reverb plug-in.

You might like this plug-in, but perhaps not its rotary controls. Some people find rotary controls quite difficult to control with a mouse.

In that case, you might want to click the plug-in's **UI** button (see position of mouse cursor), and turn that graphical interface into this:



In REAPER's generic interface, every parameter is controlled by a horizontal fader.

There is also an option on the **Plug-ins, VST** page of your preferences settings to **Default VST to generic UI (instead of plug-in UI)**.

### 15 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, you might like to have a look anyway. You might find it interesting ... or you might prefer to skip past it for now and come back to this chapter later.

#### 15.1 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.

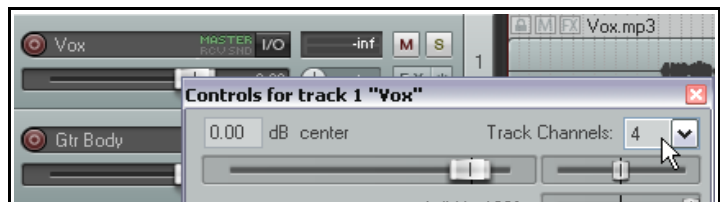
This is where REAPER's routing capabilities can be so useful. They allow you have the best of both worlds – the richer, fuller sound that you can get from adding a small amount of controlled bleed, but without the disadvantages. Here's how it works:

- Use layered recording, to ensure that each track is recorded cleanly.
- Use REAPER's routing to add a little bleed where you want it, before or after any FX in the FX chain.

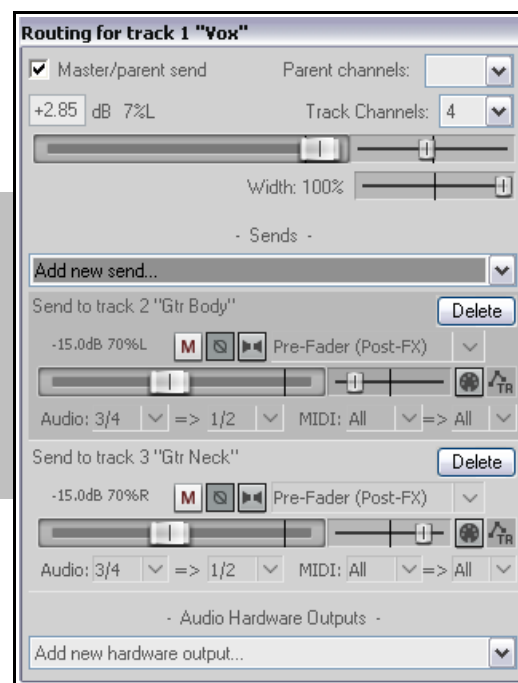
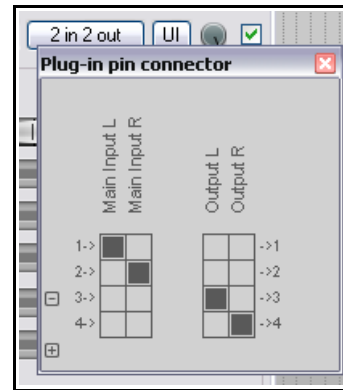
#### Example

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 four.



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.
5. After inserting the ReaVerbate plug-in (or whatever you are using), adjust its settings to suit. Click on its 2 in 2 out button and use its pin connector to direct output to Channels 3 and 4 only (see right).
6. Display the **IO Window** for the Vox track.
7. Add **Sends** from the Vox (stereo source Channels 3/4) to both Guitar tracks (channels 1/2), as shown. Pan these sends at about 70% left and right respectively, about -15dB, and Post FX (see below). This ensures that the vocal track will be heard crisply and cleanly from the center, whilst its reverb is directed quite widely left and right.
8. 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.
9. Enable the Master/Parent send on the Vox and play again. You may need to tweak some reverb parameters and/or send levels. The Vox should sound fuller and richer than before.
10. 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** track.

Create sends from the **Vox Reverb** track to both **Guitar** tracks, Post FX.

Play the song, adjusting Send, Pan and Volume levels to suit.

## 15.2 Splitting Channels

This example will introduce you to a feature in REAPER that possibly delivers you more mixing power than any other single aspect: 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: 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).

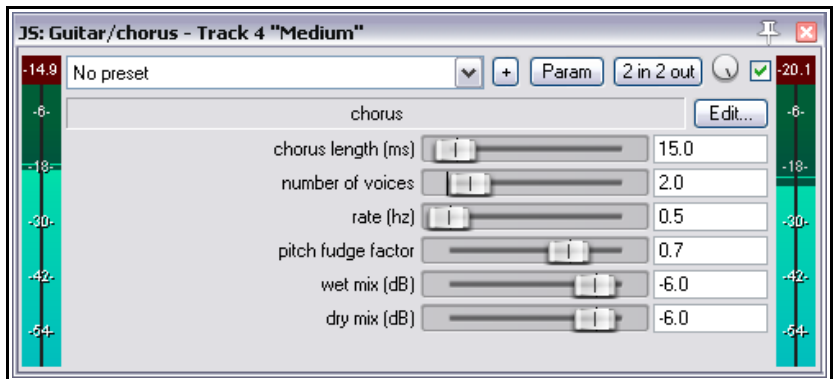
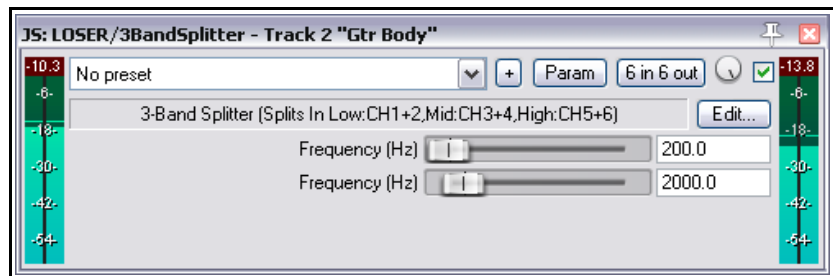
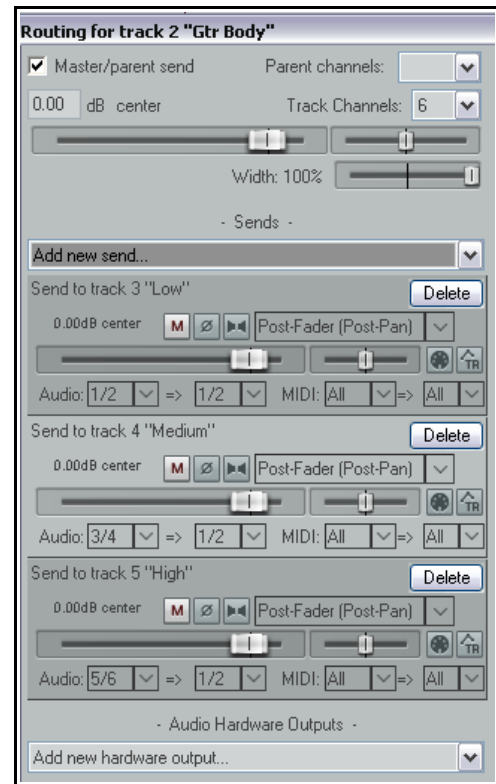
Why would you want to do this? With this particular example, maybe you would, maybe you wouldn't. But being able to create and use channels in this way opens up endless creative mixing and editing possibilities. We'll start with this example because it's a fairly simple one to put into practise, and it will help you to understand how it's done. After that, we'll look at a more complex case.





### Example

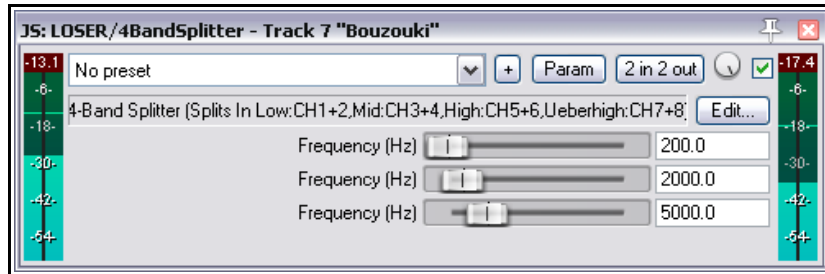
1. Open the file **All Through The Night.RPP** and save it as **All Through The Night Channels.RPP**
2. We are (for the purpose of this example) going to work only with the track **Gtr Body**. **Mute** all other tracks except this. To do this, hold the **Alt** key and click on the **Mute** button for 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 on 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 **1/2** on the **Low** track, **Channels 3/4** to **1/2** on the **Medium** track, and **Channels 5/6** to **1/2** on 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**.
8. Set the first frequency fader to about 200 Hz and the second to about 2000 Hz.
9. Solo the **Low** track and play. Notice you hear only the Low frequencies.
10. Hold **Ctrl Alt** and click on the Solo button on the **Medium** track. Notice you hear only the Medium frequencies.
11. Hold **Ctrl Alt** and click on the Solo button on the **High** track. Notice you hear only the High frequencies.
12. Experiment adjusting the faders in the 3 Band Splitter and playing back. Notice how the sound changes. Set them back to their defaults afterwards.
13. Now select the **Medium** track, open its FX window and add **JS:Guitar/chorus**. Adjust the settings to suit.
14. 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 to about -6 dB and the Bouzouki to about -10 dB (or mute altogether).



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15. Make any further adjustments you want to your **Delay Chorus** settings. An example (but only an example) is shown above.
16. Experiment with panning the three bands differently, to create a fuller sound.
17. 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) and a five band splitter.

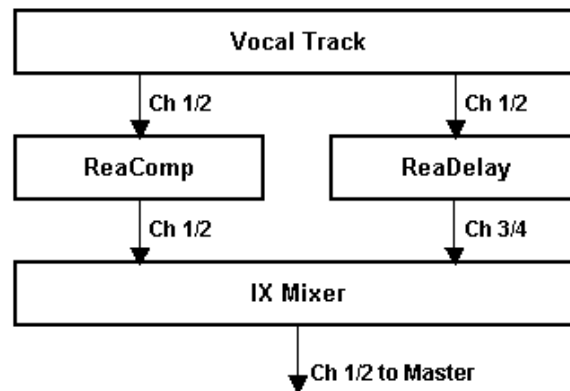


### 15.3 Full and Fat Vocals with ReaDelay

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 – all on a single track!

The flow chart on the right illustrates how this will 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.

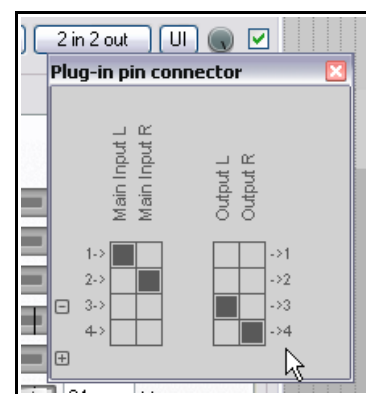


Of course, if you wish, you could apply more FX to any or all of:

- 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 **IO** window for this track and set the number of track channels to **4**.
4. Open the **FX Window** for this track. If there are 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 above).
7. Click on the **Add Tap** button to add a second page.
8. Set Page 1 to a Delay Length (time) of about 3.5 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 below.
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.

13. Set the **Wet** output to about -9 dB and the **Dry** to about -2 dB.

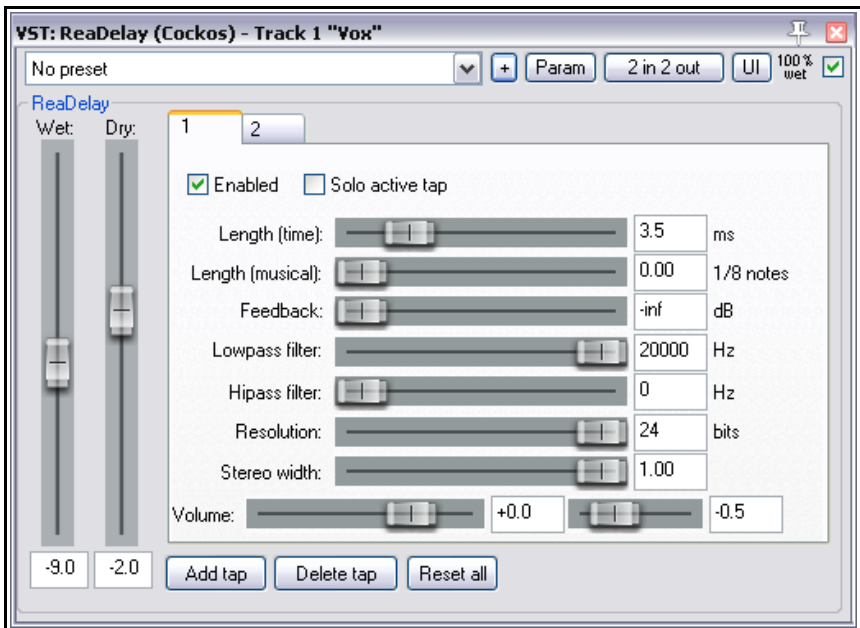
14. Insert **ReaComp** into the FX Chain. Leave the Main Inputs and Outputs both at their default settings, which are Channel 1 (Left) and Channel 2 (Right).

15. Set the **Ratio** control to about **6:1**. Adjust the **Threshold** so that for the louder passages **Output** is reduced by about 6 or 7 dB.

16. We can now join our channels back together again, to mix the delayed signal with the compressed signal. Insert the **JS:IX/Mixer\_8xS\_1xS** into the FX chain (after ReaComp).

17. Fade all but the first two faders all the way down; adjust the other two faders as you wish (see right).

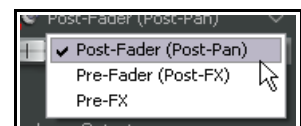
18. Play the file, adjusting the volume faders on the various tracks to suit your ears. Compare the vocal sound with FX alternately enabled and bypassed. With these FX enabled, the vocal should sit above the mix rather more easily.



**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 compressor, with the result that these signals retain more of their original dynamics.

### 15.4 REAPER Send Types

Every send is defined as being one of three types. These are **Post-Fader (Post-Pan)**, **Pre-Fader (Post-FX)**, and **Pre-FX**. The default type is **Post-Fader (Post-Pan)**, but this can be changed in your preferences if you wish (Track/Sends defaults page).



Your choice of send type determines at what stage in the signal flow the audio is sent. For example, the volume of a send that is Post-Fader (Post-Pan) will be affected by changes made to the source track's volume fader. A send that is Pre-Fader (Post FX) will not. An audio send that is Pre-FX will not be affected by any FX in the source track's FX chain. For more complete information, consult the flow charts at the end of Chapter 5.

### 15.5 Channel Splitting and Pitch Shifting

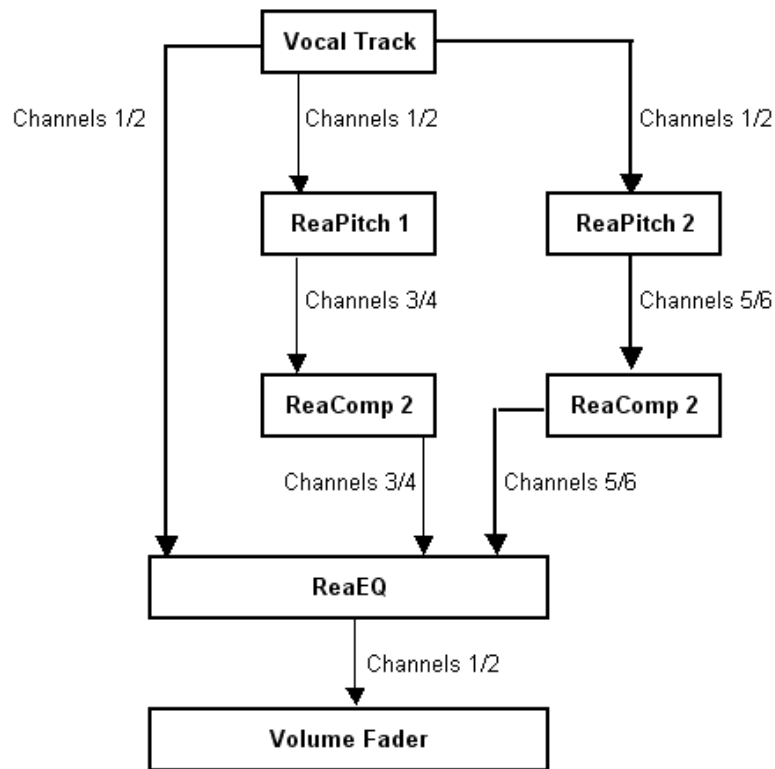
You've already seen how ReaPitch can be used, for example, to create vocal harmonies from a lead vocal track. In this example you will see how by splitting our vocal track into several channels you can create a whole vocal ensemble, with different FX and plug-ins being applied to different harmony parts.

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.

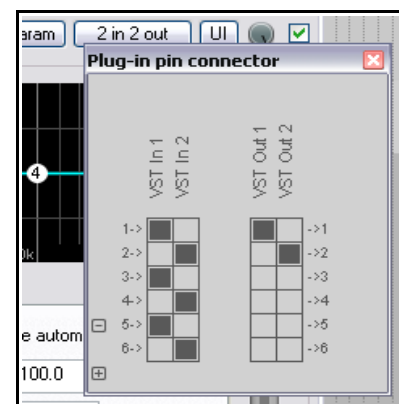
The illustration (right) demonstrates this concept.

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.
- By sending the three different audio streams directly into ReaEQ we cut out the need for a channel mixer. However in doing this it makes it more difficult to adjust the relative volume levels of the three audio streams.
- The three streams are joined back together at ReaEQ, from which they are fed to the volume fader.



Note: Set Auxiliary 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".

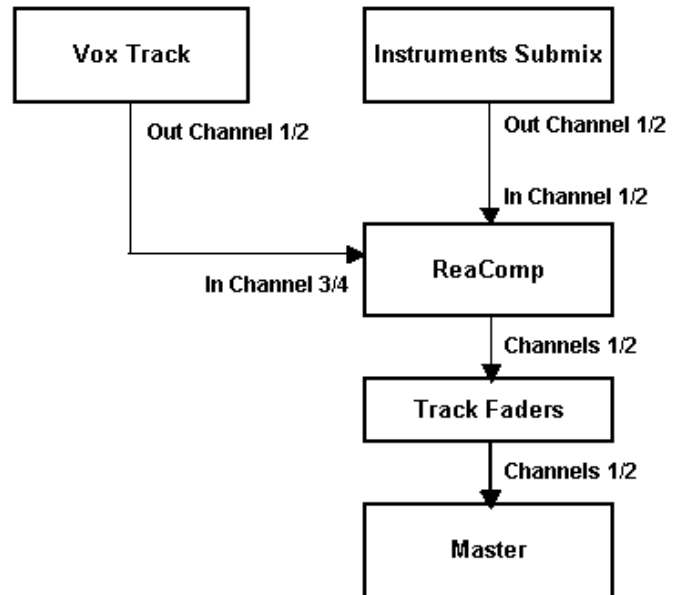
To do this, just click on the small + button in the bottom left corner of the Plug-in Pin Connector window - see position of mouse cursor (right).

### 15.6 Audio Ducking

The next example will show you how to use REAPER's routing capabilities to create an effect known as **ducking**. Put simply, this is a term which describe 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.

This diagram (right) illustrates the concept of how we use sidechaining to achieve our ducking effect. 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. Adjust the volume and pan faders of these tracks to get a reasonable mix.
3. If necessary, change track order so that Vox is Track 1, Gtr Body Track 2, Gtr Neck Track 3 and Bouzouki 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**.
5. Click on the **Folder** icon to make this track a folder. Make the Bouzouki track the last track in the folder.
6. We need to add two more channels to the **Instrument Submix** so that it can receive a sidechain signal from the Vox. Right click over the Volume fader for this track, then set the number of channels to four, as shown here.
7. 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.
8. Drag and drop from the **IO** button on the Vox track to the **IO** button on the Instrument submix. This will create a send and open the controls window for that send. Accept the default send type Post Fader, Post Pan) and set the destination channels to 3/4 (as shown above).
9. Next, display the FX window for the Instrument Submix Track. Add the **Cockos** plug-in **VST: ReaComp (Cockos)**.



10. 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**.

11. We need to ensure that Main Input is defined as the media on the Submix track (Channels 1 and 2), and Auxiliary Input is defined as the stream coming from the Vox track on Channels 3 and 4.

12. 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, Auxiliary Input L - Receive from Channel 3, and Auxiliary Input 4 - Receive from Channel 4. These are as shown on the right: most probably these will be the default settings.

13. Now display the **Detector Input** drop down list and select **Auxiliary Input L + R** (right). This ensures that the compression will be applied to the instrument mix in response to changes in the volume (strength) of the incoming signal on channels 3/4 from the vox track. When the volume of the vox exceeds the threshold setting, the instrument mix will be compressed.

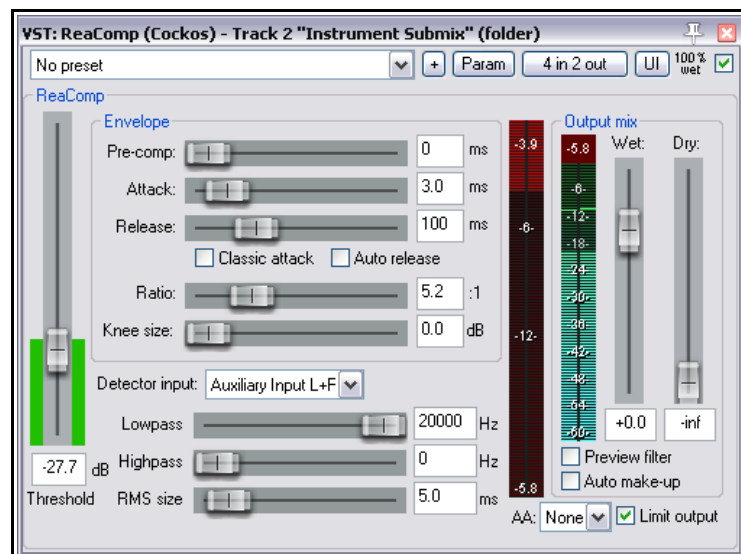
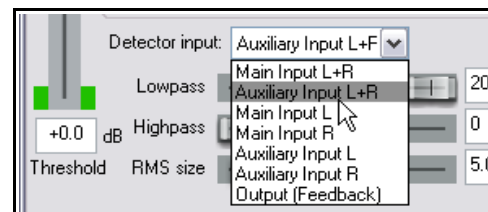
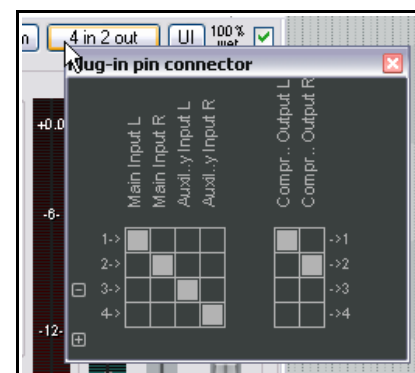
14. Now play the song. Adjust the **Threshold** (first vertical fader) downward, so that during Vocal passages the VU meter peaks above the fader level.

15. 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. Observe 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, this is -3.9 db.

16. Save the file.

Shown are possible compressor settings that might be appropriate in this case. The trick is not to make the compression too obvious, but to have it just squeezing the peaks of instrument mix down a little to make room for the vocal.

**Tip:** A quick way to create a sidechain from one track to another is to drag and drop from that track's IO button directly to the window of the plug-in on the receiving track.





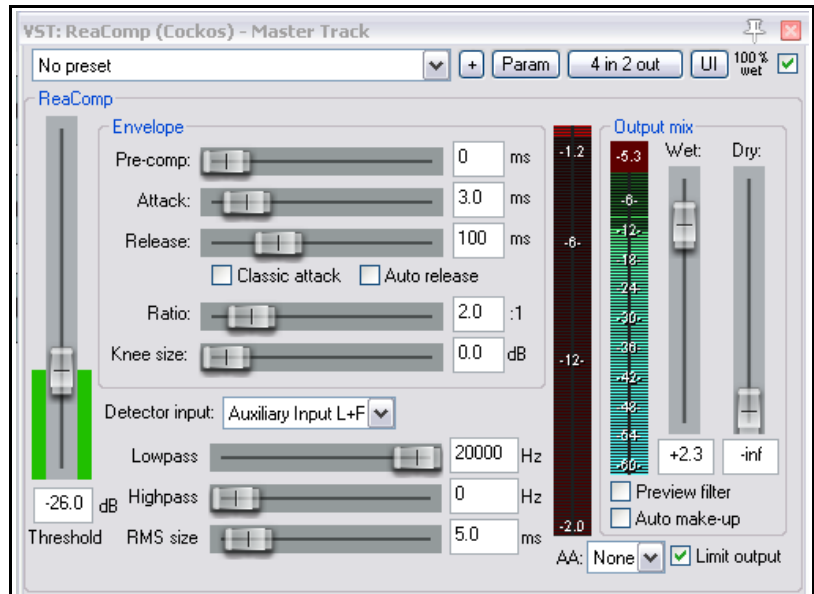
### 15.7 Double Ducking

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. We can use this just to smooth out the mix a little.

#### Example

1. Open the file **All Through The Night DUCK.rpp** and save it as **All Through The Night DOUBLE DUCK.RPP**.
2. In either the TCP or the MCP, select the **Master** Track. Right-click on the **Volume** fader for the Master and ensure that the number of Channels is set to four. Close this window.
3. Display the **FX Window** for the Master Track and insert **ReaComp**.
4. Open the pin connector window. As before, make sure that the Auxiliary Input L is set to Channel 3 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.
6. Display the **Detector Input** drop down list and select **Auxiliary Input L + R**.
7. Play the song.
8. 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 or two.
9. Make sure that **Limit Output** is selected. An example of how your settings might look is shown here.
10. That's it! You can now save your file.



These last couple of examples have introduced you to how you can use sidechaining for ducking. You can use sidechaining in conjunction with a number of other REAPER plug-ins, including ReaGate, ReaXComp, ReaComp and ReaFir.

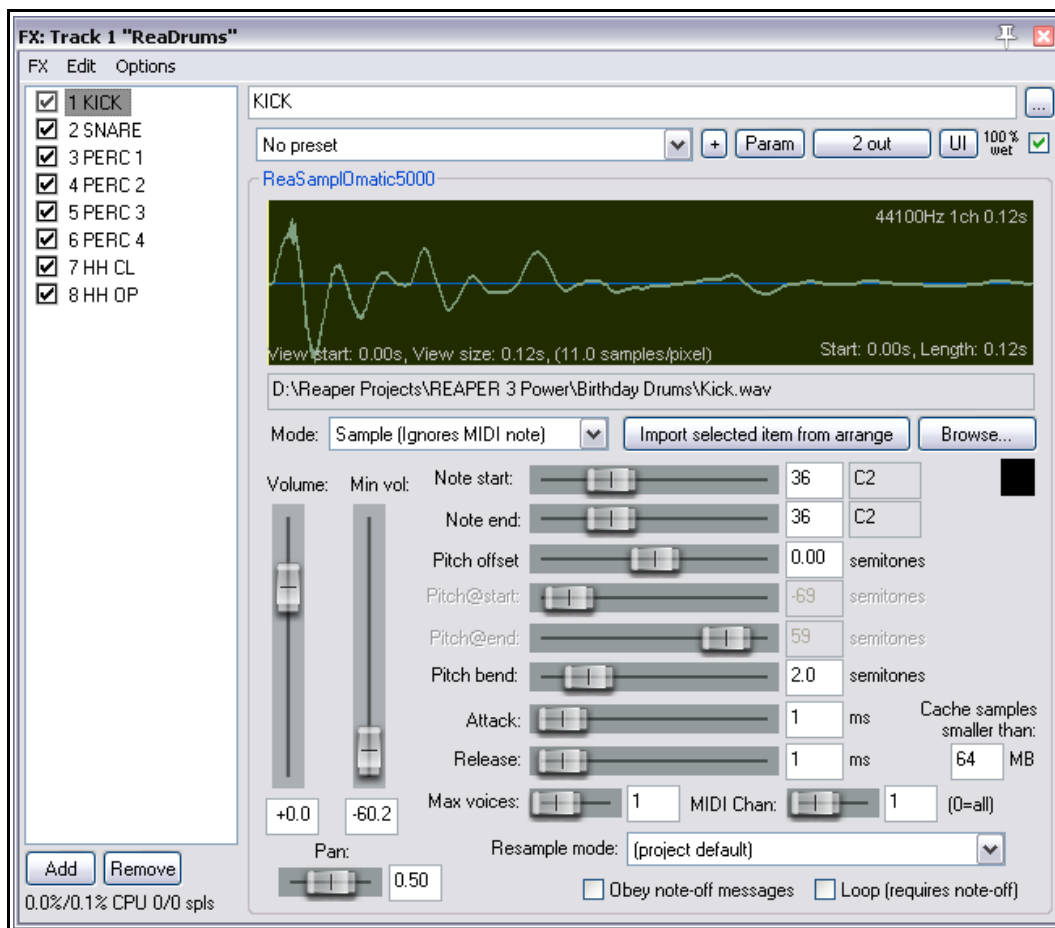
### 15.8 ReaSamplomatic and ReaDrums

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, or do a search. After downloading, it should be copied into your Track Templates folder. For XP users, this is **C:\Documents and Settings\User Name\Application Data\REAPER\TrackTemplates**

The template does get modified from time to time, so that the version that you download might not be exactly the same as the one used in the description that follows. This should not matter. Also, in the example, we will use the **MIDI Editor** for demonstration purposes, but if you have a keyboard, you can use that instead.

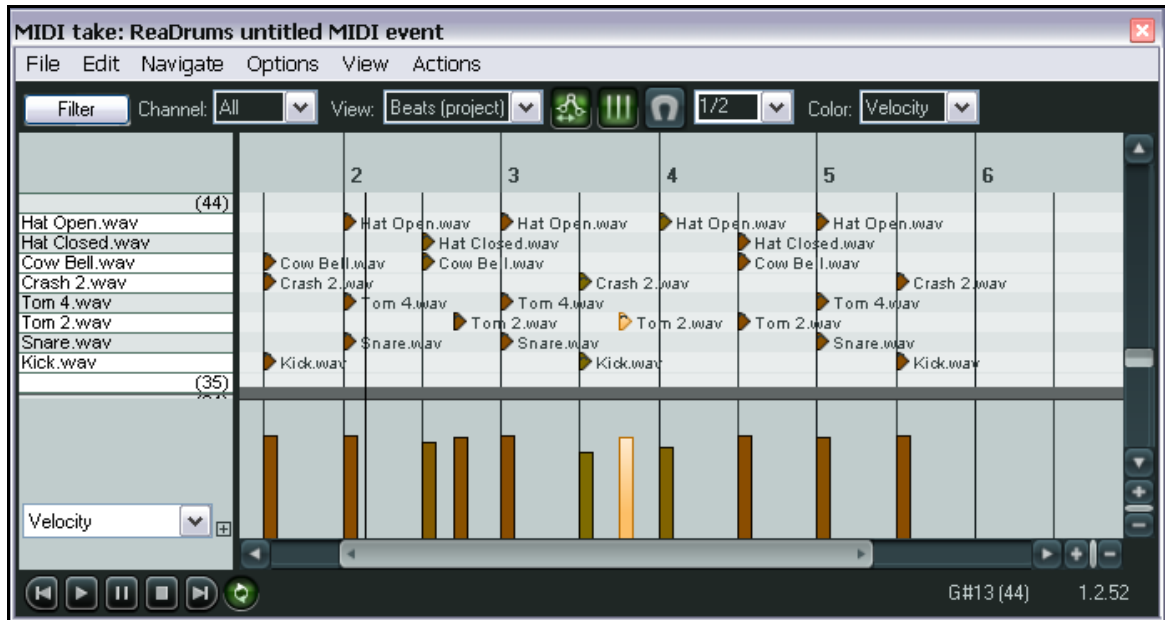
#### Example

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, with eight individual named instances of **ReaSamplomatic5000** inserted in its FX chain.
3. Notice that each instance of **ReaSamplomatic5000** is set up differently. From top to bottom, these are *Kick*, *Snare*, *Perc 1*, *Perc 2*, *Perc 3*, *Perc 4*, *HH Cl*, *HH Op*. Select any item in that list and you will see the MIDI channel used for that item. Shown here is the Kick, which uses channel 1 (bottom right corner of window). In this illustration, an audio sample has also been inserted. That's the next step!
4. Display the Media Explorer – **Ctrl Alt X** – and select a folder where your samples are stored. 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 black area above the Browse button.



## 15 - More REAPER Routing Examples

- 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.
- If the ReaDrums track is still armed, unarm it. Save the file.
- 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.
- Double click on this item to open the MIDI Editor. From the menu choose **View, Note style, Triangle** and **View, Mode, Named notes**.
- Compose a few notes, similar to the concept shown below. Don't copy this pattern, make a simple composition of your own.



- Close the MIDI Editor and save your file.
- 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.
- Press **Ctrl T** twice to add two more tracks.
- Name the first of these tracks **Kick**, the second **Snare**.
- 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).
- Open the **FX Window** for the **ReaDrums** track.
- Select the first **ReaSamplomatic5000** instance, the **Kick**. Set both of its VST Outs to Channel 3.
- Select the second **ReaSamplomatic5000** instance, the **Snare**, and set both of its VST Outputs to Channel 4.
- 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.
- Save the file.
- If you add more channels to the original ReaDrums track, you can now repeat this effect for any other of your Drum parts.

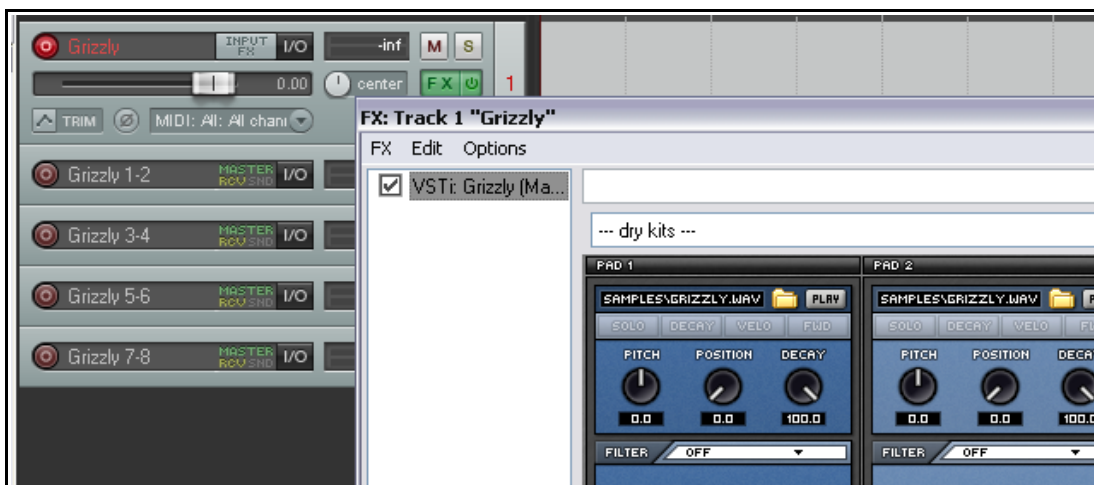
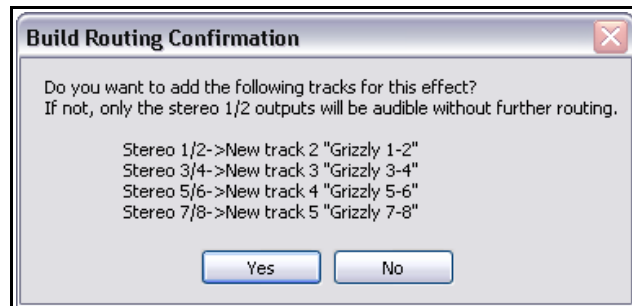
**Note:** If you download the track template **ReaDrums Rack** from the REAPER forum, you will find that in this template all the individual tracks, along with their routing, have already been set up for you.

### 15.9 Multi Output VSTi Plug-ins

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

13. Right click over the empty area of the Track Control Panel and from the menu choose **Insert virtual instrument on new track...**
14. 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). You could use any multi output instrument that you wish.
15. 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).
16. Click on **Yes**.
17. 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.



18. 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.
3. 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.

## 15 - More REAPER Routing Examples

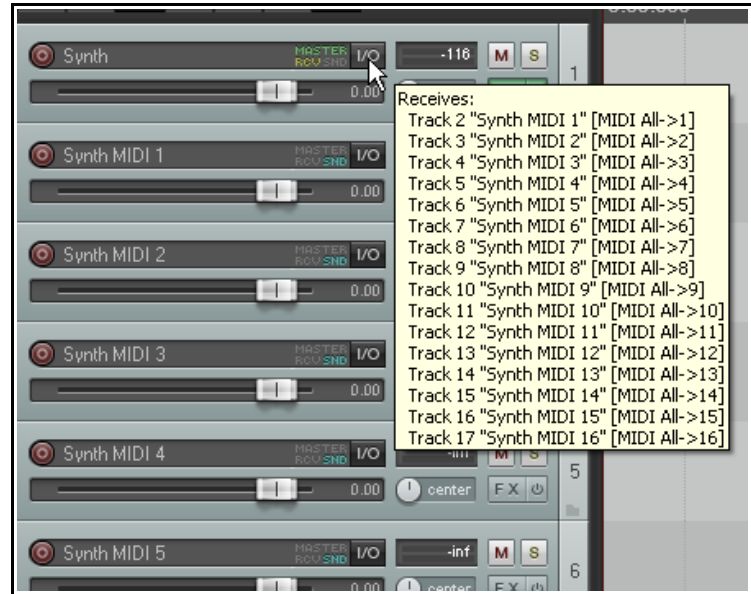
- From the FX chain **Options** menu choose the command **Build 16 channels of MIDI routing to this track**.
- You now have a separate MIDI track for each channel. Notice from the routing that the MIDI output of each of these 16 tracks is sent to the track on which you originally inserted the VSTi.

Clicking on the MIDI control button shown above by the mouse cursor will ensure that the send faders (volume and pan) will control the MIDI signals.

