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TRACKTION 2
MUSIC PRODUCTION SOFTWARE

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Table of Contents

Note: Tracktion originated in the mind of Julian Storer, an English programmer with a love of audio. Stateside Tracktioneers* will notice a distinctly British flavor to the user interface. To help you understand Tracktion better, the manual was written with a British accent (thank you to Adam Starkey). So sit back, imagine yourself overlooking an English moor (or in an English pub if you prefer), and enjoy Tracktion!

*People who use Tracktion

Chapter 1: Getting started with Tracktion

1.1 A quick overview of Tracktion's user interface

Welcome to Tracktion! Tracktion is a powerful audio and MIDI sequencer, designed with simplicity and ease of use in mind.

Do not be fooled by Tracktion's uncluttered interface however; ease of use in this case does not equate to a lack of features. Tracktion is capable of delivering professional results that only a few years back would have required a significant investment in expensive hardware. When you open Tracktion, you have at your disposal, all of the tools needed to turn your musical ideas into great sounding mixes.

The Tracktion interface

Tracktion is made up of three pages, each of which shares a similar look and feel.
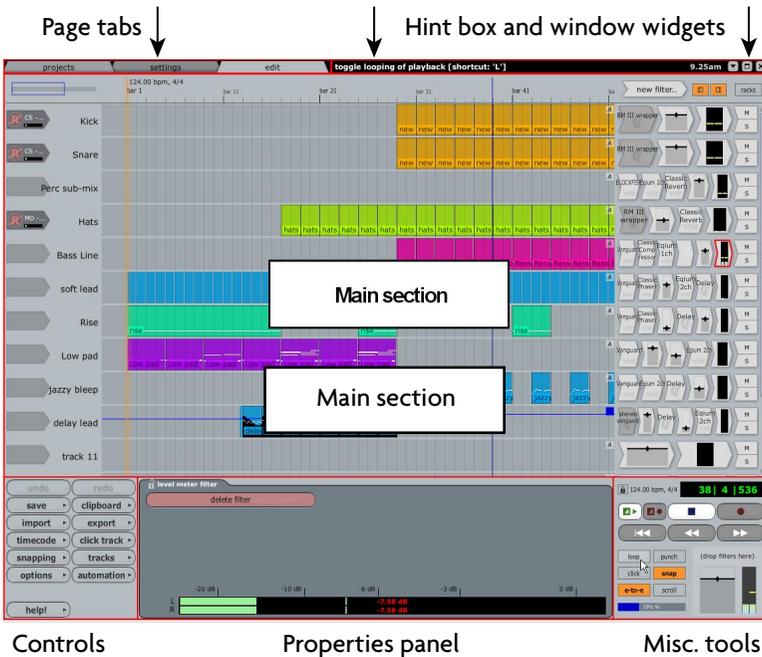
Figure 1.1.1

Page tabs

Use these tabs to switch between Tracktion's three pages: the projects page, the settings page, and the edit page (shown above). You can use the keyboard keys **F1**, **F2**, and **F3** to switch between the three tabs.

When Tracktion is first opened, you will see the projects page. All three pages will be described throughout the chapters of this user guide.

Hint box and window widgets

When you move your mouse over a tool in Tracktion, a useful hint will be shown in the hint box along the top of the Tracktion interface. This is a great way of learning your way around Tracktion.

The windows widgets allow you to close, minimise, and resize the Tracktion interface.

Main section

This is where the majority of the action takes place, on each of the Tracktion pages.

Control section

The region labelled "controls" in the image below is called the control section. Here you will find most of the tools for working with Tracktion. The tools available depend on the page you have selected.

Properties panel

Many items in Tracktion have a range of tools and options specific to them. When such items are selected, these tools and options are displayed in the properties panel.

The properties panel is integral to Tracktion's "everything in one place" design. If you have ever used other sequencer software that requires you to work though layers of menus and windows, thus constantly breaking your workflow, you will definitely appreciate the properties panel.

Misc. tools

This section is only used when the project and edit pages are open. When the project page is selected, this section shows the current clipboard for copy and paste operations.

If you switch to the edit page, this section will become the transport section, where you can control the transport and change related settings.
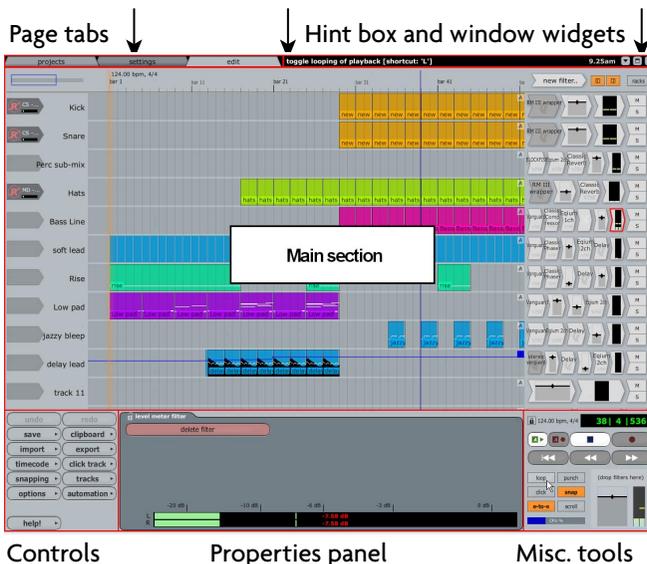
1.2 Setting up your audio and MIDI devices

- Click on the settings tab at the top of the Tracktion interface. This displays the settings page with tabbed names along the left hand side.

- Select the "audio devices" tab to view and configure the audio and MIDI devices available on your computer.

The top-most part of this page is the wave device region (Fig. 1.2.1).
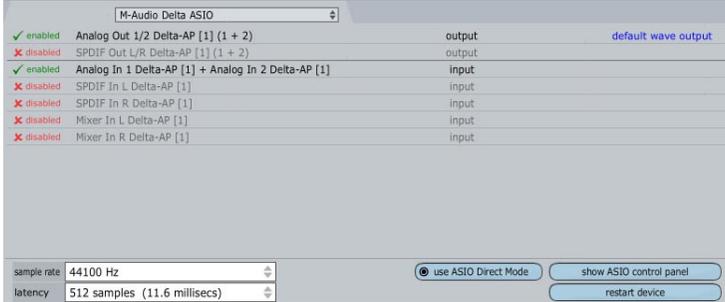
Figure 1.2.1

At the top of this display, there is a drop-down list. This is where you choose your wave device. Tracktion will normally select the correct ASIO or CoreAudio driver by default. If for some reason it does not select the best choice, or if you have more than one sound card installed, you may need to change this.

The entries in the wave device list refer to the available audio drivers installed on your computer. There may be a number of entries in this list depending on the type(s) of sound card(s) you have installed, but generally speaking, you will only be interested in the ASIO/CoreAudio options.

PC and ASIO drivers

If you are using a PC and have no ASIO options available, then you probably don't have an ASIO capable audio device installed. As such, you will need to try one of the other options. However, using Tracktion with non-ASIO drivers may have an impact on performance, and it is worth investing in a sound card or computer audio interface with ASIO driver support.

If you know your hardware has ASIO support but you do not see it in the list, you may need to uninstall and reinstall the drivers for this audio device. Consult the documentation that came with the sound card for further information.

Mac and CoreAudio drivers

If you are using a Mac and some of your CoreAudio devices are not listed, this may be because they are not currently connected to the Mac. Close Tracktion, check the connections, and try again.

Setting the sample rate

Select your desired sample rate from the drop down list. For audio intended for CD, you will typically want to set this to 44100 Hz. Opinion is split on whether working at higher rates is worthwhile, but if you like to work at higher sample rates then it is a good idea to increase this value in fixed multiples of your desired final sample rate (e.g., 88200 Hz for CD audio which will end up at 44100 Hz). Be aware that higher sample rates require correspondingly more processing power, so doubling the sample rate will likely halve the amount of effects, VSTis, and tracks your computer can process.

Setting the latency

To provide an uninterrupted audio stream it is typically necessary for computers to buffer a few milliseconds of sound before sending it out to the audio devices. This buffering causes a slight delay referred to as latency. In real terms this means that if you hit a key on a MIDI keyboard that is controlling a virtual instrument inside Tracktion, or play a guitar live into the software, there will be a (very) small period of time before the sound is actually heard. For play-back and mixing purposes, latency is seldom an issue. For live performance or recording, however, latencies above 20 ms are usually considered to be hard to work with. Fortunately, modern computers and audio interfaces are capable of achieving extremely low latencies with no noticeable delay.

It should also be noted that for end-to-end operation, where sound is being recorded and played back at the same time, the overall latency is double the value set in this box. So, if you are using Tracktion to add effects to a live guitar performance, for example, you may need to set this value a little lower than usual.

Very low latencies can have a high cost on computer performance though, and setting the latency value too low will usually cause "glitchy" playback (characterised by pops and clicks) if you are using an older machine.

ASIO settings

The PC version of Tracktion has a few extra options, specific to ASIO.

The "use ASIO direct mode" option may improve performance with some ASIO drivers. Typically it is benign at worst, so it is probably worth leaving it enabled. If you are having problems with sound in Tracktion, you should try toggling this setting.

The "show ASIO control panel" button displays the control panel for the currently selected ASIO device. Please note, the screen you see here will be specific to your hardware, so refer to the documentation that came with your audio hardware for further information.

The "use real-time priority mode" option can help with compatibility for some ASIO sound cards. Note, this option should only be enabled when absolutely necessary, as it can conflict with some VST plug-ins, causing Tracktion to freeze. It never hurts to try this setting to see if your performance improves and switch back if it doesn't.

PC user's note: Some ASIO drivers do not allow settings such as sample rate and latency to be adjusted by external applications. If your ASIO driver is one of these cases, then the sample rate and latency options will only display current values of the dedicated ASIO control panel. In this case, you will need to set these values from the ASIO driver's own interface by clicking the "show ASIO control panel" button. *Be sure to click the "restart device" button when you are done*.

The audio input and output devices

With a suitable wave device chosen, select which audio inputs and outputs you will be using. Be aware that all active inputs and outputs consume computing power, so disable any I/O channels that you do not need. Equally, if you use a particular input or output only occasionally, it probably makes sense to leave it disabled. You can always enable it when needed.

At the bottom of the "audio devices" tab there is an option labeled "only show enabled devices." Enabling this option can be convenient if your audio interface has a large number of inputs and/or outputs, some of which you rarely use. For now, leave it disabled so that all of your devices are visible.

To enable or disable an audio device, just click on the enable/disable label to the left of the entry.

You can also nominate one audio output to be the "default audio device." The default output will become the master output for Tracktion's mixed stereo output from the master fader in the lower right hand corner of the edit screen. To make a different output the default, just click on the "make this the default" label.

Setting up your MIDI devices

- Click on the settings tab at the top of the Tracktion interface. This will display the settings page.

- Select the "audio devices" tab to view and configure the MIDI devices available on your computer.

The bottom part of this page is the MIDI device region (Fig. 1.2.2).

✓ enabled	MPU-401	output	(click to make this the default)
✓ enabled	Delta AP MIDI	output	default midi output
✗ disabled	Microsoft GS Wavetable SW Synth	output	
✓ enabled	MPU-401	input	
✓ enabled	Delta AP MIDI	input	

Figure 1.2.2

At the bottom of the "audio devices" tab there is an option labelled "only show enabled devices." Disable this option so that all of your devices are visible.

To enable or disable a MIDI device, just click on the enable/disable label to the left of the entry.

A default MIDI output can also be set similarly to the default audio output. Simply click the "click here to make this the default" label to make a midi output the default.

1.3 A word on hardware requirements

Although Tracktion provides great results even on modest computers, the available computing power of a machine directly affects how large a project Tracktion is capable of playing in real-time.

Three factors go together to determine the computational resources available to Tracktion:

Processor (CPU) speed

Every track, software instrument, audio effect, and input device used by an edit requires a chunk of your computer's processing power. Tracktion features a CPU meter that shows how much of your CPU resources are being used at any one time.

Software effects and instruments place especially high demands on the processor, so if you find your edits require too much processing power, look for ways to use these plug-ins more efficiently, including Tracktion's "freeze" feature (explained elsewhere).

Hard drive speed

The speed at which data can be read from your hard drive defines how many audio tracks can be played at once. Laptop computers, in particular, tend to use slower 2.5" form factor hard drives than desktop machines, which use faster 3.5" form factor hard drives.

When using a laptop computer, if you find that your edits consistently require more hard drive performance, you may want to consider investing in an external hard drive, which houses a desktop 3.5" hard drive in an external enclosure that can interface with your laptop through USB2 or Firewire.

Memory (or RAM)

If a computer has insufficient memory, processor performance and hard drive performance will both be adversely affected. Every program or plug-in that is running on your computer will use some of your available memory. In fact, just loading the operating system (Windows XP or OSX) will use a significant amount of RAM.

When a computer runs out of RAM, it will attempt to create extra space by using sections of the hard drive as a slower form of memory. These read-write operations consequently steal some of the hard drive bandwidth from your audio tracks. In addition, because it takes many thousand times longer for your processor to read data from a hard drive than it would do to read it in main memory, processing tasks take much longer too.

Although Tracktion and its supported OS will run on 256 megabytes of memory, 512 megabytes will deliver a much better user experience, with even higher amounts being appropriate when using memory hungry instrument plugins (like virtual samplers for instance). In general, the more memory you can put in your computer, the better all programs, including Tracktion, will operate.

Note: Be aware that background processes such as virus checkers, printer monitors, or instant messengers all will use some of your precious computing power. If possible, disable any background processes that you do not actively need.

1.4 Setting up your plug-ins paths

- Click on the settings tab at the top of the Tracktion interface. This will display the settings page.

- Select the "plugins" tab to configure VST and ReWire plug-ins on your computer.

Tracktion can host 3rd party instrument and effects plug-ins in the form of VST plug-ins, and ReWire slave applications.