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.
- Right-click the Record Arm button and turn Input Monitoring button on for all 16 tracks.
- For each track, set the MIDI input channel, from 1 to 16.



### 15.10 More Parallel FX Processing with the Channel Mixers

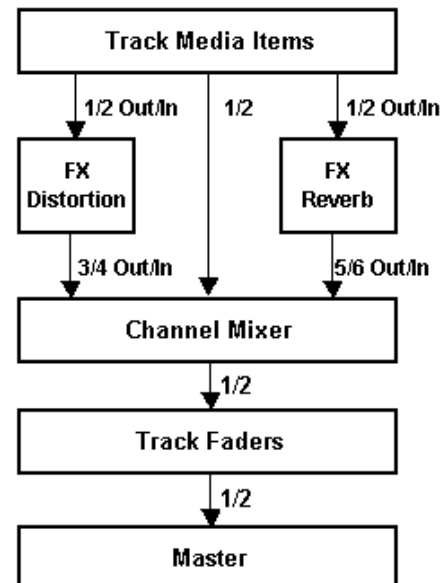
Earlier in this chapter you were introduced to parallel FX processing, for example with the full fat vocals exercise. This section is going to take this idea further, both by allowing more channels and by allowing the pan setting as well as volume level for each channel to be controlled individually.

You'll be using the **IX / Mixer 8xM-1xS** which open up more possibilities for you to split and route your audio thru different channels, then mix them back at the end to produce some truly creative sounds and effects. The main difference between this mixer and the one that you used earlier is that this one works with individual mono channels. The example that follows is designed to show you how this mixer can be set up and used. After working thru it, you should be capable of using it for your own projects.

#### Example

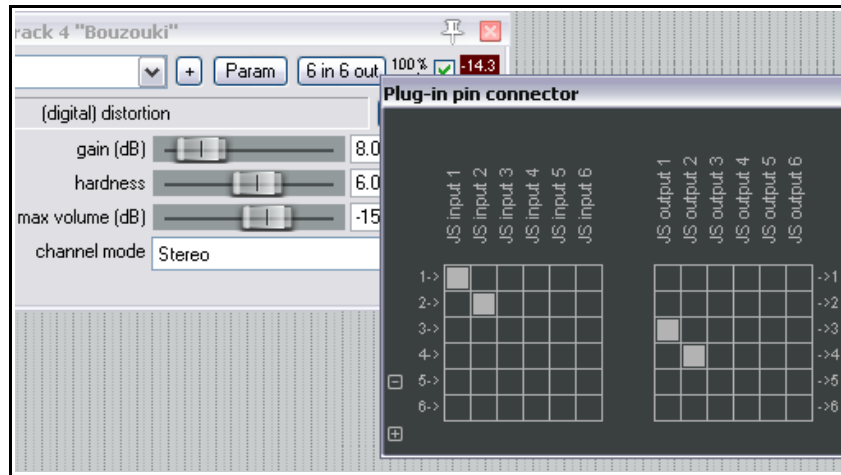
In this example, we will send output from one instrumental track separately to a Distortion FX and a Reverb FX, then mix the wet and dry signals back together, panning as required – all within one single track and without using any busses. To do this, we'll use the **IX Mixer 8xM** together with a couple of other plug-ins supplied with REAPER. The diagram above illustrates conceptually what we are going to achieve:

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 from the normal FX chain, which processes effects sequentially.



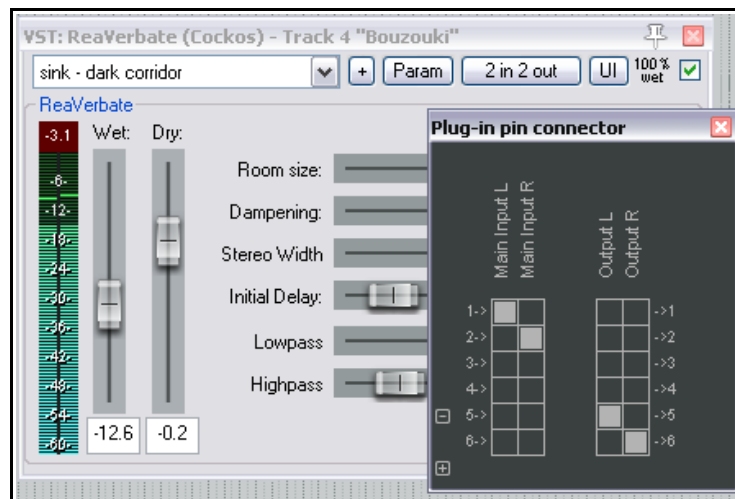
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1. Open the file **All Through The Night.RPP** and save it as **All Through The Night IX MIX.rpp**
2. For the purpose of this example, we are going to work on only the **Bouzouki** track. Solo this track.
3. Open the **IO** window for the **Bouzouki** 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 (but see note below!).



**Note:** In this case, at step 5 (above) you should adjust the parameter controls for the plug-in before you open and use the pin connector. This is because you will not be able to hear or monitor any output sent to channels 3 and 4 until later, when you add the channel mixer to the FX chain.

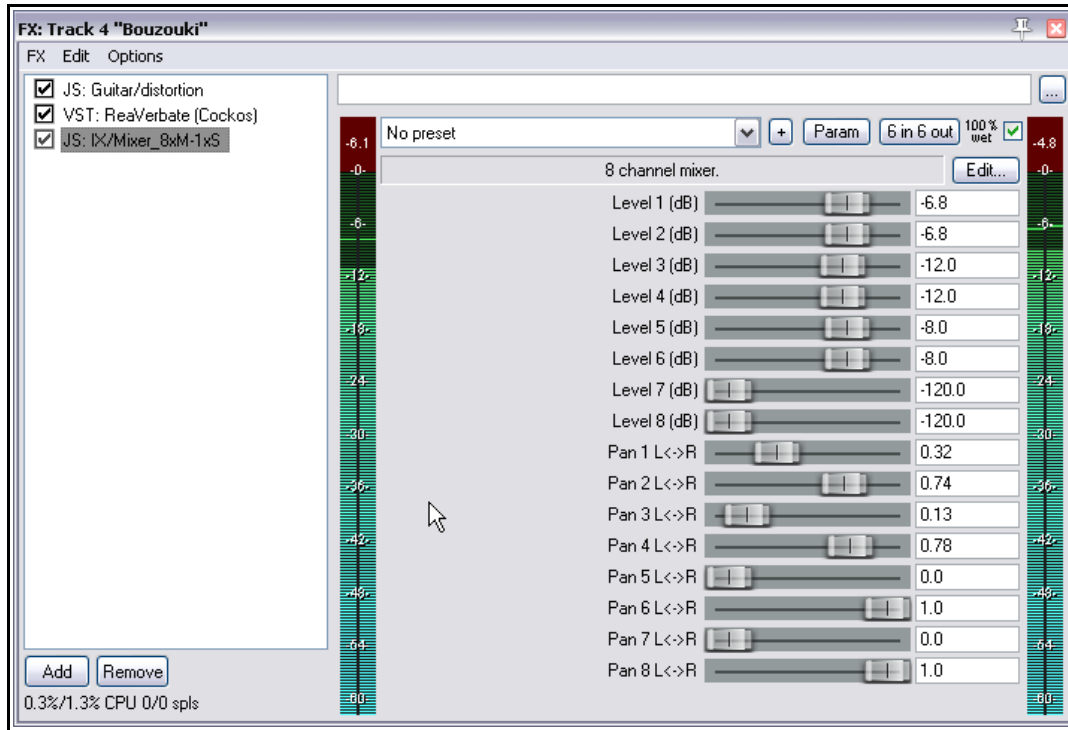
6. Make sure that input is from Channels 1 and 2 only and output is to Channels 3 and 4 only, as shown above.
7. Now add **ReaVerbate** to the FX Chain for the Bouzouki.
8. Select a preset of your choice, adjust wet/dry levels as you wish, then set the Output to Channels 5/6 as shown right.
9. Now insert the **JS: IX/Mixer\_8xM-1xS** at the end of the Bouzouki track's FX chain.
10. Play the song and experiment with the volume levels and pan settings for your different channels. Experiment with changes also to the FX settings. One suggested possible outcome is shown below.
11. Unsolo the Bouzouki track. Lower the track fader to blend it back into the mix. 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. A big thank you to Philip for his help in developing this example.





### 15.11 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. All three streams then get mixed back together using the Channel Mixer Plug-in.

Channels 1 and 2: Dry – the original signal, unprocessed.

Channels 3 and 4: Distortion then Compression.

Channels 5 and 6: EQ then Reverb.

### 15.12 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 other plug-ins (not used in these examples) that are specifically designed for use in a multi-channel routing environment.

The information below comes from text files supplied with these plug-ins by their author, Philip S. Considine. Obviously, these plug-ins should only be used on tracks which have more than one defined pair of channels.

Plug-in	Description
<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.

Plug-in	Description
<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.

15.13 REAPER’s Routing Interface

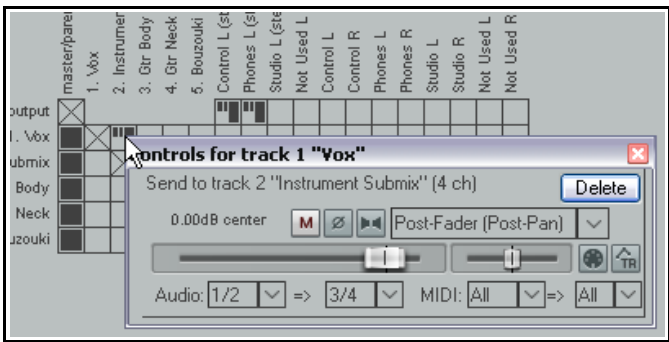
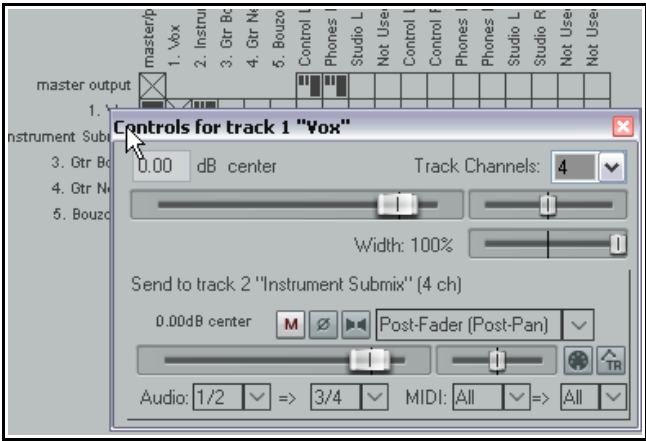
If you are using multiple track channels, sends and receives (as do many of the examples in this section), then you should consider keeping the Routing Matrix in view. You can use your routing matrix to make adjustments to any of your sends and receives, or to specify the number of channels required for any track. Some examples are summarised below.

Right click over any track name (as shown above 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).

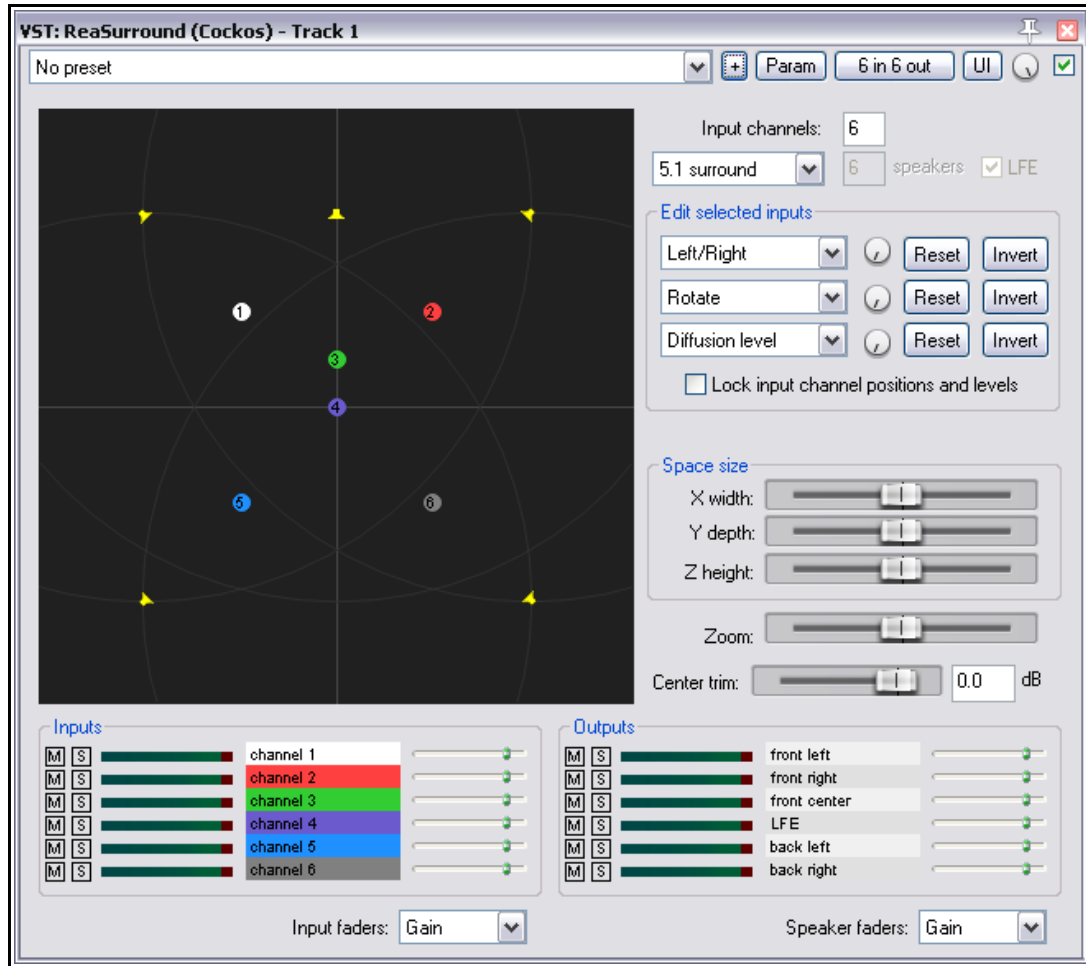
Click over any vacant intersection on the Routing Matrix to create a Send/Receive at that point.

Remember, of course, that you can also create, remove and manage sends and receives in the TCP and the MCP. In either case, you can click on any track’s **IO** button to display that track’s Routing Window, or right-click over the **IO** 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 **Pre Fader (Post FX)**, **Post Fader (Post Pan)**, and **Pre FX**. In each case, the height of the large thick bar indicates the send volume level. The flow charts in Chapter 5 will help you to understand the differences between these.

### 15.14 Surround Panning with ReaSurround



Surround sound production is a complex topic. It would be beyond the scope of this User Guide to attempt to cover the principles, theory and practical issues that it involves. Whole books have been written on the subject: you can also consult various web resources, such as "The Recording Academy's Producers and Engineers Wing Recommendations for Surround Sound Production" (available as free PDF download).

REAPER's surround sound production capabilities can be found in three main areas:

1. The ability to record in multichannel format. The method for doing this is explained in Chapter 3.
2. REAPER's channel routing capabilities.
3. The ReaSurround surround panner.

Thus, the REAPER-specific issues that you need to be aware of for surround sound production are:

#### Recording

Record each track using the settings most suitable for that track. For example, for a lead vocal you might use a two channel track with a single mono input (one mic). For a piano, you might record in stereo with two mics. For ambient sounds you might prefer a four channel track with four mic inputs.

#### Routing

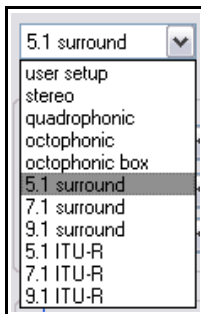
REAPER offers you various routing options. For example, you can insert ReaSurround into each track individually, with each track directly routed to the Master. Another option is to create sends from all tracks to a

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single Surround Mixing Bus and use a single instance of ReaSurround there, disabling direct sends from individual tracks to the Master. The former method gives you greater flexibility and more control.

You will also need to set up the necessary routing for your Master outputs to ensure the correct signal flow from your

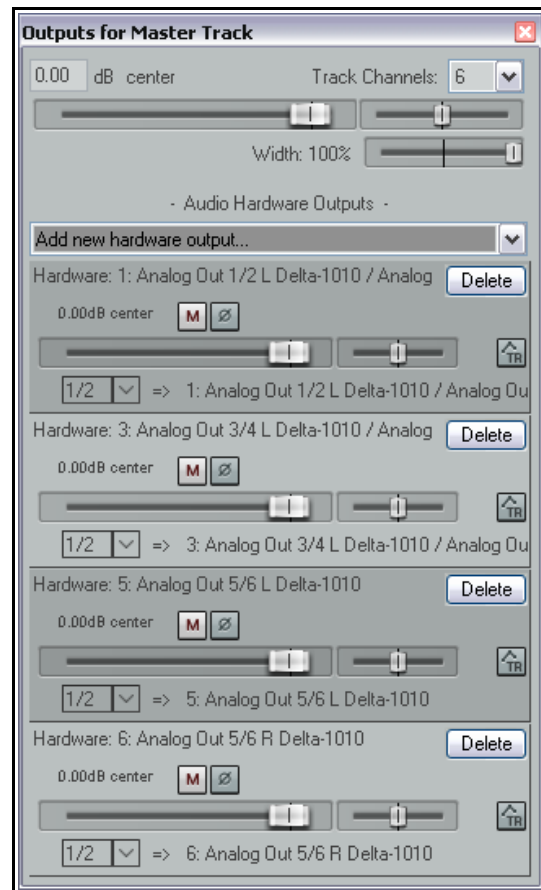
Master to your surround speakers. A possible example of this for 5.1 surround sound is shown here (right).



### ReaSurround

ReaSurround, like any other plug-in, can be inserted into a track's FX chain from the FX Browser. Here we are assuming that you are opting for the method of inserting ReaSurround into every track. Note that:

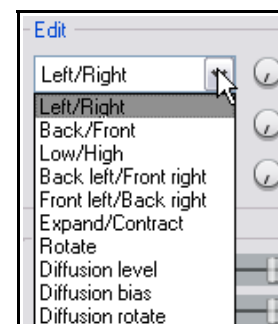
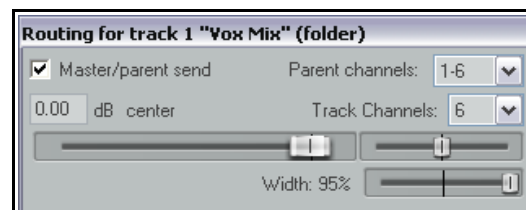
- ◆ You should place ReaSurround in the track's FX chain. Often you will want this to be at the end of the chain. However, this might not be the case if, for example, you are using a multi-channel delay effect, which most likely you will want to be after ReaSurround.
- ◆ After inserting ReaSurround, select one of the options from the setup drop down list (above left). Select the same option for all tracks. Input levels and positions can be set and locked.
- ◆ When you select a setup, the correct number of output channels are automatically added to the track. In the example here, 5.1 surround is selected, so the track is allocated six channels.
- ◆ In the example shown below (next page), a track with two channels and a mono media item (Vox Mix) displays two channel inputs, each with its own fader(which can be set to Gain or LFE) as well as solo and mute controls. Double-click on any input to rename it.
- ◆ Because 5.1 surround has been selected, there are six channel outputs. Notice that these can be soloed and/or muted in any combination. Each also has its own fader: these can be set to Gain or Influence.
- ◆ Use the pin connectors on other track FX to direct the outputs of those FX to the various channels, as required. Refer back thru this chapter for numerous examples of selecting FX pin connectors.
- ◆ You should also insert ReaSurround at the end of the Master FX chain, as shown on the previous page.



Channel inputs can be positioned by clicking and dragging them across the display. In addition, there are two further sets of controls in the ReaSurround window.

The three **Edit** drop down lists and their accompanying rotaries can be used as controls with any three of the available items shown (right). These include Left/Right, Back/Front, Low/High, Back Left/Front Right, Front Left/ Back Right, Expand/Contract, Rotate, LFE Send, Diffusion Level and Diffusion Bias.

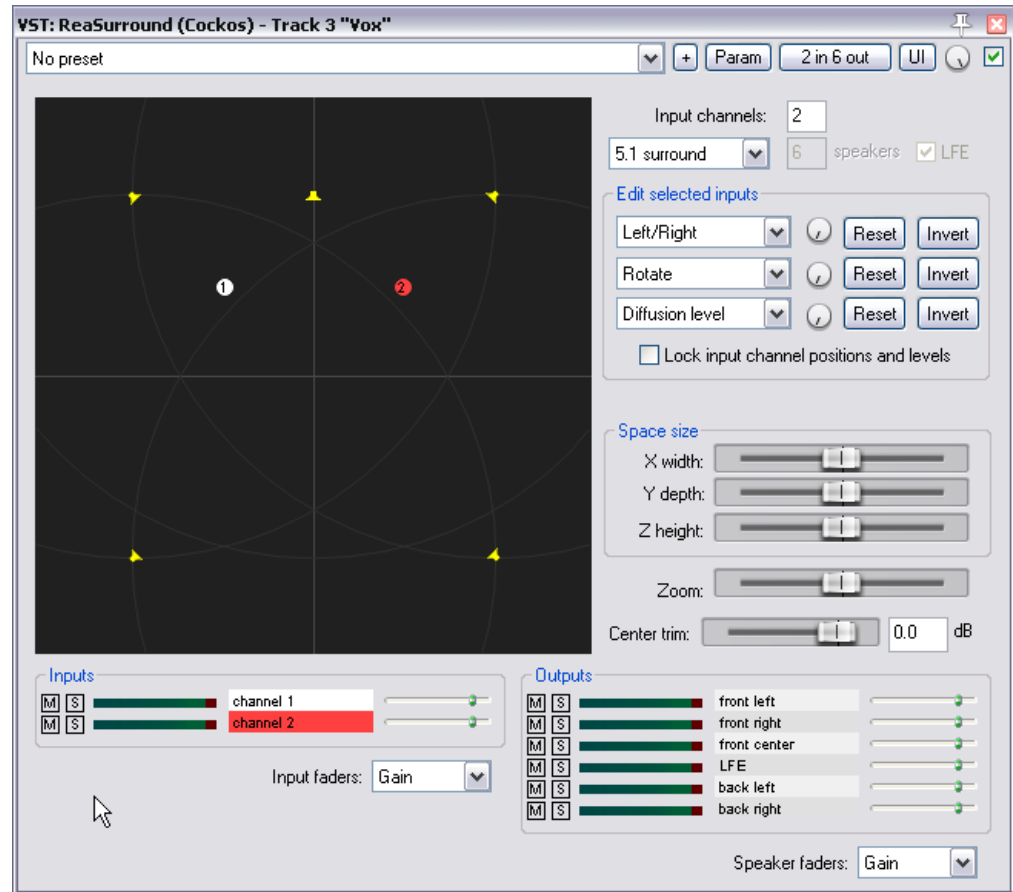
The three horizontal **Space size** faders can be used to adjust the three dimensions of the surround environment, width, depth and height, with the fourth fader acting as a zoom control.



In the example shown here, the Surround Panner has been inserted into a “normal” two channel track with a mono recorded media item.

The Surround Panner therefore finds – and displays – only two inputs this time.

Because 5.1 surround has been selected as the surround mode, the input from the two channels can be directed to the six channels shown.



See also Chapter 18, Rendering in Surround Format.



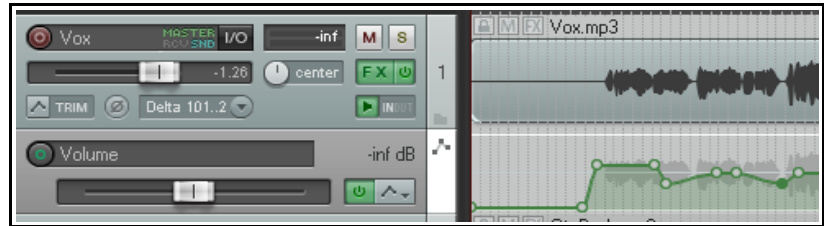


## 16 Automation with Envelopes

### 16.1 Understanding Automation

Automation is used to ensure that when your tracks are played, recorded changes in such things as volume level or panning can be recalled with the music in real time. At its simplest, for example, automation can lift the volume of a lead instrument during a particular break or passage, or 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. In the TCP you can see an envelope panel with its own envelope controls, just below the track controls. 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 little bit trickier. Whether your envelopes are initially created in separate lanes or over the media item will depend on your Editing Behavior Envelopes 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 creating and using envelopes. Parameter modulation will be covered in Chapter 17.

### 16.2 Automation Envelope Methods

REAPER's various automation modes essentially make available to you two main ways of using envelopes for automating your projects. These are writing automation and manually creating envelopes.

- Writing Automation:** When writing automation, you instruct REAPER to remember your actions – such as fading a volume control up and down – 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 three different methods that you can use to write such envelopes – write, touch and latch. We'll get round to explaining the differences shortly.
 

☒ Trim/Read (default, faders are active for trim but not recorded)  
☐ Read (play faders with armed envelopes)  
☐ Touch (record fader movements to armed envelopes)  
☐ Latch (record fader movements after first movement)  
☐ Write (record fader positions to armed envelopes)
- Manually Creating 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 envelope curves 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. Trim/Read mode is used when you are creating or editing envelopes in this way. If you wish, you can write envelopes in, say, latch mode then edit them in Trim/Read mode.

Whichever mode is currently selected is displayed on a track's envelope button. We'll explore the different automation modes in detail in the sections that follow. Both have their advantages and you can use any combination of modes on different tracks in your project. With both recorded and manual 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.

### 16.3 The Track Envelopes Window

Any track's envelopes can be managed from the **Envelopes Window** for that track. This is opened by clicking on the track's **Envelope** button in either the TCP or MCP. You can use this window, for example to:

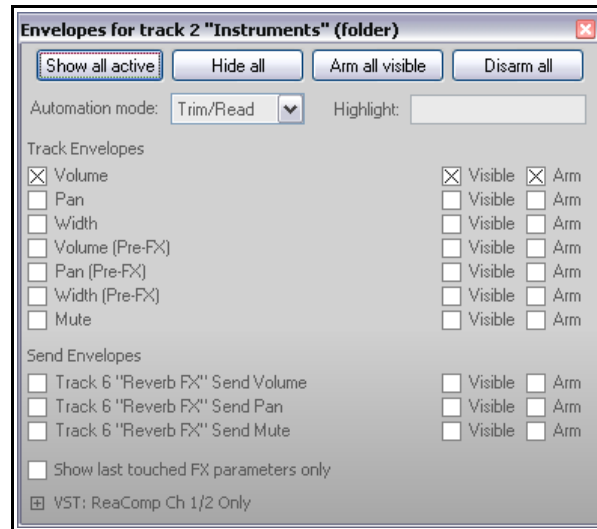
- Set the **Automation mode** for the track.
- Create an envelope (e.g. for Volume, Pan or Mute for a track or send).
- To show or hide an envelope from view.
- To Arm an envelope or Disarm it.

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 ReaComp. By clicking on the small **+** symbols next to the plug-in's name you can open up a list of plug-in parameters for which you can also create envelopes. We'll see some examples of this soon.

Checking the option to **Show last touched FX parameters only** can help prevent screen clutter.



### 16.4 Available Track and Send Envelopes

The following are the automation envelopes that by default are available for all tracks and sends. Envelopes for plug-ins and FX will be discussed later in this chapter.

Envelope	Description
<b>Volume</b>	Adjusts the volume of the Track's Output, after, for example, any item or track FX have been applied. This sets the level of the signal that is sent to the Master Track.
<b>Pan</b>	Moves the balance pan control more towards the left, right, or dead center: the signal that is sent post FX from the track to the Master Track.
<b>Width</b>	Moves the width control more towards the left, right, or dead center: the signal that is sent post FX from the track to the Master Track.
<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>Pan (Pre FX)</b>	Similar to Pan control but before track FX or track faders are applied.
<b>Width (Pre FX)</b>	Similar to Width control but before track FX or track faders are applied.
<b>Mute</b>	This envelope has effectively only two states – On and Off. It is used to mute passages of a track.
<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>Send Mute</b>	This envelope has effectively only two states – On and Off. It is used to mute passages on a send.

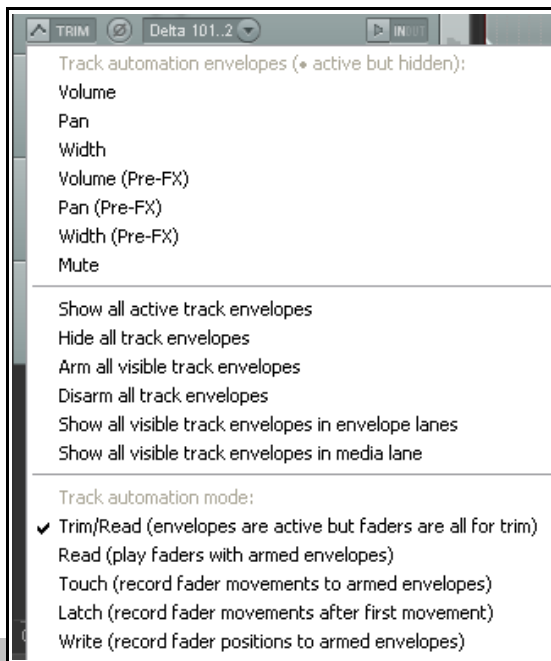
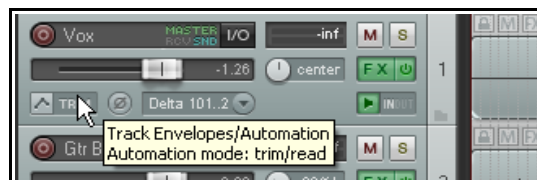
### 16.5 Writing Automation

To create automation envelopes using the **Write** feature, use this method:

- ◆ In the MCP or TCP, click on the **Envelopes** button (shown right) to open the envelopes window for that track. Notice that the envelope button displays the currently selected automation mode for that track. In the example shown, this is Trim.
- ◆ 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 **Trim/Read** or **Read**.
- ◆ Play the song. Listen and look! If you selected **Read** mode, the faders will move up and down as the automation is applied.

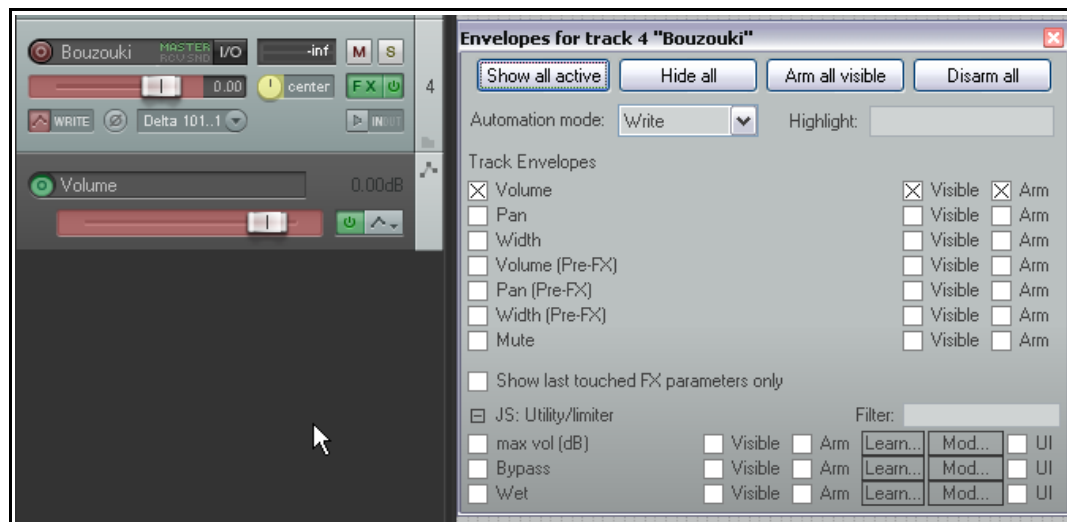
Note that if you prefer, instead of opening the envelopes window, you can right-click on the track's envelope button and make your choices from the context menu (see right).

**Tip:** Using **Volume** and **Pan** envelopes on tracks is such a common activity that the shortcut keys **V** and **P** are by default assigned to toggle the display of these two envelopes.




### 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.



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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.
  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 above).
  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 **Write**.
  6. Play the song from about the 48 sec mark for about 15 seconds.
  7. As the instrumental break starts, use your mouse to raise the track fader for the Bouzouki volume (not the envelope volume fader) by about a three decibels. 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. Zoom closely into the part of the song that goes from about 45 secs to about 65 secs.
  9. The fader area for the Volume control from this track will now be green, and your automation envelope should be clearly visible (see right).
- 
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. Trim/Read for example mode will also do this, but without moving the faders. That's because during Trim/Read mode you might wish to make manual adjustments yourself, using the faders. You'll find a more detailed explanation of the various automation modes later in this chapter.

### Modifying the Envelope

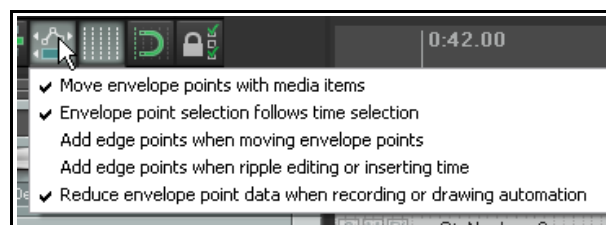
It's very likely that you won't get the exact settings for your automated faders 100% correct first time. If this happens, you have several ways of fixing the problem. Two of these are to either use Automation **Touch** mode to write changes to your envelope, or (probably easier) edit the envelope by hand.

## 16.6 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. One is to enable the option to use fewer points when recording (but this will not work retrospectively!). The other is to remove some of the points after recording.

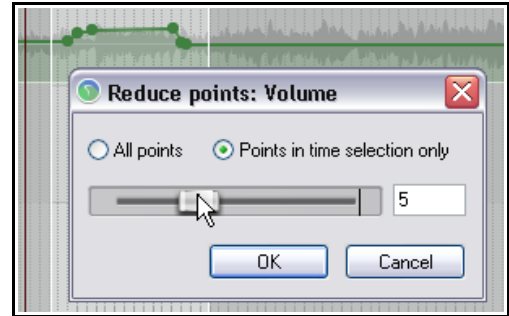
**To ensure before you start recording that fewer points will be recorded:**

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. Select (click on) the envelope.
2. Define the required time selection. All envelope points in that selection will be selected.
3. Right-click over the envelope.
4. From the menu, choose **Reduce Number of Points**.
5. Select (probably) **Points in time selection only** or (possibly) **All Points**.
6. Adjust the fader until the number of points shown looks about right. An example is shown on the right.
7. Click on **OK**.



### 16.7 Writing Mute Automation

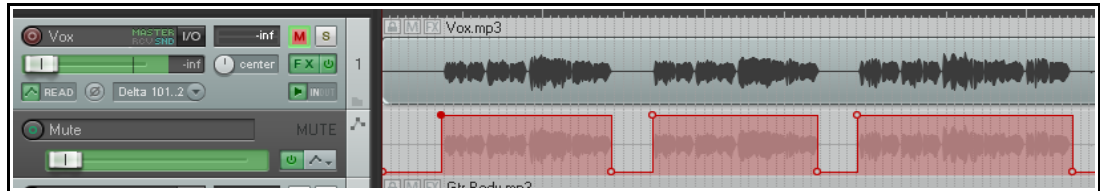
One rather special way of using automation is in conjunction with a track's **Mute** button to automatically mute unwanted passages of a track. The procedure for doing this is outlined below:

- Click on the track's **Envelopes/Automation** button to display the envelopes window.
- Select the **Mute** envelope and set the mode to **Write** (see right). Then close the Envelopes window.
- The Envelopes/Automation button will read **Write** and the armed mute button will be highlighted in red. Notice (right) how this is displayed in Track 1 (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. Automation Mode mode for this track for this track should automatically change to Trim/Read (unless this default setting has been changed in your Editing Behavior, Envelopes preferences).



In the example shown below, a vocal track is muted when it is not intended to be heard. **Read** mode has been selected.

When the track is played back, the color of the Mute button changes for the duration of the muted passages.



### 16.8 Automation Modes

Automation mode can be set as already shown from inside the Envelopes/Automation window or by right-clicking on the track envelopes/automation button. 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 track automation mode** (or right-click over the track number and select this from the context menu).

The following table summarizes the five available automation modes.



Automation Mode	Description
<b>Trim/Read</b>	Existing envelopes are applied, but on-screen controls do not move. Trim/Read mode might seem strange at first, but it does bring you a useful benefit. You can use a track's controls for overall changes. For example, adjusting a track's Volume fader in this mode will raise or lower the volume for that whole track relative to the envelope. In Trim/Read mode fader movements are not recorded: they are adjusted in the same way as when no envelope is present.
<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 on existing 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 during playback. <i>In this mode, previously written envelopes for armed items will be over written.</i> REAPER's Envelope preferences include an option to automatically switch to another mode immediately after recording automation in Write mode. By default, it will switch to Trim/Read.

Note that when you are in Latch, Touch or Write mode, an envelope can also be armed by clicking on the **Arm Record** 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.

### 16.9 Global Automation Override

The Global Automation Override button on the far left of the transport bar can be used to set certain options for your envelopes globally. Right click on this button to display the menu which can be used for two main purposes. These are:

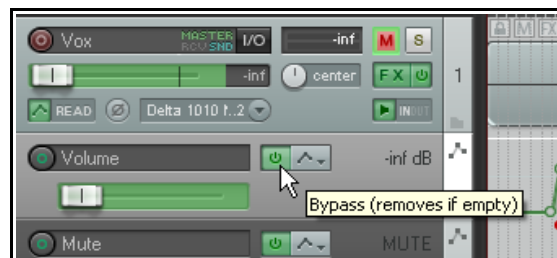
- To toggle bypass on/off for all envelopes.
- To select a single automation mode (such as Trim/Read or Read) for all tracks.
- Toggle display of all active envelopes.