VST plug-ins

The VST technology allows sequencers such as Tracktion to incorporate 3rd party applications called "plug-ins." These plug-ins can be used to add new audio effects such as reverb or delay, or complete instruments such as emulations of classic analogue synthesisers. In Tracktion, such plug-ins are referred to as "filters," and we will see how to use them later in this manual. This section merely describes how to tell Tracktion how to find any plug-ins you may have installed your computer.

The top-most part of the plug-ins tab shows the list of directories that Tracktion searches for VST plug-ins (Fig. 1.4.1).

| directories to search for VST plugins: | C:\Program Files\Tracktion\plugins |
| | C:\Program Files\Steinberg\VST Plugins |

(remove path) (add path...) (move up) (move down)
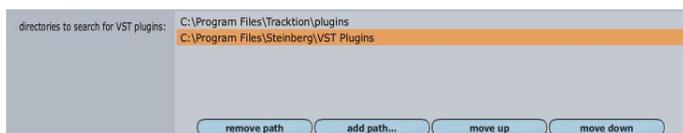
Figure 1.4.1

The directories listed in the large box, and all of their sub-directories, are searched for VST plug-ins.

To add a new search path, simply click the "add path..." button and navigate to the top level of your plug-in directory. Repeat this method for each main directory you would like searched for VST plug-ins. A path can be removed by highlighting it, and clicking "remove path."

The "move up" and "move down" buttons allow you to adjust the order in which directories are searched. Directories at the top of the list are searched first.

The next box (Fig. 1.4.2) shows a list of plug-ins that Tracktion has chosen to ignore. If a plug-in file cannot be opened as a VST plug-in, Tracktion will add it to this list.

| files to ignore when searching: (this list can be edited) | msvcr71.dll |
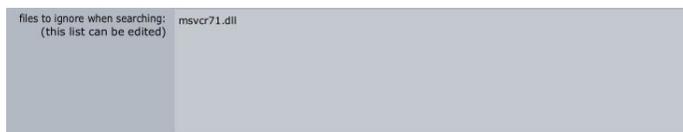
Figure 1.4.2

Sometimes plug-ins are incorrectly added to the list because they failed to initialise correctly at some point. If you believe a plug-in should work, but it has been added to this list, try removing it and rescanning the plug-in directories. Do this by first highlighting the plug-in in the ignore list and pressing delete to remove it from the list. Then click the "rescan plug-in directories" button and choose "just look for plug-ins that are new or have changed" from the pop up list.

For a good resource for plug-ins of all flavours, go to the KvR Audio Website at http://www.kvraudio.com

ReWire slaves

ReWire provides a method by which an audio application can be run as a slave to another application. It is possible to have two sequencers running on one computer, with one essentially acting as a virtual instrument inside the other.

To configure Tracktion to host ReWire applications, just click the "enable ReWire" option.

A note on plug-in organisation

The tree-structure displayed when adding new filters to tracks will correspond to the directory structure used to organise VST plug-ins on your hard drive (Fig. 1.4.3).
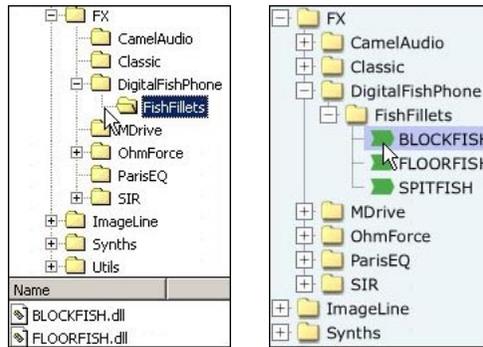
Figure 1.4.3

The image on the left shows a folder-view inside Windows Explorer. The image on the right shows Tracktion's filter pop-up menu. If you look at the tree structure for both, you will see that the filter list matches the VST directory structure. This can be very handy if you have large number of VST plug-ins installed, as it allows you to organise them in a meaningful manner. The plug-ins above have been categorised by companies.

1.5 Trying the demo songs

Now you have Tracktion all set up and ready to go, a good way to familiarize yourself with your new software is to check out some of the included demo songs.

• Click on the projects page tab, to bring the projects page to the fore.

• On the left hand side of your screen is the project list (Fig. 1.5.1). This is where all of your active projects are shown. To start, select "Everyone Wants You" from the list.
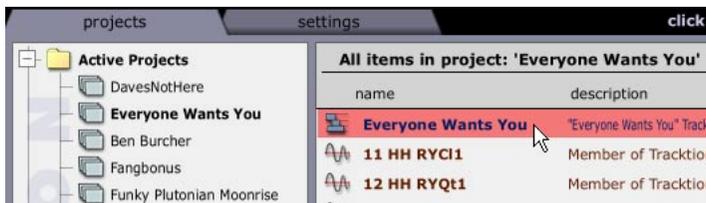
Figure 1.5.1

• The main area to the right of the project list is called the item list; it shows all of the edits and media associated with the currently selected project.

• Double-click on the edit named "Everyone Wants You," or select it and click the "open for editing" button at the bottom of the page.

After a few moments the edit will load and you will see the "edit page". It is here that you construct your songs. If you play this demo, you can see visually how the song is constructed by watching the vertical time-line cursor (or "play-head") scroll through the arrangement.

• To play the song, click the "play" button in the bottom right of the screen (Fig. 1.5.2), or hit the SPACEBAR key.

• Click the stop button again (or press the SPACEBAR key) to stop playback.

Figure 1.5.2

Chapter 2: The projects page—working with projects and items

2.1 An overview of the projects page

To help you organize your work, Tracktion provides a handy project manager that keeps track of projects and their associated files (called items). In addition, the "projects" page allows you to add custom descriptions to items and projects, making it much easier for you to keep track of your work.
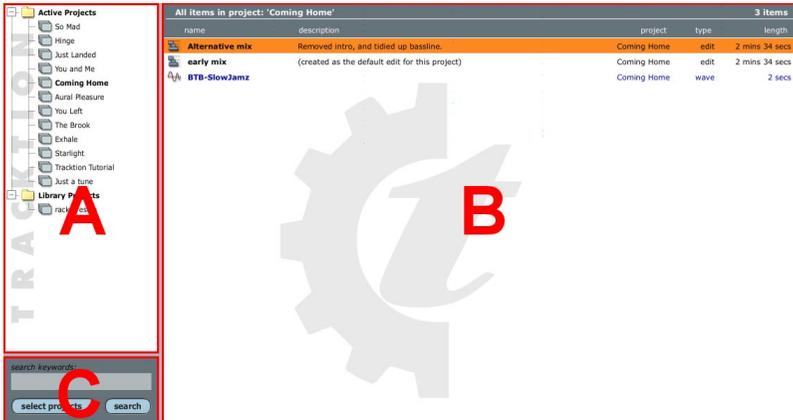
Figure 2.1.1

If you look at the projects page (Fig. 2.1.1), you will see that the main region is broken into three panels. In the image above, these panels are labelled as A, B and C. The panel labelled A is called the "project-list." The panel labelled B is called the "item-list." The final panel, labelled C, is the "search box."

A: The project-list

The project-list is not, as it may at first appear, a list of all projects on your hard drive. Rather, it shows those projects that are currently "open." An open project can be thought of as a book-marked project. It isn't open in the way that a document may be open in a word processor; rather it is marked as being a work in progress. All newly created projects, will be opened by default ready for you to work on them. Projects that you have previously closed, however, will need to be re-opened before they can be edited.

To close a project, right-click on the project name, and select the "close project" option. You can also opt to close all open projects from this menu. Closing a project does not alter the project in any way; it simply removes the reference to the project from the project-list. To open a previously closed project, click the "open project" button, and from the displayed dialogue box, navigate to the project file.

When a project is selected in the list, various related options and values will appear in the properties-panel. These options will be discussed later in this chapter.

If you wish to change the order in which projects are listed, you can simply drag their names up or down to the desired location. Notice that there are two folders displayed in the project list. These are simply for your convenience in organising your projects into "active projects" or "library projects" that are not being worked on as regularly.

B: The item-list

The item-list shows all material associated with a project. This material may take the form of MIDI files, audio files, and edits.

If you are used to simply placing all of the files related to a project in the project's folder on your hard drive, then you may be wondering what advantages the item-list offers. Primarily the item-list is there to streamline the process of managing projects and related media items. It does this by providing a way of storing extra information about individual files, and a mechanism by which files can be shared between projects. In the same way, if you have reason to keep files in different locations on your hard drive, the item-list will help you keep track of things.

Selecting an item in the item-list, will display various related options and values in the properties-panel. These options will be discussed later in this chapter.

Clicking on the column names just above the item-list will cause the list to be sorted on that column. If you wish to manually change the order in which items are listed, simply drag their names up or down to the desired location.

C: The search box

Just below the project-list, there you will see a search box (Fig. 2.1.2). You can use this search tool to search your open projects for keywords. The search is often useful for finding resources attached to projects. For example, if you have a hi-hat sample in a project and you wish to use it in another, assuming the sample had "hi-hat" somewhere in its name, you could do a search for that keyword to locate it.
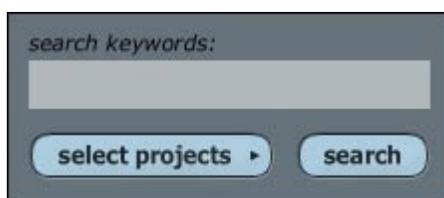
Figure 2.1.2

Search keywords: Type the name, or part of the name, of the material for which you are searching.

Select projects: If you wish to narrow the search to specific projects, click this button and choose the projects you wish to be searched from the list.

Search: Click this button to perform the search. The results will be shown in the item-list. Click a search result in the item-list to find out more about it, including which project it belongs to.

2.2 Creating a new project

A typical song may grow to consist of a number of edits, audio files, and MIDI clips. To help you keep these components organized, Tracktion combines them all into projects. A project is simply a collection of edits, and references to any audio files needed by these edits. The components of a project need not be located in the same folder as the project file on your hard drive, which makes it easy to share media between projects.

Tip: Tracktion's project system makes keeping track of your songs and associated files fairly painless, but it is still good practise to keep everything related to a project in one place. You may find it helpful to create folders for each of your projects and place in them any files referenced by the project.

If you try to create a new project in a folder that already contains other files, Tracktion will ask you if you wish to create a new folder that is named after the project.

Starting a new project is simple:

• Click "new project..." (See Fig. 2.2.1).
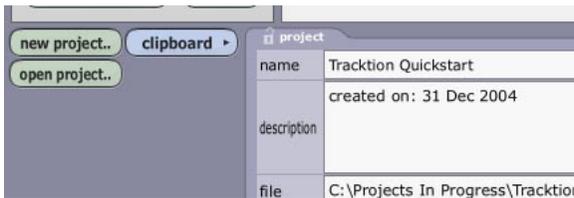
Figure 2.2.1

• A dialogue box appears asking you where you wish to save the project. Choose a location on your hard drive, and enter a name for the project, for example, "Tracktion Tutorial." (See Fig. 2.2.2).
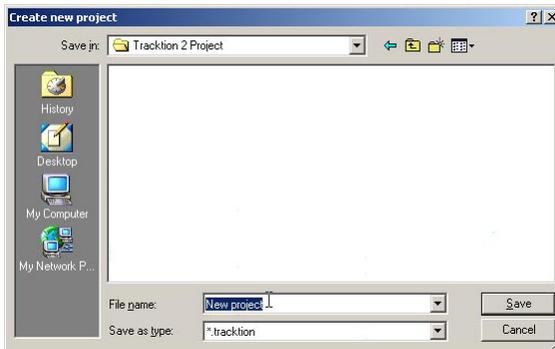
Figure 2.2.2

As shown in Figure 2.2.3, the new project will be now be present in the Active Projects list. Select it and you will see that a default edit named "new edit #1" has also been created. You can think of edits as being versions of a song. As you work, you may want to save copies of the current state of your song. This can be accomplished by simply copying your edit and continuing with your work.

Figure 2.2.3

- Open this edit by double-clicking on it, or by selecting it, and clicking the "open for editing" button near the bottom right corner of the properties panel (Fig. 2.2.4).
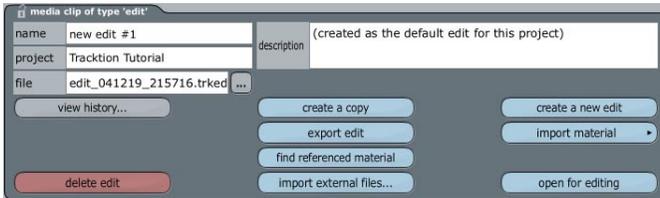
Figure 2.2.4

2.3 The project properties

When a project is selected, its properties are displayed in the properties-panel (Fig. 2.3.1). Various tools and options related to the project can be found on this panel.
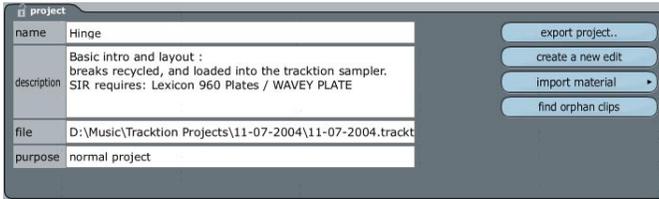
Figure 2.3.1

Name: You can view and edit the project name from this field. It is this name you see in the project-list. Note that changing the name here does not affect the project file name.

Description: This field allows you to enter a description of the project, or make notes for future reference.

File: This field shows the location of the project on your hard drive.

Export project: This option allows you to bundle the project and related materials into an archive. Use this if you want back up your work, or transfer it to another computer. Exporting is discussed in the final chapter of this guide.

Create new edit: This option creates a new empty edit in the current project.

If you wish to make a copy of an existing edit, select the edit in the item-list and click the "make a copy of this edit" button.