A global option can be removed by the **No global override** command. Each track will then be returned individually to its former state, with its previous individual automation mode and bypass settings restored.



### 16.10 The Envelope Panel Controls

The envelope panel's horizontal fader is used to write automation (write, latch or touch modes), show automation changes (read mode) or adjust the parameter value for the entire track or selected envelope segment (trim/read mode).



Other standard controls are the **Bypass** toggle button and next to that the **Hide/Clear** button which can be used to either hide an envelope or clear it altogether.

For FX parameter envelopes there may also be some additional controls, for example to enable parameter modulation or learn mode for that parameter (see later in this chapter and Chapter 17).



### 16.11 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. Amongst the actions that you will commonly use for this are:

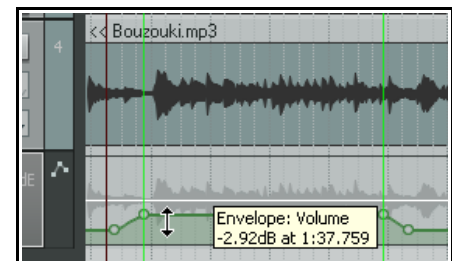
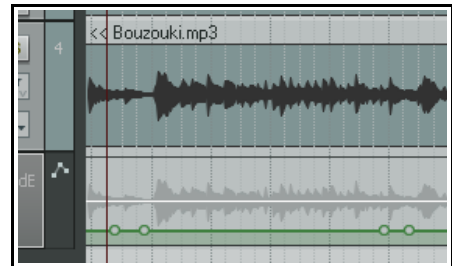
- **Shift Click** for adding points to an envelope.
- **Ctrl Click Drag** for freehand drawing of envelope points and curves.
- **Click Drag** for moving envelope segments freely up or down or envelope points in any direction.

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 Modifier (Envelope segment) preferences if you wish. In this example, we will assume that **Click Drag** is used to adjust segments, and **Shift Click** to add points.

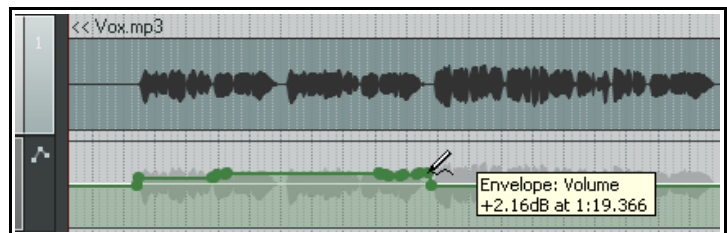
In the example that follows, you will use the mouse to raise the volume of your Bouzouki volume envelope a little for the duration of the short instrumental break that occurs between the second and third verses. You will then draw an automation curve over part of the vocal track. This example assumes 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 double-headed black arrow.
2. Hold **Shift** while you click the mouse on the envelope to create a point.
3. Repeat this three times as shown (right), 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 track's Envelope Window 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. Now select the **Vox** track and press **V** to display the Volume envelope for this track. Zoom to the passage from about 1 min 0 sec to 1 min 19 secs. We are going to make this passage a little louder.



10. Hover the mouse just above the envelope at 1:00. Hold down the **Ctrl** key. The mouse cursor will change to a pencil. Still holding **Ctrl** drag the mouse along to about the 1:19 mark (see above right) then release the mouse. The volume envelope will have been drawn by this action.
11. Remember that any excessive points that have been inserted by this action can be removed (as in the earlier exercise) using the **Reduce number of points** command.
12. Save the file.

### 16.12 Using the Mouse with Envelopes

The above exercise has introduced you to some examples, but there are many other techniques and mouse tricks that can be used for manipulating and managing envelopes and their nodes. This table is a summary of the most important. For a fully comprehensive list, consult the Mouse Modifiers page of your Preferences.

In order to do this ...	....you need to do this
<b>Select all points on envelope inside time selection.</b>	<b>Click and drag</b> in envelope lane (not on envelope itself) to create time selection.
<b>Draw and shape envelope in freehand mode.</b>	<b>Ctrl Drag</b> anywhere on, above or below the envelope
<b>Add a point.</b>	<b>Shift Click</b> on envelope
<b>Delete envelope point.</b>	<b>Alt Click</b> on any envelope point
<b>Select multiple envelope points.</b>	Hold Ctrl while clicking on envelope points one at a time
<b>Select all points in an envelope.</b>	<b>Click</b> on any point in an envelope, then press Ctrl A
<b>Select all points within the lasso area.</b>	<b>Click</b> on a point, then use the Right-Click-Drag mouse method to lasso ( <b>marquee</b> ) a portion of an envelope. Release mouse
<b>Apply an envelope command to a selection of points.</b>	When you have several points selected, <b>right click</b> over any selected point
<b>Move an envelope point vertically and/or horizontally at the same time.</b>	<b>Click and drag</b> envelope point in any direction
<b>Finely adjust a point's vertical position.</b>	<b>Ctrl Alt Drag</b> on any envelope point
<b>Allow an envelope point to be moved vertically or horizontally only.</b>	<b>Click</b> and hold <b>mouse</b> on any envelope point, hold both the <b>Ctrl</b> and <b>Shift</b> keys while then <b>dragging</b> any envelope point either vertically or horizontally.
<b>Reset point to center (default value).</b>	<b>Double-click</b> on envelope point

Most of these defaults can be changed in your **Editing Behavior, Mouse Modifiers** preferences settings.

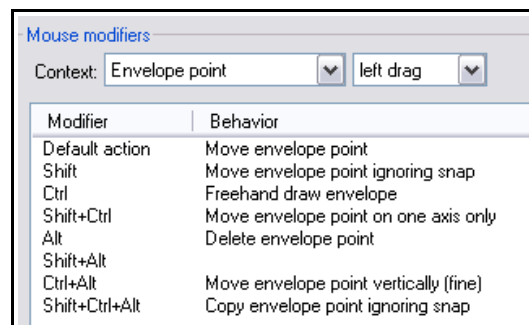
### 16.13 Envelope Edit Mouse Modifiers

This probably won't be the very first thing you'll want to do, but after you have been working with envelopes for a while you might wish to consider changing some of the default mouse modifier settings so as better to suit your personal workflow requirements. There are several contexts relevant here – Envelope lane (left click), Envelope segment (left drag), Envelope point (left drag), Envelope segment (double-click) and Envelope point (double-click).

For example, if you manually add points to envelopes a lot, you might wish to consider changing the default

behavior for Envelope double-click from *Reset point to default value* to the action *Envelope: Insert new point at current position*. If horizontal adjustment of envelope points is important to you, consider assigning *Move envelope point horizontally* as one of your envelope point modifier instead of just *Move envelope point*.

Also, by default, double-clicking on an envelope's control panel will cause all points on the envelope to be selected. This too can be changed. There's more about mouse modifiers in Chapter 13.

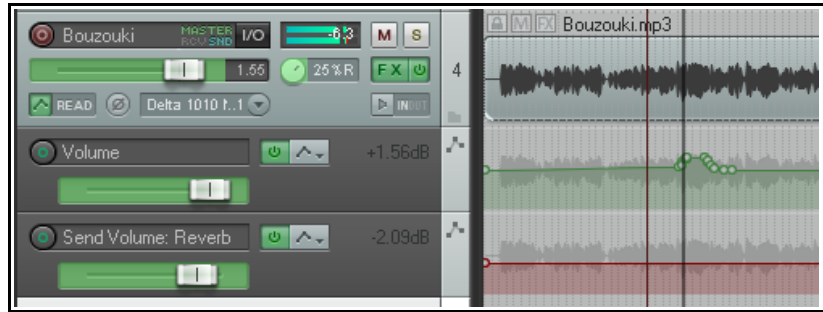


## 16.14 Managing Automation Envelope Display


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 a reverb track. One of these – Pan – is displayed on top of the actual media items. The other two each have their own lanes. The Appearance preferences option to **Draw faint peaks in automation lanes** has been enabled. The summary table explains how you use these options.



You should also check the preference (Editing Behavior, Envelopes) **When adding volume/pan envelopes, apply trim to envelope and reset trim**. Your safest option is to set this to **Never** to ensure that the envelope will be placed in the vertical center of the automation lane, thus leaving adequate room both above and below the envelope for manual editing.

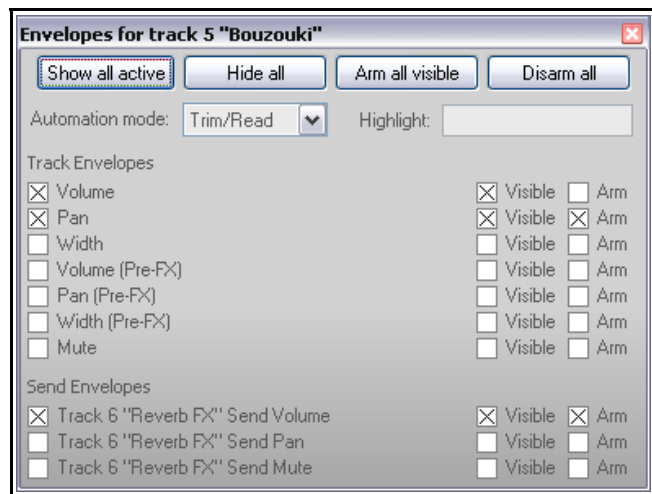
In order to do this ...	... you need to do this
<b>Hide an individual envelope</b>	Right click over the envelope and choose <b>Hide Envelope</b> from the menu, or ... In the envelope panel, click on the <b>Hide/Clear</b> button and choose <b>Hide Envelope</b> . 
<b>Display a currently hidden envelope</b>	Click on the <b>Envelopes/Automation</b> button in the TCP and check the <b>Visible</b> box for that envelope.
<b>Change the envelope displayed in a particular lane</b>	In the TCP, right click over the envelope name and choose another parameter from the list.
<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 <b>Hide/Clear</b> button in the envelope panel and choose <b>Move to media lane</b> .
<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>Show all visible envelopes in individual lanes</b>	In the TCP, right click over the envelope button and choose <b>Show all visible track envelopes to envelope lanes</b> from the menu.
<b>Show all visible envelopes over their media item(s)</b>	In the TCP, right click on the envelope button and choose <b>Show all visible track envelopes to media lane</b> from the menu.

In order to do this ...	... you need to do this
<b>Show all active envelopes</b>	In the TCP, right click over the envelope button and choose <b>Show all active track 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 the envelope button and choose <b>Hide all track 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 here, this track could have up to ten envelopes, one for each of the items listed. However, it actually contains only three *active* envelopes, one each for Volume, Pan, and Track 6 Send Volume. Of these, we have chosen to make only the first three visible.

If we were to add some plug-ins (such as Delay, EQ or compression) to this track we would immediately create more potential envelopes.



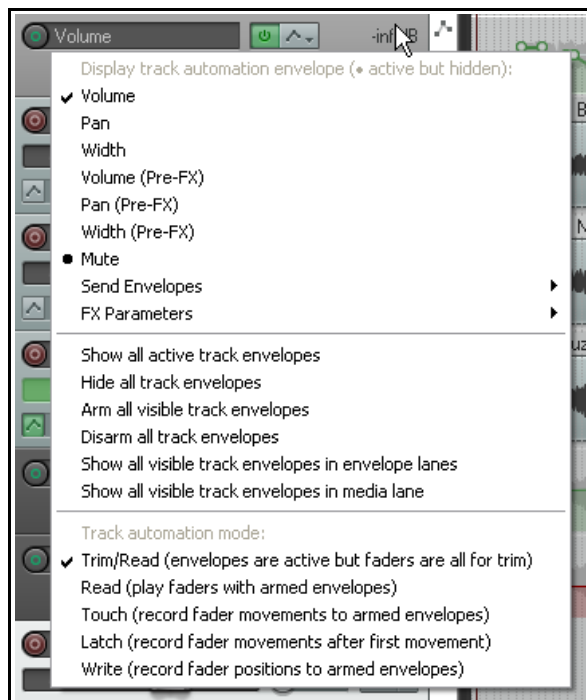
### 16.15 The Envelope Panel Controls

An envelope displayed in a lane can have its behavior and characteristics modified from within the TCP, using its fader, its buttons and its context menu. For example:

- In **Trim/Read** mode, use the horizontal fader to raise or lower envelope for its entire length or for a particular time selection. For example, with no time selection active, sliding a pan envelope's fader control left would cause panning for the entire track to be moved further to the left (maintaining the relative movement between existing points). If a time selection is active, then the envelope would be adjusted only within that time selection.
- Use the **BP** button to toggle bypass on and off.

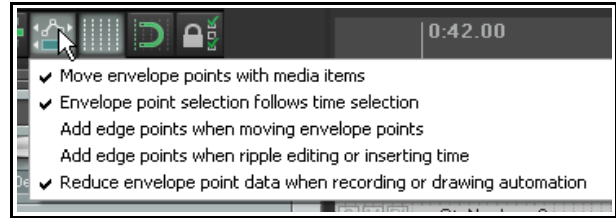
Right clicking over the envelope name in the TCP produces a menu which includes the following:

- A list of all available envelopes for this track (standard track and send parameters plus any FX parameters). Choose one of these to change the envelope displayed in this lane.
- Various show/hide envelope options.
- A list of automation modes: this is one way to change a track's automation mode.



### 16.16 Moving and Copying Envelopes with Items

You can choose whether or not to move and copy automation envelopes with your media items by setting the option to **Move envelope points with media items** on or off. This is accessed by right clicking on the Envelope tool on the main REAPER toolbar, or by choosing **Envelope points** from REAPER's Options menu. You can use the Actions editor to assign a shortcut key to toggle this action on and off.

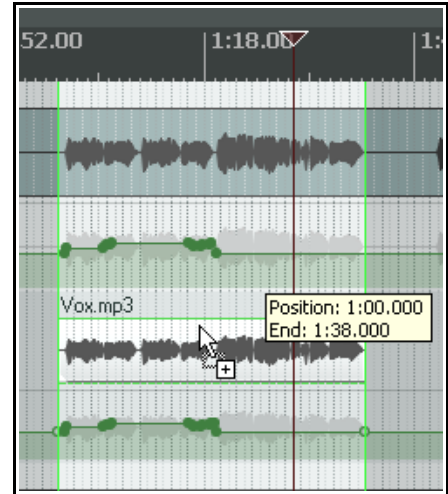


- If this option is turned off, then envelopes will *not* be moved or copied with the media items.
- If this option is turned on, then the envelopes *will* be moved or copied with the media items.

An example of this is illustrated on the right. A selected portion of the media item on the top track is being copied to the track below it using the **Ctrl** drag and drop method.

You can also specify whether or not you want to **Add edge points** (new envelope points at the start and end of the time selection) when the item is being moved or copied.

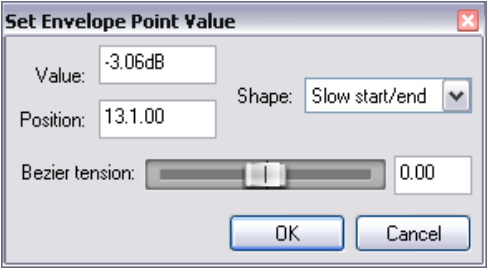
Notice that not only is the envelope copied with it, but also that because the option to show guidelines is also on, there are guide lines displayed which can help you when positioning the item that you are copying.





### 16.17 Managing and Manipulating Envelopes

The Envelope Point and Envelope Segment right-click context menus both contain commands and options that are there to help you manage and manipulate your envelopes. Which of these two menus will appear depends on whether your mouse is hovering over an actual point or over a segment when the right button is clicked.

In the table below, those commands which are on the Envelope Point menu only are marked indicated by **(P)**

Command	Explanation
<b>Set point value ... (P)</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>  <p>Optionally, you can assign <b>Double Click</b> (under Options, Preferences, Envelopes) to this function.</p>
<b>Set point shape (P)</b>	Changes the shape of the current point. The six available shapes are Linear, Square, Smooth, Fast Start, Fast End and Bezier. These are explained in more detail shortly.
<b>Set shape for 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.

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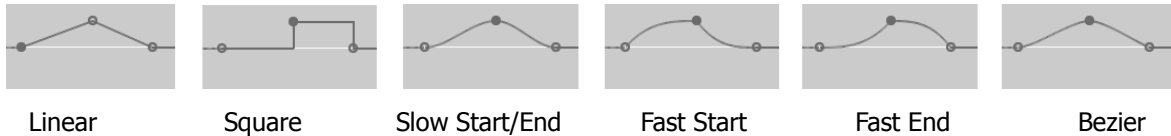
Command	Explanation
<b>Set envelope default point shape</b>	Sets shape for future points. The six available shapes are Linear, Smooth, Fast Start, Fast End, Square and Bezier. These are explained in more detail shortly.
<b>Select all points</b>	Selects all points in current envelope.
<b>Unselect all 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 points</b>	Copies all points in current selection into clipboard. <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. This ensures that the selected points remain selected when the context menu is displayed.
<b>Cut points</b>	Cuts all points in current selection into clipboard.
<b>Delete point (P)</b>	Deletes the envelope point.
<b>Delete selected points</b>	Deletes all envelope points in current selection.
<b>Delete 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 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.



### 16.18 Envelope Shapes

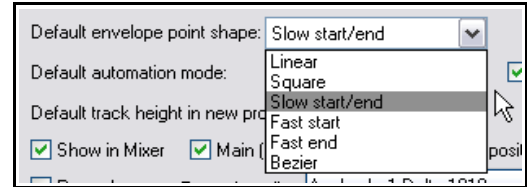
Envelopes can be any of six shapes – **Linear**, **Square**, **Slow Start/End**, **Fast Start**, **Fast End** or **Bezier**.

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 examples below illustrate 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, Track/Send Defaults** window, as shown on the right.

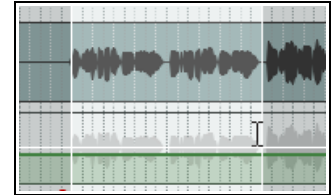


### 16.19 Envelope Preferences

REAPER's envelopes preferences fall into several different categories within your **Options, Preferences** window. These are explained in more detail in Chapter 19. Meanwhile, it's worth taking note of the following.

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 the options to:

- Show solid edge on time selection highlight. Makes the boundaries of the time selection more obvious.
- Show guide lines when editing. Facilitates editing.
- Draw faint peaks in automation lanes. Helps you to relate an envelope's position in its own lane to the track's volume level.
- Fill automation envelopes: this faintly colors the area below the envelope.



The **Editing Behavior, Envelopes** page is another important place to go to. It gives you the option, for example, to **Automatically add envelopes when tweaking parameters in automation write mode**. This enables you to create envelopes on the fly without having to select the required parameters from any menu. Be careful when enabling this: you can end up with any number of envelopes that you didn't want!

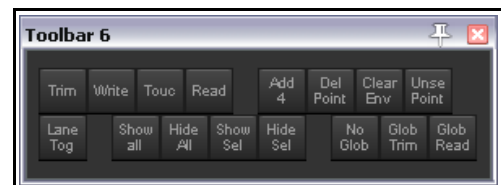
Finally, a number of the options on the **Project, Track/Send Defaults** have something to say about envelopes. These include:

- Whether to have any envelopes (such as Pan and Volume) automatically displayed for all new tracks.
- Your choice of default envelope shape for new points.
- Your choice of default automation mode for new tracks.
- Whether new envelopes are to be automatically armed.

### 16.20 Using an Envelopes Toolbar

Chapter 13 explains in step by step detail how to create custom toolbars. If you work a lot with envelopes then this is one area where it should really pay dividends for you to put your thinking cap on.

Shown here is an example of a simple Envelopes toolbar that you could create. Listed below are the actions attached to each of the icons in this example, left to right, starting with the top row.



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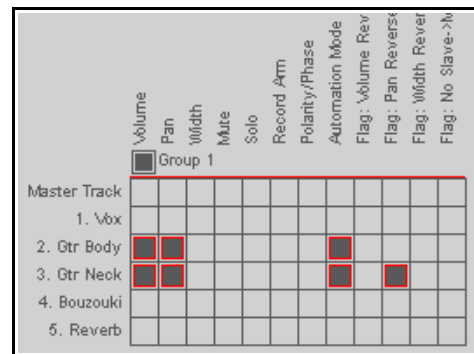
Automation: Set track automation mode to trim/read  
Automation: Set track automation mode to write  
Automation: Set track automation mode to touch  
Automation: Set track automation mode to touch/read  
Envelope: Insert 4 envelope points at time selection  
Envelope: Delete all points in time selection  
Envelope: Clear envelope  
Envelope: Unselect all points  
Envelope: Toggle display of all visible envelopes in lanes for tracks  
Envelope: Show all envelopes for all tracks  
Envelope: Hide all envelopes for all tracks  
Envelope: Show all envelopes for tracks  
Envelope: Hide all envelopes for tracks  
Global automation over-ride: No over-ride (set automation modes per track)  
Global automation over-ride: All automation in trim/read mode  
Global automation over-ride: All automation in read mode

Keep in mind that this is only an example. The same commands and actions that are most useful to one person might not also be most useful to another. In the end, you must decide for yourself.

### 16.21 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 grouping is similar to that used in the exercise file **All Through The Night TGROUPS.RPP**. If you completed those examples it might help you to open that file now.



	Volume	Pan	Width	Mute	Solo	Record Arm	Polarity/Phase	Automation Mode	Flag: Volume Rev	Flag: Pan Revers	Flag: Width Rever	Flag: No Slave->h
Group 1												
Master Track												
1. Vox												
2. Gtr Body												
3. Gtr Neck												
4. Bouzouki												
5. Reverb												

#### Example

In this example, both of the guitar tracks are set to act as both master and slave in automation mode and both volume envelopes are armed (indicated by the colored circular button to the left of the envelope name, Volume).

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 here.

Had the automation envelope been armed on only one of the tracks then the automation would have been written to that track only and not to the other.

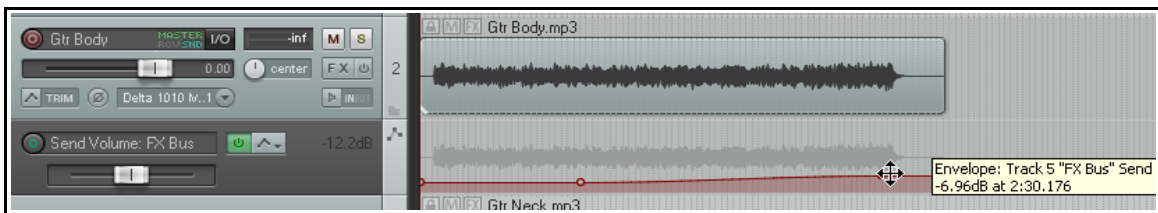
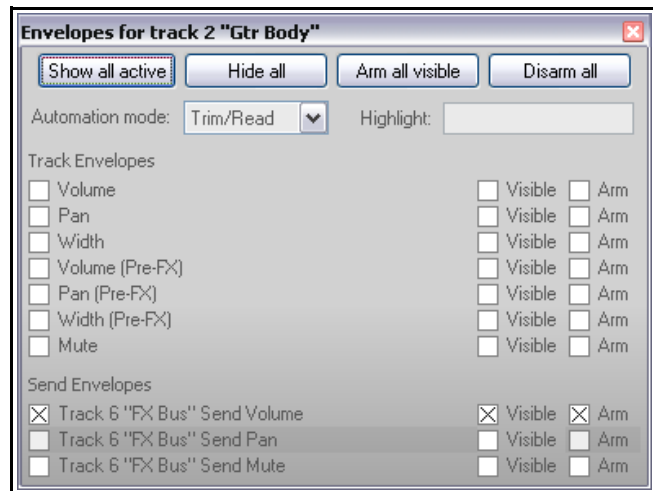


### 16.22 Automation with Track Sends

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 **IO** routing for this track. Create a send to the FX Bus and set send volume and pan levels as shown (above).
4. Select the track **Gtr Neck** and display the **IO** routing for this track. Create a send to the FX Bus as a send and set send volume to -10dB 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, visible and armed.
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 -12dB.
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 (Shift Click). Add another point at about 2:30.
10. Hover the mouse over the envelope just after this second point. Hold **Ctrl Alt** while you drag up until the envelope is set to about -7dB. 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.

### 16.23 Automation 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, or to add more warmth to a vocal take at those times when it is needed.

There are three main ways of creating envelopes for your FX parameters:

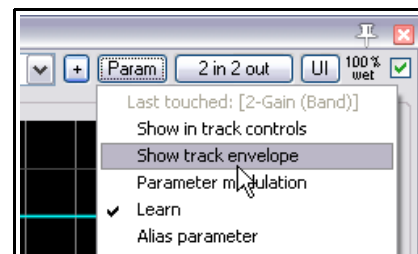
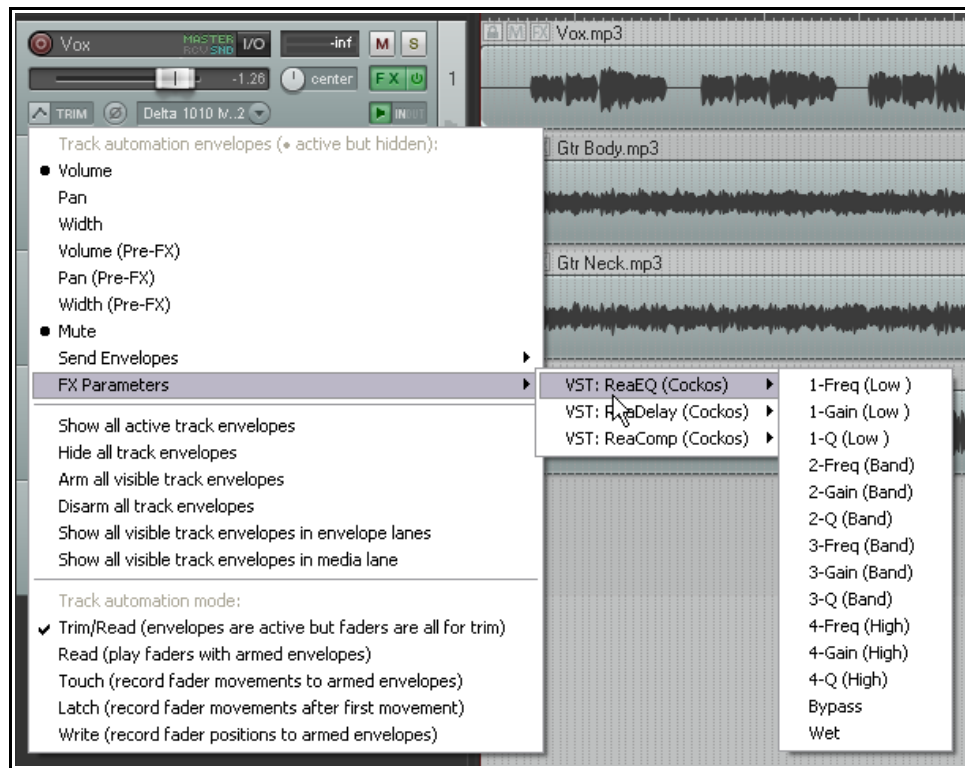
- Select those parameters for which you wish to add envelopes from the Envelopes window. You may need to click on the small **+** button next to a plug-in's name to display a list of all automatable parameters for that plug-in.
- Right click over background area of any existing envelope lane in the TCP 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 right).
- The third method is to create the parameter envelope from within the plug-in's own window. This is probably the most useful method because in many cases, this will be the environment in which you will find yourself working when you decide that you would like to create the envelope. The standard procedure for doing this is quite simple:

1. Touch the parameter for which you want to create an envelope with your mouse.
2. Click on the **Param** button.
3. Choose **Show track envelope** from the menu.

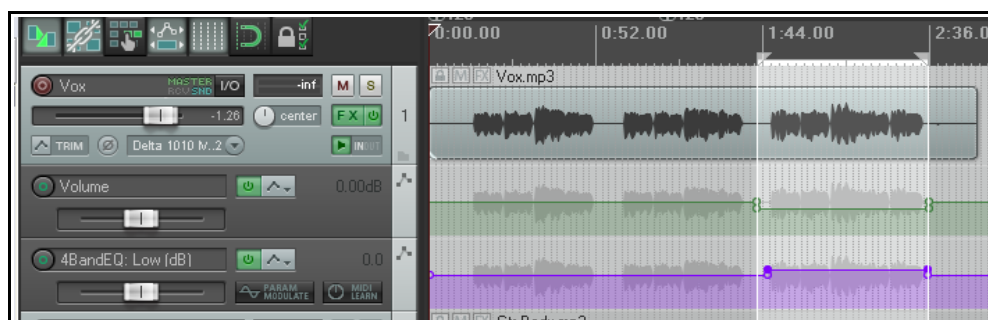
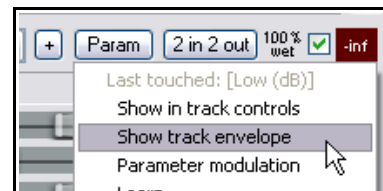
Most FX can be automated in this way, but be warned that especially with some older plug-ins this might not be possible.

#### 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.



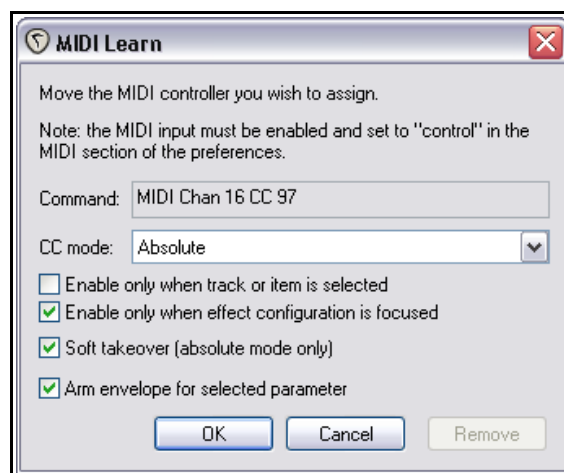
- We are going to add an automation envelope to increase this level for the phrase *All Through The Night* at the end of the song, from about the 2:14 mark. This will warm up that phrase, but also make it louder. Therefore, we will also need to add use another envelope to lower the volume to compensate.
- Adjust the horizontal and vertical zooms of the Vox track, so that you can clearly see the area that you are working with.
- Click on the **Low dB** fader in the EQ then click on the **Param** button. Choose **Show track envelope** from the menu (see right). The envelope will be shown. Unless you have changed the default preferences, this will be shown in its lane.
- Mark the time selection from about 2:14 to the end of the song. Use the slider for this parameter (in the TCP) to raise the level of this envelope by about 6 dB.
- With the same time selection still active, use this same technique to lower the fader for the volume envelope by about 2 dB (see right).
- Play the file. Save it.



### 16.24 FX Parameter Automation in Learn Mode

If you are using REAPER with a correctly installed control surface, such as a Behringer BCR2000, you can use that to create automation envelopes for the 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) for this purpose. The exact steps will depend on which device you are using, but in overview:

- Within the plug-in window, click on the parameter, then on **Param** then on **Learn**.
- Tweak the button, knob, or fader on the control device. A confirmation message such as that shown here will appear in the Command field (right).
- Select a CC mode, absolute or relative. Consult the device's documentation: if in doubt, try **Absolute** to begin with. For smoother operation, choose **Soft takeover**.
- Optionally, select **Enable only when effect configuration is focussed**. This allows you to assign the same control to another parameter in a different plug-in.
- 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**. Depending on the parameter



You can now use the control device to write your parameter changes to the envelope during project playback. In Trim/Read mode you can still use the control device to manually adjust the parameter - see Chapter 11.



### 16.25 Automating FX Parameters on the Fly

If you turn on the Editing Behavior, Envelopes preferences option to **Automatically add and arm envelopes when tweaking parameters in automation write modes**, then for any track is set to write, latch or touch an automation envelope will be created for you as you tweak the parameter settings during playback.

This feature can be used in conjunction with your control surface. Note that any changes to these parameters that are made on the screen with your mouse will still be applied, as will any changes made using your control surface. Be careful, though, 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 to Read or Trim/Read, otherwise every parameter you tweak will create and/or modify an envelope, whether you want it to or not.

### 16.26 Automation with Items and Takes

Individual media items and takes can be given their own Volume, Pan, Pitch and Mute envelopes. To do this, select and right click over the item then choose the **Take** command followed by whichever of the three envelope types you want.

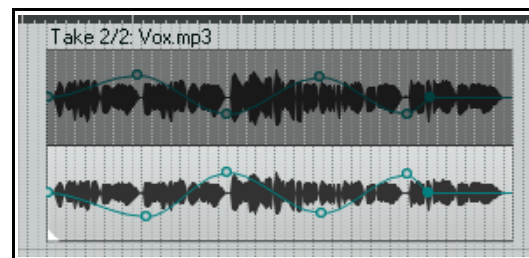
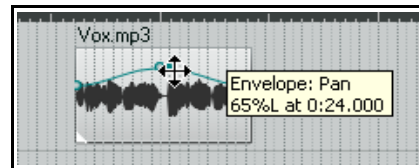
#### Envelopes with Media Items

In the example shown on the right, a pan envelope has been added to our media item, using the **Take, Take volume envelope** command. The item is panned first away from the center then back towards it.

The envelope can be edited with points added, moved, and so on, just like any other. You can right-click over any point or segment of a take envelope to access the context menus. You can also create different envelopes for different takes of the same item.

#### Envelopes with Multiple Takes

In the example shown here, separate Pan envelopes have been added to the both takes for the last verse of a song, with different FX . The combination of the different panning and the touch of ReaVerbate added to one of the takes can make for an interesting vocal effect when the **Play all takes** option is enabled for this item.



### 16.27 Automation with Hardware Output Sends

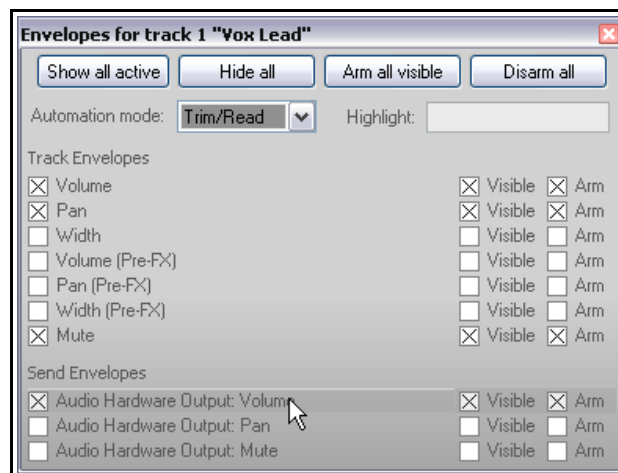
If you are using hardware output sends with any of your tracks, you will find that you can automate the Volume, Pan and Mute parameters for these sends.

These items will appear in the track's envelopes window as shown on the right.

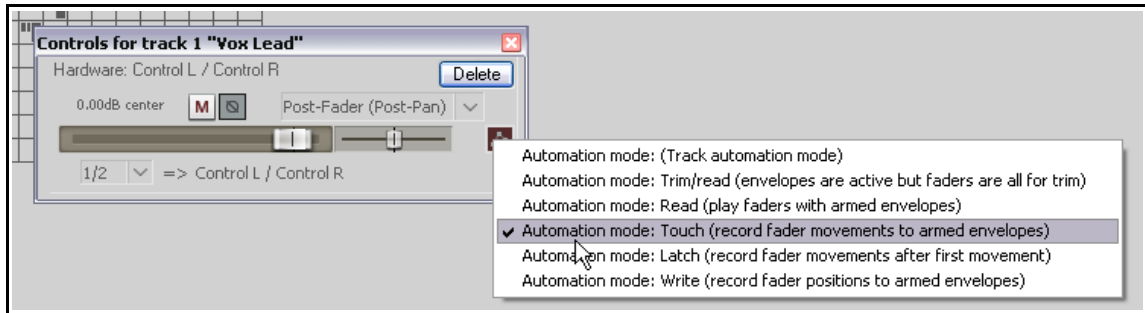
In the example shown, we have already created a send from Track 1 to an Audio Hardware Output. We can now create an envelope to control the volume of this send.

We can even 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 IO (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.

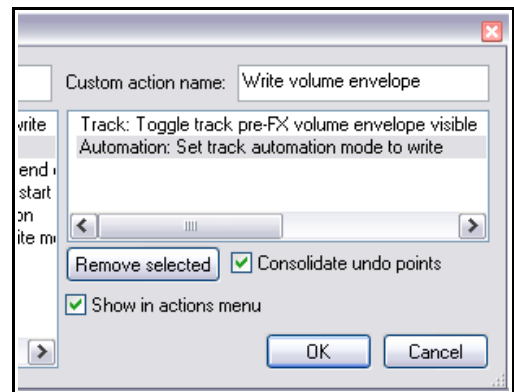
You can also do this with Track Send envelopes.

### 16.28 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 custom action similar to that shown. You could then assign a keyboard shortcut to that custom action, or add it to one of your toolbars. Refer back to Chapter 13 for more information about custom actions, keyboard shortcuts, and custom toolbars.

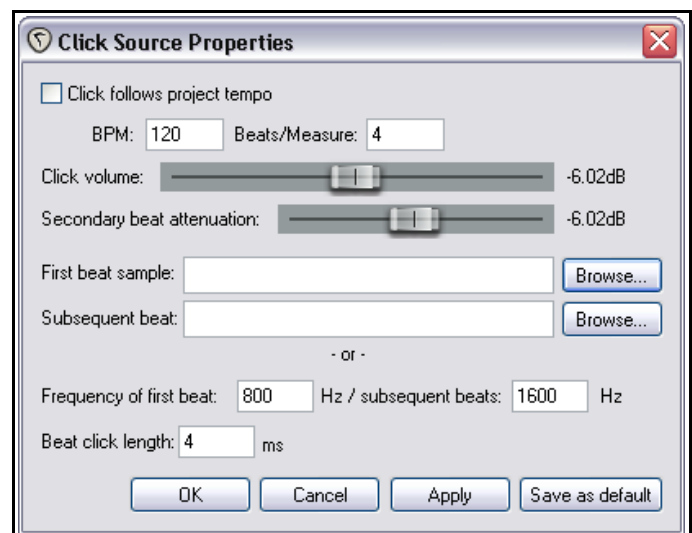


### 16.29 Automating the Metronome

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 mute envelope to mute certain passages, and so on.

To modify any of the click track properties, right click over the track and choose **Source Properties** from the menu.

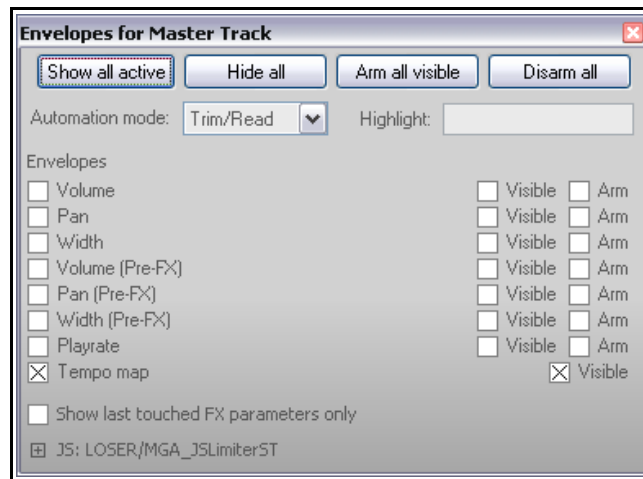
For example, you can change the BPM setting, or use your own sample files to create the beats.



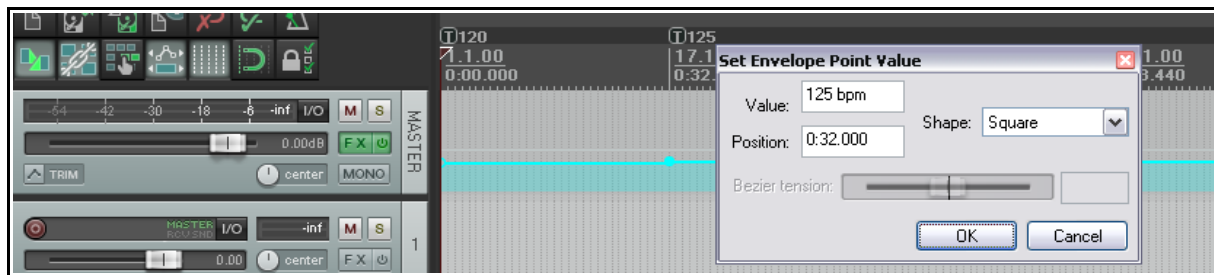
### 16.30 Using the Tempo Map and Play Speed Envelopes

In Chapter 9, 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 Envelope 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 in arrange view. 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 Playrate 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 **Playrate**. Make sure this item is marked as both Visible and Armed.
2. Close this window.

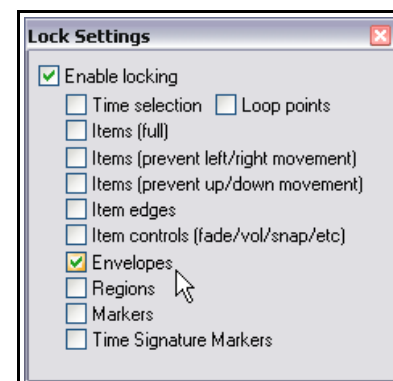
### 16.31 Locking Envelopes

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** (or right-clicking on the Lock button on the main toolbar) 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. The keyboard shortcut **L** can be used to toggle lock enabled status on and off.



### 17 Automation with Parameter Modulation

#### 17.1 The Concept

The use of parameter modulation is probably best undertaken only by experienced mixers. This chapter serves as an introduction, but inevitably (because of the complexity of the topic) it is not really pitched at the relatively novice user.

Parameter modulation takes REAPER's routing, channel splitting, automation and sidechaining capabilities to new levels. You should probably not attempt this chapter unless you already have a sound grasp of these and other 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 level of a track's volume or one or more FX parameter to control the behavior of one or more other FX parameters on the same track or on a different track or on a number of tracks. Don't worry if at this stage you find this difficult to comprehend. The concepts of what this is and how it works will become clearer after you have worked thru some examples.

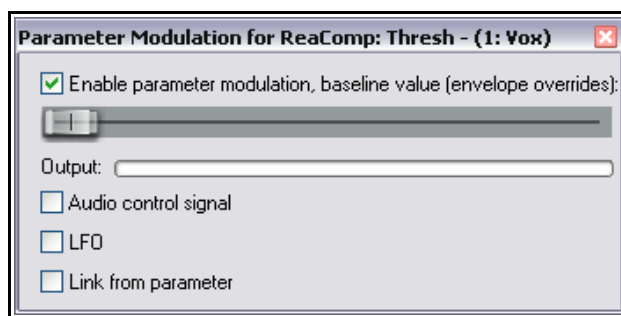
One relatively simple example might relate to the application of a chorus plug-in to a guitar or bouzouki track. Suppose that we wish to vary the wet/dry balance of the chorus throughout the track. We could, of course, accomplish this with the use of automation envelopes. However, this might involve quite a lot of work. Let's 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. The chorus will seem to tail away more into the distance during at times when the instrument is played more forcefully and become gently more present during the quieter passages. Rather than have to create a series of envelopes for our chorus plug-in, we can use parameter modulation to ensure that the chorus mix will respond automatically and in real time to changes in volume.

Incidentally, this particular example can create an interesting effect of space and distance on the instrument, but as with most of the other examples throughout this User Guide, 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'll find will bring new life and vigor to your own mixes.

#### 17.2 The Interface

We'll shortly work thru some examples which will show both how parameter modulation works and how you can go about using it. First, we need to introduce a few basic terms and concepts.

When you select a parameter to be modulated, you will initially see the window shown here (right). In this example, parameter modulation is about to be applied to control a compressor's threshold on a vocal track. This initial window features five basic controls. These are:

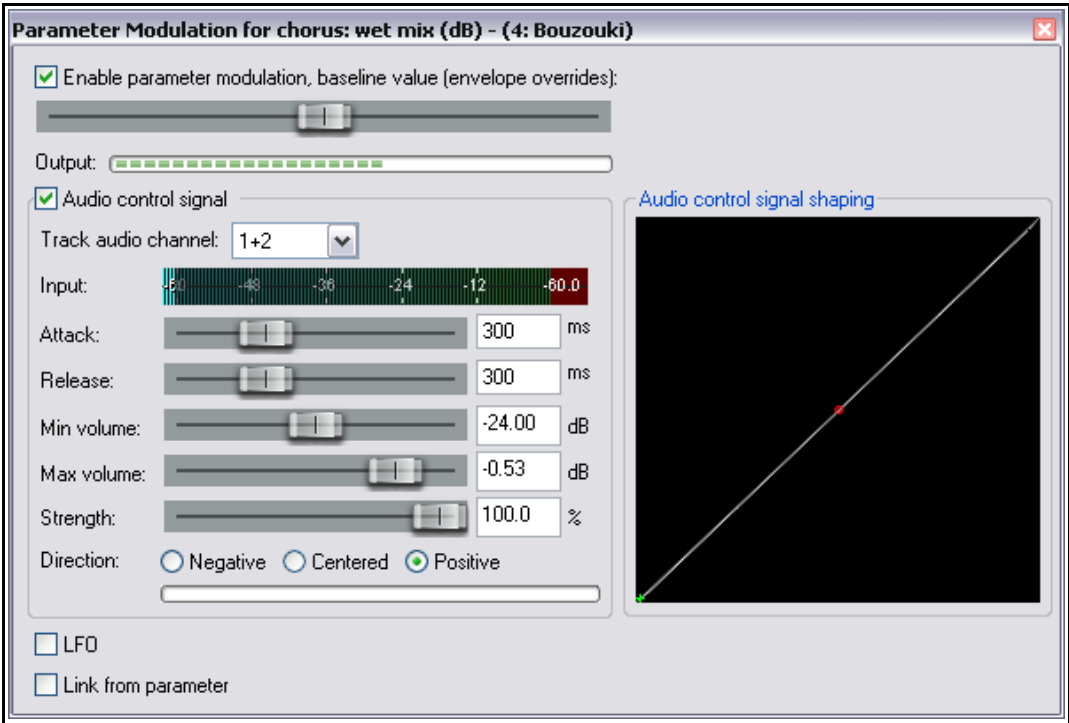


- ◆ **Enable parameter modulation, baseline value.** This needs to be ticked for the parameter modulation (PM) to be applied. Unticking this box sets the PM to bypass.
- ◆ **The horizontal baseline value fader.** This determines the starting value of the parameter being controlled. We'll come to an example shortly. Initially, leave this at its default setting (fully left).
- ◆ **Audio control signal.** Ticking this option will open a window which is used to define both which track (or tracks) contains the audio signal that is to be used to control the parameter being modulated, and how you want the modulation to be applied. Don't worry, we'll get to an example soon!
- ◆ **LFO.** This option allows you to use a low frequency oscillator signal (such as sine, square, triangle, etc.) to generate a tone to control the parameter being modulated. This is more likely (but not exclusively) to be used when it is a synthesizer parameter that is being modulated.
- ◆ **Link from parameter.** This option allows you to link one FX parameter to another. An example might be to ensure that as a track is compressed more heavily, some presence is added to the EQ (to compensate for loss of dynamics). Another might be that as the wet/dry balance on a delay effect is

adjusted to add more delay, the pan position of the delayed signal is automatically moved further out. The possibilities really are endless.

17.3 Defining a Parameter for Modulation

Illustrated below is an example of the Parameter Modulation window with just the **Enable parameter modulation** and **Audio control signal** options enabled. 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.



Item	Description
<b>Enable parameter modulation, baseline value</b> with <b>Fader</b>	The checkbox enables/disables parameter modulation on this parameter. The fader 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>Audio control signal</b>	Enables/disables control of the parameter by the audio signal in the specified <b>Track audio channel</b> .
<b>Track audio channel</b>	<p>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. The selection of channels available will depend on how many channels have been previously defined for the track.</p> <p>In more straightforward applications, you will want to choose channels 1 + 2. This will ensure that the parameter is controlled by the audio signal on its own track. However, as you will see soon, you can choose a source other than channels 1 + 2 if you want an FX parameter on one track controlled by the audio signal from a different track. The latter case would be an example of sidechain parameter modulation.</p>

## 17 - Automation with Parameter Modulation

Item	Description
<b>Attack</b> and <b>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>A higher attack setting will cause the parameter to respond more slowly to changes in volume in the source audio channel.</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>Min Volume</b> and <b>Max Volume</b>	<p>These determine the range within which the signal on the track audio channel will be used to modify the FX parameter.</p> <p>For example, in the illustration shown, the parameter in question (chorus wet mix) on the track in question (track 4, Bouzouki) will only be controlled by the audio signal on channels 1 and 2 when its volume falls within the range - 24 dB to - 0.53 dB. If or when the signal is quieter than -24 dB or louder than - 0.53 dB the parameter modulation is in effect set to bypass.</p>
<b>Strength</b> and <b>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 or decreases, then the parameter being controlled will also increase or decrease to the same degree. At 50%, the relationship will still be positive, but more moderate. You can think of this as being conceptually similar to a ratio control on a compressor.</p> <p>Likewise, a setting of 100% negative means that as the incoming audio signal increases, the parameter being controlled will decrease in the same proportion, 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>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> <p>Don't worry, we'll work thru an example soon.</p>

The best way for you to understand how parameter modulation works is to try it out in practise. This first example will use several of the PM window controls. We will first select a parameter to be modulated, then set its baseline fader level, and then select the required audio control signal. Finally, we will define the relationship between the audio control signal and the parameter being modulated.

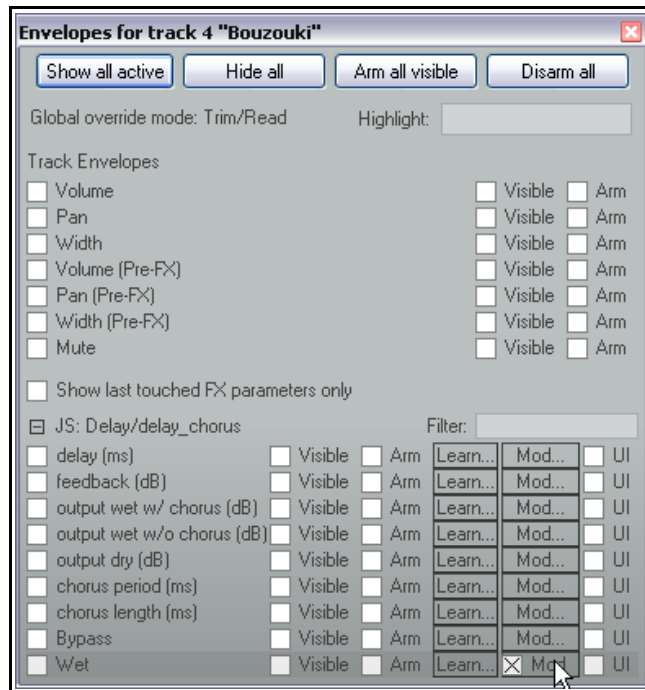
### 17.4 Defining a Parameter for Modification

To select an FX parameter to be modified, follow either of these sequences:

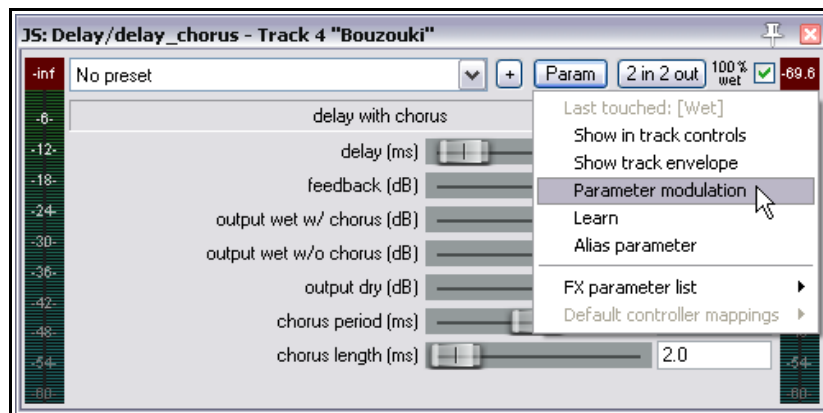
1. Displaying the track's **Envelopes/Automation** window and click on the **+** for any plug-in to display the list of its controls.
2. Click on the **Mod** button for any parameter that you wish to have modified by an audio signal. You will then see a small check box next to the **Mod** text for that 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 (as shown below).



Notice (right) that the name of the last touched parameter – the one to which parameter modulation will be applied – is shown dimmed at the top of the **Param** button menu.



### 17.5 Parameter Modulation with Audio Control

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.

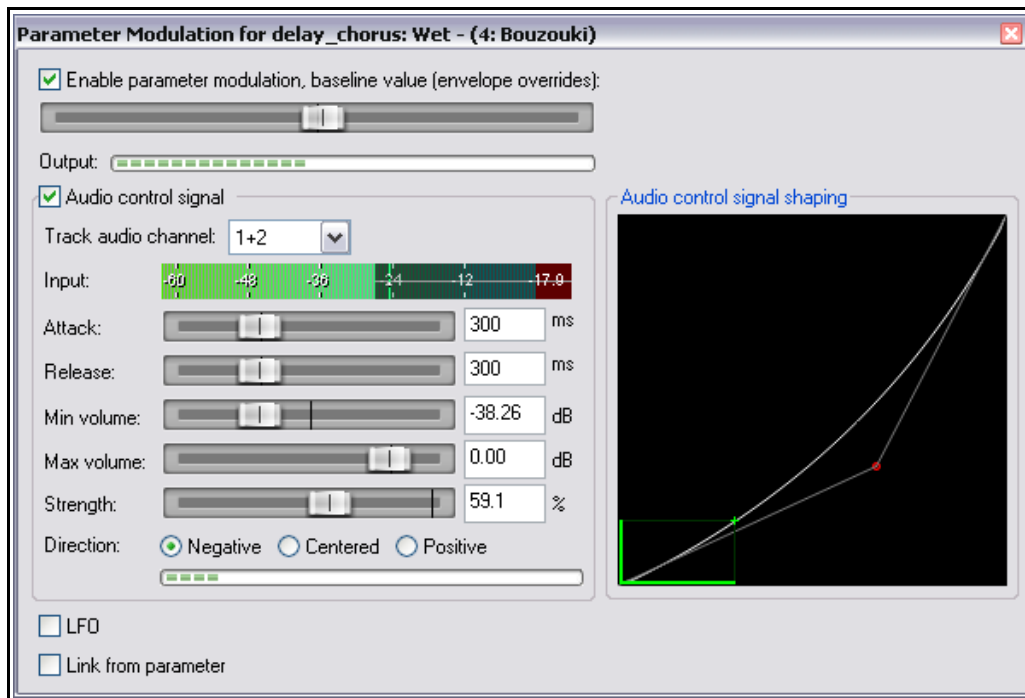
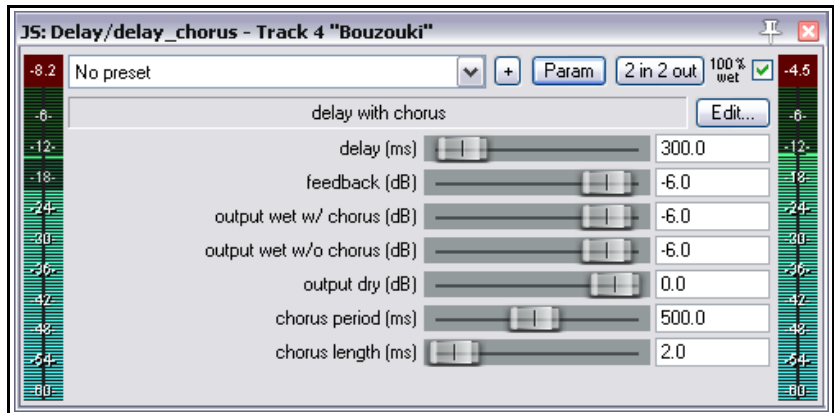
#### Example

1. Open the file **All Through The Night** and save it as **All Through The Night MOD1**.
2. Adjust track faders to get a reasonable mix. This could be Volume at -0.5 db, center, Guitar Body at 0 db, 55% left, Guitar Neck at 0 dB, 63% right, and Bouzouki at -4 dB, 15% left.
3. Solo the **Bouzouki** track. While working thru this example, this is the only track that will be needed.
4. Insert the **JS: Delay/delay\_chorus** plug-in into this track's FX chain, and set the various parameters as shown here.
5. Click on the **wet mix (dB) rotary** in this plug-in. Notice that currently this is set at 100%.



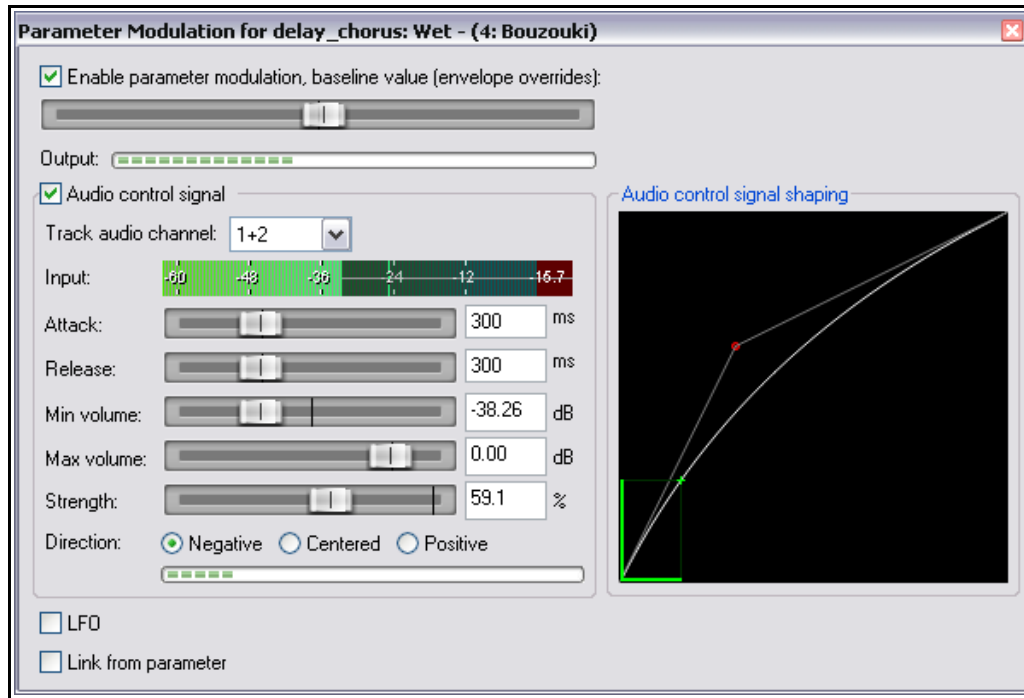
## 17 - Automation with Parameter Modulation

6. Click on the **Param** button, then choose **Parameter Modulation** from the menu. This will open a parameter modulation window for the wet mix rotary. Enable the option **Audio control signal** and select as the **Track audio channels** 1 + 2. Play the track.
7. The wet rotary on the plug-in was initially at 100%, as shown here. However, as you adjust the baseline fader (in the PM window) while the track is playing, the wet value in the Chorus window (shown to the immediate right of the 2 in 2 out button) is also adjusted. Leave it with a wet mix level of about 50%.
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) to the right will cause the wet mix chorus fader to be faded down for louder notes and down up quieter ones. Selecting positive reverses this.
  - Moving the **Min Volume** 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, adjust the settings to those shown here.



11. This instrument becomes louder as the song progresses. Play it, with the Bouzouki unsoloed. By the end, there is less chorus being applied to the bouzouki.

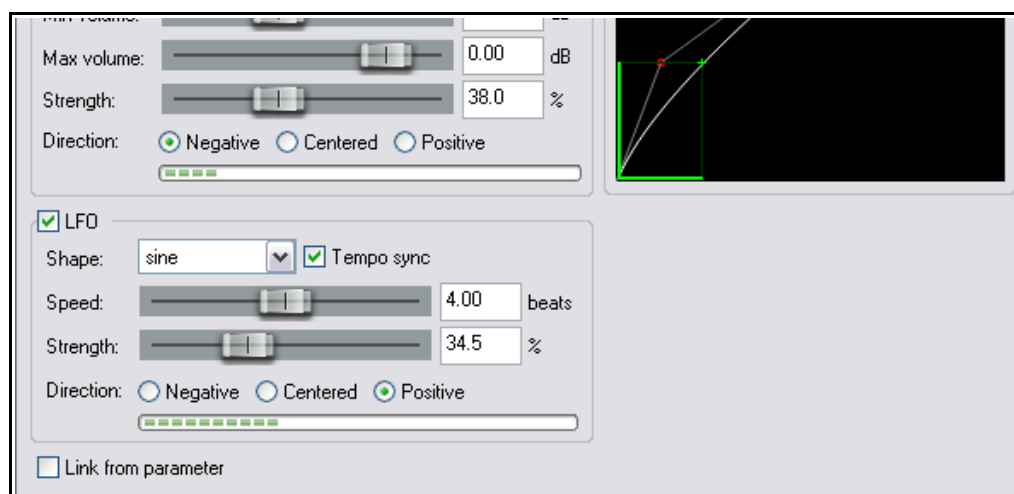
12. Now play the song again. Drag hold of the handle on the graph, and use your mouse to drag it to the lower right position. Notice that the movements of the wet mix fader now become more modest.
13. Now drag hold of the handle on the graph, and use your mouse to drag it towards the top left corner of the graph (as shown below). Notice that the movements of the wet mix rotary now become much sharper and the wet mix level stays well below 50%.



14. Restore the graph to its earlier position (shown at step 10) when you have finished. Save the file.

### 17.6 Using an LFO Shape with Parameter Modulation

Now let's have some fun and use a low frequency oscillator to further modify the way parameter modulation is applied. Adjust the shape of the curve as shown below. Try turning on the **LFO** option. Start with some fairly conservative settings as shown below. Selecting the **Tempo Sync** option should help make for a fairly safe outcome! The **Speed** setting controls the rate at which the signal is repeated. With this set to beats you should be able to stay in sync with the tempo.



## 17 - Automation with Parameter Modulation

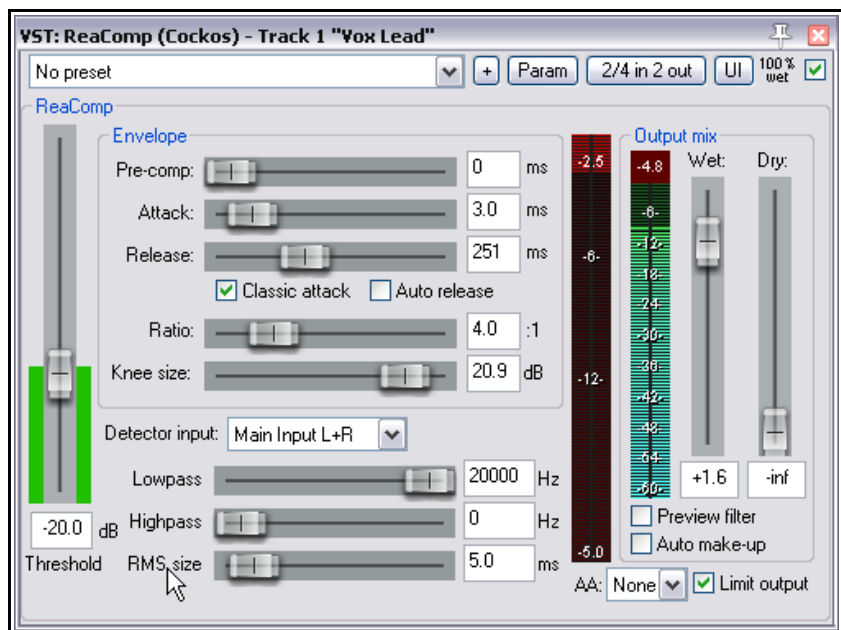
Compare how the track now sounds with PM enabled and disabled. If you are familiar with working with low frequency oscillators, you might wish to be a little more adventurous. Otherwise, just save the file as **All Through The Night MOD1 LFO**.

### 17.7 Using Parameter Modulation for 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 adjusted during the louder passages. This gives you a more precise control over the compressor's operation than would otherwise be possible.

#### Example

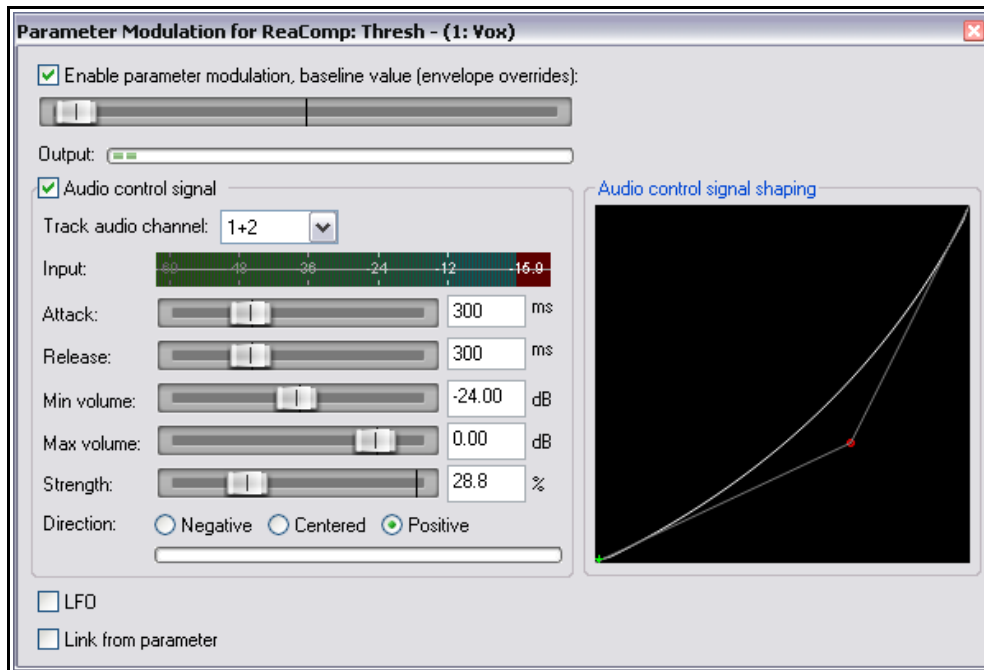
1. Open the file **All Through The Night MOD1** and save it as **All Through The Night MOD1A**.
2. Pan the Vocal track to the center and set its volume at about -0.5 dB
3. Insert an instance of **ReaComp** into the FX Chain for the **Vox** track.
4. Set the **Threshold** to about -24 and the **Ratio** somewhere around 4:1. Set **Knee** size to around 15dB. Set the **Wet** gain to about +1.6dB.
5. As you play the song, adjust the settings to suit. One possible set of suitable parameter values is shown on the right.
6. As you play the track you might feel that the compression at times sounds about right but at other times is being applied too heavily. This is where we can use the track's own volume level to control its 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.
7. Click once on the **Threshold** fader.
8. Click the **Param** button for this plug-in.
9. From the menu, then choose **Parameter Modulation**.
10. Study the suggested settings shown below and adjust your settings accordingly as you play the song. Refer to the comments below.
11. Notice in particular how the attack and release setting levels, the shape of the curve and the volume settings all help prevent the threshold from being adjusted too radically.
12. Save and close the file when finished.



#### Notes

By setting the Min Volume in the PM window to the same level as the Threshold in the ReaComp window we ensure that the PM is only applied when the vocal is at its loudest. The Strength setting of 33% effectively means that for every 3 decibels by which the volume exceeds the min volume, the threshold will be lifted by about 1 dB.

**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. If at first you do not seem to get any result, experiment especially with adjusting the baseline value setting.

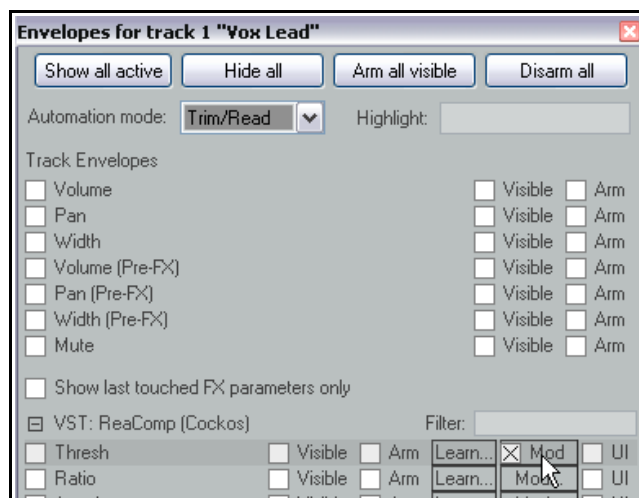


### 17.8 Bypass Mode

Whenever you create a parameter modulation for a parameter, 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). Otherwise you can do this from inside the Parameter Modulation window itself.

In the example shown here, PM settings exist for the Threshold (currently enabled).

Also, note that clicking on the word **Mod** for an item where parameter modulation already exists will cause that window to be opened (even if it is currently disabled) so that you can view and/or edit the settings.



### 17.9 Parameter Modulation Under Parameter Control

By linking parameters you can use dynamic changes in one FX parameter to directly control another. In this next example you will do just this, linking a track's EQ gain with its compressor threshold, so that whenever the compression threshold is raised a little more warmth is automatically added to the track.

1. Open the file **All Through the Night MOD1A** and save it as **All Through the Night MOD1B**.
2. In the vocal FX chain, add an instance of ReaEQ (after ReaComp). Select Band 2. Set the Frequency to about 180 Hz, the bandwidth to about 2.00 octave and the Gain to 0.0 dB.
3. With the ReaEQ window open, click on the Band 3 Gain control, then the **Param** button, then **Parameter Modulation** to open the Parameter Modulation window. Select the option **Link from parameter**.

## 17 - Automation with Parameter Modulation

- Click on the large button immediately below the **Link from parameter** option and choose **ReaComp** then **Threshold** (as shown here).
- While the project plays, adjust the baseline value fader so that the Gain on Band 3 in ReaEQ is restored to 0 dB.
- Set the **Offset** fader to 5% and the **Scale** to +100% (see notes below).
- Play the song and save the file.

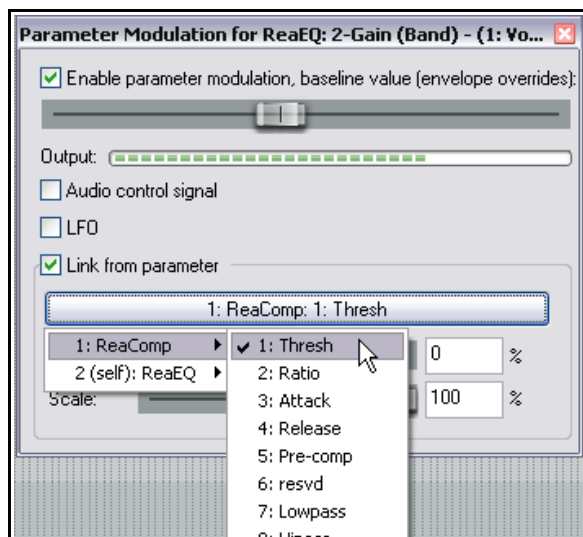
In our first two examples (17. 5 and 17. 6) parameter modulation was used to create quite a dramatic effect. In the last two examples (17. 7 and 17. 9), the effect is far more subtle.

The two controls **Offset** and **Scale** can be used to control the extent to which the controlling parameter (in this example the compressor's threshold) modifies the controlled parameter (in this case the EQ band gain).

The Offset fader increase (to the right) or decreases (to the left) by a specified percentage the value of the parameter being modified

The Scale fader covers a range from -100% to +100%. At -100% the relationship between the controlling parameter (threshold) and the controlled parameter (EQ band 2 gain) will be 100% negative: the EQ gain will be lowered exactly as the threshold is raised. At +100% the relationship will be 100% positive and the opposite will occur.

Parameter modulation is a very powerful feature indeed. You will get the best out of it if you are prepared to experiment and be creative. For example, in the above example you could add a parameter control for another EQ Gain (perhaps Band 3), driven this time directly by the track's audio signal. Another example would be to use, say, the threshold on one compressor to drive directly the threshold on another compressor, independently of audio control.



### 17.10 Using Parameter Modulation with an Envelope

When you have an automation envelope enabled 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. This can produce some interesting results.



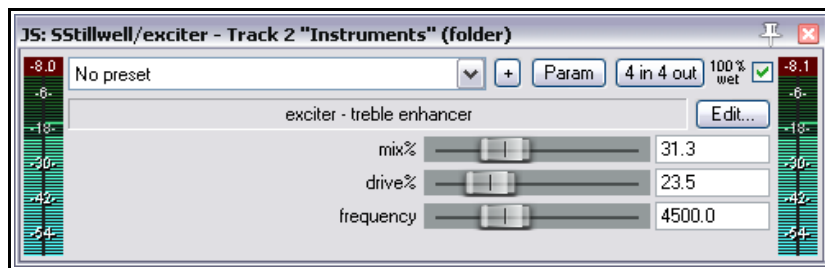
Here we have added an envelope to control the **Band 3 EQ Gain** setting of ReaEQ. By clicking the **Modulate** button in the envelope lane we are able to open the Parameter Modulation window and take the necessary steps to ensure that the EQ gain will respond automatically to changes in the strength of the audio signal on this track. In this example, when the envelope is lowered just after the current position of the play cursor, the baseline value of the parameter being modulated will also be lowered.

### 17.11 Parameter Modulation under Sidechain Audio Control

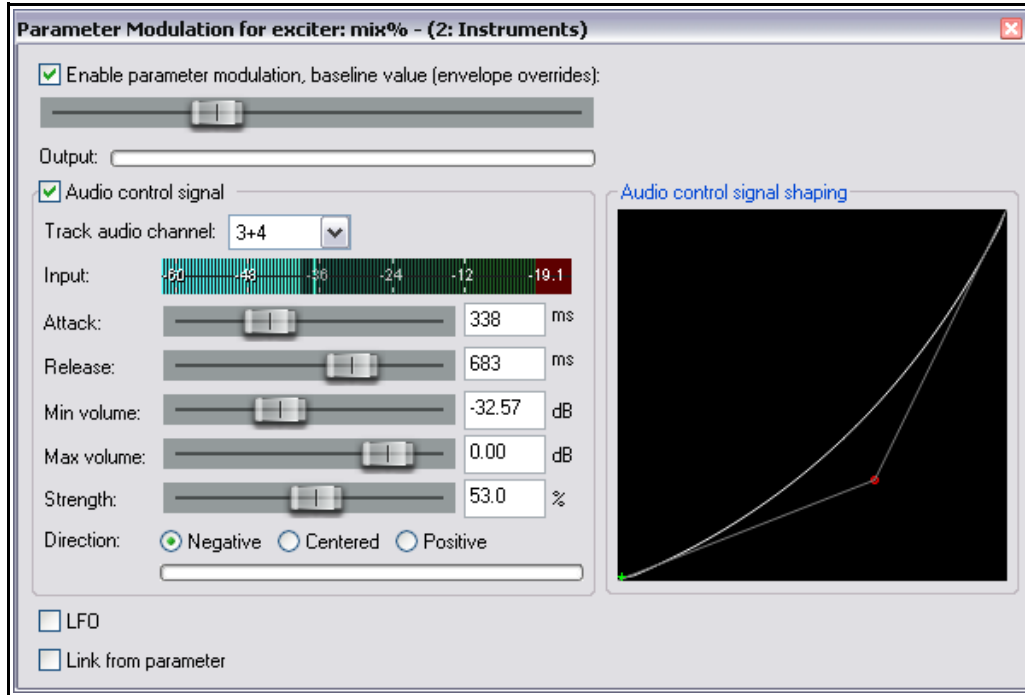
This next example introduces another application for Parameter Modulation. In this case, we will use the audio signal from one track (a vocal track) to shape the sound of an instrument submix (that is, a folder track containing several instrument tracks). This will be done in such a way as to cause the instruments to appear to pull back slightly during the vocal passages.