Chapter 3: The edit page

3.1 Familiarising yourself with the edit page

The edit page is where you arrange your compositions, and is the main screen in which you will spend most of your time in Tracktion. If you look at Figure 3.1.1, you can see there are nine sections of note on this page. Working from the top-left hand corner notice the following:
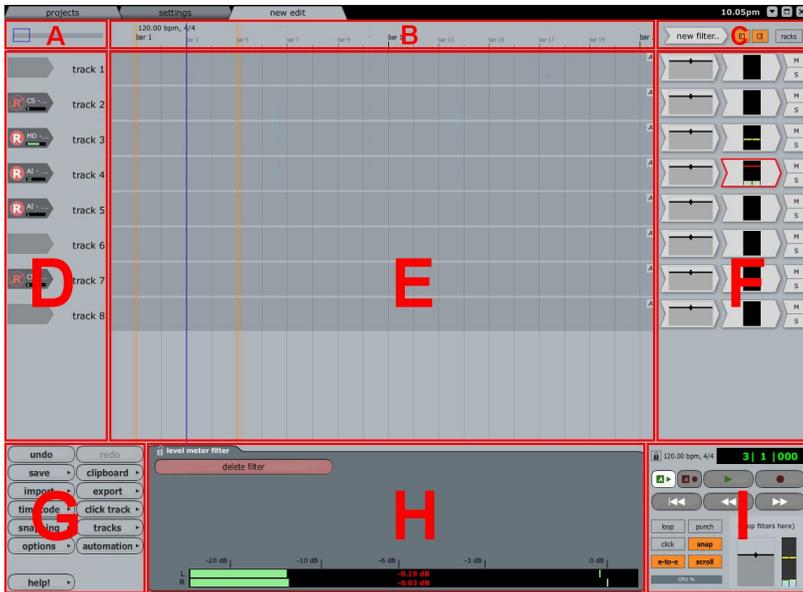
Figure 3.1.1

A: The quick scroll tool

The blue box shows the area of the whole edit that is currently in view. At a glance you can see how far into a song you are. By dragging the box from side to side, you can also use this tool as a fast way to navigate through the entire length of your edit.

B: The time-line

The time-line provides a series of time divisions against which you can arrange the components and sections of your song, in terms of bars/beats, seconds/milliseconds, or seconds/frames.

In figure 3.1.1 you can see three vertical lines, that span the section labelled "**E**," and reach up into the time-line. The orange lines are the In and Out markers and the blue line is the play-head cursor.

The In and Out markers are used to define a section of an edit to be played in looped mode. They are also used to specify record start and stop points for punch mode. Some editing tools can also be set to work only on the region between the In and Out markers. To move these markers, simply click and drag them left or right.

During playback, the play-head cursor shows the current location on the time-line. Dragging the play-head cursor left or right scrolls through the edit.

C: Miscellaneous tools

The "new filter..." icon is used to add new filters to tracks. We will look at filters in more detail in a later chapter.
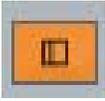
Toggle option to show/hide the input section (shown as "D" in Fig. 3.1.1). Shortcut **SHIFT + CTRL + I**.
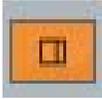
Toggle option to show/hide the filter section (shown as "F" in Fig. 3.1.1). Shortcut **SHIFT + CTRL + F**.

Toggles the visibility of the rack editor window (not shown in Fig. 3.1.1). Shortcut **CTRL + G** (**CMD + G** for Mac users). We will look at rack filters in a later chapter.

D: The input section

This is where you manage your input devices, the input channels of your audio interface and MIDI interface(s). There are two display modes available for the input section. Figure 3.1.1 above shows the "per-track view" mode. The alternative display type shows all of the inputs as draggable icons (Fig. 3.1.2). Both modes behave slightly differently, and have their own advantages and disadvantages. The "per-track view" makes keeping track of a large amount of inputs far easier than the icon view. The icon view allows more than one input device to be connected to a single track, and works better when only a few input devices are present. We will look at the input devices in greater detail in the later chapters on audio and MIDI.
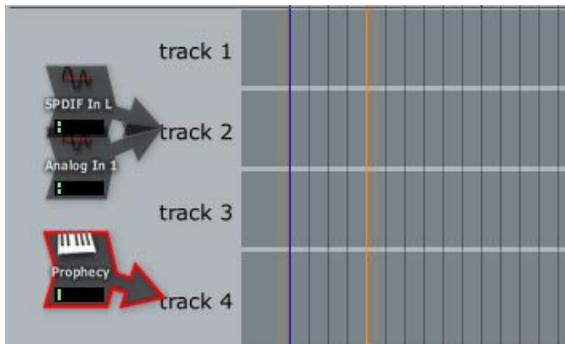
Figure 3.1.2

In addition to the input devices, the input section has selectable track names which you can use to re-order tracks, or access the track properties. We will look more closely at tracks later in this chapter.

E: The arrange area

The arrange area is where you actually construct your songs. Working with the arrange area, tracks, and clips, is described later in this chapter.

F: The filters section

The filter section can be though of as a mixer and as a plug-ins effects rack all in one place. Another way to think of it is like a traditional "mixer", but rotated 90 degrees on its side, allowing it to peacefully exist as part of Tracktion's one-screen interface. We will look at filters in more detail in later chapters. For now, bear in mind that each track has a corresponding filter strip.

G: The control section

The control section contains various tools and options for working with Tracktion.

Figure 3.1.3

With the exception of the undo/redo buttons, when clicked, these buttons display a pop-up menu with various options and functions available. We will look at the options available from the control section throughout the rest of this user guide, but let's take a look at the help button right now.

When you click the "help" button, you are presented with a pop-up menu showing the following options:

- Show Tracktion help pages: This option launches the Tracktion documentation file so you can read through it. Keyboard shortcut: **F12**.

- Turn on pop-up help : When this option is enabled, Tracktion displays a pop-up window next to options. This can be handy when you are first finding your way around Tracktion. Keyboard shortcut **F11**.

- Use longer delay before pop-up help appears: When this option is activated, Tracktion will wait a few moments before displaying the pop-up help, which some users prefer. This setting will have no effect unless the pop-up help is enabled.

Tip: If you would like to see the pop-up help for any item, simply position the mouse over the item, and press **F10** on your computer keyboard. This works even with pop-up help turned off.

H: The properties panel

The properties panel is a context sensitive system. Most objects and controls have a range of properties available to them. When such an item is selected, this panel will display the properties. The properties-panel helps to keep all Tracktion's functionality on one screen, and in one place. By removing the burden of opening, closing, and moving, windows, the properties-panel greatly improves workflow and is the heart of Tracktion's single screen interface.

Tip: you can lock the properties of a selected item in place, so that they remain even when you click off of the item by clicking the padlock icon at the top-left-hand corner of the properties panel. Shortcut **CTRL + P** (**CMD + P** for Mac users).

I: The transport section

The transport section contains the main play/record transport controls, plus options related to playback and recording (Fig. 3.1.4).

Figure 3.1.4

The top-left-hand corner of the transport section shows the current tempo and time signature.

To the right of the tempo is the current play-head position. This value can be edited to snap the play-head cursor to an exact point.

The two "A" buttons below the tempo, toggle on/off the automation read mode and automation record mode. Automation is discussed in a later chapter.

The next five buttons provide standard tape-deck style play, record, return to zero, rewind, and fast forward functions.

Play: Clicking on this button starts playback, clicking it again will stop the transport. Keyboard shortcut: **SPACE**.

Record: This button starts recording from all input device channels that are "record armed". Keyboard shortcut: **R**.

Return to zero: This button moves the play-cursor back to the start of the edit. Keyboard shortcut: **HOME**.

Rewind/fast-forward: These buttons move the play-head cursor backwards or forwards through the edit. A single click moves the play-head to the next snapping location. Holding either of these buttons down causes Tracktion to scroll through the edit until the button is released.

The next series of buttons are toggle controls for various play/record functions. When they are active, their button becomes highlighted. The functions of these buttons will be discussed throughout this user guide.

At the bottom of the transport section there is a CPU usage meter. Use this to monitor how much of your available computing power is being used by the current edit. As CPU usage reaches its maximum, audio stability can be compromised, and pops and clicks may occur during recording and playback.

In addition to the usage meter, you may sometimes see a small exclamation mark ("!") appear on the usage bar. This notifies you that an edit required more data to be read from your hard drive than could physically be achieved.

The final part of the transport section is called the master filter section, and it is here that you can see and edit the overall level of your edit. Think of this as the "master fader" on the virtual mixing console. You can also add filters here and they will be applied to the finished mix. A perfect candidate for this would be the included Final Mix mastering filter.

Figure 3.1.4

3.2 Tracks, clips, and the arrange area

An overview of tracks

If you look at the edit page, you can see that it reflects the flow of the signal path from left to right. Audio or MIDI is received from an input device, it then flows into the arrange area, and then passes into the filter section, where it is effected by the filters, has its volume and panning adjusted, and is then mixed down to stereo. If you were to mentally replace the arrange area with a multi-track recording device, and the filter section with a mixing console, it all starts to make sense.

All input from external devices enters Tracktion through the input devices on the left. That signal then passes into the arrange area, where it joins any previously recorded

material ready to be passed to the filter section on the right. When the signal reaches the filter section, it passes serially from the left-most filter on the track to the right-most, being processed by each as it goes. Finally, the signal leaves the track for master outputs.

Figure 3.2.1 shows a schematic diagram of this arrangement.
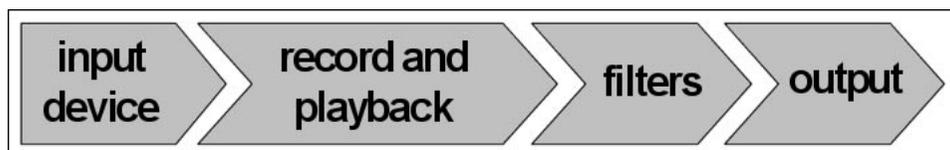
Figure 3.2.1

The main thing to take from this explanation is that signal always runs from left to right in Tracktion, and that each track is a recording device and mixer channel all in one.

To add a new track to an edit:

• Click the "tracks" button in the control section.

• Select the "create new track" option. Keyboard shortcut: **CTRL + T** (**CMD + T** for Mac users).

• The new track will be inserted under the currently selected track, or at the bottom of the edit if no track is selected.

To adjust the height of the tracks such that they all fit on screen, choose the "fit all tracks on screen" option from the "tracks" button pop-up. Keyboard shortcut: F8.

To reset the height of all tracks to the default, select the "Set all tracks to default height" option from the "tracks" button pop-up. Keyboard shortcut: F9.

An overview of clips

Songs in Tracktion are built up from individual "clips". These clips are placed on tracks, where they can be arranged into a composition. A clip is a container for an audio file, or MIDI data. An audio clip might contain a recorded vocal, or guitar part. MIDI clips contain instructions that tell instruments (either a virtual VST instrument plug-in, or an external MIDI hardware instrument) what notes to play.

The track properties

Clicking on a track's name in the input section displays the properties for that track (Fig. 3.2.2). As with most things in Tracktion, a number of tracks can be selected at once by holding down the CTRL key (CMD for Mac users), and selecting each item in turn. When multiple tracks are selected however, a few of the options described below are not available.

Figure 3.2.2

Name: This field allows you to view or set the name of the track(s) as shown in the filter section.

Delete track: This button removes the track(s) from the edit. Keyboard shortcut: DELETE or BACKSPACE.

Insert new tracks: This option adds new tracks to the edit. From this menu you can choose to add a number of tracks at once from a set of preset numbers. You can also add a single track by pressing CTRL + T (CMD + T for Mac users). New tracks will be inserted between the currently selected track and the next track.

Insert new clip: When this button is clicked, a pop-up menu is shown from which you can choose the type of clip to add. The new clip will be placed on the current track. If there is a loop region set then the new clip will fill that region, otherwise a new clip of arbitrary length will be created at the cursor point.

- Insert new MIDI clip: adds a new MIDI clip to the edit. MIDI clips are detailed in a later chapter. Keyboard shortcut: G

- Insert new audio clip: adds a new audio clip to the edit. Audio clips are detailed in a later chapter.

Move track up/down: These options allow you to move the track up or down in the track-list order. You can also reposition a track in the list by dragging on the track's name.

Destination output for this track: By default all tracks send their output to whatever two output channels you have designated as your "default audio device". This is similar to how on a 2-bus mixer, all individual channels are automatically routed to the master stereo output. If you wish to have audio sent to an alternate audio device, or have the MIDI data from a track sent to external MIDI gear, just select the desired output from this list. You can also send the output of a track, or even a number of tracks, to another track.

3.3 Handy shortcuts for working with tracks

Mac users:
Replace the **CTRL** key with the **CMD** key.
Replace the **ALT** key with the **OPTION** key.

Creating, naming, and deleting, shortcuts

CTRL + T: Insert a new track into the edit.
TAB (when track selected): Automatically highlights the track name area so it is ready to type a name in
DELETE or **BACKSPACE**: Remove selected track(s).

Zooming and Viewing Shortcuts

Mouse-wheel (+ **SHIFT**): Zoom in/out horizontally (scroll through edit).
F5: Zoom out to fit the entire edit on screen.
F6: Zoom to show a few seconds around the cursor.
F7: Zoom in to show marked region.
F8: Rescale all tracks vertically to fit on screen.
CTRL + F8: Rescale all tracks vertically and horizontally to fit on screen.
F9: Set all tracks to the default height.
Z: Expand or contract the current track height.

Navigation shortcuts

CTRL + HOME: Scroll up to top-most track.
CTRL + END: Scroll down to bottom-most track.
SHIFT + CURSOR UP / DOWN: Scroll tracks up / down.
SHIFT + CURSOR LEFT / RIGHT: Scroll tracks left / right.
ALT + CURSOR UP / DOWN (when track selected) : Select track above / below current track.

Miscellaneous

CTRL + SHIFT + I: Show / hide the input section.
CTRL + SHIFT + F: Show / hide the filter section.

Loop Marker shortcuts

I: Set the In marker to the current play-head cursor location.
O: Set the Out marker to the current play-head cursor location.
[: Set the play-head cursor to the location of the In marker.
]: Set the play-head cursor to the location of the Out marker.
M: Set the In and Out markers around the currently selected clip.

Chapter 4: Working with audio

4.1 A brief introduction to digital audio

Before we look at recording and working with audio in Tracktion, it may be helpful to look at a few of the basics about digital audio. If you have only recorded audio in analogue form before now, there are a few rules you will need to unlearn, as well as few principles you may find helpful to keep in mind. Of course, if you are comfortable working with digital audio already, you may just want jump straight into the next section.

Before we dive into the technical stuff, let us first give a quick word of warning about digital recording levels. You may be used to recording with analogue hardware, and if so you have almost certainly, at some point, made recordings where the level meters are bouncing into the red areas. This is a habit you need to break when working with digital. Whilst there are some practical and artistic benefits to recording a little hot with analogue recorders, when it comes to recording digitally, the level meters should be kept below the red at all times. Digital recorders are very unforgiving with audio that goes beyond the maximum level, and such peaks will result in a most unpleasant digital distortion. Aim to get your input levels at a medium-high, but without ever hitting the 0dB mark, and if unsure, err on the side of caution.

Figure 4.1.1

Figure 4.1.1 shows the waveform of a simple percussive pattern. The waveform at the top is the audio belonging to the left-hand stereo channel, while the waveform at the bottom belongs to the right-hand channel. This image is a graph of amplitude and time, where amplitude is measured on the vertical axis, and time is measured across the horizontal axis. If you know that this audio file contains a single bar of a drum pattern, you can probably see that each of the high peaks represents an individual percussive hit. Look closely at each of the peaks above and you can see that they all tend to reach the peak amplitude very quickly. Once at their peak amplitude, they decay over a short period of time, and finally fade to silence over a slightly longer period of time. If you think about the sound that percussive instruments such as snares make, you should be able to see the correlation between the sound described by Figure 4.1.1, and the sound of an actual drum part.

That digital audio is a measurement of amplitude over time may not come as a surprise to you, after-all this describes analogue recordings too. Where digital does differ from analogue though, is in how the amplitude and time measurements are made.

Sample resolution (or bit depth)

Although perhaps a strange analogy, a thermometer is a good model for describing what sample resolution is. Imagine you have a thermometer that was graded from the freezing point of water through to the boiling point. The accuracy with which you could measure the temperature of a cup of tea would be dependent on how finely gradated the thermometer scale is. If it showed a scaled that jumped in increments of 10 degrees it would clearly be less accurate than a thermometer that offered a scale in terms of single degrees.

So, how does this tie in to digital audio? Reading a thermometer is largely a digital process. That is to say, whilst there is theoretically an infinite spread of possible temperatures between freezing and boiling, if you were to record them, you'd be using finite approximations. The temperature may be 50.2 degrees, but you would write down 50 degrees. This is exactly what happens with digital audio. The number of tick marks shown between the minimum and maximum temperature can be thought of as the sampling resolution.

Figure 4.1.2 shows what happens to a sine wave when the amplitude is measured. The first image shows the sine wave when only two states are possible, either on or off. The second image shows the same sine wave reproduced with slightly less coarse graduations. Finally, the third image shows how increasing how increasing the sampling resolution produces a greatly more accurate impression of the original sine wave. So, when people talk about bit-depth, what they are in effect describing is how accurately an audio signal's amplitude can be measured.
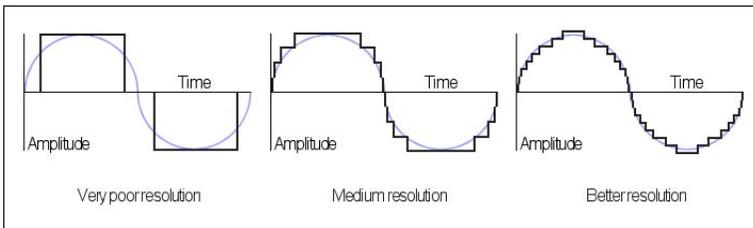
Figure 4.1.2

Getting back to that thermometer for a second; what happens if the temperature being measured exceeds the boiling point of water? Well, in short, the temperature cannot be accurately recorded; you would have to log it as "off the scale." If, for example, you were to heat a beaker of water to just above boiling, then allow it to cool, a chart showing temperature over time might look something like Figure 4.1.3.

Because the thermometer cannot measure temperatures above boiling, a whole section of the chart has been cut off (or clipped). Exactly the same thing happens when audio is being recorded digitally. Any audio that exceeds the maximum recordable level is simply clipped which produces a very unmusical form of distortion.
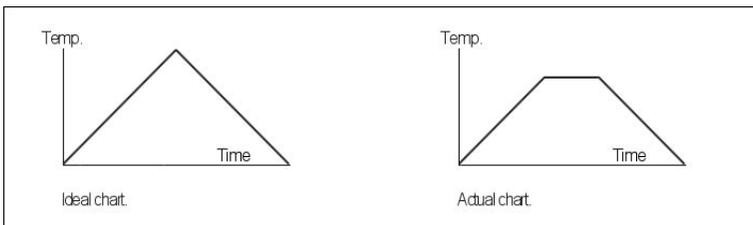
Figure 4.1.3

CD audio has a resolution of 16-bits. Modern sound cards and computer audio interfaces can record at 24-bits. A big advantage of recording at these higher bit depths is that you can reduce your input level enough to ensure that digital clipping is very unlikely to occur, whilst still maintaining a resolution that is greater than CD.

Sample frequency (or sample rate)

It is all very well having an accurate recording device, but recordings need to also be made frequently enough to be meaningful. If you were to take the temperature outside of your home, you would expect to obtain different results at different times of the day. If you were to look at your thermometer only at midday though, you only ever see one tempera-ture, and you could be forgiven for thinking that it pretty much stays constant all day long. This is because your sampling frequency matches the frequency of the temperature cycle. To get a more accurate idea of how temperature changes throughout the day, you'd need to at least double the frequency of measurements, and take a second reading at midnight. In sampling terms, the need to record at a frequency at least double the highest desired fre-quency is known as Nyquist's Theorem. It is also the reason why CDs are recorded at 44.1 kHz, when the human ear can only hear up to around 20 kHz.

The sample frequency, therefore, is quite literally the number of times per second that the amplitude of an audio signal is measured.

When choosing a sample rate to record and work at, it is usually best to simply opt for whatever frequency at which your work will be distributed. If, for example, you are making music, and intend to have it printed to CD, you should probably work at 44.1 kHz.

Tip: If you wish to work at higher frequencies, and render down to a lower frequency when your project is complete, it is probably best to work at direct multiples of your target sample rate, e.g., 44.1 kHz and 88.2 kHz.

4.2 Recording and importing audio

There are two different ways of working with the filter section: the per-track view, and the icon view. You can select which view to use from the "options" button located in the control section at the bottom-left of the edit page.

Icon view

If you are using the icon view, you will see all of your input devices (both audio inputs and MIDI con-troller inputs) as icons arranged in the filter section. Drag your chosen audio input device to the track you wish to record on. To arm the input, drag it to right. When it is close enough to the track, the tip of the arrow will "attach" to the track name, indicating the track is armed for recording. (Fig. 4.2.1). You can unarm the input by dragging it to the left until the arrow disappears.

Figure 4.2.1

Per-track view

To select an audio input device, click and drag slightly on the shaded input region to the left of the track name. This will display a pop-up menu, from which you can select your desired input (Fig. 4.2.2).
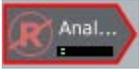
Input devices in the per-track view can be enabled or disabled by clicking the large red "R" icon. If the icon is solid red, then the input is armed. Otherwise, if the icon is non-solid with a bar across it, the input is unarmed. Ensure that your input is armed if you want to record on the track it is attached to.
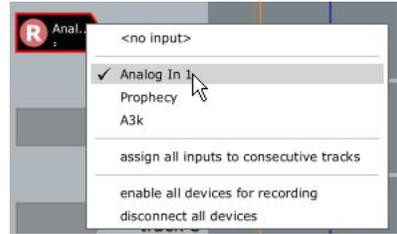
Figure 4.2.2

Tip: The "assign all inputs to consecutive tracks" option in the per-track view pop-up menu (Fig. 4.2.2) allows you to quickly line up all of your audio inputs ready for recording. This is very useful if you are multi-track recording a band.

Then, you can quickly arm or un-arm all inputs by choosing the "enable/disable all devices for recording option from the pop-up menu. Keyboard shortcut: **ALT + R** (for Mac use **CTRL + R**).

Monitoring the input

The input icon contains a small level meter, which should be responding to any incoming signal at this point.

If you need to monitor levels visually from some distance or just want to bask in the glow of some really big meters, Tracktion has a "large meters" for just this purpose. To activate it, click the "options" button located at the bottom-left of the edit page, and choose the "show big input level meters" menu option. Keyboard shortcut: CTRL + ALT + M (for Mac uses CMD + CTRL + M).

Readying the source material

Whilst it is possible to adjust the input gain on the input properties, it is far better to always get the input levels as good as possible before the audio reaches your audio input device. If the signal reaching Tracktion is too quiet, increasing the gain will raise the noise-floor too. If, on the other hand, the signal is too loud, digital clipping will occur at the analogue to digital converters (ADCs) of your audio input device. Once this clipping is present, it cannot be removed, and will still be present even if you lower the "input gain" control in Tracktion.

To get the optimum recording level, start by setting the input gain to 0 dB, and adjusting the levels of the source material such that the signal in Tracktion never reaches the 0 dB line on the input meters. Leaving yourself about 6 dB of headroom will not dramatically lower the resulting quality, but will give you some protection against peaks and spikes in the recorded material.

Working with the click-track

If you want to record along to a click-track, you can start the click at any time by clicking the "click track" button and selecting the "turn on click track" option from the pop-up menu. You can also use the keyboard shortcut key C to toggle the click-track. Using the click-track can help keep performances in time, which in addition to providing a generally tighter feel, can also make it easier to edit and work with recorded audio.

The options available from the "click track" button allow you to set the click to your taste. In particular, you may want to check the "pre-record count-in length" value, as this defines the amount of time click track plays before recording starts.

Recording in normal mode

To record a continuous take:

- Ensure that punch mode (keyboard shortcut: **P**) and loop mode (keyboard shortcut: **L**) are both inactive. The punch and loop buttons can be found in the transport section. Clicking on the options toggles them on and off.

- Place the play-head cursor at the point from which you wish to start recording.

- Record enable the appropriate track.

- Click the record button to start recording. Keyboard shortcut: **R**.

- When you are done, click the "stop" button to stop recording. Keyboard shortcut: **SPACE**.

Recording in punch mode

Punch mode causes recording to only take place when the play-head cursor is in the region between the loop-start and loop-end markers.

You could, for example, use this feature to have a vocalist re-do a single line of a recorded vocal. To help the vocalist prepare, playback could be started a verse earlier than the punch-in point. In this way, they can sing along to the existing material without altering it, to get prepared. When the play-head reaches the punch-in point, recording would start, and the existing vocal take would be replaced by the new recording. Finally, when the play-head reaches the punch-out point, recording would stop.

To record in punch mode:

- Ensure that punch mode is active, and that loop mode is inactive.

- Set the In and Out markers to your desired punch in and out points. The In and Out markers can be set by dragging them to the desired location.

- Position the play-head cursor at some point prior to the In marker.

- Record enable the appropriate track.

- When you are ready, click the record button to start the recording.

- Tracktion will automatically drop out of record though playback will continue, when the play-head leaves the marked region.

Tip: To cancel a recording, and have Tracktion delete the recorded material, use the following keyboard shortcut: PC users **CTRL + R**. Mac users **CMD + R**.

Tip: Usually, you will want to replace any material previously on the track between the In and Out markers with the newly recorded audio. To be sure this happens, select the input device and make sure the record mode listed in the properties area is set to "replace old clips in edit with new ones."

Recording in looped mode

Loop record mode will loop through the region between the In and Out markers just like regular looped play mode. A separate recording take will be made for every repeat of the loop. When the recording is finished, the resultant audio clip will contain all of the takes as layers. Figure 4.2.3 shows a clip with multiple takes available.

Figure 4.2.3

To record in loop mode:

• Ensure that loop mode is active.

• Disable punch mode. Looped recording cannot be used when punch mode is active.

• Set the In and Out markers around your desired loop region

• Record enable the appropriate track.

• When you are ready, click the record button to start the recording.

• Stop the record when you are done by clicking the "stop" button.

• The resultant audio clip will have a small "+" symbol at the bottom-right corner. Click this symbol to see a drop down menu of the available takes.

• To review a take, simply select it from the list and it becomes the active, visible take for playback.

• When you have selected the perfect take, you can use the "delete wavefiles for unused takes" option to remove any unneeded takes.

Loop mode is also perfect for recording repeat takes of a performance and then editing together the best bits of each take for a perfectly assembled "composite take". This method has been responsible for more polished vocal performances than anyone cares to admit.

The above scenario could be executed as follows:

• Record three loop takes as described above, and click the "stop" button when you are done.

• Review the three takes, and choose the one that needs the least correction.

- Make copies of the new clip on two other tracks by holding down the **CTRL + SHIFT** keys (**CMD + SHIFT** for Mac users) and dragging the clip to the two other tracks. The **SHIFT** modifier forces this clip to keep its current time location.

- For each of the two new clips, select one of the unused vocal takes.

- Disable snap-to-grid. Keyboard shortcut: **Q**.

- To use sections from the two extra takes to correct errors in the best take, select the clip you wish to copy from.

- Set the play-head cursor at the point you wish to begin splicing. Use the / key to split the clip. Do the same at the splice end point.

- Use the **SHIFT** modifier, and drag the spliced audio section onto the primary take.

- Repeat the last two steps for each correction you wish to make.