#### Example

1. Open the file **All Through The Night MOD1** and save it as **All Through The Night MOD2**.
2. Remove or set to bypass the delay plug-in in the Bouzouki track's FX chain.
3. Insert a new track after the vocal track. Name this track **Instruments** and make it into a folder. Insert the three instrument tracks into this folder, 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 4:1.
6. Select the Instruments folder and display its Routing (IO) window. Set the number of track 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 **JS: SStillwell/exciter**. This will be used to brighten up the instrument a little.
8. Settings similar to those shown here will definitely brighten the instruments, perhaps more than you would like. For the sake of this exercise, however, these levels should be fine.
9. We are now going to use parameter modulation to ensure that audio signal from the vocal track drives down the mix level of the exciter. This will have the effect of helping the vocal to just float over the instruments a little.
10. Click on the **Mix %** control, then on the **Param** button and choose **Parameter modulation** from the menu.
11. When the PM window is opened, enable parameter modulation and use the baseline fader to set the baseline level for the Mix % back to about 30%.
12. Select **Track audio channels 3/4** and make the direction **Negative**.
13. Adjust the other parameters so that as the vocal floats above the instruments the Mix % of the Exciter is smoothly and gently faded down.
14. One possible solution to this exercise is shown below. But don't just dive straight in and copy these settings. Try to get there by yourself!
15. Save the file when you are finished.





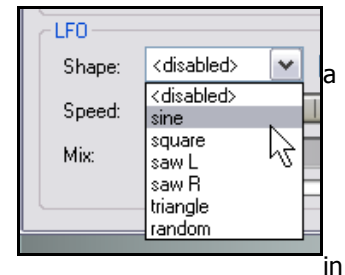


### 17.12 Further Applications

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. The opportunities here can take you well beyond the introductory example used earlier this section.
- 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.



### 18 Exporting Files, Mixing Down and Rendering

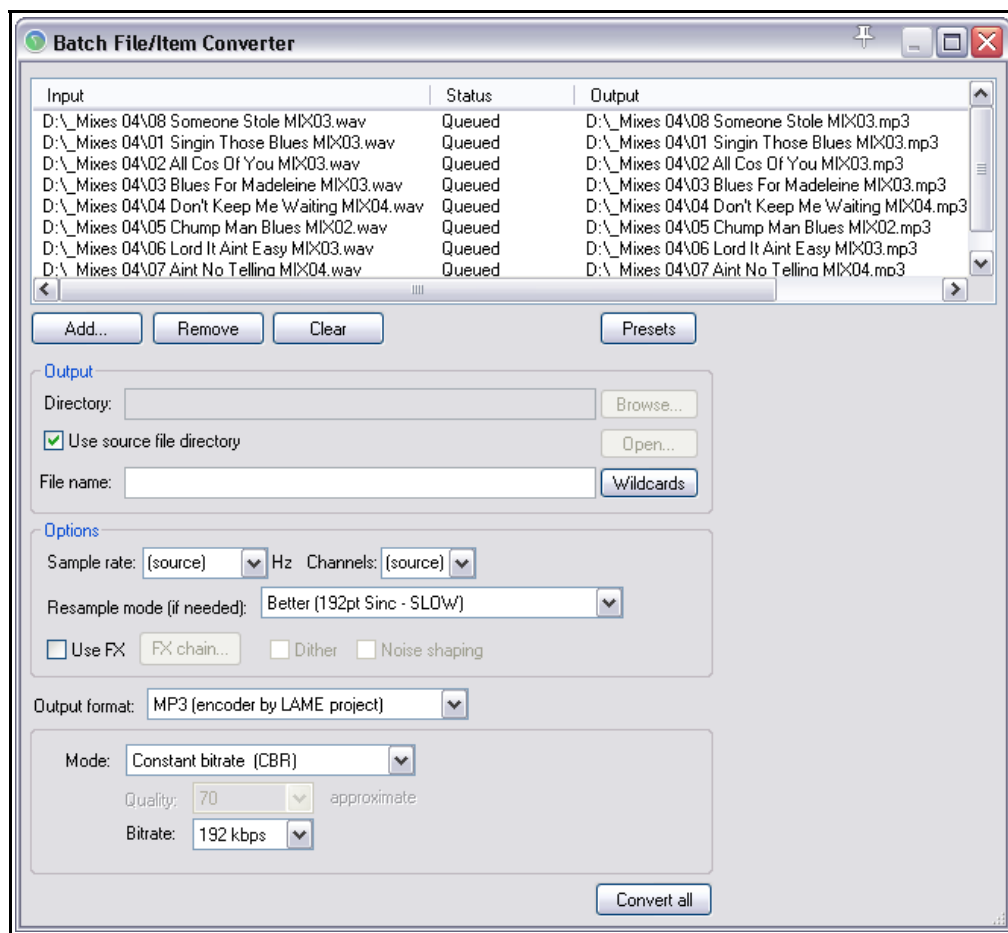
#### 18.1 Batch File Conversion

You might have a number of recorded tracks that you need to convert to another format, e.g. from .WAV format to .MP3.

These can all be handled in one pass, using REAPER's batch file converter. To access the file converter, first choose the **File, Batch file/item converter** command from the main menu.

This causes the dialog box shown here to be displayed. Then follow this sequence:

- To specify items in the current project to be converted, select the items in Arrange view then click on **Add**, then **Add media items**.
- To specify files that you wish to have converted, click on the **Add...** button, then **Add files...** then use the browser to make your selection, then click on **Open**.
- To remove any file from the current selection, click on its name in the File Converter window, then click on the **Remove** button. To clear the entire selection, use the **Clear** button.
- Leave the **channels** and **samplerate** settings at source to use the same values for your output files as are used by your input files. Otherwise, you may make what changes you like – e.g. from stereo to mono, or from 88.2 kHz to 44.1 kHz.
- To convert the files, after making your selection on the **Convert** button. This opens the **File Conversion** window (see above).
- Select your required output format (e.g. MP3, OGG, FLAC) and any parameters associated with that format. Depending on the format, you might have the options for dithering and/or noise shaping.
- Optionally, you can select **Use FX**. If you select this option, you should also click on the **FX chain...** button to specify your required effect(s) – for example, perhaps a limiter.
- Specify your required output (destination) folder and click on **Convert All** to implement the file conversions.
- Close the File Converter window when finished.



### 18.2 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.

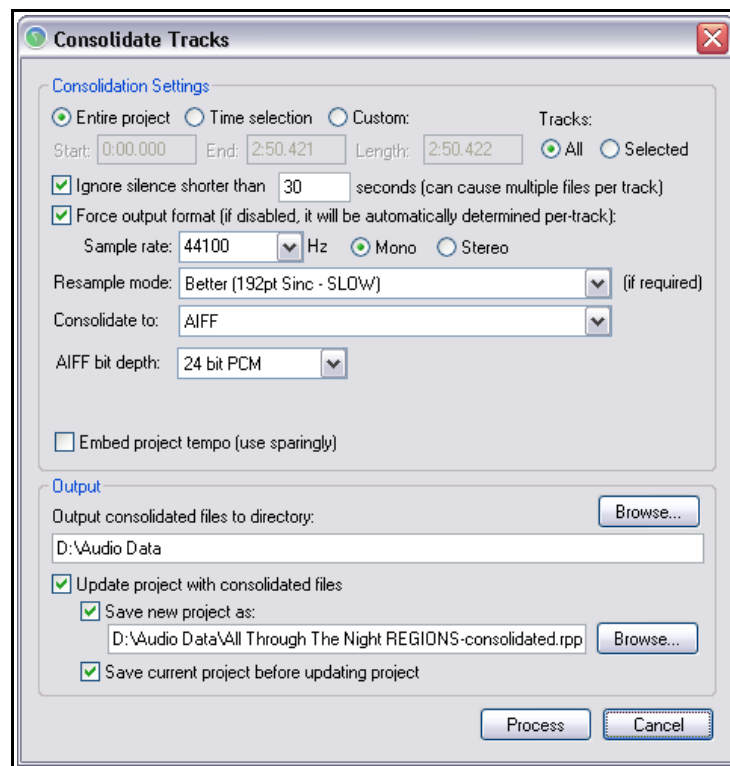
But what if she doesn't use REAPER? Perhaps she uses a different software program, or perhaps she doesn't have a DAW herself and will need to use a commercial studio for this purpose. In this case, it should first be consolidated and exported. Take a look at this example:



In the example shown here, the Vox track is made up of three separate items, each covering part of the total song. If we were to hand a copy of the media files (six in all) to someone else, then it would be quite a job for that person to line everything up.

That's where consolidate and export comes in. 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 have this determined on a per track basis.
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.
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 your project with the newly consolidated files.
8. Specify a name for the new project file (or accept the default). Click on **Process**.



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.

**Note:** Be careful how you use the option to **Embed project tempo**. It adds an ACID tempo tag to the audio file(s). This may be interpreted by any tempo aware application so that the audio is stretched or processed when you do not wish this to happen. Only enable this option if you are certain you want the tempo embedded.

## 18 - Exporting Files, Mixing Down and Rendering



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 the correct free Lame encoder file for your platform and REAPER version. For example, for Windows XP or Vista this is **lame\_enc.dll**. For 64 bit Windows it will be either **libmp3lame.dll** or **lame\_enc64.dll**. The file should be 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.

### 18.3 Rendering A Project

As you'll find out before you reach the end of this chapter, the **File, Render...** command has several diverse uses. One common one is for rendering a complete project down to a single stereo file.

Let's say that 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 want to produce an end product for distribution.

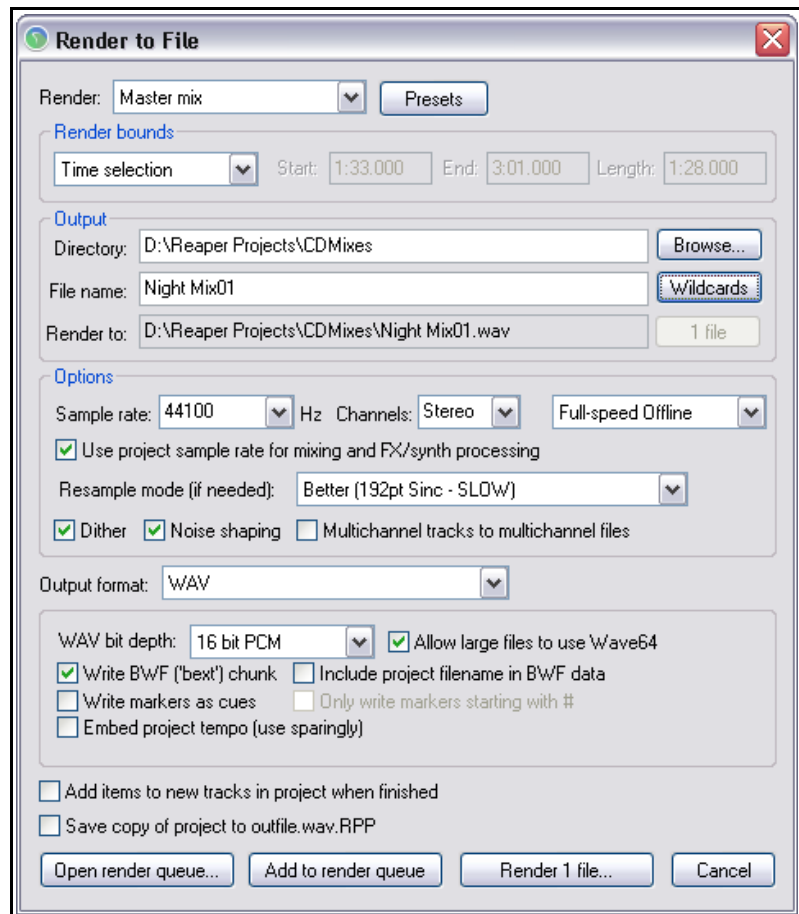
If you're aiming for an audio CD, you will need one 16 bit stereo wave file for each song on the CD.

If you're distributing thru the web, then most likely you will want a series of stereo MP3 files. But whatever format you're using, each project will ultimately need to be rendered down to one file.

To do this, we use the **File, Render** command. You can also use the shortcut **Ctrl Alt R**.

The dialog box on the right shows your various options. You must specify a directory and file name: if you wish, use the **Browse** button for either or both of these. Your other choices will depend on the ultimate destination of your material.

A summary of **Render to File** dialog box options follows below.



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Option	Explanation
<b>Render</b>	Choose master mix to mix all material to a single file, stems to render selected tracks to separate files, or both.
<b>Presets</b>	You can save your settings as a preset, or load a previously saved preset.
<b>Render Bounds</b>	Choose custom time range (enter in edit boxes), entire project, time selection (make selection in arrange view) or project regions (use region manager to select regions).
<b>Directory File Name</b>	Enter these in the edit boxes, or use the Browse button. Use the <b>Wildcards</b> button if you want to automatically include in rendered file names any information such as (where appropriate) track name or number, region name, project file name, or date and time information.
<b>Sample Rate</b>	Select a value in the range 8000 to 192000, depending on output format and other factors. Some examples follow in the table after this one.
<b>Channels</b>	Choose mono, stereo or select a number for multichannel output.
<b>Speed</b>	Full-speed (default) for fastest rendering. Others include 1 x offline and online.
<b>Resample mode</b>	Various options allow trade off between speed and quality. Default is 192.
<b>Dither, Noise Shaping</b>	Not available with all output formats, commonly used when rendering 24 bit (or higher) audio material to 16 bit WAV format for audio CD. Creates a smoother transition to the lower sample rate in the rendering process. Consult Wikipedia for a detailed explanation of these techniques.
<b>Multichannel options</b>	Multichannel tracks can be rendered to multichannel files. An example of this follows shortly.
<b>Output format</b>	Choose from WAV, AIFF, monkeys audio, audio CD image, FLAC, MP3, OGG Vorbis, video (FFmpeg), video (GIF), or WavPack.
<b>Format specific options</b>	Several other options will be specific to your selected format. For example, for WAV or AIFF files, bit depth will need to be specified, for FLAC you must select FLAC encoding depth and data compression level.
<b>Add items to new tracks in project</b>	If enabled, this option causes your rendered file(s) to be added to the project as new tracks.
<b>Save copy of project to outline.wav.RPP</b>	Tells REAPER to make a time and date stamped copy of your project file, preserving all settings exactly as they are at the time of rendering.
<b>Open render queue Add to render queue</b>	These options are used in batch rendering, which will be discussed shortly.
<b>Render x files</b>	Causes the project to be rendered to one or more files, depending on and according to your selected options.

### Project Rendering Examples

Example	Specification
<b>DVD Audio Soundtrack</b>	Sample Rate: 48000 HZ, Channels: Stereo, Higher Quality Output format: WAV format, 24 bit
<b>CD Audio</b>	Sample Rate 44100 HZ, Channels: Stereo, Higher Quality Output format: WAV format, 16 bit
<b>Apple Mac</b>	AIFF Format. Consult the engineer who will be working with the file for advice on preferred settings.



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Example	Specification
<b>Web Site / Web Audio</b>	<p>Sample Rate 44100 HZ, Channels: Stereo, Higher Quality</p> <p>Output format: MP3 format</p> <p>Other options may vary as you trade off files size and download time against audio quality, but a typical selection might be:</p> <p>CBR (Constant Bit Rate) 96 or 128, Joint Stereo, Quality High</p>
<b>Monkey's Audio</b>	Use this format for lossless compression at 16 or 24 bit, sample rate as preferred.
<b>Audio CD Image (Cue/Bin) format</b>	<p>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.</p> <p>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.</p> <p>Further information about how to do this can be found later in this chapter.</p>
<b>Multichannel Tracks</b>	<p>We look at channel splitting and creating multichannel tracks in detail elsewhere in this User Guide, and especially in Chapter 15. 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> <div> </div> <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>

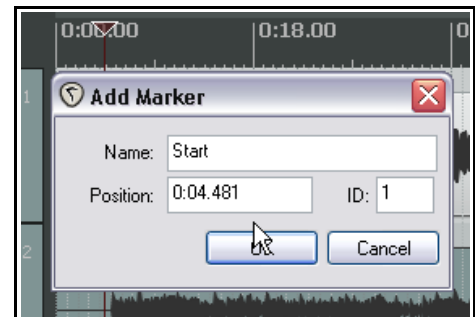
Shown here (below) is a four channel track (Track 1) rendered in multichannel format (Track 2).



### 18.4 Rendering a Finished Song

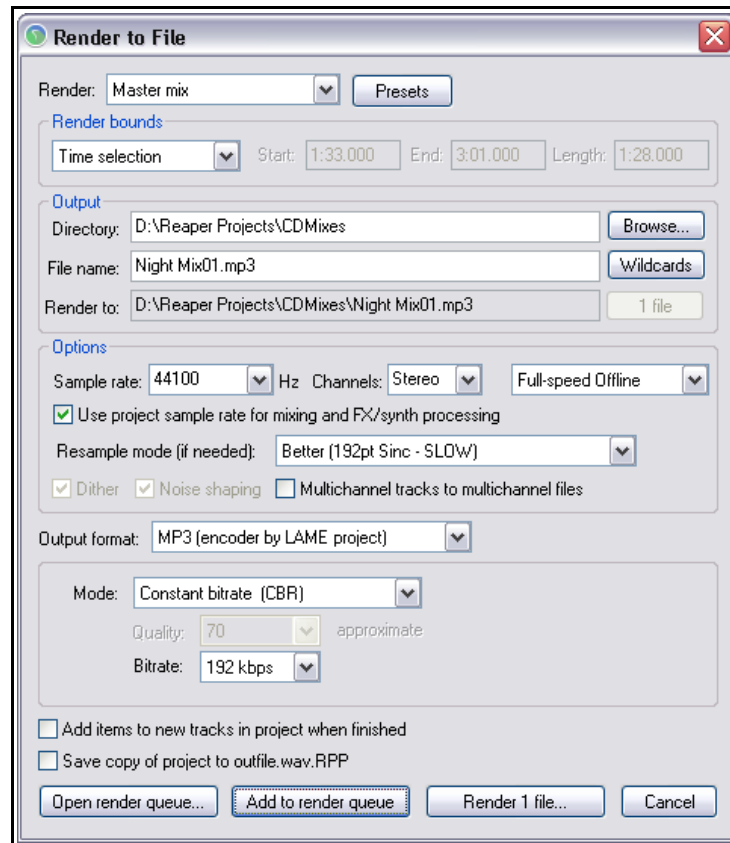
As mentioned earlier, when rendering a finished song you will be likely to make different output format choices depending upon whether your final destination is, for example, audio CD or the web. However, there are a few tips that you may wish to keep in mind which are equally applicable to both.

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:



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1. Position the play cursor at the point where you 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 on the marker line (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 **Time selection** from the Render Bounds drop down list.. The settings shown at the start of section 18.3 would be suitable for producing a file for CD audio. Shown here are those that would be suitable for producing a .MP3 file. Notice that for MP3 some options (e.g. dither and noise shape) are not available.
6. When you are ready, click the **Render 1 file ...** button in this dialog box to create your rendered file.



### 18.5 Batch Rendering

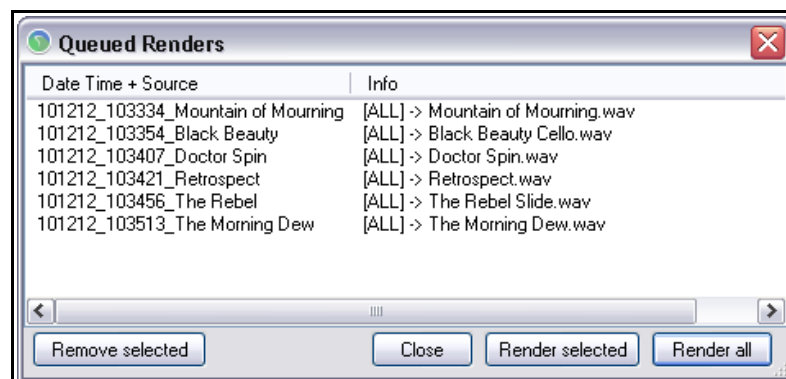
You might have a whole collection of songs (perhaps to go together on a CD), and that you may wish to render all of the songs together when the project is finished. That way, you can go away while REAPER renders your entire collection of songs, and then come back later. The procedure for doing this is 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 Render1 File button. Instead, click the **Add to Render Queue** button.
4. The dialog box will be closed, and nothing appears 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.



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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.

### 18.6 Burning an Audio CD with REAPER

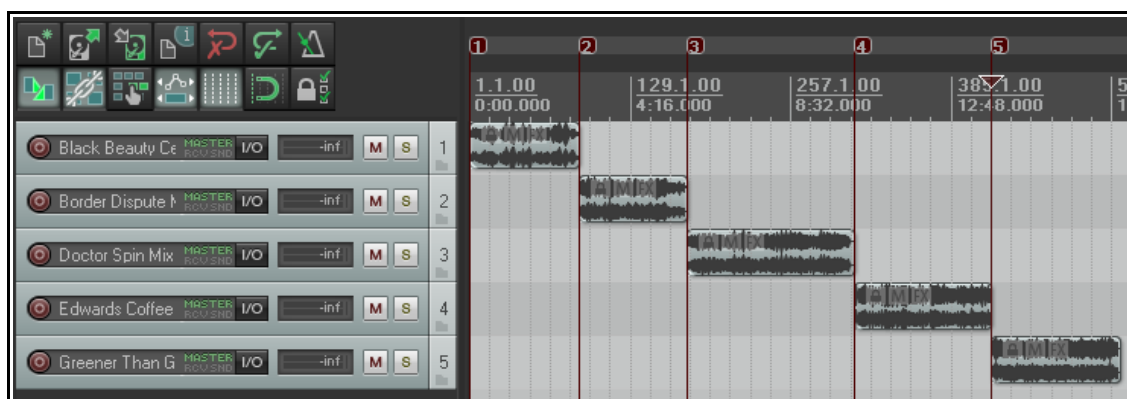
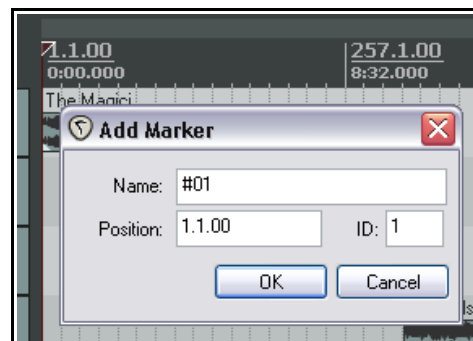
There are at least two situations in which you might wish to burn your material direct to an audio CD.

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, with some slight differences in how you set the project up.

#### 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 here:



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:

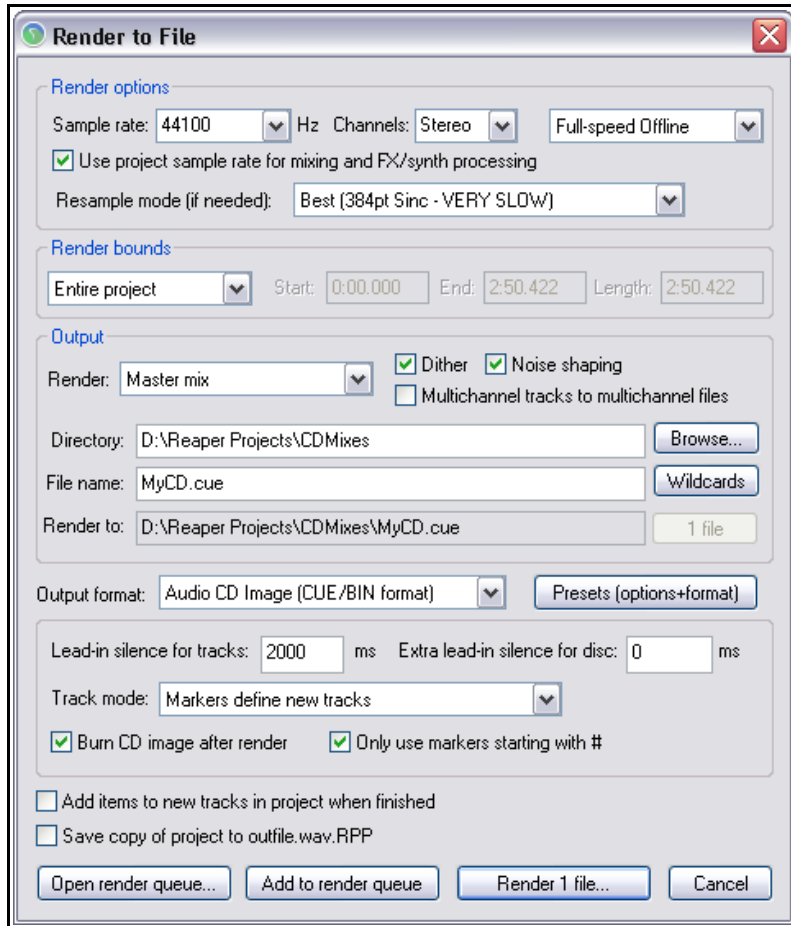


6. Save the Project File.
7. Now follow the instructions below for **Burning the CD**.

## Burning the CD

1. Choose the **File, Render** command. You should now select the necessary options and settings for burning your CD.
2. **Sample rate:** 44100  
**Channels:** 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/or **Noise Shape** options.



## 18 - Exporting Files, Mixing Down and Rendering

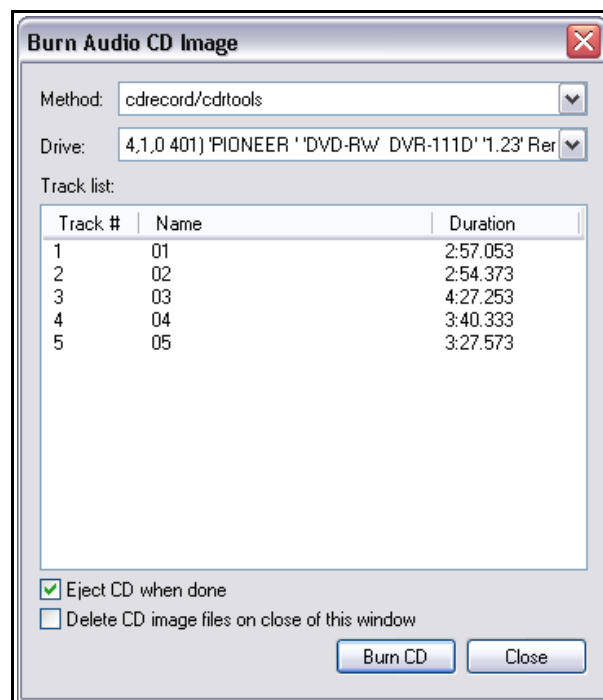
media items lined up on different tracks) you will probably also want to specify a **Lead in silence for tracks** of 2000 ms.

- 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/cdtools** as shown.
- Select **Eject CD when done**. Decide also whether or not you wish to keep or delete the CD image files when done. It's probably worth keeping it, at least for now. If you have any problems with burning the CD itself here, you might well be able to use the image file with another CD burning program such as Nero or Toast.
- Insert a blank CD into your CD drive and wait for it to load.
- Click **Burn CD**.
- 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.

### Note:

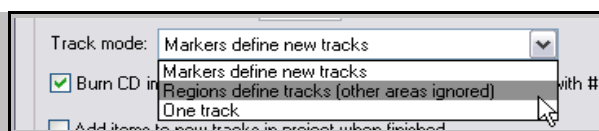
Instead of using markers to define the start of your tracks, you can if you wish create a separate **region** for each CD track and use the **Regions define tracks (other areas ignored)** option. Only that part of the material that is included in your regions will be burnt to CD.

A further option is to burn the contents of the project as **One track**.



**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.



### 18.7 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.

### 18.8 Rendering in Surround Format

When you are rendering a project for surround format, most of the settings will be made as for any other project (such as a stereo mix).

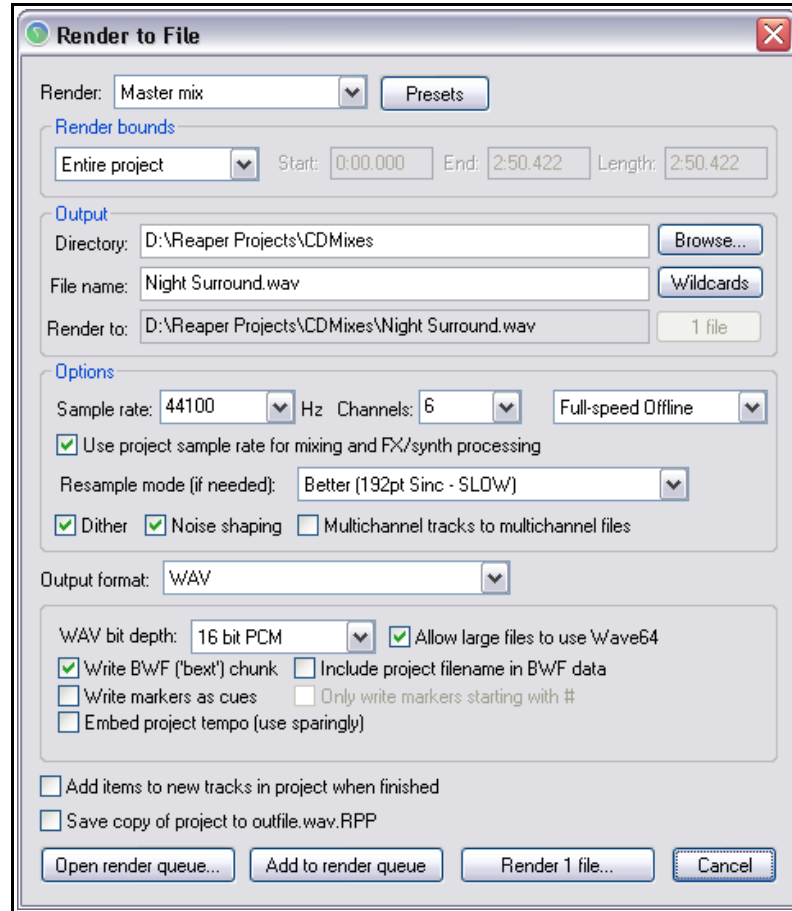
The one important difference is that you should be sure to select the correct number of channels.

In the example shown here, the project is for 5.1 surround, therefore 6 channels have been selected.

REAPER will render this project into a single multichannel file. You may later need to convert the interleaved multichannel file into multi-mono files of the type required by Dolby and DTS encoders.

REAPER itself does not do this, but there are a number of good tools available which will do this for you.

These include **Wave Agent** - <http://www.sounddevices.com/products/waveagent.htm>.





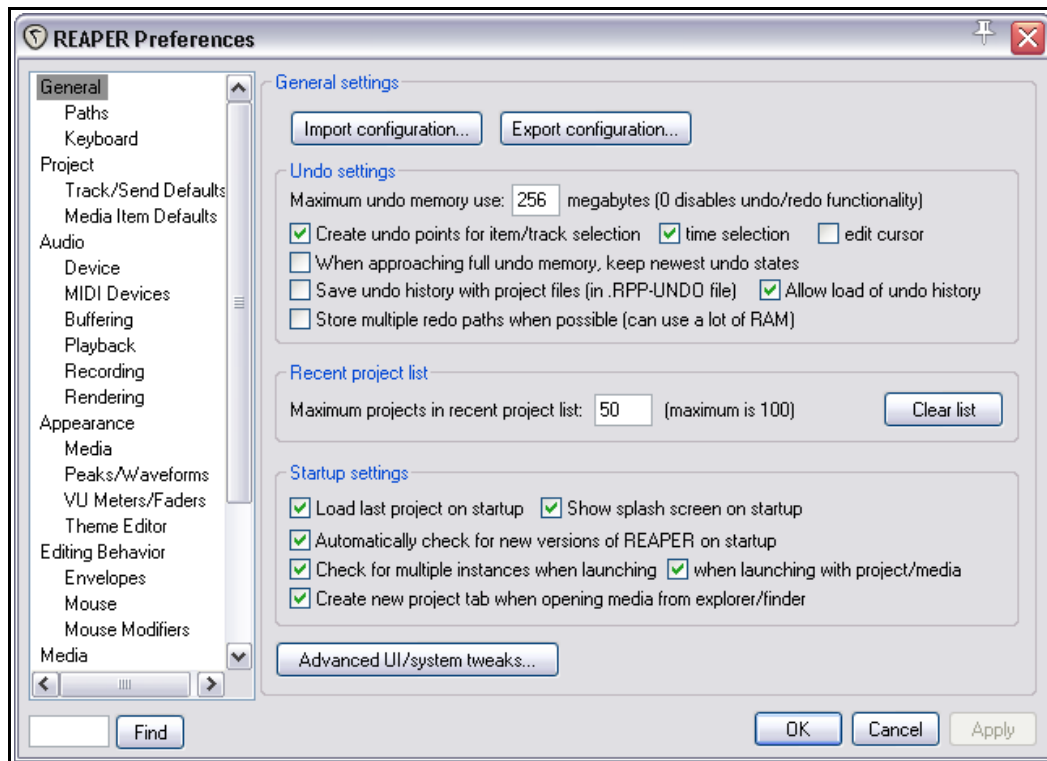
## 19 REAPER's Preferences and Other Settings

### 19.1 Introduction

At several places in this User Guide we have encountered the use of preferences and settings. 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. Don't worry about the sheer number of options available. In many cases, you'll probably be perfectly happy to leave the program settings as they are and just let it run.

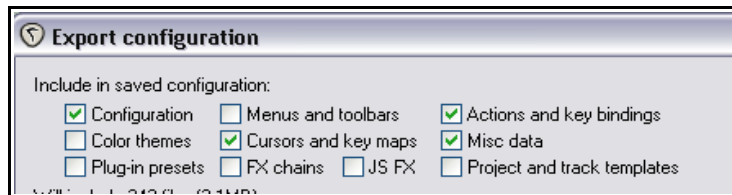
Not all of the options and preferences are covered in this chapter. If you need any further information about any of REAPER's other preferences and settings, go to the REAPER WIKI or the REAPER forums.

### 19.2 General Preferences



Most of the settings on the **General** page fall into a number of categories, namely:

- ◆ **Import and Export.** These buttons can be used to consolidate, save and export your various settings and configurations to a ReaperConfigZip file, or to import them from such a previously saved file. As you can see here, you can include any of a large number of settings, including your REAPER configuration, menus and toolbars, actions and key bindings, color themes, plug-in presets, FX chains and miscellaneous data.
- ◆ **Undo Settings.** These are explained in Chapter 2 and re-examined near the end of this chapter.
- ◆ **Recent Project List and Startup Settings,** as explained in Chapter 1.
- ◆ **Advanced UI System Tweaks.** These allow for a number of options, including the scaling of UI elements such as your icons and panels. We'll deal with these later in this chapter.



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Within the **General** preferences category you will find two more pages – **Paths** and **Keyboard**.

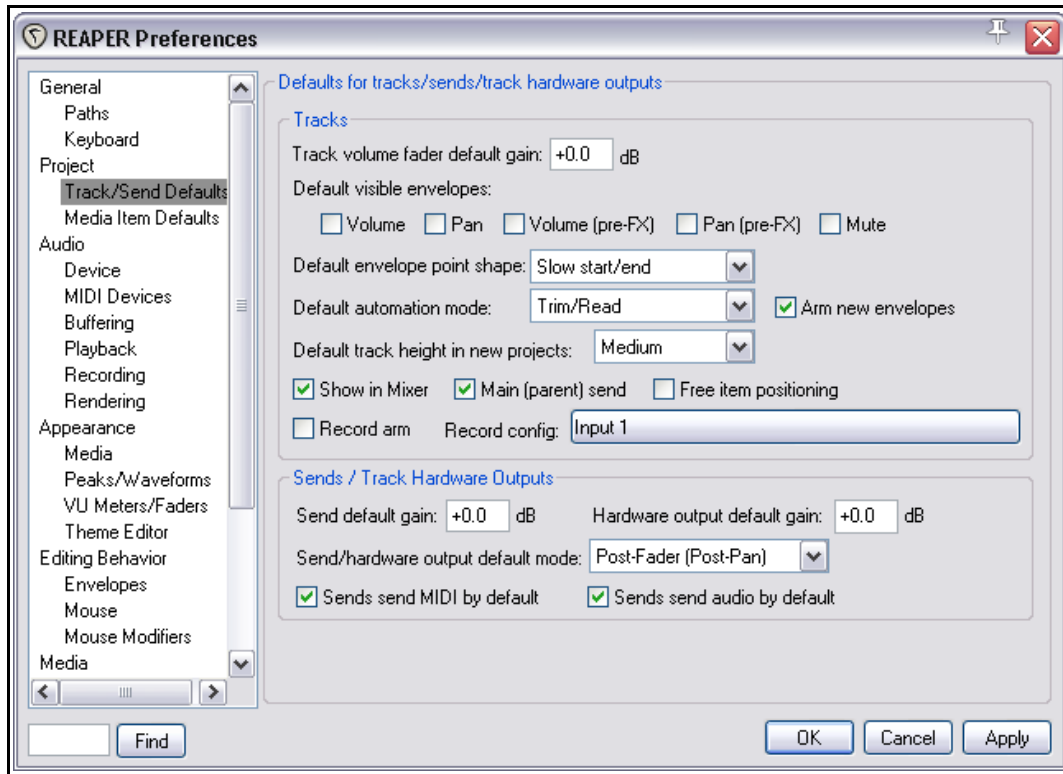
Settings Page	Main Options
<b>Paths</b>	<p>Here you can set (individually) default paths for REAPER to use when rendering, recording, and/or for storage of waveform peaks.</p> <p>The last of these will only be applied if under Preferences, Media the option to <b>Store all peak caches in alternate path</b> is enabled.</p>
<b>Keyboard</b>	<p>This page consists of two main sections – <b>Keyboard</b> and <b>Multi-touch</b>.</p> <p>The <b>keyboard</b> section includes the following:</p> <p><b>Commit changes to some edit fields after 1 second of typing.</b> Enabled, this allows, for example, a play rate to be typed in to the relevant Transport Bar field without your needing to press <b>Enter</b></p> <p><b>Use alternate keyboard section when recording.</b> You must enable this if you wish to use your Main (Alt recording) keyboard shortcuts when recording.</p> <p><b>Prevent ALT key from focussing main menu.</b> Enabling this will stop the main menu getting focus when the Alt key is pressed.</p> <p>You can click on either of the two links in this window to open the action list editor (Assign keyboard shortcuts ....) or to open your web browser with a list of keyboard shortcuts (View keyboard shortcuts as ....).</p> <p>The other section allows you to customise the behavior of your <b>Multi-touch</b> trackpad or similar, if you have such a device. Refer to the Preferences, General, Keyboard window and your device's documentation for a list of options.</p>

### 19.3 Main Project Preferences

REAPER's main **Project** settings page is in some respects less interesting than either of its two sub-pages (see below). Nevertheless, it has some useful items, including:

- ◆ The option to specify a **default .RPP** file to use as a **template** when starting new projects.
- ◆ Whether to prompt you to save whenever a new project is created. This can be a useful reminder to you if you wish to use a separate sub-directory for the project and its media files.
- ◆ Whether to open and **display the project settings window** when a new project is created. This can serve as a handy reminder, for example, if you need to set a project time signature or timebase that is different from your default.
- ◆ Whether to prompt you with a warning if a project that you are attempting to load cannot be found. This can happen, for example, when an older project has been deleted but remains on the Recent Projects list.
- ◆ Whether to show the file load status and REAPER's splash screen when a project is loading.
- ◆ Whether to save project file references with **relative pathnames**. This can be useful, for example, if a project is likely to be moved from one disk to another.
- ◆ Whether to **automatically create a backup** file (.RPP-BAK) from the previously saved version of a project file when it is resaved, and if so whether to timestamp it. Enabling these options can be a wise precaution to help you recover data if, for example, a project file becomes corrupted.
- ◆ Whether to **auto-save** your projects and, if so, at what intervals. The default (if this is enabled) is 15 minutes. This can help prevent work from being lost due to power outages or computer crashes.
- ◆ Whether to include your **Undo history** when the project is being auto-saved. This option will only be applied if saving undo history is enabled in your General preferences.