- Select the primary clip to display its properties.

- Click the "delete region" button, and choose "delete any parts of selected clip(s) that overlap others." This option automatically trims the main clip to make room for the corrections.

Importing audio

Existing audio files can be imported into Tracktion from your hard drive or from CDs. Tracktion can even copy audio tracks from CDs into your project. These audio files may, for example, be 3rd party drum-loops for use in your own work, or complete tracks of audio that have been exported from another sequencer, or a hard drive recorder.

To import audio into an edit, click the "import" button and choose whether you want to import an audio file, or a CD audio track, from the pop-up menu (Fig. 4.2.4). The **A** key acts as a keyboard shortcut for importing audio files.

Tracktion can import AIFF, WAV, and OGG files.
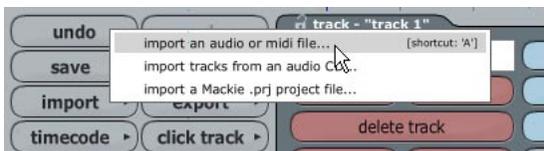
Figure 4.2.4

To import an audio file into an edit:

- Select the track on to which you wish to place the new audio file.

- Set the play-head cursor position at the point the audio should be located.

- Press the **A** key.

- From the dialogue box, select the file you wish to import.

If you import files from a removable disc such as a CD, Tracktion will automatically make a copy of the file in the project folder, otherwise the audio will be referenced from its location on your hard drive.

If you import a "broadcast wave" format audio file, the file's time-stamp information will determine where it is placed.

The import CD tracks option shows the list of audio tracks available on an inserted audio CD, and gives options for selecting the region to copy from the audio CD. Mac users can import Audio from a CD by using the "import an audio or midi file…" option. The imported audio is stored in your project folder, and a new audio clip will be created at the current play-head cursor position.

Importing Mackie .prj projects files

Users of the Mackie HDR, MDR, or SDR hard disk recorders can import their projects into Tracktion for editing and mixing. This is very useful for users who wish to track an ensemble on location with their hard disc recorder, but then import the audio and edits into Tracktion for further overdubs and the final mixing stage.

When the "import a Mackie .prj project file…" option (see Fig. 4.2.4 on previous page) is chosen you will be prompted for the path of the .prj file. Once a suitable project file has been selected, Tracktion will import the audio files (original and edited) into the edit. Track names will also be imported.

HDR users should note, however, that non-destructive fades, looped audio clips, and volume envelopes are not imported. If you have any important fades, loops, or envelopes in your project, render these tracks on the HDR first. All other edits will be accurately imported. Also, only the first virtual track is imported, so be sure the take you wish to include is located on the first virtual track.

It is worth noting that Tracktion does not make local copies of your audio files when importing .prj files, so you may wish to copy the project folder from your Mackie HDR to your computer's hard drive before importing the project into Tracktion.

For example:

- Create a new Tracktion project in an empty folder on your computer.

- Copy (or move) the HDR project into your new Tracktion project folder. You can transfer projects via FTP, or by connecting the HDR device to a Mackie HDR Pro FireWire drive bay (or many of the third party drive bays available). Be sure to leave the Mackie Hard Disk Recorder Project folder structure intact.

- In Tracktion, open the default edit for editing.

- Select the "import a Mackie .prj project file..." option from the "import" button's pop-up menu.

- Navigate the dialogue box to the .prj file for your project.

- After a few moments, you should see your project ready for editing in Tracktion.

Note: You should ensure that your HDR, MDR, or SDR unit has the latest operating system installed; otherwise, imports may not work correctly. The latest operating system updates can be obtained from http://www.mackie.com.

4.3 Working with audio clips

When you record or import audio into Tracktion, it will be presented in the edit page as an audio clip. These clips provide tools for editing and working with your audio, and a convenient way to arrange audio parts into a song.

Non-destructive editing

One of the most useful and fundamental aspects of clips is that you can edit and resize them non-destructively.

To understand audio clips, and indeed clips in general, it is useful to know that a clip doesn't actually contain any audio. Rather it can more helpfully be imagined as a window onto an audio file. What does that mean? Imagine a piece of cardboard with a square cut out of it. If you lay that piece of the cardboard on a page of text, you will only be able to see a small region of text at any one time. The hole is obviously a window in this case, and the text you can see through it is determined entirely by the position of the window, and its size.

An audio clip's relationship to an audio file works in the same way as the piece of cardboard over a piece of paper. The text you can see is not part of the cardboard; it is just what is visible through it. Similarly, the audio shown in a clip is not part of the clip, but rather the clip is acting as a window to the individual audio file.

By changing the position and size of a clip, you can show or hide as much of an audio file as you want at a given point in your song. Figure 4.3.1 shows an audio clip displaying just the middle section of an audio file.

A single audio file may be used by many different clips in a single edit, and each clip may not only be showing different sections of the file, but even applying unique processes to it.
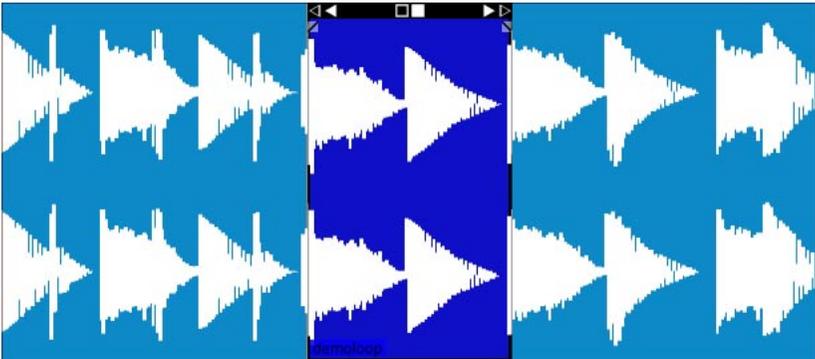
Figure 4.3.1

What "non-destructive editing" means then, is that splitting, trimming, and resizing clips, does not affect the underlying audio file in any way. If you shorten a clip, some of its contents may appear to be lost, but if you then re-stretch it back to its original size the contents will still be there. In short, any changes you make to a clip's size are only as permanent as you want them to be. Not only does this provide an extra-ordinarily flexible way of working, it also brings great peace of mind when making experimental edits to audio clips.

Working with the clip tools

When a clip is selected (by clicking on the body of the clip with the mouse), the clip becomes highlighted and the title-bar of the clip displays a collection of tools for working with the clip (Fig. 4.3.2).
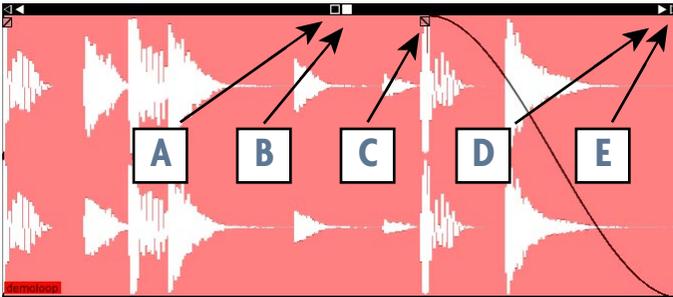
Figure 4.3.2

- **The main title-bar:** To move a clip to a new location in an edit, click anywhere on the title-bar other than on the tool icons, and drag the clip to the desired location.

- **A and B:** The two squares located in the centre of the title-bar are used to slide the clip or its contents around. Dragging on the hollow square icon (labelled A) allows you to move the clip forwards or backwards along the time-line without moving the contents of the clip. This would be like sliding that piece of cardboard over the page. The solid square icon (labelled B) is the inverse of the first function in that the clip stays still, but the contents are moved. If this was our hypothetical piece of cardboard, the effect would be just like holding the cardboard still whilst moving the page underneath it. Note that you cannot shift the clip beyond the boundaries of the source material. Once either edge of the source material has been reached, these options will cease to function.

- **C:** Audio clips have built in support for volume fades that can be set by dragging the two envelope icons (labelled C) to the desired envelope break points. The left-most envelope icon allows you to set a fade in period, whilst the right-most allows you to set a fade out period. The shape of the fade is controlled by an option in the clip properties.

- **D and E:** The size of the clip can be adjusted by dragging on either of the two arrow icons to each side of the title-bar.

The hollow arrow icon (labelled E) simply resizes the clip, leaving the position of the contents fixed in relation to the edit. Visually this is like making the hole in that cardboard a different size whilst keeping the cardboard stationary. Typically you might use this tool to remove silence from the beginning or end of a recorded audio clip.

The solid icon (labelled F) also resizes the clip, but in this case, the clip contents will be fixed in relation to the side of the clip being adjusted. Note that you cannot resize the clip beyond the boundaries of the source material. Once either edge of the source material has been reached, these options will cease to function.

Holding down the **ALT** (**OPTION** for Mac users) key whilst resizing the clip with these controls causes them to switch to stretch mode. In this case, the visible area of the clip contents stays fixed, but is stretched to match the new clip size.

Scrubbing audio clips

In addition to the main tools provided on the clip's title-bar, you can also "scrub" the clip's audio.

Double-clicking on the clip begins causes playback of the clip to begin of audio at the pointer position. Dragging the play-head cursor can then be used to scrub the clip.

To stop the clip playback, just click anywhere outside of the clip.

Tip: You can open the source audio for a clip in an external audio editor. Right-click on an audio clip and select the "edit using.." option, or the keyboard shortcut **CTRL + W** (**CMD + W** for Mac users).

4.4 Troubleshooting audio problems

Note: Clicking an input device icon will show the properties for that device in the properties-panel.

"*I can't hear my audio input, and I can't see a signal on the meters.*"

- Ensure that the "input gain" control in the input device's properties is set to at least 0 dB.
- Check that your audio cables are correctly connected to the source, and to your audio input device.
- If the audio is being passed through any mixers or effects processors, make sure that they are correctly configured and mute buttons have not been activated by mistake.
- Try a different source, and if possible, try a different input device.

"*I can see a signal on the meters, but I can't hear anything.*"

- Verify that you have the correct input device connected to a track.
- Ensure that "enable end-to-end" is activated in the input device's properties. In addition, ensure the "e-to-e" is activated in the transport section.

"*I can't hear my audio unless I'm recording.*"

- Ensure that "enable end-to-end" is activated in the input device's properties. In addition, ensure the "e-to-e" is activated in the transport section.

"I can hear my monitored signal OK, but when I finish recording, there is nothing there."

- Check the "trigger level" option in the input device's properties is not set to too high a value. If unsure, reduce it to "-INF".

- Make sure the "record mode" option in the input device's properties is not set to "don't make recordings from this device."

"My recordings are distorted."

- Reduce the level of the source material.

"My recordings contain pops and clicks."

Typically this is caused when too high a demand is placed on computer resources. For more information, see the section on hardware requirements, and improving performance. Note, background tasks running on your computer such as virus checkers can also cause these kinds of problems.

4.5 Handy audio clip and recording shortcuts

Mac users:
Replace the **CTRL** key with the **CMD** key.
Replace the **ALT** key with your **CTRL** key.

Record mode

L: Toggle loop mode.
P: Toggle punch mode.

Recording

R: Start recording.
CTRL + R: Abort recording and delete all recorded material.
SPACE: Stop recording.
C: Toggle click-track.
ALT + R: Arm/un-arm all input devices.

Editing

A: Import an audio file.
/ : Split selected clip(s) at the current play-head cursor location.
DELETE or **BACKSPACE**: Delete selected clip(s).
CTRL + M: Delete selected clip(s) and source audio file(s).
CTRL + C: Copy selected clip(s).

CTRL + X: Cut selected clip(s).

CTRL + V: Paste clipboard contents.

CTRL + I: Insert clipboard contents at current play-head cursor location.

CTRL + W: Open the source audio file in an external audio editor.

CTRL + LEFT / RIGHT CURSOR: Move the selected clip(s) to the next previous snap location.

CTRL + UP / DOWN CURSOR: Move the selected clip(s) to the track above or be low their current track.

SHIFT + drag: Move the selected clip(s) to a different track, maintaining their off set from the current snapping grid.

Double-click: Starts playback of the clip at the current pointer position.

Markers

M: Set In and Out markers around selected clip(s).

I: Move the In marker to the current play-head cursor location.

O: Move the Out marker to the current play-head cursor location.

[: Move the play-head cursor to the In marker.

]: Move the play-head cursor to the Out marker.

Chapter 5: Working with MIDI

5.1 A brief introduction to MIDI

If you are unfamiliar with MIDI, then perhaps the best analogy to start working with is one of those old player pianos -- the kind with a large roll of punched paper that allows the piano to play itself. MIDI is a modern version of that punched roll; it tells an instrument what notes to play, and a little about how to play them. In fact, it is from these devices that the term "piano roll" used to describe MIDI editors in sequencers is derived.

A common misconception is to see MIDI data as being the sound. It is important to realise that MIDI is little more than a list of instructions that an instrument can follow. Much like a sheet of musical score, MIDI data by itself is not sound.

In practical terms, MIDI data is made up of three types of MIDI events: note events, controller events, and program changes. In reality, these groups are not quite so clear-cut, and there are other types, such as system exclusive (sysex) messages. For most users, the three groups listed above are all you really need to know.

Note events

A MIDI note event tells an instrument to play or stop playing a given note. When a key is struck on a keyboard, a MIDI note-on event is generated. The note-on event tells any attached MIDI devices which note was played, and the velocity with which it was struck. The MIDI note is considered to be held until a note-off event is generated by releasing the key. Velocity typically corresponds to "loudness," but it may also affect the timbre of a sound; consider the way a piano sounds when keys are struck hard.

Controller events

Most synthesizer keyboards have pitch bend and modulation wheels that allow the keyboardist to add extra character to a performance. These controls generate controller events that typically are used to change some nature of a sound over time. The modulation wheel for example may add a vibrato effect to a synthesizer performance. Most controllers are known as "continuous controllers" as they maintain their current state without needing to be held. In the same way that the modulation wheel will physically stay where you leave it, so to will the control changes generated by the wheel.