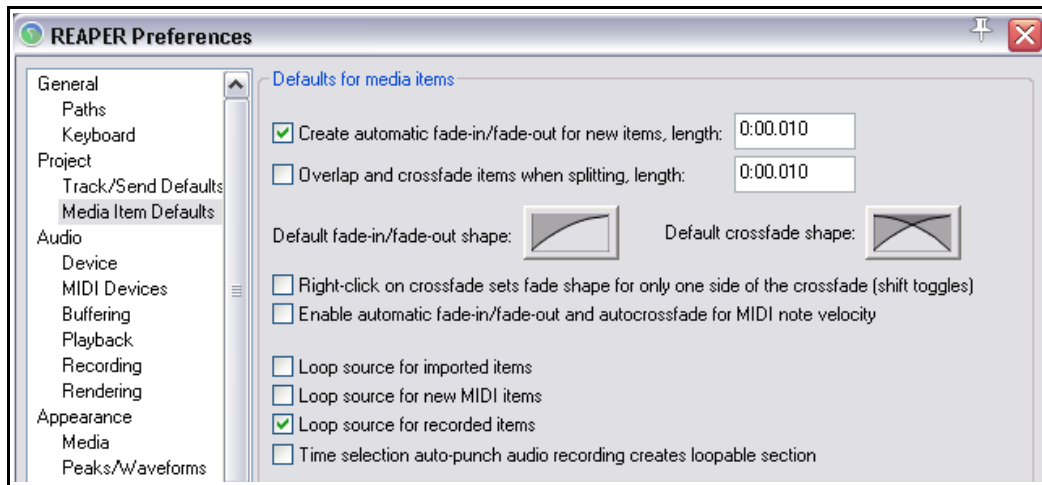
## 19.3.1 Project Track/Send Defaults



As the page name implies, you'll find two groups of default settings here – one each for **Tracks** and **Sends**.

Settings Group	Main Options
<b>Tracks</b>	<p><b>Track volume fader default gain:</b> sets the initial volume fader level for new tracks. Default is 0.0 dB.</p> <p><b>Default visible envelopes:</b> allows you to specify any envelopes (e.g. Volume, Pan) that you would like automatically displayed for new tracks.</p> <p><b>Default envelope point shape:</b> sets the shape for new envelopes (e.g. Linear).</p> <p><b>Default automation mode:</b> sets automation mode (e.g. Trim/Read) for new tracks.</p> <p><b>Default track height in new projects:</b> choose from small, medium and large.</p> <p><b>Show in mixer:</b> whether or not new tracks by default are shown in Mixer.</p> <p><b>Main (parent) send:</b> whether send to Master (top level tracks) or parent folder (child tracks) is by default enabled.</p> <p><b>Free item positioning:</b> whether FIPM is by default enabled for new tracks.</p> <p><b>Record-arm:</b> whether new tracks are automatically armed for recording.</p> <p><b>Record config:</b> default recording settings for new tracks, e.g. whether monitoring is on, whether to record audio input or MIDI, default input source.</p>
<b>Sends/Track Hardware Outputs</b>	<p><b>Send default gain:</b> default volume fader level for new track sends.</p> <p><b>Hardware output default gain:</b> default volume fader level for new hardware sends.</p> <p><b>Sends/hardware output default mode:</b> default send type (e.g. Post fader/Post pan).</p> <p><b>Sends ... by default:</b> whether sends by default include audio or MIDI or both.</p>

### 19.3.2 Media Item Defaults



REAPER's **Media Item Defaults** include:

- ◆ Whether to use automatic fade-ins/fade-outs on new items, and if so how long they should be.
- ◆ Whether to overlap and split crossfade items, and if so by how much.
- ◆ Default fade and cross fade shapes.
- ◆ Whether right-clicking on one side of crossfade set should change only that side (use **Shift** to toggle).
- ◆ Whether to allow automatic fades and crossfades for MIDI note velocity.
- ◆ Whether to loop source imported items and/or new MIDI items and/or recorded items.
- ◆ Whether time selection auto-punch audio recording should create a loopable section.

### 19.4 Audio Configuration and Settings

We've already mentioned (Chapter 1) the **Audio Device** screen (in the **Preferences** window), but it's worth discussing this topic a little more.

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.

## 19 - REAPER's Preferences and Other Settings

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.

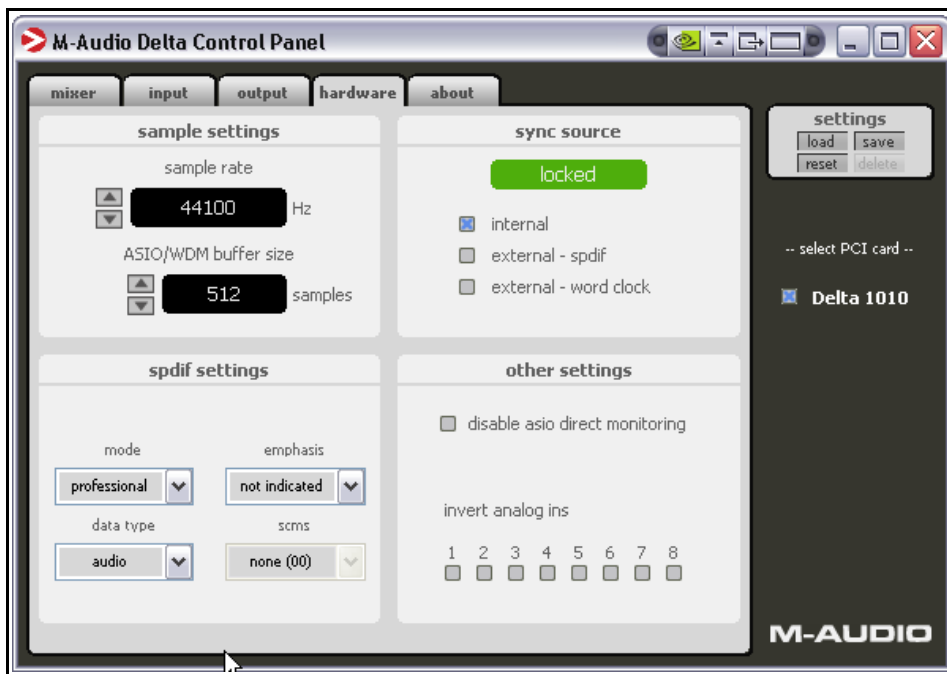
Thus, as you play back your audio, Windows hands over to your sound card a block of audio that the sound card releases at a steady rate to your external amplifier. If it empties these buffers before Windows gets round to handing it some more, then you've got a problem. The same principle applies, but 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.

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).

**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.

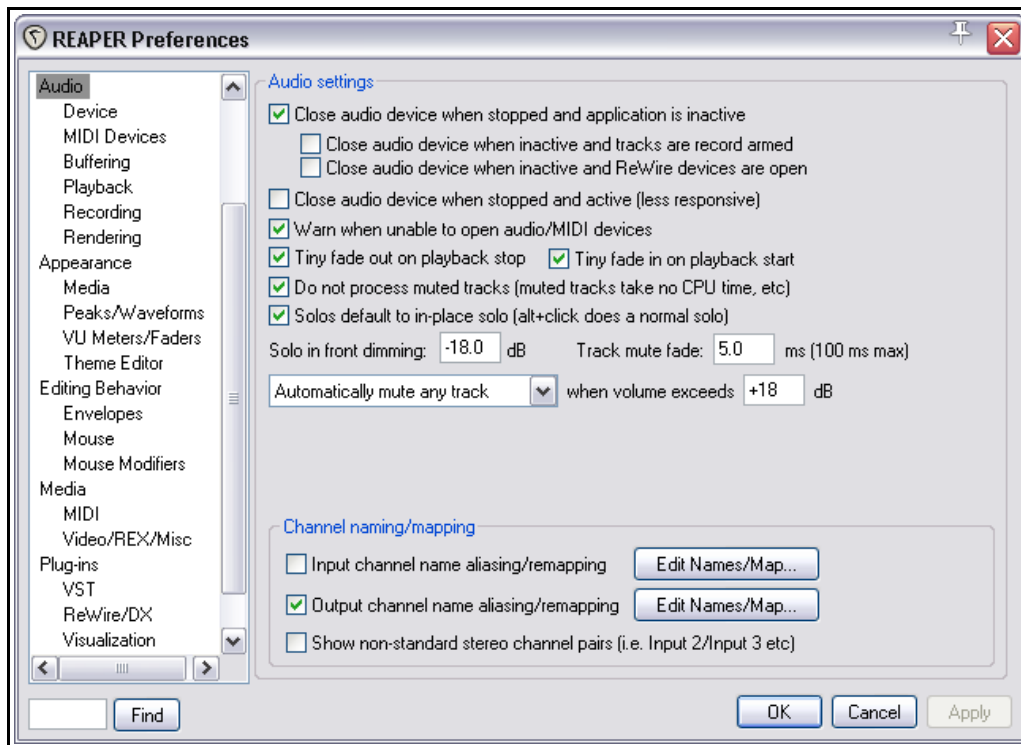
As a rule, low levels of latency are only really needed for recording, not when you are only playing audio back. Therefore, if you find that you are pushing your CPU close to its limits, you will often be able to fix this by accessing your audio card's control software and increasing the buffer size.

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.

Another important aspect of your Audio preferences is your **MIDI Devices** settings page. This has been covered in Chapter 1.

### 19.5 Audio Preferences



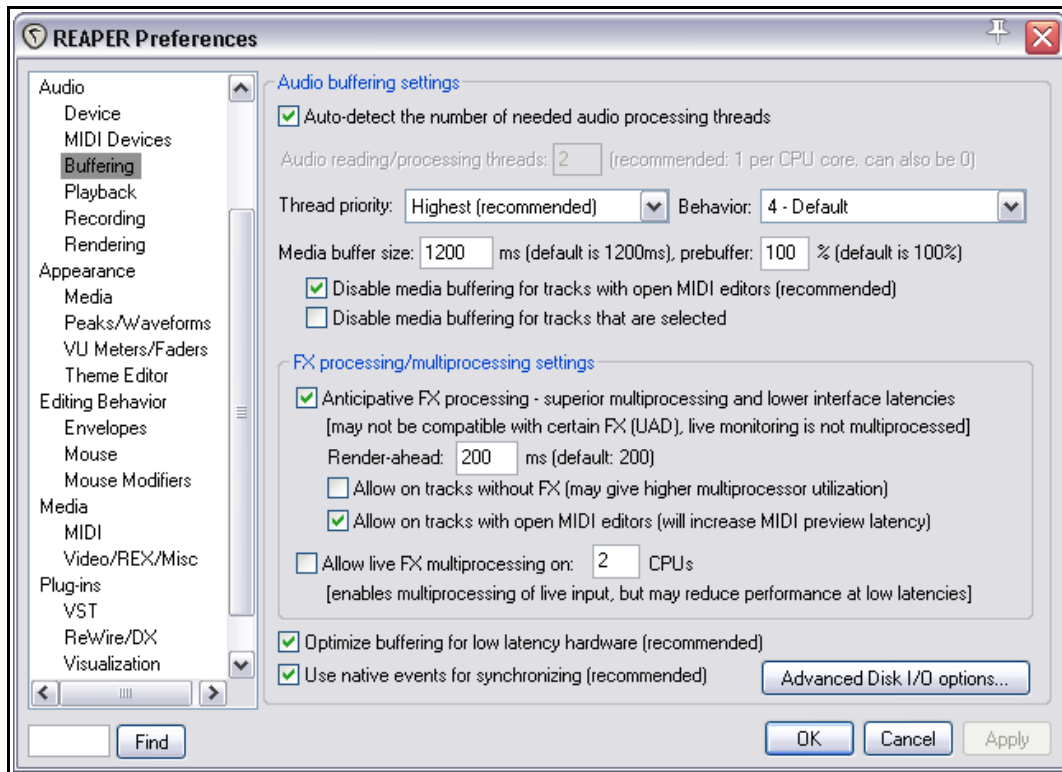
This page presents you with a range of audio preferences and options. Many, if not most, users will find they can leave at least the first half dozen or so of these at their default settings and forget them.

- ◆ Whether to **Close audio device when stopped and application inactive**. Enabled, this allows you to have other audio programs (such as Sound Forge) open at the same time as REAPER, and for you to be able to switch easily between them.
- ◆ **Close audio device when inactive and tracks are record armed**. Leave this unselected if you want REAPER not to share your audio device with other programs when you have record armed tracks.
- ◆ **Close audio device when stopped and active**. If enabled, REAPER will automatically close audio devices when audio is not being played back.
- ◆ Enabling **Warn when unable to open audio/MIDI devices** could potentially help you to troubleshoot if you encounter hardware interface issues.
- ◆ Enabling the option **Do not process muted tracks** could lessen the load placed on your CPU.
- ◆ **Solos defaults to in-place solo**. Enabled, this means that when you solo a track you will hear along with that track the audio output of any other tracks which take receives from that track. Disabling this ensures that you will hear only the soloed track. In either event, holding **Alt** while clicking solo will reverse your default option.
- ◆ **Solo in front** allows you to hear quietly in the background your other tracks when one or more are soloed. This may help you to place more in context the track that is being auditioned. The feature itself is enabled/disabled from the **Options** menu: in your preferences you can set your preferred dB level for the background material.
- ◆ You can **Automatically mute any track** or only the **Master track** when a specified dB limit is reached. This option can help protect your ears, your speakers and your sound card!
- ◆ **Channel naming/mapping**. This feature enables you to give your own meaningful names to your audio input and output devices. It is explained in detail in Chapter 1.



### 19.5.1 Audio Buffering

While we're looking at optimising audio, the **Audio Buffering** page of the **Preferences** window contain a number of customisation options.

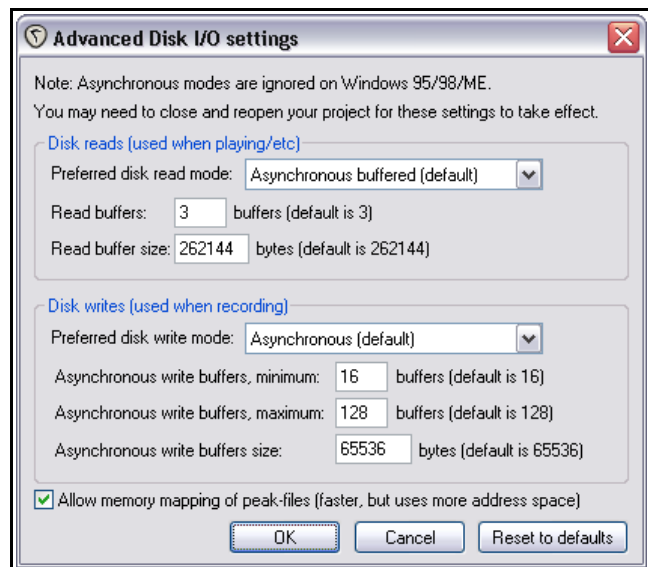


The option to **Disable media buffering for tracks that are selected** can be useful if you are using a third party plug-in that does not respond well to buffering. Otherwise, if you are not technically minded you would be best advised to leave most of these settings at their default values. If your computer has two or more processors, you might find the following options useful.

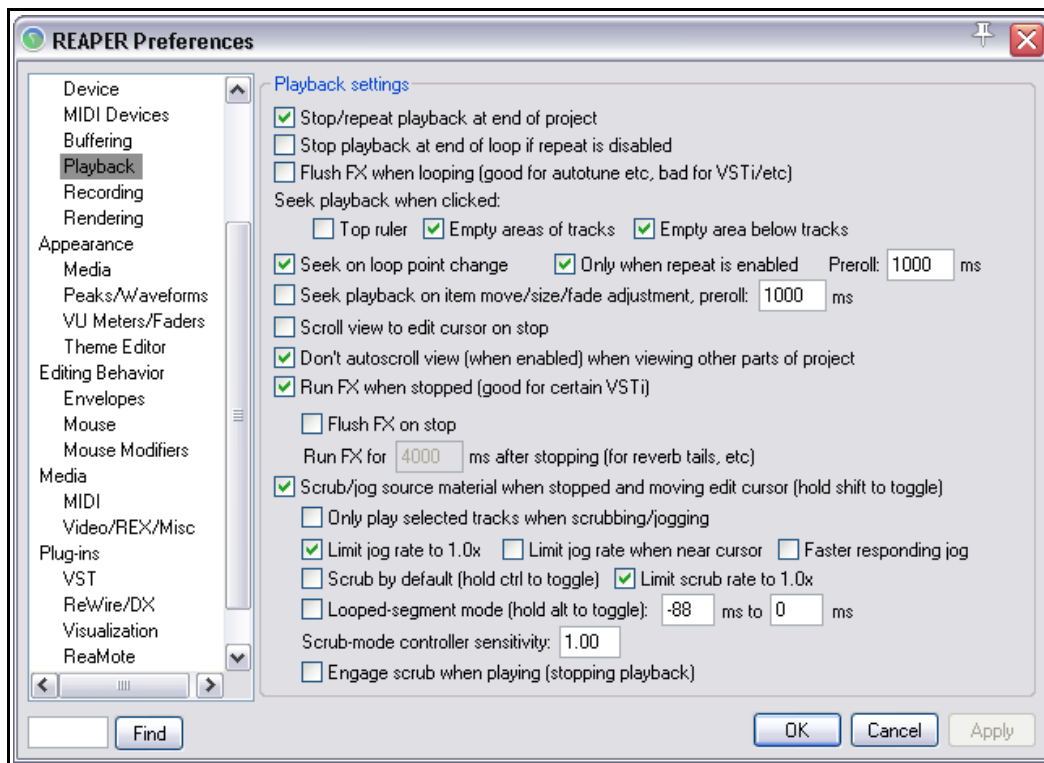
**Anticipative FX processing** has benefits for both multiprocessor and single processor systems. On single processors it makes REAPER more tolerant of lower interface latencies (and more resistant to plug-ins that do larger block-based processing, such as ReaVerb and ReaFir). On multiprocessor/multicore systems it also allows for very significant multiprocessor usage. Enabling this feature may allow improved latency.

Notice also that clicking on the **Advanced Disk IO 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.



### 19.5.2 Audio Playback



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 loop** if repeat is disabled.
- ◆ Whether to **seek playback** (repositioning the play cursor) when clicking on any of the top ruler, empty areas of tracks, and/or empty areas below tracks. Disabling any of these will enable you to click or click and drag in arrange view (for example, on the ruler to define a loop, or in the empty area between tracks to define a time selection) without affecting existing playback.
- ◆ 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).

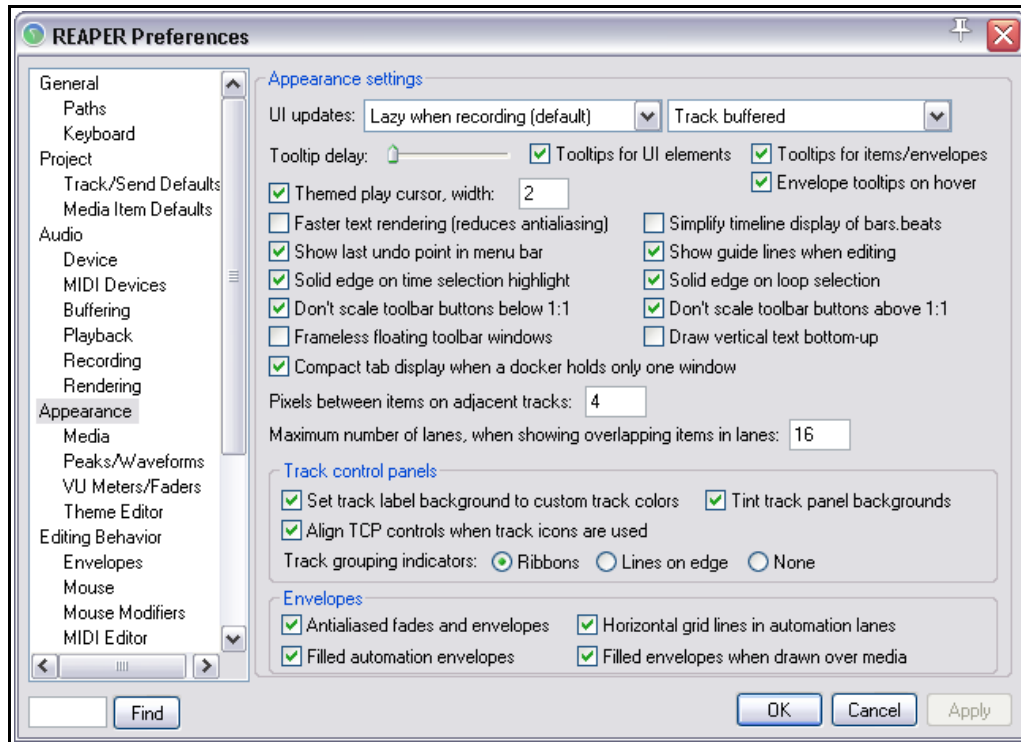
Note that **Audio Recording** preferences (the page after this one) are detailed and explained in Chapter 3.

### 19.5.3 Audio Rendering

These are found on the page after **Audio Recording** preferences. They are rather technical: unsure of what to do, leave them at their system defaults:

- ◆ Block size to use when rendering samples. If in doubt, leave blank.
- ◆ Whether to allow anticipative FX processing. This may lead to better multiprocessing performance (default is on).
- ◆ Whether to limit apply FX/Render stems to realtime (default is off).

### 19.6 Appearance Preferences



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:

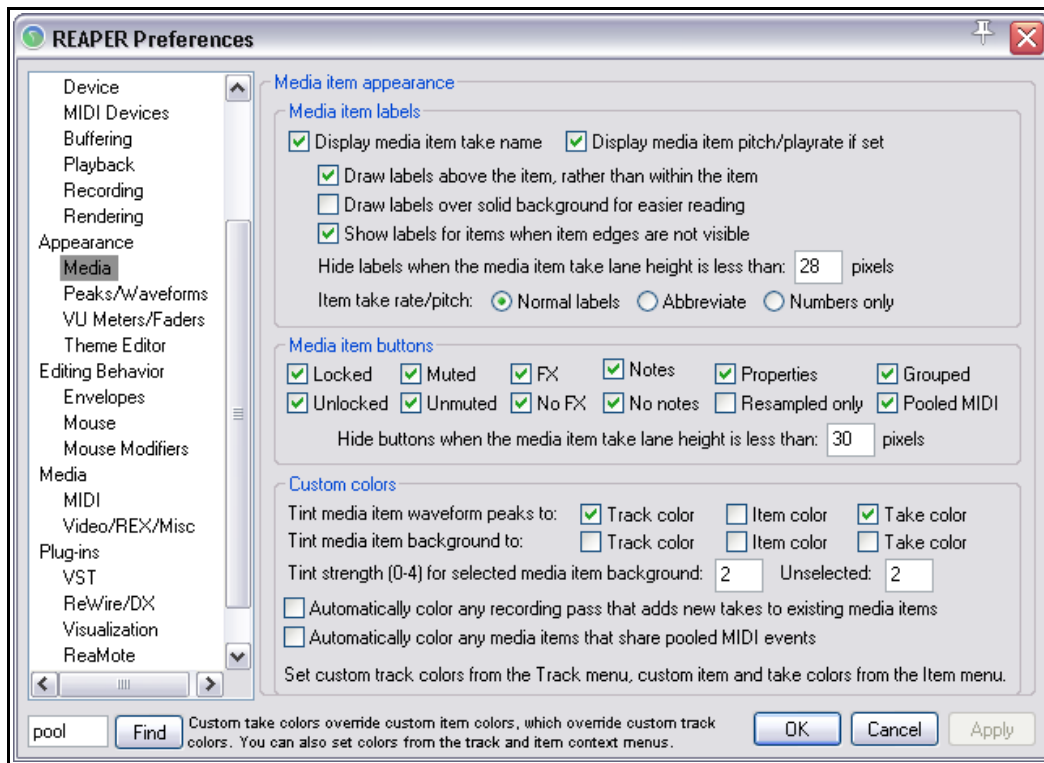
**Miscellaneous Appearance Settings** include:

- ◆ Whether to use **tooltips for UI elements** such as buttons and faders, media items and envelopes, etc.: if so you can specify the length of any delay that should be allowed before the tooltip is displayed.
- ◆ The **width (in pixels) of the play cursor**. Default is 1 pixel, but you can make this wider.
- ◆ Whether to **show the last undo event on the menu bar** (just after the Help command). If you enable this option, clicking on the action shown will open the Undo History window.
- ◆ Whether to **show guidelines when editing**. This can be an aid to editing.
- ◆ Whether to **apply solid edges** to time selection highlights. and/or loop highlights.
- ◆ Whether to **limit the scaling of toolbar buttons**. Enabling both these options will prevent the buttons from becoming smaller or larger if you resize the main or floating toolbar.
- ◆ Whether to enclose **floating toolbar windows** in **frames**.
- ◆ Number of pixels to leave between adjacent tracks – i.e., between the bottom of one media item and the top of the one underneath it.
- ◆ Maximum number of lanes to be used when showing overlapping items.

**Track Control Panel and Envelope Settings** include:

- ◆ Whether to **use custom track colors** as a background color on track labels (in TCP and mixer) and whether to **tint track panels** (in TCP and mixer) with custom track colors.
- ◆ Whether to use **track grouping indicators**, and if so which ones.
- ◆ Whether to use **filled automation envelopes**: enabled, this colors the area below the envelope and may make its shape easier for the eye to discern. Showing this over media items can be disabled.
- ◆ Whether to **show faint media peaks behind envelopes** in envelope lanes.
- ◆ Whether to **show horizontal grid lines** in automation lanes.

## 19.6.1 Appearance Media



There really are a very large number of options to take into account here. For the most part they fall into three main groups – **Media item labels**, **Media item buttons** and **Custom colors**.

Settings Group	Main Options
<b>Media item labels</b>	Whether to <b>display item take names</b> and/or <b>media item pitch/play rate</b> . If showing either or both of these, whether to <b>draw labels above the item rather than within the item</b> , whether to use a <b>solid background for easier reading</b> and <b>whether to show labels when item edges are not visible</b> . This last option will ensure that the labels remain visible as the project scrolls past the beginning of items. You can also determine how rate/pitch data is shown – e.g. normal or abbreviated.
<b>Media item buttons</b>	Mostly these are paired (e.g. Locked/Unlocked, Muted/Unmuted, FX/No FX). Choose which of these buttons you want displayed over or above your media items.
<b>Custom Colors</b>	You have the options to <b>Tint media item waveform peaks</b> or <b>Tint item background</b> to any of <b>Track Color</b> , <b>Item Color</b> or <b>Take Color</b> . Where more than one option is available (e.g., if you have specified both an item color and a track color for the track that contains the item), then the lowest level has precedence. That is, take color wins over item color which wins over track color. You can also specify your required <b>tint strength</b> to be used for media item backgrounds, within a range of 0 to 4, where 2 is the system default. Also in this section is the option <b>Automatically color any recording pass that adds takes to existing media items</b> . This can help to give you a clearer picture when you are working with multiple takes.

The **Appearance**, **Theme Editor** preferences and settings are discussed in Chapter 11.

### 19.6.2 Appearance, Peaks/Waveforms

This page contains a number of options which between them help determine the appearance of your peaks and waveforms and, indeed, whether they are shown at all.

For the most part you might well be content to leave these at their system defaults, but feel free to experiment.

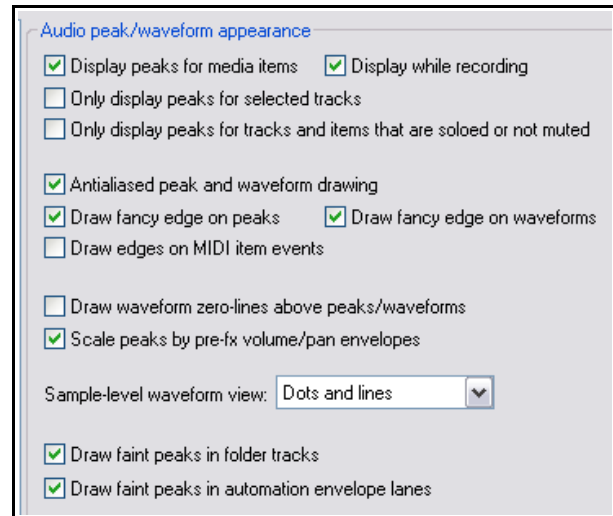
You can specify whether you wish to **Display peaks for media items** and/or **Display peaks while recording**.

You can also choose not to show peaks for unselected tracks and/or muted/unsoloed tracks – **Don't display peaks on tracks that are not selected** and **Don't display peaks for tracks that are muted/unsoloed or for muted items** will give you this.

**Antialiasing** is a technical issue. Google if you wish to learn more, but, in short, enabling antialiasing may give you a more accurate representation: disabling it may cause your peaks to be drawn/redrawn more quickly. The only difference that **Fancy edges** make is cosmetic. Enable these options, for example, if you like your peaks bordered when using custom colors, disable them if you don't.

The option to **Scale peaks by pre-fx volume/pan envelopes** should be enabled if you want the peaks on your media items to be adjusted according to any pre FX envelope volume changes. Notice too that you can choose when closely zoomed in to your material to view the waveforms as Dots and lines, Filled samples, Outlined samples, Stepped samples or Smooth.

Enabling **Draw faint peaks in folder tracks** allows the output of a folder's child tracks to be displayed as waveforms in the folder's lane in arrange view.



### 19.6.3 Appearance, VU Meters/Faders

The first four items on this page set **Meter update frequency**, **Meter decay rate**, **Meter minimum value** and **Meter max value**. Unless you have good reason to change them, leave them at their system defaults.

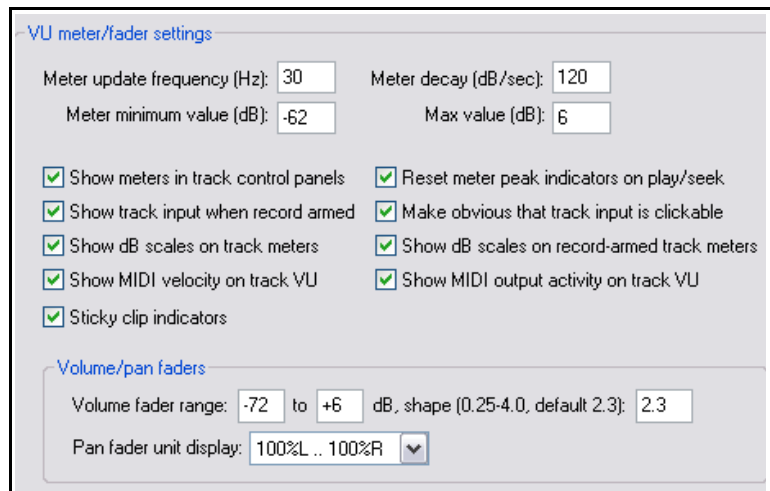
There are nine other options which together define how your track meters will appear. Of special interest are:

**Reset meter peak indicators on play seek**. Disable this if you want to keep the existing peak level displayed (until exceeded) when you re-commence playback.

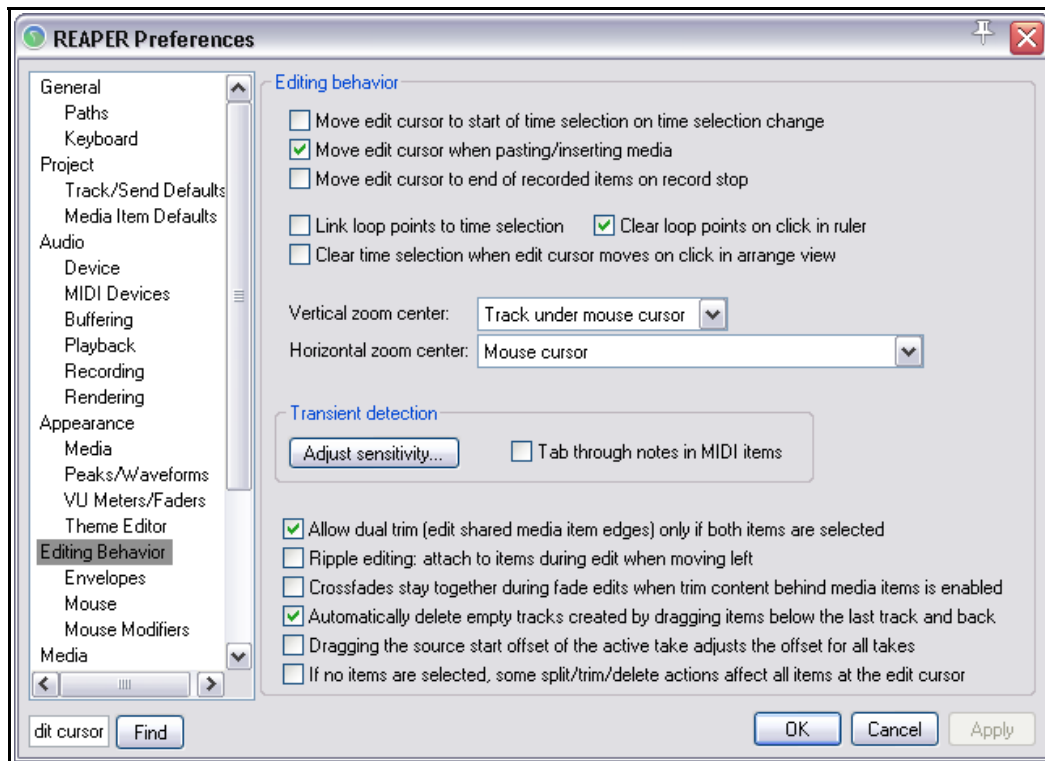
**Sticky clip indicators** (enabled) ensure that peaks on the VU meter itself are marked with a graphic bar for a few moments after they have passed.

**Show dB scales on track meters** if enabled will cause the dB scale to be marked, in numerals, on your VU meters.

The final two options are **fader** option which can be used to restrict the adjustable range of your volume and/or pan faders.



### 19.7 Editing Behavior Preferences

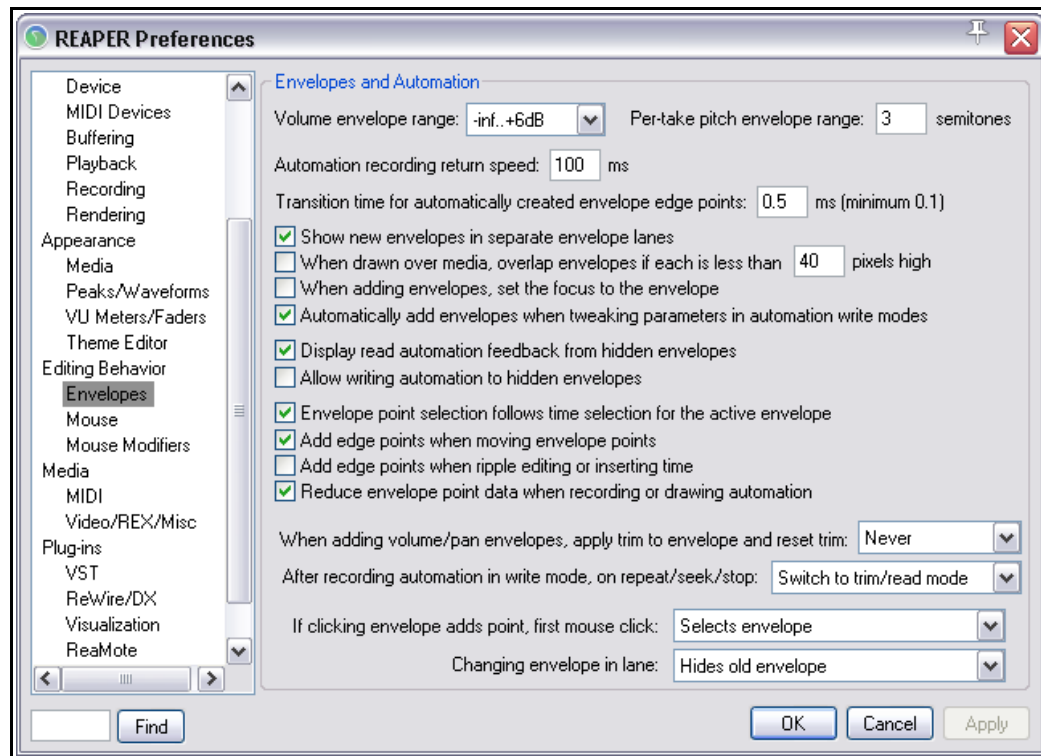


The **Editing Behavior** page of the **Options, Preferences** window (shown above) includes a number of areas in which you can specify default settings in a range of matters that will affect how you work when editing your REAPER projects. Here is a summary of some of the most useful options:

- ◆ You can specify your **edit cursor behavior**, in particular to specify which of the following actions should cause the edit cursor to be moved:
  - Changing time selection, Pasting or inserting media, Stopping recording
- ◆ You can allow **shift click/control click** to override your move edit cursor assignments.
- ◆ You can by default link (or unlink) time selection and loop points.
- ◆ You can enable or disable loop points to be cleared by clicking on the ruler, and/or time selection to be cleared by clicking in arrange view. Think how you want to use these options. For example, if you want to click on the ruler as a means of repositioning the edit cursor then you probably won't want loop points automatically cleared.
- ◆ You can specify your **Zoom** preferences. **Vertical zoom** options are Track at centre of view, Top visible track, Last selected track or Track under mouse cursor. **Horizontal zoom** options are Edit or play cursor, Edit cursor only, Centre of view or Mouse cursor. If in both cases you choose the mouse cursor option you will ensure that as you zoom whatever is under the mouse cursor will stay on screen.
- ◆ You can set the **tab to transient sensitivity**.
- ◆ **Dual trim options** (for editing shared media item edges).
- ◆ Whether to **automatically delete empty tracks** created when dragging items below last track.
- ◆ Whether slip-editing the start of an active take will also adjust all other takes.
- ◆ Whether to split/trim/delete all items at edit cursor if splitting/trimming/deleting with no items selected. Disabling this will prevent, for example, all items being split if you press **S** with no item selected.