Technically pitch-bend is not a continuous controller, but for the purposes of working with Tracktion, it can be regarded as one.

Program changes

A program (commonly referred to as a patch) in MIDI terms is one of the different preset sounds available on a MIDI device. A typical synthesizer may be able to emulate pianos, organs, violins, and bass sounds. Each of these different sounds would be a program. A special set of controller events can be used to change the current program on a MIDI device, but Tracktion makes it even easier by offering tools and options to insert program changes into edits.

MIDI Channels

Many MIDI devices are capable of playing more than one instrument at a time. Such devices are referred to as being "multi-timbral." A multi-timbral MIDI device may be able to play a piano part, a percussive part, a bass part, and a flute, all at the same time. In order for the device to know which instruments are expected to play a given note received from Tracktion, the instruments are each assigned to one of 16 MIDI channels.

You can think of a MIDI channel as being broadly like a radio channel. In the same way that an FM tuner may be tuned to a radio station, the instruments in the MIDI device will only respond to MIDI events that are transmitted on their channel.

Each MIDI clip in Tracktion can be assigned a MIDI channel, and all midi events from the clip will be sent on this midi channel. To make sure that a MIDI clip is played by the piano, therefore, you would simply set the MIDI channel for the clip to match the piano's channel.

There are 16 MIDI channels available for every physical MIDI output. It is not a rule, but it is convention that MIDI channel 10 is used for percussion.

Working with MIDI in Tracktion

You can enter MIDI into Tracktion either by recording a performance from a MIDI controller keyboard, drum pad, etc, or by entering the notes by hand. In addition, Tracktion features a handy hybrid of these two approaches, called "step editing."

Before you can record or playback MIDI, it is necessary to select a MIDI instrument to receive the midi data, and produce sound from this MIDI data.

There are two types of MIDI instrument you can use with Tracktion:

VST instruments

VST instruments, or VSTis, are synthesiser plug-ins that can be added to the filter section just like effects. Typically, such filters will be displayed with a piano icon in the new-filter list.

Software instruments should always be the first plug-in on the track, as other filters may stop the MIDI data reaching the instrument plug-in.

VST instruments are often a more convenient instrument to use than an outboard hardware instrument, because the audio they produce is already inside Tracktion and ready to be mixed with other Tracktion tracks.

Hardware instruments

If you have MIDI sound-module hardware that you wish to control through Tracktion, you need to ensure that a MIDI cable has been connected between the "MIDI IN" of this device, and the "MIDI OUT" of your computer's MIDI interface.

In addition, if you wish to hear the audio output of the hardware MIDI instrument through Tracktion, you need to connect the audio outputs of the device to one of your computer's audio inputs as if you were intending to record it.

5.2 Using external MIDI gear

To control external MIDI hardware from Tracktion, you need to:

• Choose the track that will contain the MIDI events for this device.

• Select the track by clicking on its name. This will display the track properties (Fig. 5.2.1).

• There is a large box on the right of the properties-panel labelled "destination output for this track." Click the MIDI output device that is attached to your hardware and a check will be displayed next to it.

Figure 5.2.1

Tip: Many different tracks can send to one MIDI output device, so you can assign a different track to each MIDI channel for multi-timbral synthesizers.

Once the output is set up, your external device should be receiving MIDI from Tracktion. If you are sending program changes to the MIDI device, it is a good idea to do so at the very start of the edit, and leave a bar or so before any notes are sent, since program changes can take a while to process on some MIDI hardware.

Note: Take care that there are no unnecessary filters on tracks used for external MIDI as many filters do not pass MIDI data.

5.3 Working with virtual instruments, and MIDI filters

Working with virtual instruments such as VSTis is easy in Tracktion. Simply drag the "new filter..." icon to the filter section of a track, placing it at the start of the filter line, and select a virtual instrument from the filters list.

Filters that can act as virtual instruments will have a small piano icon to the right of their name in the list. This helps you quickly differentiate them, in the filters list, from traditional effects plug-ins.

Once the virtual instrument has been added to a track, any MIDI clips on that track will be played by the VST instrument filter.

Note: Unlike for external MIDI devices, tracks containing virtual instruments should always have the track output destination set to an audio device (usually the default one, like any other track producing audio), or another track that itself outputs to an audio device.

It is possible for filters other than virtual instruments to receive MIDI. Some effects plug-ins can receive MIDI. It is also possible for filters to act as MIDI processors that can alter or even generate MIDI data. An example of this is the Tracktion volume/pan filter. When the "apply to MIDI velocities" option is selected, this filter can be used to scale velocities on a track. There are many MIDI only filters available on the Internet too. These range from simple MIDI processors, to fully featured pattern editors, and arpeggiators.

Multiple output VSTis

Whilst most virtual instruments offer only a standard stereo output, there are some (usually drum machines and samplers) that have multiple outputs. This can be extremely useful, allowing you to do things like send each individual drum instrument to its own track, where they can be individually equalized, compressed, and processed, just like a drum kit recorded in a studio with multiple microphones.

If you wish to use these VST instruments to this type of full potential, rather than only using the main stereo output channels of the VSTi, you will need to wrap them in a rack filter. The reference manual on your Tracktion install CD discusses rack filters in detail, but here we will just look at using them for this specific task.

- Place the multiple-output VSTi on a track as normal.

- Right-click on the VSTi filter, and select the "wrap this filter in a rack" option.

- The VSTi will be replaced by a rack filter, and the rack editor should be visible. (You should see something like Figure 5.3.1). Notice a single MIDI Input is sent to the plug-in that generates six audio outputs.
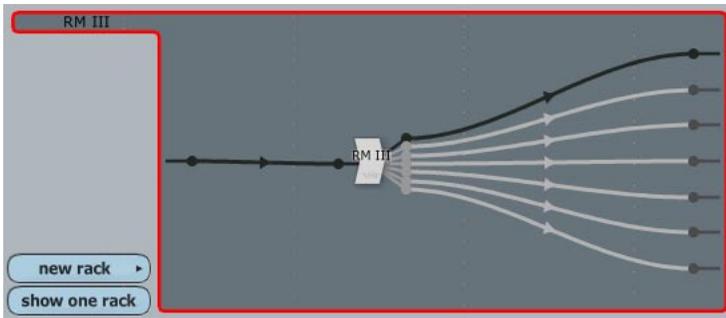
Figure 5.3.1

- With your rack ready, you simply need to place copies of it on as many tracks as you have outputs of the VSTi you wish to use (Fig. 5.3.2). Keep in mind that mono outputs will need a track to themselves.

Figure 5.3.2

- Click on each rack filter icon in turn, and from the "left/right output comes from" boxes, choose the VSTi output(s) you want to connect to the current track (Fig. 5.3.3).

- Click the "racks" button, or press **CTRL + G** (**CMD + G** for Mac users) to hide the rack editor.
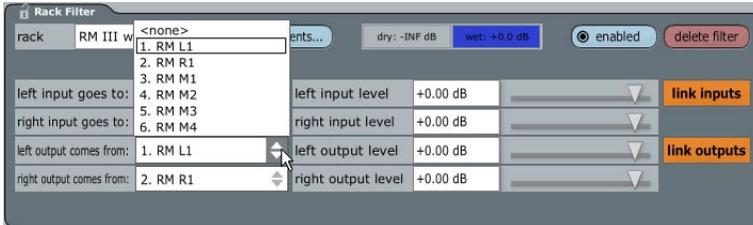
Figure 5.3.3

5.4 Recording MIDI

Assigning a MIDI input to a track, and arming it for recording is performed in the same manner as for audio inputs. The previous chapter details the steps required, so if you haven't already, read that chapter first.

Monitoring the input

MIDI input icons contain a small velocity meter, which should be responding to any incoming signal at this point. If you press a key on a control keyboard, you should see the meter react to the incoming MIDI event.

The large meters mode can also be used for MIDI inputs.

Before recording you should check that the properties for the input device are correctly set. Clicking on the input device icon will display its properties in the properties-panel. Ensure that:

- The MIDI channel your controller transmits on is not disabled. It is OK to enable all of the MIDI channels if unsure.

- The action option is not set to "end-to-end from this device, but don't actually record."

- The quantise field is not set incorrectly. It is OK to leave quantise off, as you can always quantise the clip(s) later.

- The "set all incoming velocities to full" option is not enabled, unless you want it to be.

Note: When MIDI is recorded to parts of a track that already contain other clips, Tracktion can either write the recorded MIDI into the existing clips, replace the clips, or create new clips on top of the existing ones. This behaviour is controlled by the "action" option in the input properties.

Recording in normal mode

To record a continuous take:

- Ensure that punch mode and loop mode are both inactive.

- Place the play-head cursor at the point from which you wish to start recording.

- Record enable the appropriate track.

- Click the record button to start recording.

- When you are done, click the stop button to stop recording.

Recording in punch mode

Punch mode causes recording to only take place when the play-head cursor is in the region between the loop-start and loop-end markers. You can use punch mode to correct a specific region of a MIDI performance.

Punch mode cannot be used at the same time as loop mode.

To record in punch mode:

- Ensure that punch mode is active, and that loop mode is inactive.

- Set the loop markers to your desired punch in and out points.

- Position the play-head cursor at some point prior to the loop-start marker.

- Record enable the appropriate track.

- When you are ready, click the record button to start the recording.

- Recording will automatically stop, though playback will continue, when the play-head leaves the marked region.

5.5 The MIDI editor

The basic tools for working with MIDI clips are the same as those for audio clips, except that MIDI clips do not offer the fade-in/out tool. When MIDI clips are of sufficient vertical size, however, they display a powerful MIDI editor, or "piano roll." You can switch to the MIDI editor very quickly by either double-clicking on the clip to be edited, or pressing the **Z** key when a MIDI clip is selected.

Figure 5.5.1 shows the MIDI editor, and associated tools. To create a new MIDI clip from scratch, select the track you wish to place the clip, and choose "insert new MIDI clip," or use the keyboard shortcut **G**. The clip will be inserted at the current play-head cursor position.
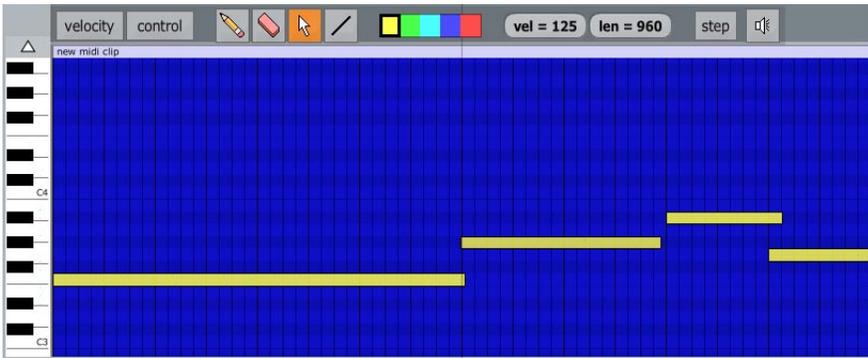
Figure 5.5.1

The MIDI editor is made up of a number of lanes that run horizontally along the clip. Each of these lanes represents a note on the musical scale. A piano keyboard to the left of the clip shows the relationship between a given lane and the note it represents. As you can see, this arrangement is similar to a staff in standard musical notation.

The range of visible notes can be changed by dragging the piano keyboard with the right mouse button. A default range can be set from the "default midi editor vertical scale" menu option available from the "options" button at the bottom-left corner of the edit page.

To change the octave(s) shown in the editor, drag the piano keyboard vertically with the left mouse button. When the **ALT** key (**CTRL** for Mac users) is held down, you can drag anywhere in the MIDI editor to adjust the currently visible octave(s).

The period of time that a note is held down is represented by the length of the note.

The vertical divisions are the current time-line ticks. As such, by zooming into and out of the edit, you can change the snap resolution in the MIDI editor.

Drawing new notes

When the pencil tool is selected (shortcut **D**), clicking on the editor will insert new MIDI notes. The note inserted will start at the location where you clicked, and it will have a length and velocity determined by the "len" and "vel" parameters.

The line tool allows you to draw a line of MIDI notes, all with their length and velocity determined by the "len" and "vel" parameters.

Editing notes

If you wish to transpose a note, or adjust the timing of an incorrectly played note, you can do so by using the select tool. Keyboard shortcut: **S**.

Clicking on an existing MIDI note when the select tool is active allows you to either move or resize MIDI notes. If the mouse pointer is near the right-hand edge of the note, the cursor will switch to a left/right arrow to indicate you are in resize mode. If the pointer is anywhere else over the note you will be in move mode, and you can simply drag the note to a new location. It is also possible to lasso a group of notes by simply dragging a box around them.

The select mode also allows displays information about currently selected notes in the properties-panel, where a number of useful tools can be found.

Changing the values of the "vel" and "len" parameters will apply the new value to any selected note(s). Conversely, editing the length or velocity of a note by hand will in turn update the "vel" and "len" values.

You can transpose notes without losing their start position by holding down the **SHIFT** key as you move them up or down.

Tip: Some of the features of the select mode are also available when in pencil mode, including the ability to select, resize and move existing notes.

Erasing notes

When the eraser tool (keyboard shortcut: **E**) is selected, notes can be removed by simply clicking on them.

You can also delete selected notes by selecting a group of them with the select tool, and clicking the "delete midi notes" button in the properties-panel.
Keyboard shortcut: **DELETE** or **BACKSPACE**.