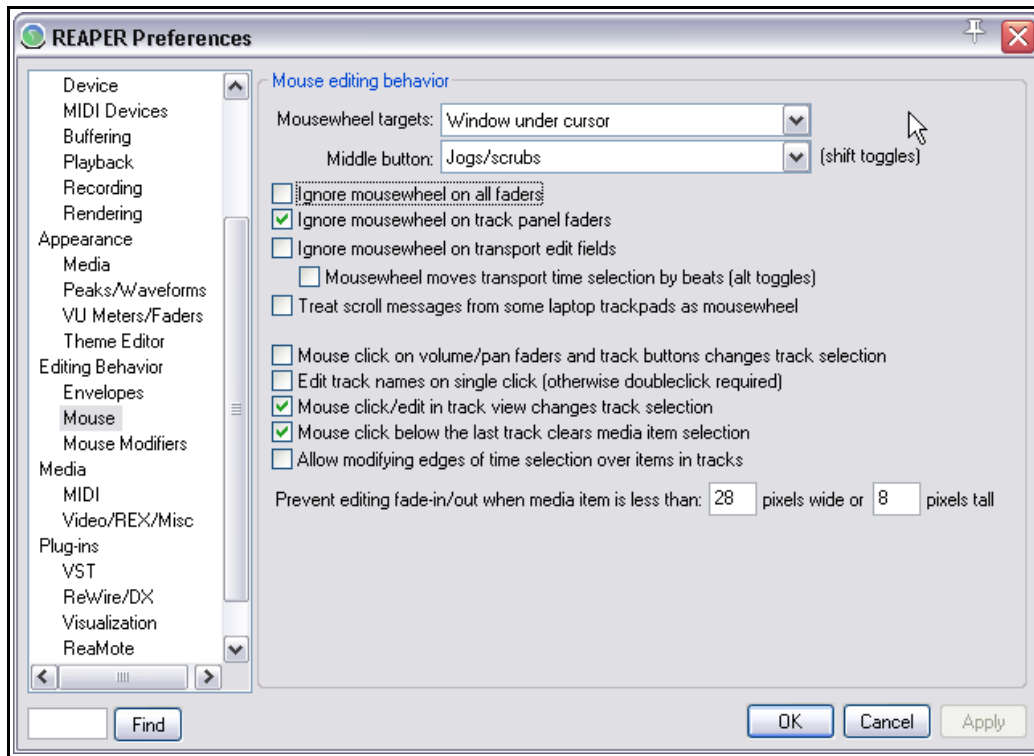
### 19.7.1 Editing Behavior, Envelope Preferences



You can specify various diverse envelope editing options, including:

- ◆ The **range** within which **volume** envelopes can be adjusted.
- ◆ **Automation recording return speed**. If you have no obvious need to change this, leave it as it is.
- ◆ Whether or not to **Show new envelopes in separate envelope lanes** by default.
- ◆ **When drawn over media, overlap envelopes if each is less than x pixels high**. Enabling this option may create a more cluttered visual effect, but it will allow more height for editing envelope points.
- ◆ Whether to **set the focus to new envelopes**. This automatically selects them for editing, etc.
- ◆ Whether to **Automatically add envelopes** when you have write mode enabled and adjust any parameters. This makes creating envelopes fast and snappy, but means that you with write mode enabled you will not be able to adjust any parameters without creating envelopes for them.
- ◆ In **Read** mode, whether to display automation feedback (such as fader movements) for hidden active envelopes. In **Write** mode, whether to apply parameter changes to hidden envelopes.
- ◆ Whether **envelope points** are also selected with a **time selection**.
- ◆ Whether **edge points** (at start and end of time selection) are added to envelopes when points are moved, or when ripple editing, or when inserting time.
- ◆ Whether to **reduce envelope point data** when recording or drawing automation.
- ◆ **When adding pan/volume envelopes** are added, whether trim is reset when the envelope is drawn. Options are Always, In read/write mode only, or Never. Setting this to Never may make the manual editing of such envelopes easier (by leaving you plenty of room both above and below the envelope).
- ◆ **After recording automation in write mode** whether to automatically switch to one of the other modes. The trim/read option is handy if you are inclined to forget to do this manually!
- ◆ Whether after **clicking to add an envelope point** the next click should add another point or select the envelope. The latter can save you from accidentally adding unwanted points.
- ◆ Whether to **Add points when clicking** only on an existing envelope or anywhere in the lane. The latter can save you having to drag new envelope points up or down.
- ◆ Whether **Changing the envelope shown in any lane** should cause the envelope previously there to be hidden or moved to the media lane.

### 19.7.2 Editing Behavior, Mouse Preferences

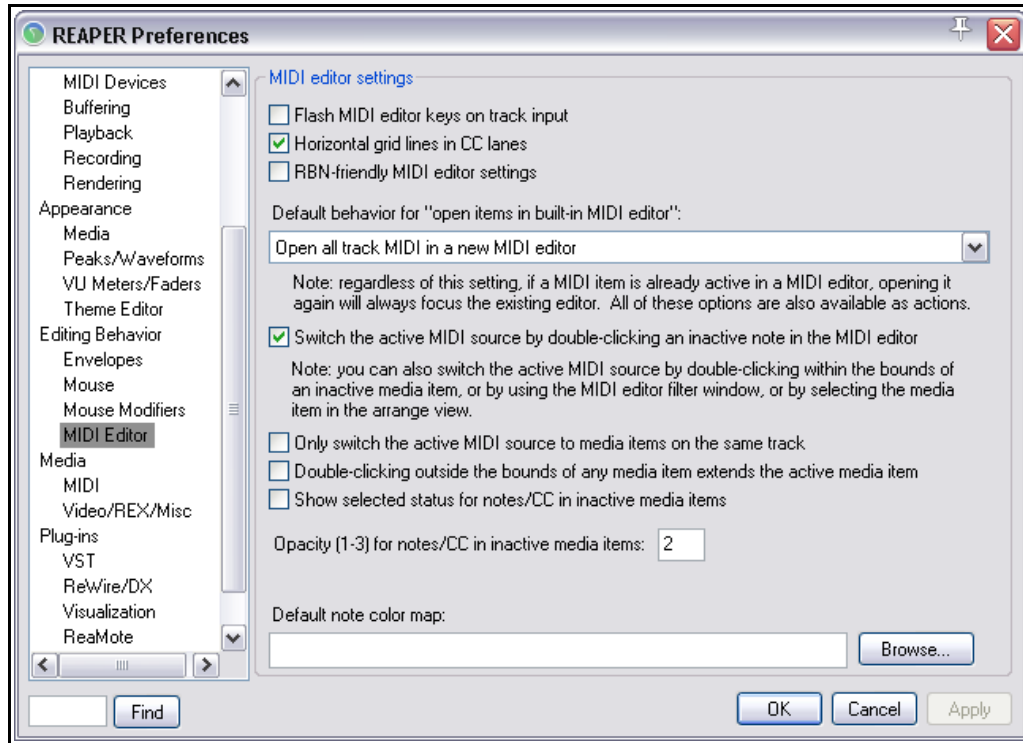


The **Mouse** page of the **Options, Preferences, Editing Behavior** window (above) includes a number of ways in which you can specify how you would like your mouse to behave in REAPER. Here is a summary of some useful options:

- ◆ **Mousewheel targets:** whether your mousewheel acts on the window currently underneath the mouse or on the last window to have focus. This, for example, allows you to use the mousewheel to adjust the parameters of an open FX window without first having to click on the window to give it focus. Focus can remain with your mixer, or arrange view, or wherever you were before. For example, **Esc** would then clear the current time selection rather than close the FX window.
- ◆ Whether to use or **Ignore the mousewheel on all faders**. Enabling this and/or the next two options can help prevent those of us who tend to be heavy handed from accidentally changing faders levels.
- ◆ Whether to use or **Ignore the mousewheel on track panel faders**.
- ◆ Whether to use or **Ignore the mousewheel over transport edit fields**. If disabled, you can edit text fields such as BPM and play rate just by scrolling your mouse over the field.
- ◆ Whether to treat scrolling a **laptop trackpad** as being like using a mousewheel.
- ◆ Whether **Mouse click on track fader or button** causes that track to become the currently selected track. Disabling this allows you to adjust track faders, etc. without changing the track selection.
- ◆ Whether to require a **single** click or a **double** click when **editing track names**.
- ◆ Whether **Mouse click/edit in track view changes the track selection**. Enabling this will ensure that track selection will follow media item selection.
- ◆ Whether to **Allow modifying edges of time selection over items in tracks**. Enabling this means that you can click and drag over a track (as well as between tracks) to adjust the start or end of a time selection without affecting item selection.
- ◆ **Prevent editing fade-in/out when media item less than ...** : This can prevent the accidental editing/removal of fade-ins/outs on small media items.

The topic of **Mouse Modifier** preferences is covered extensively in Chapter 13 and elsewhere.

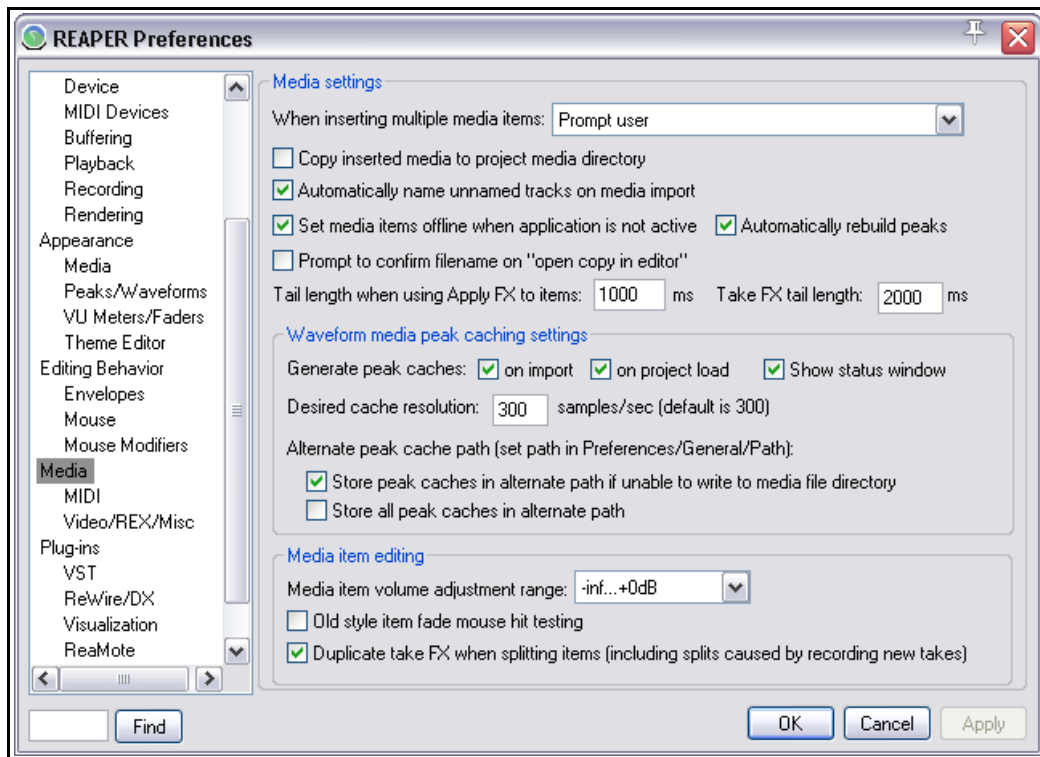
### 19.7.3 Editing Preferences, MIDI Editor



- ◆ **Flash MIDI editor keys on track input:** if enabled, causes a brief color flash to be displayed on the MIDI editor keyboard when the track receives MIDI note-on input.
- ◆ **Horizontal grid lines in CC lanes:** toggles this option on and off.
- ◆ **RBN friendly MIDI editor settings:** allows REAPER's MIDI editor to behave in a way compatible with RBN (RockBand) MIDI authoring. For example, lyric events will be attached only to playable notes.
- ◆ **Default behavior for open items in built-in MIDI editor.** The six options (self-explanatory) are:]
  - Open selected items in a new MIDI editor** (separate from any MIDI editor window that may already be open). This is the default behavior.
  - Open selected items in last focussed MIDI editor, clear the editor first.** Replaces content of currently open MIDI editor window with the selected item(s).
  - Open selected items in last focussed MIDI editor, preserve existing editor content.** Adds the selected item(s) to the existing MIDI editor window.
  - Open all track MIDI in a new MIDI Editor** (separate from any MIDI editor window that may already be open). Opens in the one window all items on the same track as the selected item.
  - Open all track MIDI in last focussed MIDI Editor clear the content first.** Replaces content of existing MIDI editor window with all MIDI items on same track as the selected item.
  - Open all track MIDI in last focussed MIDI Editor preserve existing editor content.** Adds to the content of existing MIDI editor window all MIDI items on same track as the selected item.
- ◆ **Switch active MIDI source by double clicking an inactive note in the MIDI editor:** when multiple sources are displayed in the same window, use this to make an inactive source active.
- ◆ **Only switch active MIDI source to items on same track:** self-explanatory toggle.
- ◆ Whether **Double-clicking outside bounds of any media item extends the nearest media item..**
- ◆ Whether to **Show selected status for notes/CC in inactive media items.**
- ◆ Set **Opacity for notes/CC in inactive media items.**
- ◆ **Default note color map:** allows you to specify your own default note color map.

## 19.8 Media Preferences

The **Media** page of the **Options, Preferences** window lets you customize your Media settings.



Here is a summary of some of the options that you might find most 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> <p>Whether to use the media file name to <b>Automatically name unnamed tracks on media import.</b></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 editing settings</b>	<p><b>Media item volume adjustment range:</b> Sets this to -inf to 0 dB or -inf to +6 dB.</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>

### 19.8.1 Media, MIDI Preferences

#### MIDI octave name display offset:

by default, middle C (MIDI note 60) is labelled C4. An offset of, say, -1 would cause this to become C3, and so on.

The **Send all-notes-off** option is intended to stop hanging notes when record arm is disabled.

**Allow trim of MIDI items when splitting**, if enabled, will add a note-off message for any note that spans the split point when a MIDI item is split.

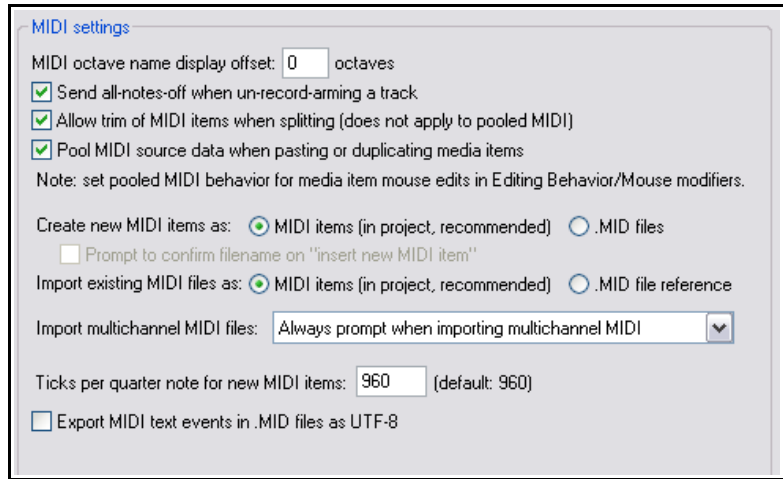
**Pool MIDI source data** is discussed and explained in Chapter 12. You can disable this if you prefer.

Items created or imported as REAPER

**MIDI items** (rather than .MID files) can be better edited in the MIDI Editor. .MID files are more portable between apps. You can, of course, create them as MIDI items and later export to file if you wish.

You can specify when **Importing multichannel MIDI files** whether to do so as a series of single channel tracks, as one multichannel track, or always to prompt.

**Ticks per quarter note** sets data resolution for new MIDI items. The default setting of 960 equates to 2 ticks per microsecond at 120 bpm.



### 19.8.2 Media, Video/REX/Misc Preferences

The various **Video** options relate mostly to performance and playback quality.

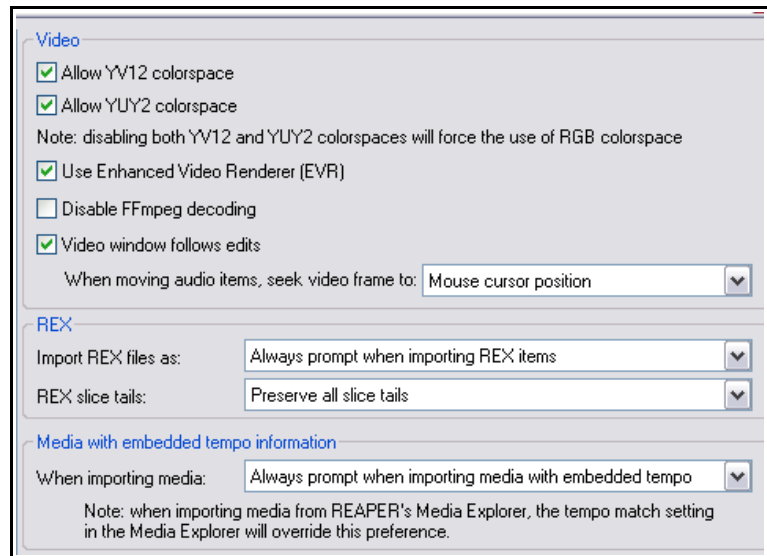
The best permutations of settings will depend largely on which platform you are using (e.g. Windows 7) as well as your choice of video systems and format. If you need help you should post to one of the REAPER forums.

The **REX** options include how you wish to **Import REX file contents**. This can be as beat slices that will adjust to tempo changes, or as single loopable media items, or to prompt.

You can also specify whether **REX slice tails** should be preserved, all chopped, all chopped except the final slice, or the final slice only be chopped.

Finally, you have an option for

determining how **imported media with embedded tempo** is to be handled. You can always adjust the media to project tempo, import it at its own tempo, or always prompt.



### 19.9 Plug-ins Preferences

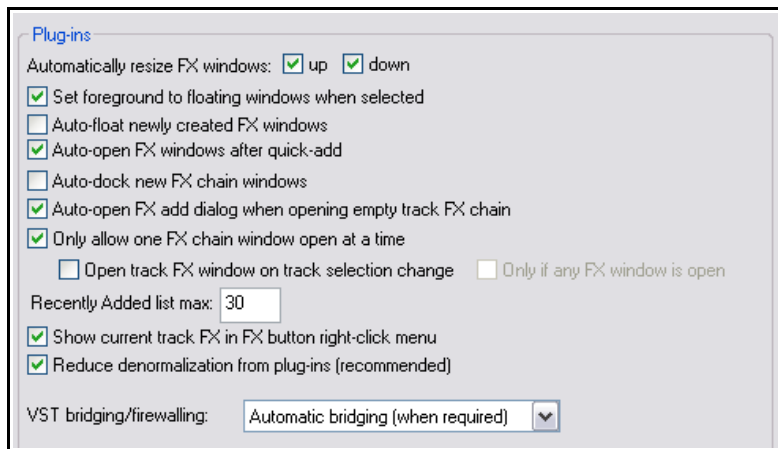
Your two **Automatically resize FX windows** options, if enabled, will ensure as you browse thru a track's FX chain that the FX window is automatically resized to suit the currently selected FX.

You can specify whether **float**ed FX windows should automatically be placed on top, whether **newly created FX windows** should be floated, and whether windows should be automatically opened for FX added from the quick-add context menus in the TCP and MCP.

You can specify whether or not to **auto-dock newly created FX windows** and whether you want the **Add FX** window opened automatically when you open an empty FX chain for a track or media item.

If you enable the option to **Only allow one FX chain window open at a time** you may also specify whether you want the open window shown to change when you change track selection (**Open FX window on track selection change**) and whether this is to happen **only if an FX window is open**. You can also specify how many FX are to be shown on the context menu **Recently added list** and whether **current track FX** should be shown on the FX button context menu.

The final option here concerns VST bridging and firewalling. These are features designed to help protect REAPER from crashing as a result of an unstable plug-in being used. The default option is for **automatic bridging** to be applied when the program deems it necessary, but you can change this to In separate plug-in process, In dedicated process per plug-in, or Disable bridging. To follow discussions on what these options mean in practice in different situations you should consult the REAPER forums.



#### 19.9.1 Plug-ins, VST Compatibility

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 **Compatibility** page (under **Plug-ins** within the **Preferences** window) offers a number of further options for controlling the behavior of your VST plug-ins.

Your preferences in this category may likely to depend on which plug-ins you are using. Individual plug-ins vary so much that it would be virtually impossible to give very much meaningful general advice here. You may need to experiment to get the best results. Be prepared to ask questions on the REAPER forum or indeed on the plug-in supplier's forums.

#### 19.9.2 Plug-ins, ReWire/DX Preferences

ReWire options include whether to show any already opened ReWire aware apps or devices as available FX in the FX window and whether to automatically open the native control panel for any ReWire application selected. There is an option to **Check when starting REAPER for any device already open** that is capable of acting as a ReWire master, and if so to open REAPER in slave mode. There is also a dialog box where you can specify your **ReWire slave project settings**.

**Direct-X (DX)** plug-ins are by default **Enabled**. You can **Scan for new DX plug-ins** manually or specify **Scan for DX plug-ins** on startup.

#### 19.9.3 Plug-ins, Visualization Preferences

This topic is outside the scope of this User Guide.



### 19.10 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.

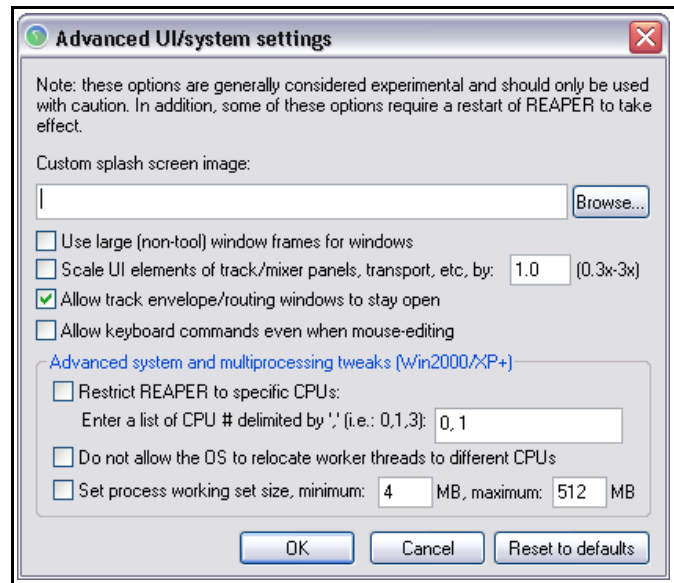
**Use large window frames** for windows.

**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 system and multiprocessing tweaks**

These options help determine the way REAPER behaves on a system with two or more processors. They are considered experimental, should be used with caution, and may require a restart of REAPER.



### 19.11 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.

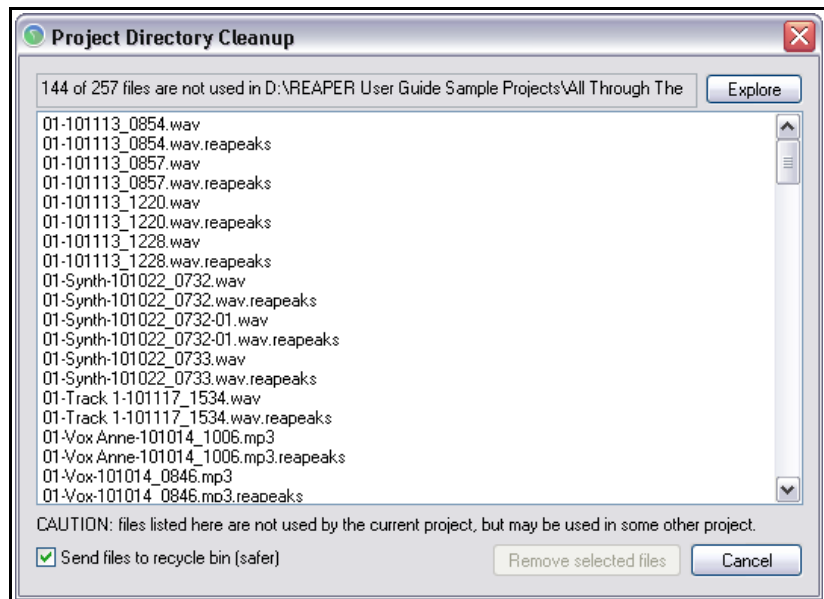
However, you will most likely find that as a project evolves, it will accumulate any number of media items, such as rejected tracks and overdubs, or deleted items that are no longer required. You can easily remove these unwanted items, using the command **File, Clean Current Project Directory**.

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.



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Don't forget also to **backup** your work regularly, to a flash drive, external hard disk, CD or DVD, or more than one of these. The easiest way to back projects up is to simply use the Windows file management system.

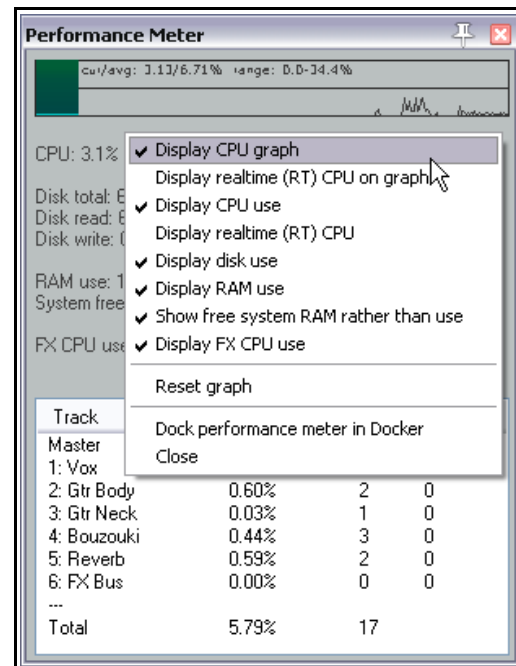
### 19.12 Customising the Performance Meter

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.



### 19.13 Customising Undo History Behavior

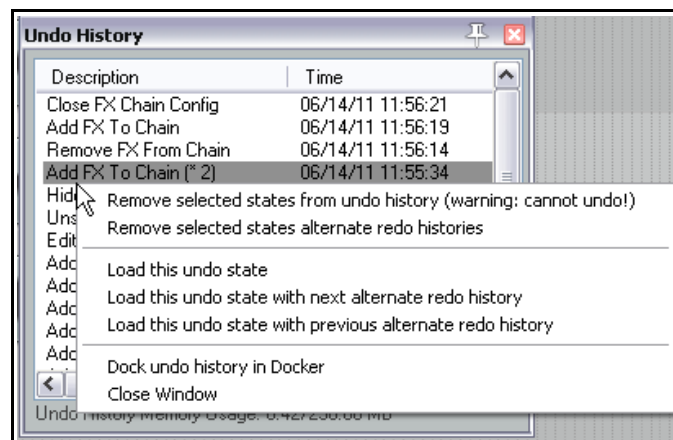
As already discussed (Chapter 2), three important features of REAPER's **General** preferences that enable you to customise your Undo History behavior are:

- 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.

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.

### 19.14 Some Other REAPER Options

The following are some of the items that appear on the **Options** menu. Many of these have been covered throughout this User Guide. In many cases the function of these commands is self-explanatory:

**Auto-crossfade media items when editing:** on/off toggle.

**Trim content behind media items when editing:** on/off toggle.

**Show all takes in lanes:** on/off toggle.

**Take lane behavior:** Show or hide empty take lanes. Allow/disallow selecting of empty take lanes.

**Show overlapping media items in lanes:** on/off toggle.

**Ripple editing:** three way toggle – off, per track or all tracks.

**Item grouping enabled:** on/off toggle.

**Snap/Grid:** enable snapping toggle, show grid toggle, access snap/grid settings.

**Locking:** on/off toggle, access lock settings.

**Metronome/preroll:** on/off toggle, access metronome settings.

**Envelope points:** sub menu of options also available by right-clicking on envelope button.

**Loop points linked to time selection:** on/off toggle.

**Automatically scroll view during playback:** on/off toggle.

**Smooth seeking:** on/off toggle.

**External Timecode Synchronisation:** on/off toggle enable synchronisation, access to synchronisation settings.

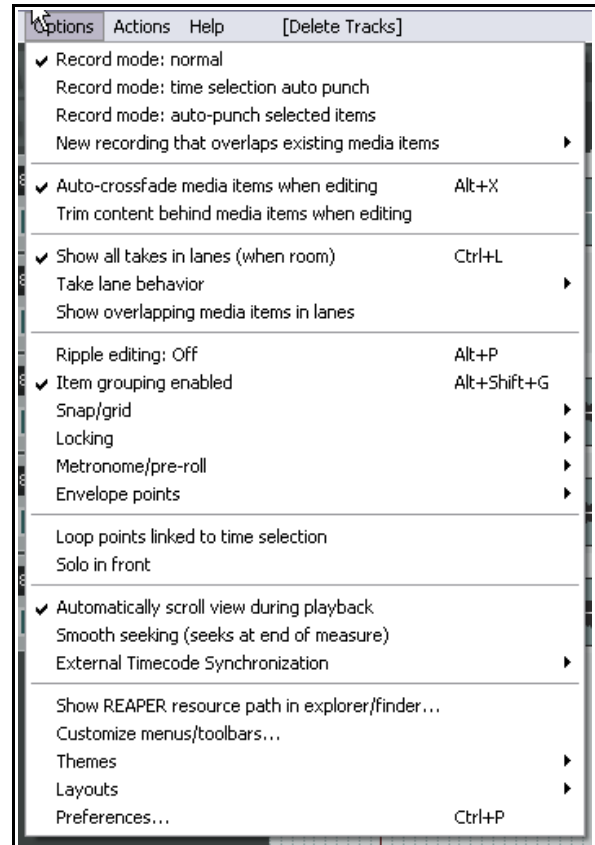
**Show REAPER resource path ... :** shows location of REAPER resource files in Explorer type window.

**Customize menus/toolbars...:** opens customise menu/toolbars window.

**Themes:** displays sub-menu of installed color themes.

**Layouts:** displays sub-menu of track and mixer layouts.

**Preferences:** opens Preferences window.





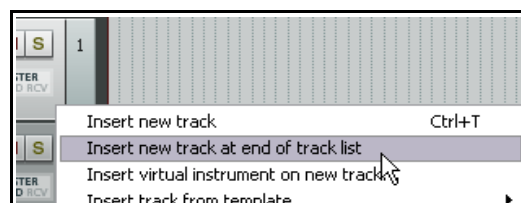
### 20 Main Right-Click Context Menus Summary

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.

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

This menu is accessed by right-clicking over a track name or number, or over any part of its control panel that does not show a track control.



Command	Comments
<b>Insert new track</b>	Inserts a new track after the currently selected track.
<b>Insert new track at end of track list</b>	Inserts new track after current last 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. Offers you a submenu of templates.
<b>Save selected tracks as track template ...</b>	Saves all tracks in current selection as a single track template.
<b>Remove tracks</b>	Removes (deletes) any track or tracks currently selected.
<b>Duplicate tracks</b>	Creates a duplicate of any track or tracks currently selected, immediately below the original track.
<b>Render tracks</b>	Offers a sub-menu from which to choose an option for rendering the current track selection. <b>Render tracks to stem tracks (mute originals)</b> <b>Render tracks to mono stem tracks (mute originals)</b>
<b>MIDI track controls</b>	Offers a sub-menu of: <b>Show MIDI track control panel</b> <b>Link track volume/pan to all MIDI channels</b> <b>Link track volume/pan to [specified] MIDI channel</b>
<b>Lock track controls</b>	Toggles lock status of all parameter controls on selected track(s).
<b>Enable track free item positioning s</b>	Toggles free item positioning mode on and off for selected tracks.
<b>Automatic record-arm when track selected</b>	Toggles automatic record arm status for current track selection.
<b>Custom track colors</b>	Displays a sub-menu of track coloring options.
<b>Custom track icons</b>	Displays a sub menu to show or hide icons for selected tracks.
<b>Set track timebase</b>	Displays a sub-menu to set the timebase of selected tracks to Project timebase (default), time, beats (position, length rate) or beats (position only).
<b>Set track automation mode</b>	Displays a sub-menu to set automation mode for selected tracks to Trim/Read, Read, Touch, Latch or Write.

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Command	Comments
<b>Track performance options</b>	Displays a sub-menu to enable/disable anticipative FX processing and/or media buffering for selected tracks.
<b>Set track layout</b>	Displays a sub-menu to choose a custom TCP and/or MCP layout for selected tracks.
<b>Envelopes</b>	Displays envelopes management sub-menu.
<b>Track grouping parameters ...</b>	Modify parameter settings for track groups.
<b>Track grouping enabled</b>	Enables/disables track grouping for selected tracks.
<b>Show master in track view</b>	Toggles on and off the display of the Master in track view.

### 20.2 The Empty Track List Area Context Menu

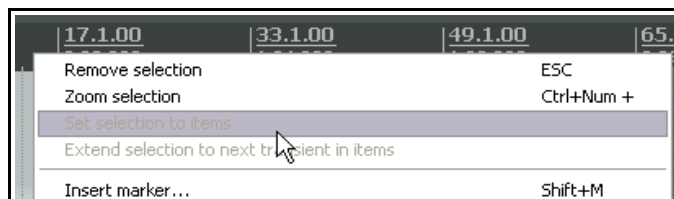
This menu is accessed by right-clicking anywhere in the empty area below the track list in the track pane area.

Command	Comments
<b>Insert new track</b>	Inserts a new track below currently selected track.
<b>Insert multiple tracks</b>	Allows you to insert more than one track at a time.
<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

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 right).
- 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 current time selection. Removing the selection does not cause any media items to be deleted.
<b>Zoom selection</b>	Zoom to current time selection.
<b>Set selection to 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 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

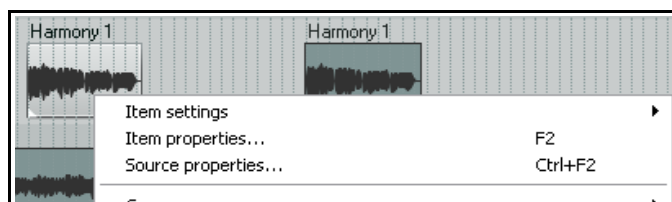
Command	Comments
<b>Insert time signature marker...</b>	Allows you to insert a time signature marker at the current cursor position.
<b>Remove all markers from time selection</b>	Removes all markers from the currently selected area.
<b>Set project tempo from time selection...</b>	Creates project tempo 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 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 Measures – Beats (M:S secondary) Measures – Beats Seconds Samples Hours : Minutes : Seconds : Frames</b>	These six options are mutually exclusive. Select any one to set the unit of measurement used for ruler display.

### 20.4 The Media Items Context Menu

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 sub-menu (see below).
<b>Item properties...</b>	Opens Item Properties dialog box.
<b>Source Properties...</b>	Opens Source Properties dialog box.
<b>Group</b>	Opens Group sub-menu, to group or ungroup selected items,

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Command	Comments
<b>Take</b>	Opens Take sub-menu for takes management (see below).
<b>Comps</b>	Opens Comps sub-menu for comps management (see below).
<b>Item and take colors</b>	Opens color management sub-menu (see below).
<b>Item processing</b>	Opens Item processing sub-menu (see below).
<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 editor of your choice (specified under Options, Preferences, External Editors).
<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 items</b>	Joins selected media items into one new item.
<b>Copy items</b> <b>Copy selected area of 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 items</b> <b>Cut selected area of 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 items</b>	Deletes selected media items from the project.
<b>Trim items to selected area</b>	Trims media items to the currently selected area.
<b>Nudge/set items</b>	Opens the Nudge/Set Items dialog box.
<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 items</b>	Removes splits and joins items as one again.

### 20.5 The Media Items Context Sub-Menus

Several of the Media Items context menu commands cause substantial sub-menus to be displayed, including Item settings, Take, Comp, Item and take colors and Item processing.

These are explained below.