The velocity editor

In addition to the velocity editing functions provided by the "vel" control, and through the note properties, Tracktion has a velocity editor available by selecting the "velocity" option from the MIDI editor tool-bar, or pressing the **V** key. Figure 5.5.2 shows the velocity editor.
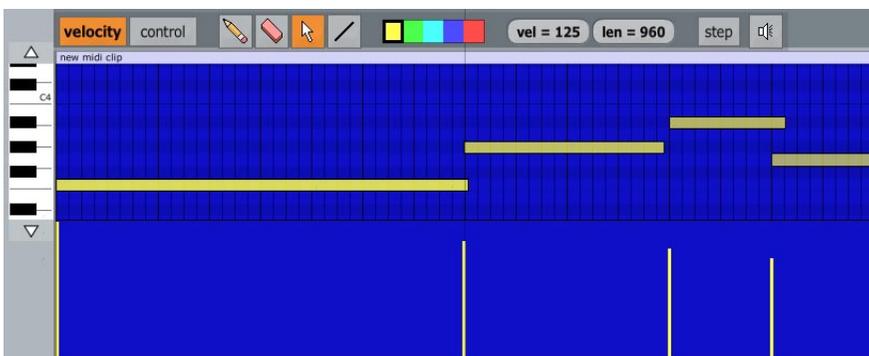
Figure 5.5.2

Each note has a vertical velocity line. The taller the velocity line, the higher the velocity. Editing velocities is as simple as clicking and dragging to the desired level. The line tool can also be used to draw velocity ramps. Note that the eraser tool has no effect when applied to velocities.

Tip: If you wish to edit only the velocities of certain notes, just select those notes with the selector tool. The velocities of any notes not selected will now be fixed.

Editing controller events

To edit controller events, click the "control" button. A view similar to the velocity editor will be displayed (Fig. 5.5.3).
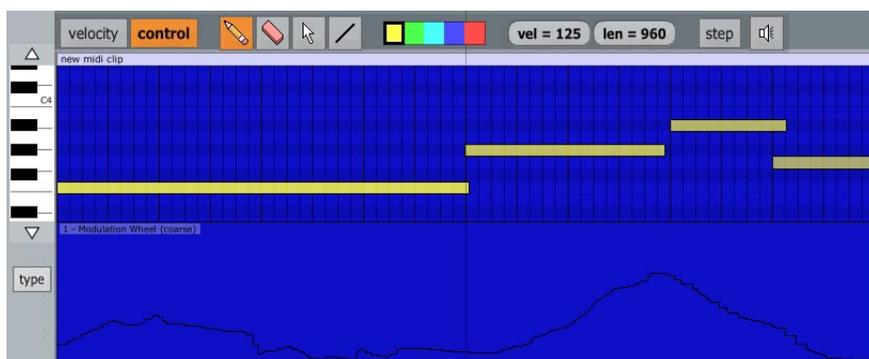
Figure 5.5.3

To the left of the controller event editor is a button labelled "type," which when clicked displays a list of available controllers. If the current clip contains events for a controller, its entry in the list will be shown in a different colour to the other controllers. If you are unsure which control events are contained in a clip, you can use this feature to see at a glance. Selecting a control from this list will cause the editor to show the events, if any, for the chosen controller. In addition, a label at the top-left corner of the editor will show the current controller name and number.

Once you have selected a controller to edit, you can use the pencil, eraser, select, and line tools to edit the events.

Pencil tool: Use this to insert a control change at the cursor location.
Eraser tool: Use this to remove a control change at the cursor location.
Select tool: Use this to modify an existing control change at the cursor location.
Line tool: Use this to draw a line of control changes between the specified start and end points.

If snapping is enabled, control events will be inserted at the current snapping resolution. The **CTRL** key (**CMD** for Mac users) can be used as usual to override the snapping mode, thus allowing the tools to create smoother control change curves.

Step entry

When the step entry mode is activated, any MIDI note received from a MIDI controller attached to the track input will be inserted into the clip at the current play-head cursor position. After the note has been added, the play-head will jump forward to the next snap position, ready for a new note to be input. In this way, you can play a part without needing to worry about being able to play the section live, a useful capability for people with limited playing skills. Step entry can also be handy for entering drum patterns.

If you play a chord, the step editor will treat it as a chord and enter it appropriately.

The "options" button located at the bottom-left of the edit page has a menu option labelled "use incoming velocities for MIDI step entry" (Fig. 5.5.4). When this option is selected, the velocity at which you play each note on your controller keyboard is applied to the step entered note. If this option is disabled, however, the velocity defined by the "vel" setting is used instead.
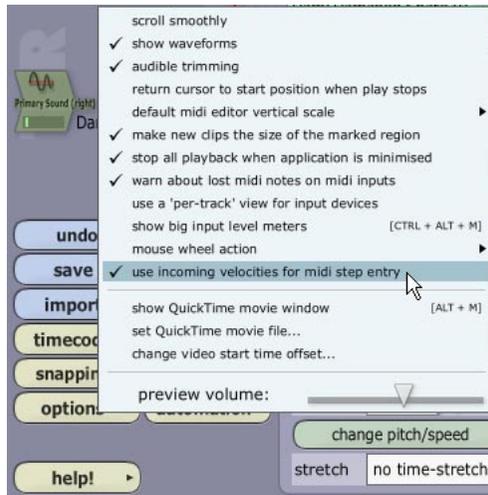
Figure 5.5.4

The length of the notes is defined by the "len" value.

To insert a rest, or space, in the clip press the ` key. This will cause the play-head to jump to the next snap position, without any note being entered.

To work in step entry mode, first ready the track for MIDI recording as if you were about to record live. Now, just set the play-head to the point where you want step editing to begin in the clip, activate the step button, and begin playing your sequence. *Remember to disable step entry mode when finished.*

5.6 Quantising, and working with groove templates

If you have a recorded MIDI part that is a little sloppier in feel than you would like, you can have Tracktion tighten it up by using one of the quantise tools. If, on the other hand, your timing is just a little too tight, or your MIDI clip was recorded using the step entry mode, you can have Tracktion apply a groove template to it.

The quantise and groove template tools can both be used completely non-destructively, so you can make changes and experiment without fear of losing your original work.

To use the quantise or groove tools, simply select the clip you wish to apply the process to. Be careful that you have the clip, and not any individual notes selected, as the groove and quantise tools are non-destructive at the clip level, but make permanent changes when applied to individual notes. Similarly, the quantise tool available for MIDI input devices is permanent in nature, and therefore should be used with care. Figure 5.6.1 shows the MIDI clip properties, where the quantise and groove template tools are located.
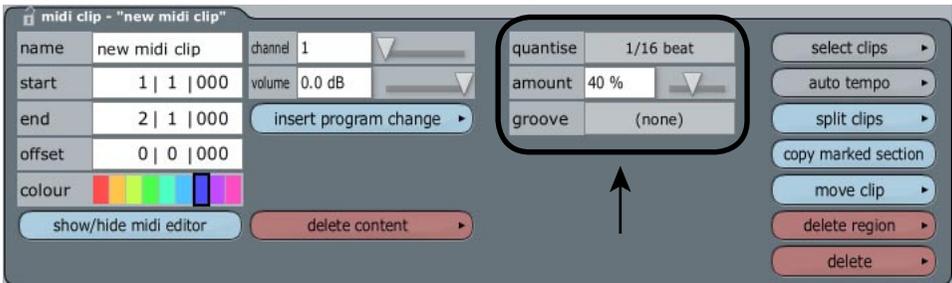
Figure 5.6.1

Quantise

The quantise setting is used to select the quantise grid. The grid is defined in terms of fractions of a beat, so 1/4 of a beat, given a standard 4/4 bar, would be equal to 1/16ths in musical notation. Once this value is set, adjusting the amount control defines how tightly notes are pulled to the quantise grid. A value of zero percent would have no effect on the note events, whereas a value of 100% would be a rigid quantise. Unless the timing of a MIDI clip is particularly sloppy, setting the quantise amount to between 20%-50% is probably a good place to start.

Even though clip quantise in non-destructive in nature, you will see the notes in the clip move around as you adjust the quantise grid, and the quantise amount.

Groove templates

The groove option will display a pop-up menu when you click on it. From this menu, you can select a groove template to be applied to the clip. Unlike with the quantise control, you will not see the groove template changes in the clip, but when you play back the edit you should hear the effect. See the reference guide for more information on applying and creating groove templates.

5.7 Troubleshooting MIDI recording problems

Note: Clicking an input device icon will show the properties for that device in the properties-panel.

"*I can't hear anything from my MIDI instruments, and I can't see any signal on the MIDI input device meters.*"

- Check that all of the "midi filter" channels are activated in the MIDI input device's properties.

- Ensure that you have you MIDI cables hooked up from your MIDI control hardware to Tracktion correctly, and that the MIDI Out of your controller is connected to the MIDI In of the MIDI input device.

"*I can see that my MIDI input device is receiving a signal, but my MIDI instrument(s) are not making any sound.*"

- Verify that you have the correct input device connected to a track.

- Ensure that "enable end-to-end" is activated in the MIDI input device's properties. In addition, ensure the "e-to-e" is activated in the transport section.

- If you are trying to control an external instrument that is playing through any hardware mixers or effects processors, make sure that they are correctly configured and mute buttons have not been activated by mistake.

- If you are trying to control an external instrument that is playing through Tracktion, ensure that the recording options are set up correctly as described in chapter four.

"*I can't hear my MIDI devices unless I'm recording.*"

- Ensure that "enable end-to-end" is activated in the input device's properties. In addition, ensure the "e-to-e" is activated in the transport section.

"*Recordings seem to work OK, but when I'm finished there is nothing there.*"

- Check the "action" option in the input device properties and make sure it is not set to "enable end-to-end but don't record from this device.

5.8 Handy MIDI editing shortcuts

Mac users:
Replace the **CTRL** key with the **CMD** key.

Z: Show / hide MIDI editor.
D: Select the pencil tool.
E: Select the eraser tool.
V: Show / hide the velocity editor.
CTRL + LEFT / RIGHT CURSOR: Move the selected note(s) to the next or previous snap location.
CTRL + UP / DOWN CURSOR: Transpose the selected note(s) up or down a semitone from their current location, maintaining their offset from the current snapping grid.
SHIFT + drag: Transpose the selected note(s) to a new note, maintaining their offset from the current snapping grid.
DELETE / BACKSPACE: Delete selected notes.

Chapter 6: Mixing and Adding Effects

6.1 Adding effects and setting levels

A fundamental part of bringing a song to life is the process of setting the volume of all instruments, vocals, and percussive sounds, such that the listener's attention is drawn to the sounds you wish to emphasise, while keeping other sounds clearly audible. Effects processes, such as reverb, may be used to give sounds a sense of position and space. Treatments, such as compression, may be used to give sounds punch or weight without making them too loud. You may even use a little EQ to boost the bass of a kick drum, or maybe roll a little of the treble off an overly bright piano. Tracktion allows you to do all of these things, and much more. Fundamentally, mixing is all about levels, and Tracktion makes this very easy.

When a track is first created it will contain a volume/pan filter, and a level meter. These are the filters you will use for setting levels. In this way, the filter section of each new track represents the functionality of a classic mixing console. Figure 6.1.1 shows the default filter configuration.
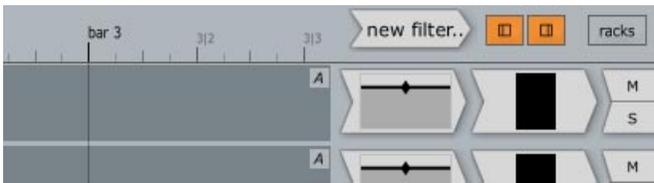
Figure 6.1.1

Adding new filters

If you want to add other filters to your tracks, simply drag the icon labelled "new filter..." that is located just above the filter section, and drop it where you want the new filter to be placed. Figure 6.1.2 shows a filter being added to track one. Notice that the area in front of the volume/pan filter is glowing red; this is how you can tell where the filter will be placed. If there is no illumination then you are not currently over a valid target area.
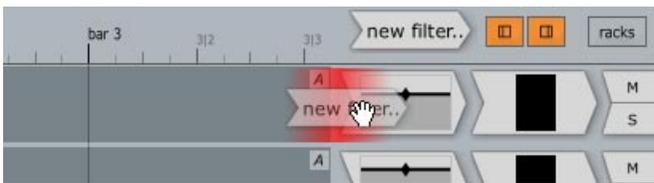
Figure 6.1.2

Once the "new filter" icon has been dropped, a list will appear of available filters will appear. Choose the filter you wish to add to the track from this list.

Filters can be anything from volume/pan controls, to effects such as delays, or reverbs. Filters can even take the form of virtual instruments. Tracktion simply uses the term "filter" to refer to a plug-in, be it native to Tracktion, or a 3rd party plug-in such as a VST plug-in.

The filter order can be changed, and filters can even be moved onto a new track, by simply dragging the filter icons in the same way that you first added them.

Tip: You can copy filters by holding down **CTRL** (**CMD** for Mac users) and dragging an existing filter to a new location. The newly copied filter will also have the same configuration state as the original filter.

Tip: Filters can be applied to a single audio clip by dragging the new filter… icon onto the clip itself. This is especially useful if you wish to apply a special effect to just a small portion of a track.

The volume/pan filter

The left-most filter in Figure 6.1.1 is the volume/pan filter. Clicking on this filter will display the volume and pan settings for the track in the properties-panel (Fig. 6.1.3). You can use the volume and pan sliders to control their respective settings.

Notice how the volume/pan filter icon changes to reflect your pan and volume adjustments. The dark horizontal line shows the level, and the diamond shows the left-right pan position. Even more handily, the pan and level settings can be adjusted directly from the surface of the filter icon. If you move your mouse over a volume/pan filter, you will notice that the pointer will change appearance. Depending on the pointer type, you will be in either pan or volume edit mode:

Pan: Holding the pointer over the horizontal line with the small diamond icon will cause the pointer to switch to a left/right arrow. Clicking and dragging the mouse left or right when the left/right arrow is shown will edit the pan position.