## 20 - Main Right-Click Context Menus Summary

Item settings Sub Menu Commands	Comments
<b>Mute</b> <b>Loop item source</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. There are also icons that can be used for Mute and Lock item.
<b>Item notes</b>	Opens Item Notes window.
<b>Invert phase</b>	Toggles phase invert.
<b>Loop section of item source</b>	Toggles loop selection status.
<b>Preserve pitch when changing playrate</b>	Toggles preserve pitch option.
<b>Reverse active take</b>	Reverses the current active take.
<b>Item channel mode</b>	Several mutually exclusive options, including Normal, Reverse stereo, Mono (downmix), Mono (left) or Mono(right). Default is Normal.
<b>Set item timebase</b>	Four mutually exclusive options used to set item timebase: Project/track default, Time, Beats (position, length, rate) or Beats (position only).
Item and takes colors sub menu commands	Comments
<b>Set items to ...</b>	Choose Custom Color, Random Color, One Random Color or Default Color.
<b>Set active takes to ...</b>	Choose Custom Color, Random Color, One Random Color or Default Color.
Take sub menu commands	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>Lock to active take</b>	Locks currently active take (toggle).
<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> <b>Take pan envelope</b> <b>Take mute envelope</b>	Toggles volume, pan, mute envelopes for take on/off.
<b>Explode all takes to new tracks</b> <b>Explode all takes (in place)</b> <b>Explode all takes (in order)</b>	Three options for exploding takes.
<b>Implode items across tracks into takes</b>	Creates one track with a take for each media item selected, where the media items are selected across several tracks.
<b>Implode items on same track into takes</b>	Creates one track with a take for each media item selected, where the media items are all selected from the same track.
<b>Paste to takes in items</b>	Pastes to takes in selected items.
<b>Take lane 1, Take lane 2, etc</b>	Makes the selected take active.

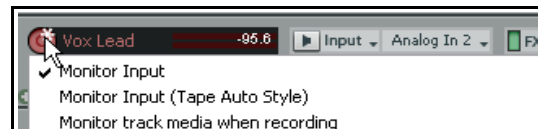
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Comps sub menu commands	Comments
<b>Save as new comp</b>	Saves current takes selection as a new comp.
<b>Remove active comp from list</b>	Removes current comp from Comp sub menu.
<b>Crop list to active comp</b>	Removes all comps except current one from sub menu.
<b>Move active comp to top lane</b>	Moves take selection for active comp to the top media item lane.
<b>Saved comp names</b>	Where comps have been named, these are listed on, and can be made active by selecting from, the Comps menu.
Item processing sub menu commands	Comments
<b>Normalize items</b>	Normalizes all selected items, independently of each other.
<b>Normalize items (common gain)</b>	Normalizes as far as possible all selected items, adding the same amount of gain to each.
<b>Dynamic split items ...</b>	Opens the dynamic split dialog box for dynamic splitting.
<b>Quantize item positions to grid</b>	Quantizes the positions of selected items to grid settings.
<b>Move items to source preferred position</b>	Moves items to source preferred position
<b>Implode 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 as project markers</b>	Converts existing media cues in an imported item into REAPER markers.

### 20.6 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 Auto 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.

## 20 - Main Right-Click Context Menus Summary

Command	Comments
<b>Record: MIDI overdub in existing items</b> <b>Record: MIDI replace in existing items</b> <b>Record: MIDI touch-replace in existing items</b>	Use any of these to select one of the three MIDI recording modes explained in Chapter 3.
<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 input (force format)</b>	Use this command to force recorded input into mono, stereo, multichannel or MIDI format.
<b>Record: disable (input monitoring only)</b>	Allows for input monitoring without recording.
<b>Input: Mono</b>	Displays sub menu from which to select the required mono input from your sound card.
<b>Input: Stereo</b>	Displays sub menu from which to select the required stereo input from your sound card.
<b>Input: MIDI</b>	Displays a menu from which to select your required MIDI device and channels
<b>Input: None</b>	Disables recording input.
<b>Automatic record-arm when selected</b>	Causes the track to be auto armed when selected.
<b>Track VU meter</b>	Displays a submenu with two options, <b>Show peaks from all track channels (not just 1+2)</b> and <b>Disable VU meter</b> .
<b>Track recording settings</b>	Opens Track Recording Settings dialog box, used to change recording format settings and/or input quantize settings for this track.
<b>Track input FX chain</b>	Opens FX browser to select FX to be used when input is recorded.

### 20.7 The Envelopes Context Menu

The envelope menu (left) is commonly accessed by right-clicking over any existing point on an envelope.

Right clicking over an existing envelope but not on a specific point produces a similar menu, but instead of point editing commands such as **Set point value...** and **Set point shape**, you will find the command **Create new point**.



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>Set shape for selected points</b>	Sets shape for all points in current selection.
<b>Set envelope default point shape</b>	Allows you to change the default shape that will be applied to new envelope points.
<b>Select all points</b>	Selects all points in the envelope.
<b>Unselect all points</b>	Unselects all points in the envelope.

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Command	Comments
<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 points</b>	Copies currently selected envelope point or points to the clipboard.
<b>Cut 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>Delete point</b>	Deletes the envelope point.
<b>Delete selected points</b>	Deletes all currently selected envelope points.
<b>Delete 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 points to zero/center</b>	Resets all currently selected envelope points effectively to a "neutral" value.
<b>Reduce number of 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 context menu with three sets of commands:

**Existing available envelopes:** Used to change the envelope displayed in this lane.

**Envelope management:** 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.

### 20.8 The Transport Bar Context Menu

This 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.

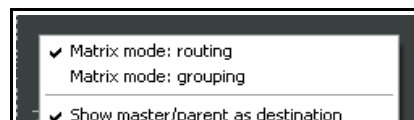


## 20 - Main Right-Click Context Menus Summary

Command	Comments
<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>Automatically scroll view during playback</b>	When selected, screen display follows play cursor during playback.
<b>Smooth seeking (seeks at end of measure)</b>	When enabled, moves play cursor on stop/pause to end of measure.
<b>Record mode: normal</b> <b>Record mode: time selection auto punch</b> <b>Record mode: auto-punch selected items</b>	Selects one of the three recording modes explained in Chapter 3. 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> <b>Measures – Beats / M S</b> <b>Measures – Beats</b> <b>Seconds</b> <b>Samples</b> <b>Hours:Minutes:Seconds:Frames</b>	Select your preferred unit of measurement for display on the Transport Bar. These options are mutually exclusive.
<b>Show playrate control</b>	Toggles on and off display of playrate controls in transport bar,
<b>Show time signature</b>	Toggles on and off display of time signature in transport bar.
<b>Show play state as text</b>	Toggles on and off text display of play state in transport bar – Playing, Stopped, etc.
<b>Center transport controls</b>	Toggles display of transport controls (Play, Stop, etc) in center or on left..
<b>Dock transport in Main Window</b>	Toggles on and off docking of Transport Bar.
<b>Hide transport</b>	Hides the Transport Bar. To redisplay, press <b>Ctrl Alt T</b> .

### 20.9 The Routing Matrix Context Menu

This menu is displayed by right-clicking on the empty background area of the matrix. The commands 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.



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.

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### 20.10 The FX Window Context Menu

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.
<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.

### 20.11 The MIDI In-Line Editor and MIDI Editor Context Menus

Insert note at edit cursor	Shift+I
Copy	
Cut	
Paste	Ctrl+V
Paste preserving position in measure	Ctrl+Shift+V
Select all notes	
Delete notes	
Split notes	S
Join notes	J
Mute events	Alt+M
Reverse	
Note properties...	Ctrl+F2
Note channel	
Quantize...	Q
Quantize using last settings	
Quantize position to grid	
Unquantize	
Freeze quantization	
Humanize notes...	H
Select all notes with same note value	
Remove duplicate notes	
Set note ends to start of next note	
View	
Single click inserts/removes notes	Alt+8
✓ Single click selects CC events	
Drawing or selecting a note sets the new note length	
✓ Preview notes on add/edit	
Load color map from file...	
Clear color map (use default)	

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 **Note channel** command displays a sub menu of channels 1 thru 16.

The second section (from **Quantize events** to **Set note ends to start of next note**) can also be found on the **Edit** menu in the MIDI Editor's main menu.

The **View** command leads to a sub-menu similar to the View command on the MIDI Editor main menu.

The remaining commands include some of the other options found on the MIDI Editor's main menu.

#### 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.

### 20.12 The Media Explorer Context Menu

Right-clicking over any vacant area within this window produces a context menu that is the same as the Media Explorer's Options menu. In addition, right-clicking over the name of any media item will produce its own context menu.

File	Size	D
Base01.wav	3.1 KB	12
Ba:		12
Ba:		12
Ba:		12
Ba:		12

Command	Comments
<b>Insert into project</b>	Inserts into selected track at play cursor position.
<b>Insert at time selection</b>	Inserts into selected track at time selection, stretching/looping to fit.
<b>Insert into project on a new track</b>	Inserts at play cursor position on to a new track.
<b>Insert as take in selected items</b>	Adds the selected item in the media explorer to the selected item in Arrange view as a new take.
<b>Use as media source for selected item</b>	Replaces current media source in item currently selected in Arrange view.
<b>Use as media source for selected item (stretch/loop to fit)</b>	Replaces current media source in item currently selected in Arrange view, stretching/looping to fit.
<b>Preview</b>	Previews this item.



## 21 ReaRoute: Using REAPER with Other Audio Apps

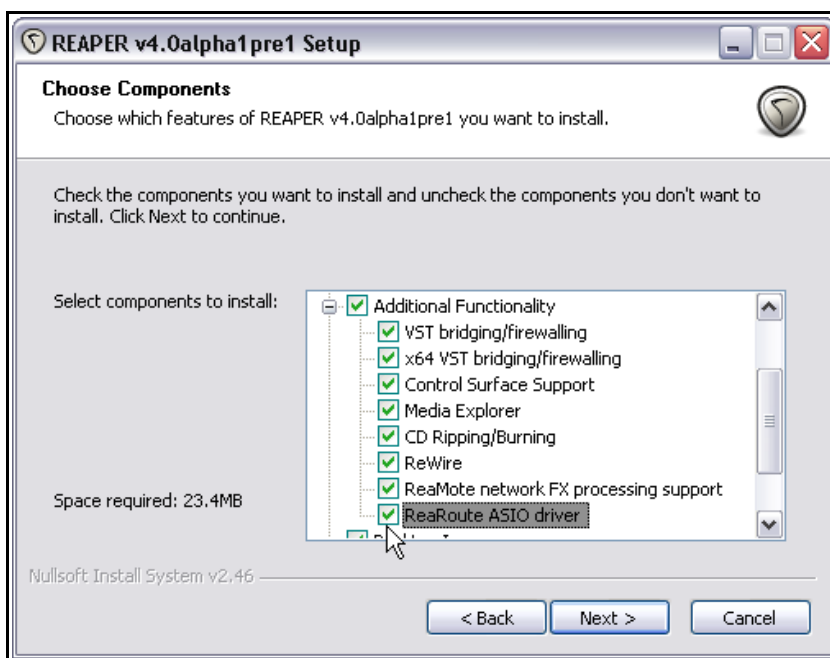
### 21.1 What is ReaRoute?

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 **Additional 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.



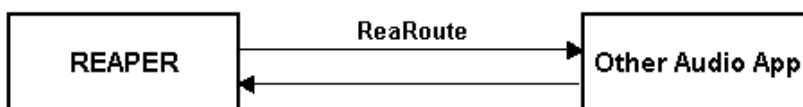
**Note:** Some users have reported problems with native ASIO drivers after installing the ReaRoute driver. If you experience problems with your ASIO drivers after installing this feature, uninstall REAPER, then re-install with this check box cleared.

Once ReaRoute has been installed, you can pass audio streams between REAPER and other audio applications. In the example that follows, 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 application and recording it track by track within that application.
- 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 stand alone 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 Applications 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.

**Note:** Before setting up or using any application for use with ReaRoute, you should:

- ◆ Make sure that the ReaRoute ASIO Driver has been installed (see previous page), and
- ◆ Make sure that REAPER is open and minimised.

Application	Instructions
Ableton Live	<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>
FL Studio	<b>Options, Audio Settings</b> , then select <b>ReaRoute ASIO</b> for <b>Output</b> . Close Audio Settings window.
Project 5	<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> .
Sonar	<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> These instructions are for Sonar 8.5. Some earlier versions of Sonar require 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>
Tracktion	<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 Application

*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:

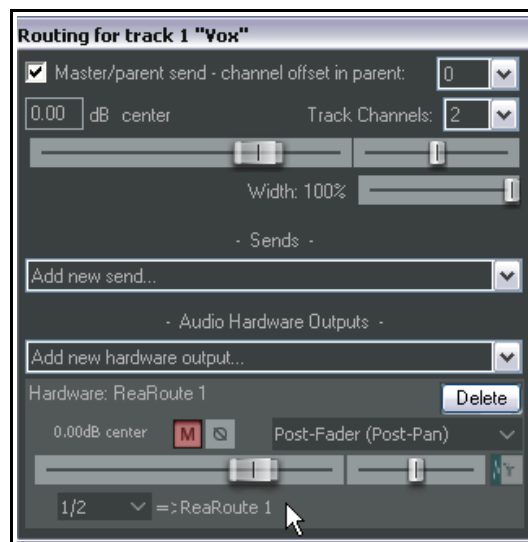
- Open REAPER. It is important that you open REAPER before the other application.
- Open the project file that you wish to use. For each track that you wish to use, create a hardware output to a different ReaRoute channel.
- Open the other application (e.g. Sonar) and create a new project file.
- Insert 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.

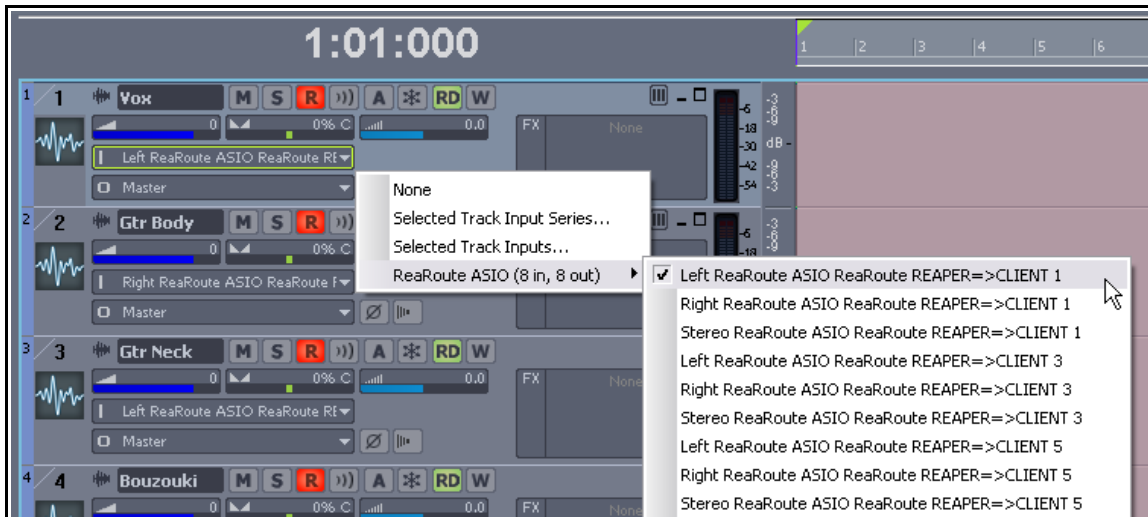
#### Example

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 Routing (IO) window for this track and add a hardware output to **ReaRoute Channel 1** as shown (right).
3. Similarly, create hardware outputs for track 2 to ReaRoute Channel 2, track 3 to ReaRoute Channel 3, and Track 4 to ReaRoute Channel 4.
4. Save the file. Minimize REAPER.
5. Open Sonar (or whichever application you are using). These instructions refer to SONAR 8.5 and assume that you are already familiar with how to give commands and perform basic tasks in this application.

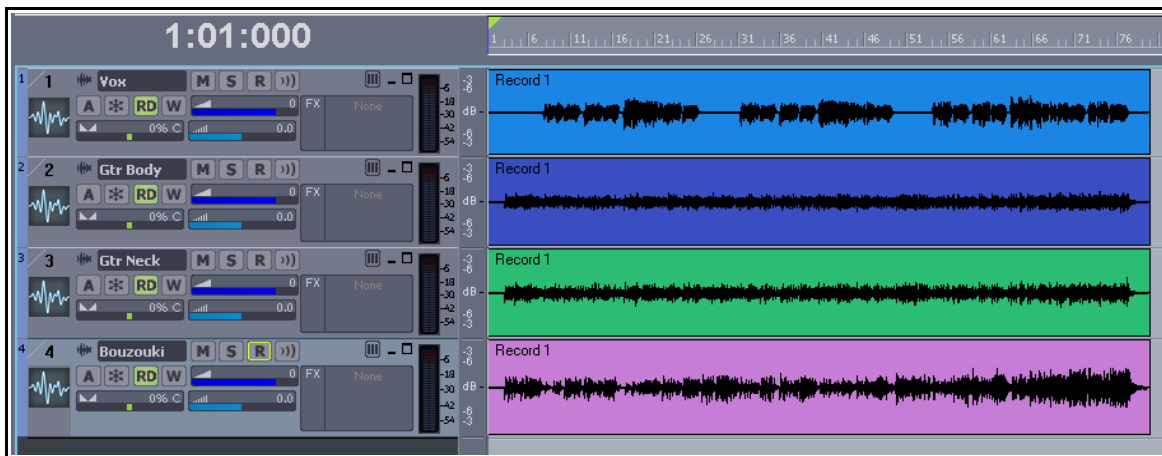


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6. Create a new project file containing four new audio tracks. Save this as **All Through The Night REAPER.cwp**. Name these tracks as shown below.
7. Set the Input for **Track 1** to **Left ReaRoute ASIO REAPER=>CLIENT 1** as shown below.
8. Set the 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**. Arm all four tracks for recording.



9. Save this file.
10. Start Recording.
11. Switch to REAPER and press **Play**. As the song is played back, the tracks will be recorded in Sonar. Note that if any of your REAPER tracks have any active FX in their FX windows, then unless the sends are Pre FX it will be the 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

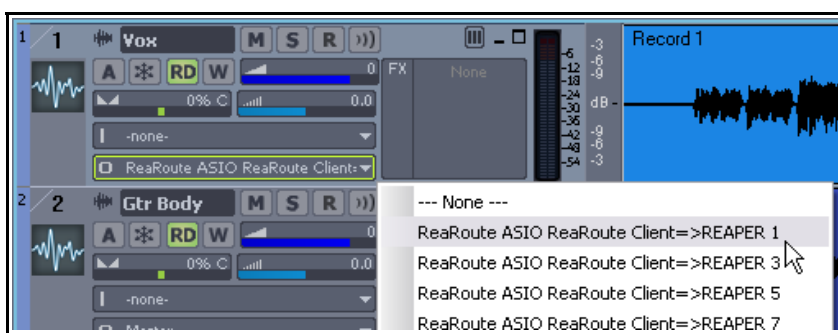
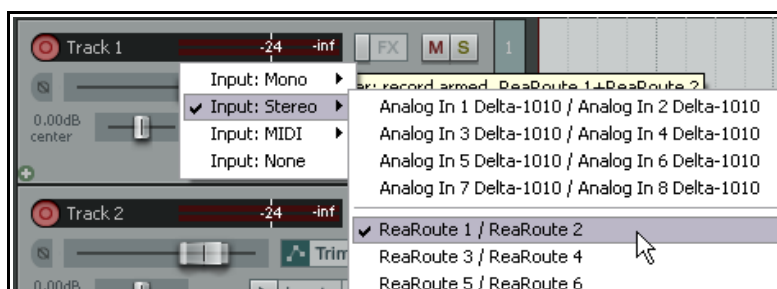
Staying with the same example, we are now going to use ReaRoute to take our open Sonar project and send an audio signal back to REAPER. In overview, this is how it is done.

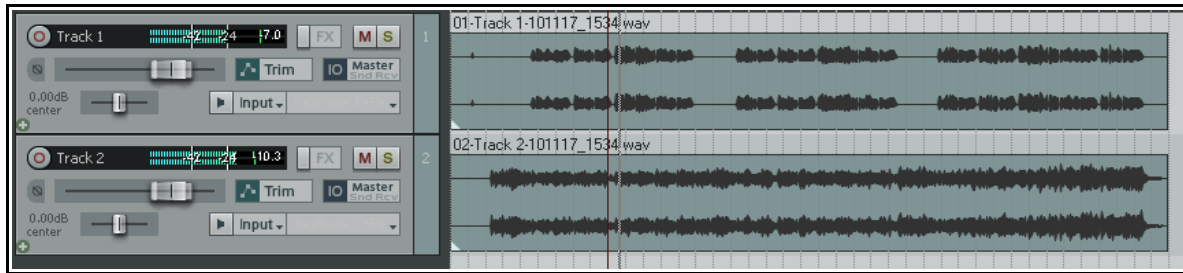
- Open REAPER and create a new project file. Insert as many new tracks as you need.
- Open Sonar. In Sonar, open the file you wish to work on, and assign outputs on a track by track basis to your various ReaRoute channels as required. Arm these tracks for recording.
- Insert any FX (such as V-Vocal) 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 1/ ReaRoute 2**, as shown right.
5. For the second of these tracks, set the input to **ReaRoute 3/ ReaRoute 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 input of all tracks to None. 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 2 40% Left, Track 3 40% Right, Track 4 Centre.
10. In Sonar, insert any Cakewalk FX required for the vocal in the Vocal Track. For example, you could use the VX64 Vocal Strip.
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, save your Sonar file, 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 Instrumental 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 in this User Guide).

### 21.5 Using REAPER With a Synth Workstation

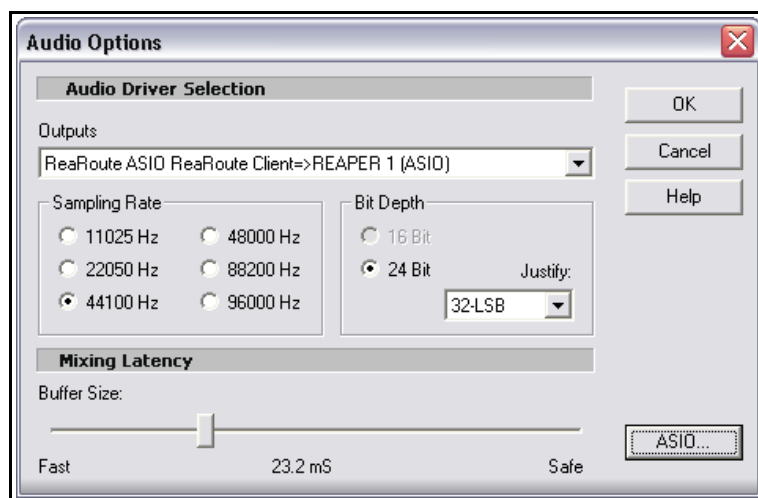
Project 5 from Cakewalk is a Synthesizer Workstation application. It's been around for a few years now. You can use Project 5 or any other broadly equivalent product for this exercise. In this section, you will see how ReaRoute can be used to make the functionality of Project 5 (or any similar application) available to you when you are working with REAPER. To be able to work through 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 SONAR.RPP** and save it as **All Through the Night PROJ5.RPP**
2. Add a track at the end of this project. 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 here.



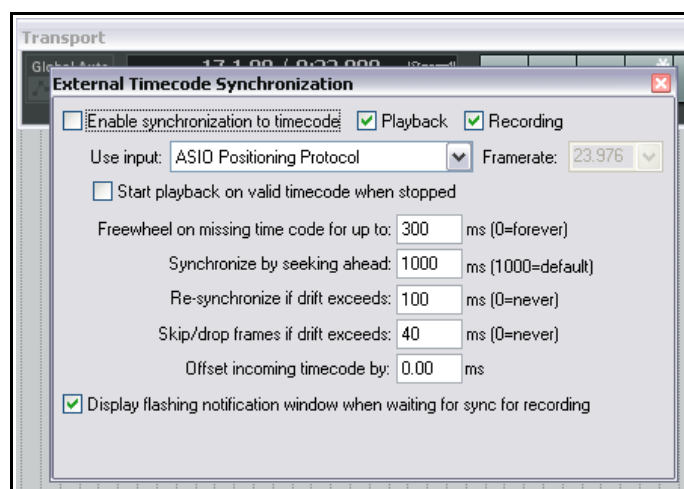
5. For this simple example, insert a synth of your choice into your Project 5 project file. Of course, you could if you wish insert several different synths and take full advantage of the program's features, but for this simple demonstration we will confine ourselves to just the one.
6. Within REAPER, make sure your cursor is at the start of the project. Press **Record**.
7. 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 is additional to any activity that occurs within Project 5.
8. When you have finished, save your Project 5 file as **ReaRoute Demo.p5p** and close the program.
9. In REAPER, unarm the Synths track and save your file.

## 21.6 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:

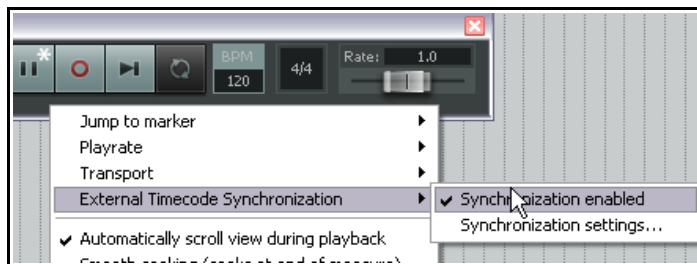
- Right click over the **Play** button on the Transport Bar. This opens the settings dialog box shown on the right.
- Select the Input to be used. Available sync types include ASIO Positioning Protocol, MTC and SPP.
- Complete the other settings and close the dialog box. You should consult the documentation 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 (Actions, Show Action List):

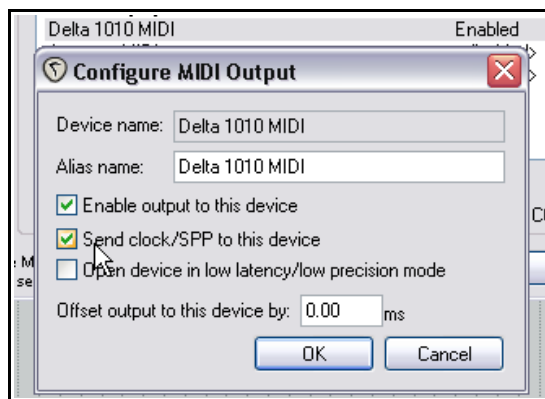
- Show external timecode synchronization settings.

- 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**.

Double-click on the device name to open the **Configure MIDI Input** dialog box, 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 ReaScript

ReaScript is a scripting language that takes your ability to customize REAPER well beyond that offered by the Actions List editor. With ReaScript, you can not only create more powerful and sophisticated macros, you can even create your own extension commands. To use ReaScript, you will first need to have either the Perl or Python scripting languages installed on your computer.

ReaScript isn't for everyone – in fact, because it requires an understanding of programming it probably isn't for most people. You can find out more about ReaScript and how to get started at:

<http://www.cockos.com/reaper/sdk/reascript/reascript.php>

### 22.2 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.

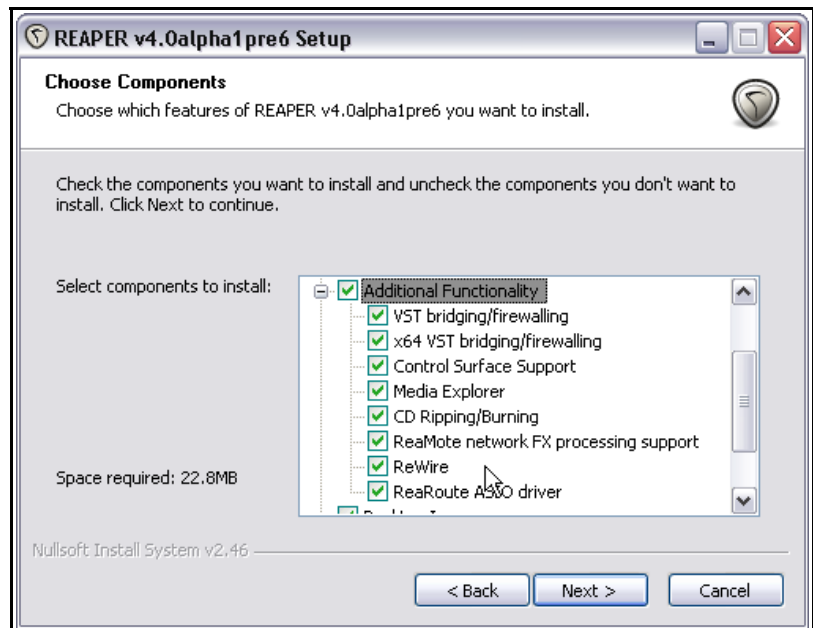
To set up ReaMote, simply install REAPER and whatever plug-ins you need on the slave machines. Make sure when installing REAPER that you have ReaMote selected and enabled under Additional functionality. Run the ReaMote slave on the slave machines, then enable ReaMote in the **REAPER Preferences** on the master, and you're ready to go!

### 22.3 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. If you wish to use it, make sure when installing REAPER that you have ReWire selected and enabled under Additional functionality.

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.



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### 22.4 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.

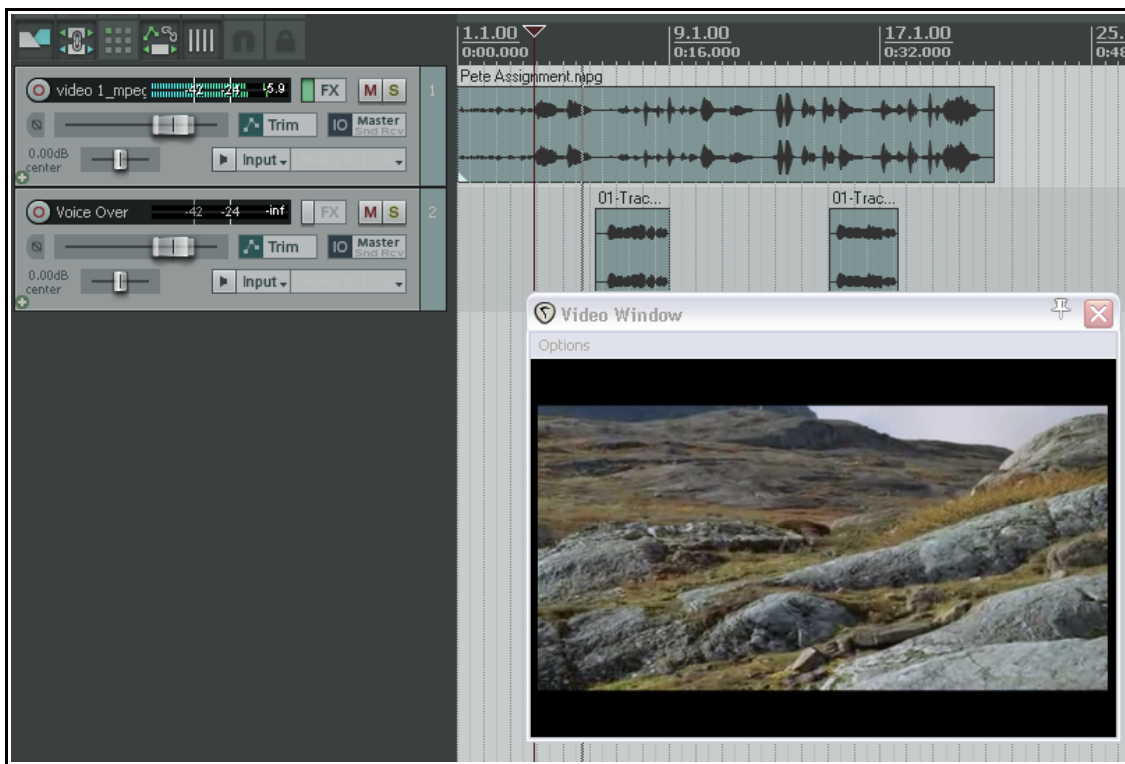
To learn more about the NINJAM software or download a copy, visit <http://www.NinJam.com>

To learn more about using NINJAM with REAPER, visit the Cockos WIKI <http://www.cockos.com/wiki/>

### 22.5 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, 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
<b>When I play back, my audio track is silent, even though there is activity in the track's VU meter.</b>	<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.</p> <p>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.</p> <p>Make sure that everything is connected to the power supply, switched on, and with appropriate volume levels.</p> <p>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>
<b>I get an error message to the effect that MIDI device(s) cannot be opened</b>	<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.</p> <p>Check whether another program has use of the MIDI device.</p> <p>Check that you have not accidentally opened REAPER twice.</p>
<b>When I play back, my audio track is silent, and there is no activity in the track's VU meter.</b>	<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.</p> <p>Make sure that the item has not been muted (right click over item, Item Properties).</p> <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>
<b>When I play back, I don't hear some or all of a track's FX being applied</b>	<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.</p>

Input Output Issues	
Problem	Diagnosis and Possible Solution
	<p>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>
<b>When I play back, I get clicks, pops, stutters or dropouts</b>	<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>
<b>When I play back, the Master clips into the red and distorts, even though the track level(s) appear quite low</b>	<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>
<b>When I play back, the audio sounds clipped, even though it doesn't appear to be visibly clipping anywhere</b>	<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> <p>If it does, reintroduce the FX gradually until you can identify which is causing the problem.</p>
<b>When I try to play an imported MIDI track, it is silent</b>	<p>This can be a routing, sound card or setup issue – see previous page. 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>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>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>
<b>When I try to record audio, nothing is recorded</b>	<p>The problem here could lie either with your REAPER settings or with your hardware set up.</p> <p>Make sure the track is armed for recording.</p> <p>Make sure that the track has been assigned an input.</p>

Input Output Issues	
Problem	Diagnosis and Possible Solution
	<p>Check (Options, Preferences, Audio Device) that your range of audio inputs has been defined <i>and enabled</i>.</p> <p>Make sure under the Options menu that you have the correct required Record Mode set (usually this should be Normal).</p> <p>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>Make sure that the microphone or lead for the instrument being recorded is connected to the correct audio input.</p> <p>If the microphone requires phantom power, make sure that the phantom power supply is enabled.</p> <p>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>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>
<b>I don't have enough CPU to play back my project</b>	<p>Almost certainly, this is because you are trying to use more FX than your DAW can handle.</p> <p>Use the Performance Meter to determine which tracks are using the most CPU hungry FX.</p> <p>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>

## 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>	<p>This happens when focus is with another window, such as the Routing Matrix, or an open Dialog Box. Two possible solutions are:</p> <p>Give focus to another view such as the Track View or Mixer before pressing the key, or</p> <p>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.</p>
<b>When I try to place the edit cursor exactly where I want it, it moves a little</b>	<p>Snapping may be enabled. If so, use the Options, Enable Snapping command to disable it.</p>
<b>When I try to make a time selection, the start and end points move from where I want them.</b>	<p>Snapping may be enabled. If so, use the Options, Enable Snapping command to disable it.</p>
<b>I add a Volume or Pan envelope to a track, but when I play back</b>	<p>Make sure that Automation Mode is set to Read and the envelope is armed.</p>

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Interface Issues	
Problem	Diagnosis and Possible Solution
the fader does not move.	
I record multiple takes on a track, but only the last one is visible.	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.
When I maximize a track, the wrong track is displayed	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> .
When I zoom in horizontally, the edit cursor disappears from view and I lose my place	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> .
I try to view a window, such as Big Clock or Performance Meter, but I can't see it on the screen	<p>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.</p> <p>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 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 [bigclock] wnd_vis=1 wnd_left=967 wnd_top=600 wnd_width=426 wnd_height=137 time_mode=0 [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>
My Undo History window is cluttered with every item and track selection I make	Go to Options, Preferences, General and disable <i>Create Undo points for item/track selection</i> .

### 23.3 Troubleshooting Record Modes and Monitoring

It can be difficult at first to understand how various permutations of REAPER's record modes (available from the Options menu) and monitoring options (from a track's arm record context menu) can be used together to obtain different results.

I am indebted to **John Bercik** for supplying me with the information in summary form that is contained in the table below:



Record Mode	Monitor Options	Behaviors
Normal	Monitor input ON Monitor track media when recording OFF	When stopped: monitors live material only When playing: monitors existing and live material continuously When recording: monitors live material only
	Monitor input (tape auto style) ON Monitor track media when recording OFF	Stopped: monitors live material Playing: monitors existing material only Recording: monitors existing and live material
	Monitor input ON Monitor track media when recording ON	Stopped: monitors live material Playing: monitors existing and live material continuously Recording: monitors existing and live outside punch, only live inside punch
	Monitor input (tape auto style) ON Monitor track media when recording ON	Stopped: monitors live material Playing: monitors existing material, then only live in punch Recording: monitors existing material, then only live in punch
Time Selection Auto Punch	Monitor input ON Monitor track media when recording OFF	Stopped: monitors live material Playing: monitors existing and live material continuously Recording: monitors existing and live outside punch, then only live material in punch
	Monitor input (tape auto style) ON Monitor track media when recording OFF	Stopped: monitors live material Playing: monitors existing material only Recording: monitors only existing material outside punch, then only live material in punch
	Monitor input ON Monitor track media when recording ON	Stopped: monitors live material Playing: monitors existing and live material continuously Recording: monitors existing and live outside and inside punch
	Monitor input (tape auto style) ON Monitor track media when recording ON	Stopped: monitors live material Playing: monitors only existing material Recording: monitors existing material outside punch, then existing and live inside punch
Auto Punch Selected Items	Monitor input ON Monitor track media when recording OFF	Stopped: monitors live material Playing: monitors existing and live material continuously Recording: monitors existing and live outside punch, then records and monitors live material in selected items
	Monitor input (tape auto style) ON Monitor track media when recording OFF	Stopped: monitors live material Playing: monitors existing material only Recording: monitors only existing material outside punch, then records and monitors live material in selected items
	Monitor input ON Monitor track media when recording ON	Stopped: monitors live material Playing: monitors existing and live material continuously Recording: monitors existing and live outside punch, then records and monitors live material in selected items
	Monitor input (tape auto style) ON Monitor track media when recording ON	Stopped: monitors live material Playing: monitors only existing material, then only live in punch Recording: monitors existing selected item(s), then records and monitors live material in selected items



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