Volume: If you position the pointer anywhere in the boxed region other than the horizontal line, the pointer will switch to an up/down arrow. Clicking and dragging the mouse up or down when the up/down arrow is shown will edit the pan position.
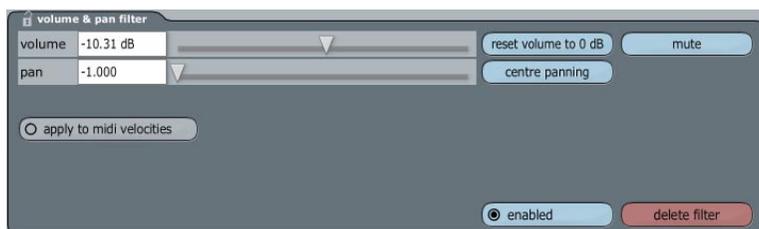
Figure 6.1.3

The level meter filter

This filter shows the level of signal passing through it. When selected, the properties panel shows a large form of the level meter, making it easier to adjust your level with precision.

When a level meter clips, red bars will remain on the meter to alert you. Clicking on the meter will clear the clip warning. The \ key clears the clip warning for all meters.

Note: It was stated a few chapters ago that it is bad practise to allow the level of a digital signal to exceed 0 dB. It should be noted that this rule does not apply to the meters on tracks. Input meters, and the master output meter should never be allowed to clip, but tracks can safely exceed 0 dB. This is due to Tracktion's high headroom mix bus. See the reference guide for more information.

The 4-band EQ filter

You can use EQ to remove or strengthen certain frequencies in a sound. For example, to add a little weight to a weak kick drum, sometimes all that is needed is a few dB of gain at around 80 Hz.

If you find that certain sounds in your mix seem to be competing for space, it may well be because they are sharing some frequencies. In this case, by cutting the level of one or both sounds at the problem frequency range, you can often create enough room for them both to peacefully co-exist.

Tracktion ships with a built in 4 band parametric EQ filter. Unlike the volume/pan filter, these EQ filters are not added to tracks by default, so you will need to add them to any tracks you wish to EQ (Fig. 6.1.4).
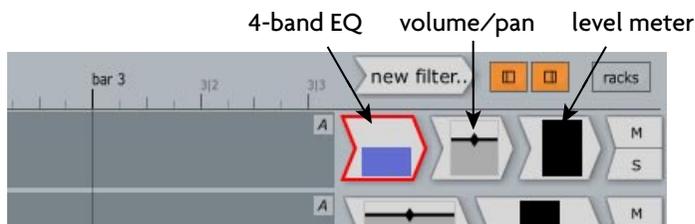
Figure 6.1.4

Clicking on the EQ filter icon will display the EQ editor in the properties panel. The large circles control the frequency, gain, and slope (Q) of the four EQ bands (Fig. 6.1.5). Dragging the centre square left and right changes the frequency, whereas dragging the square up and down alters the gain.

Tip: The golden rule of EQ: cut should always be used in preference to gain. If your kick and bass sound muddy, trim some of the bass out of one of the sounds, so that the other can sit comfortably below it.

The vertical bars on the EQ editor provide a frequency scale that can be used for orientation. The frequency range runs from left to right, with lower frequencies (bass) on the left, and higher frequencies (treble) on the right.
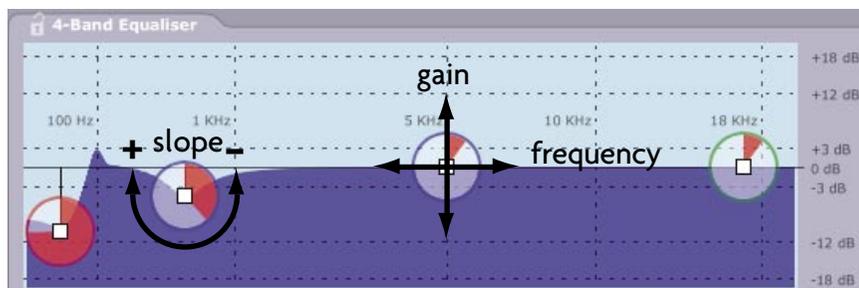
Figure 6.1.5

The slope is depicted by the shaded segment of the circle, the larger the segment, the steeper the slope. Try clicking within the circle; note how the segment responds to your clicks.

Tip: Notice how the appearance of the EQ filter icon has changes when you make adjustments to the filter curve.

Mute/Solo controls

Each track has a mute/solo switch, located at the far right-hand side of the filter section. These controls can be used to temporarily silence a track, or hear it in isolation.

Clicking the "**M**" mute control temporarily silences a track. When a track is muted, the mute button will be highlighted. Mute can be used to hear a mix without a given instrument. It can be very handy when trying to locate sounds that do not complement each other.

Clicking the "**S**" solo control temporarily silences all tracks but the current one. This is often useful when making changes to EQ, or compression on a track, as subtle changes may not be easy to hear when the full mix is playing. To solo multiple tracks at once, simply CTRL + Click (CMD + Click on the Mac) on multiple solo buttons.

To unmute, or un-solo a track, simply click again on the highlighted mute or solo button.

Tip: It is useful to note that when tracks are muted, any filters contained on the track will cease to use processing power.

6.2 Working with sub-mixes and auxiliary sends

Sub-mixes

When mixing, it is often convenient to group instruments, percussion, or vocals, into sub-mixes that can be treated as one cohesive whole. You may, for example, have each of your percussive sounds spread across the channels of a mixer, but still want to apply a global level and EQ to them. Creating such sub-mixes in Tracktion is simplicity itself.

You may recall from earlier chapters that tracks have an "output destination" option. Well, not only can the output of a track be sent to different physical outputs, it can also be sent to other tracks. In fact, a single track may be the output destination of any number of other tracks, and it is in this way that a group-mix can be created in Tracktion.

Let's imagine that the first five tracks of an edit were comprised of the percussive parts of a song. We could therefore assign track six the task of being the master track for this group, by simply setting the "output destination" field of the first five tracks to "track 6."

Figure 6.2.1

- Select "track 6" by clicking on its name field. Edit the track name to something suitable, for example "perc master." You can edit the track name quickly by selecting the track, then pressing the **TAB** key to select the track name field.

- Select tracks one to five by selecting one of these tracks, and then holding down the **CTRL** key (**CMD** for Mac) while selecting the other four.

- Set the "output destination" field to "track 6" as shown in Figure 6.2.1. Note how this setting is applied to all five of the selected tracks.

- Select "track 6", and make sure that the output destination is the default audio output.

Any changes made to the level or filter chain on "track 6" will now be global to all six tracks. In effect, "track 6" has just become a further part of the filter chain for the first five tracks. Audio passes in series through the filters on its own track, then the audio from the five tracks are mixed and is passed in series through the filters on "track 6," before finally reaching the master stereo output.

Auxiliary sends

Effects Loops in Tracktion are created using two complementary filters, the "aux send" filter, and the "aux return" filter. Before setting up an auxiliary send, it is necessary to designate a track the task of being the return track. This track will contain any effects to be applied to each track containing an auxiliary send.

Let's say we have recorded a drum-kit with different mics used to capture the kick, snare, and toms. Assuming the recorded parts are spread across tracks one to three, to apply varying amounts of reverb to each of the percussive sounds we do the following:

- Select track four by clicking on its name field, and rename the track with a meaningful label such as "reverb return." We are going to nominate this track as the return track.

- Place a reverb filter just before the volume/pan filter on track four.

- Place an "aux return" filter just before the reverb filter.

- Select the "aux return" filter, and in the properties click set the "bus" field to "bus #1." Then, in the properties, edit the "bus name" field to read "reverb." Note that the name in the "bus" field, and the "aux return" icon filter itself, will update to reflect the name. This name does not affect the functionality of the send in any way, but it makes it easier to keep track of things when many different send buses are in use.

- Place an "aux send" filter between the level meter filter and the mute/solo control on tracks one, two, and three. The send needs to be after the volume/pan filter otherwise the level of the wet effect would not stay in step with the level of the track. This is called a post-fade send.

- For each of the newly created "aux send" filters set the "bus" field to "bus #1 (reverb)." For the sends to work correctly, they need to be told which return filter to send audio.

- To control how much reverb is added to each of the three audio tracks, adjust the "send" values for relevant "aux send" filter. The track containing the kick drum will typically require a lower send level, than the track containing the snare, for example.

Figure 6.2.2 shows the filter section for a working send/return pair.
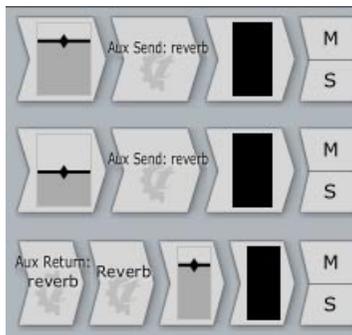
Figure 6.2.2

For every extra track to which you wish to make this send available, you simply need to follow the last three steps detailed above. If you want to add new buses, so that in addition to a reverb send you also had chorus and delay sends, you simply need to follow the steps above, but choose a different bus number.

Sub-mixes and monitor mixes

It is sometimes desirable for engineers, or some band members, to hear slightly different mixes of a track than the main mix. A common example of this is vocalists wanting to hear themselves with some reverb provided.

Auxiliary sends can be used to create monitor and sub-mixes by following largely the same steps as for making standard reverb style sends, but the return track would be sent to an alternative audio output device.

Let's give our hypothetical vocalist a separate mix to see how that works:

- Create a new track for the sub-mix.

- Set the output destination for this track to be an alternate audio output of your computer audio interface. This output will need to be fed to the vocalist's headphones from the corresponding set of audio outputs from the computer's audio interface.

- Place an "aux return" filter just before the volume/pan filter on this new track, choose an unused bus, and name it "dry send."

- Place a reverb filter just before the new "aux return" filter.

- Place another "aux return" filter just before the reverb filter, choose an unused bus, and name it "vocalist send."

- Place an "aux send" filter between the level meter filter and the mute/solo control on every other track in the edit except the track with the return filters, and the vocalist's input track.

- Select all of the new send filters by selecting one then holding down the **CTRL** key (**CMD** for Mac users).

- Set these sends to use the bus called "dry send".

- Set the send levels to 0 dB.

- Place an "aux send" filter between the level meter filter and the mute/solo control on the vocalist's input track, and set this send to use the "vocalist send" bus. By adjusting the send level for this send, you can mix the vocalist louder or softer than the overall mix for the sub-mix.

Chapter 7: Automation

7.1 Recording and editing automation

Tracktion can record mix settings at different stages in an edit, so it is easy, for example, to have percussive levels mixed louder during choruses, than during verses. Automation can be used to make changes to filter settings, perhaps varying the cut-off/resonance controls of a virtual instrument for that classic dance/techno filter sweep effect. You could perhaps use automation to briefly raise delay and reverb levels -- sometimes a subtle way to catch the listener's attention. It is the changes to levels that and add a sense of life and drama to a mix, and Tracktion's automation system allows you to quickly create and edit, these changes. More importantly, Tracktion makes it easy to the automation events used in songs, so you can see at a glance how your edit develops.

Automation curves can be activated by clicking on the "**A**" symbol at the top-right-hand corner of every track (Fig. 7.1.1). A pop-up list will be shown, from which you can see all of the automatable parameters for the current track. In addition, you can see the parameters for master filters, such as the master volume/pan control.

Figure 7.1.1

Tip: It is also possible to drag the "**A**" icon onto a filter and drop it there, to just see available automation parameters for that filter.

Once a parameter has been chosen, an automation curve will appear on the current track. To create a new point on the curve, click and drag the line at the desired break point location. To create a new point without altering the automation value, just double-click at the desired break point location.
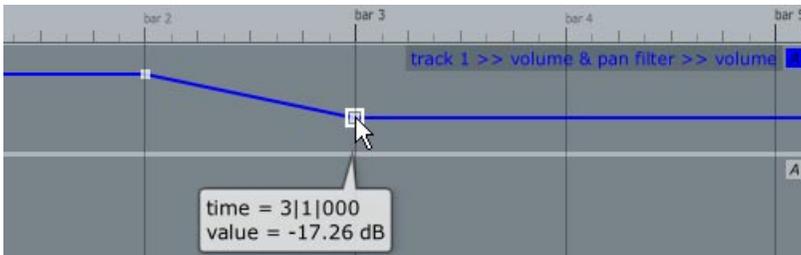
Figure 7.1.2

For example, to create a volume ramp between bars two and three (Fig. 7.1.2), you would simply:

- Click the "**A**" icon for the track to be edited.

- Select the "volume and pan filter >> volume" parameter from the list. The automation curve for the parameter should now appear.

- Double-click the line at the start of bar two.

- Click and drag the line to a new vertical position at the start of bar three.

When you hold the mouse cursor over an automation point, the parameter level is shown.

Automation curves can be hidden by clicking on the "**A**" symbol, and selecting the "hide automation curves for this track" option. This does not disable or lose the curve, it's purely cosmetic.

Automation data can be temporarily disabled however, by deactivating the "automation read" button in the transport control (Fig. 7.1.3). Keyboard shortcut: **H**.

Figure 7.1.3

Unlike other recording software, Tracktion lets you view different parameter automation data on different tracks, simultaneously. This is a much more flexible approach because it let's you view and edit automation of different parameters, on different tracks, quickly and easily.

Recording automation

Next to the "automation read" button shown in Figure 7.1.3, you can see the "automation record button." When this button is active, changes made to parameters during playback are recorded. Keyboard shortcut: **Y**.

To record the volume ramp described in the previous section:

- Set the play-head cursor at some point prior to the start of the ramp.

- Activate the record automation button.

- Start play-back of the session by clicking the play key (press play, not record, because you are playing back the session, and only recording automation, not new audio or MIDI).

- When the play-head reaches the point where you want the volume ramp to begin, adjust the volume control slowly over the ramp period to your desired end level.

- Once done, you can stop playback and deactivate the record automation button.

Automation punch-out

When recording automation curves, there are two punch-out options available. Both can be accessed from the "automation" button's pop-up menu. The automation button can be found in the lower-left corner of the edit page.

- **Punch out:** The recorded changes do not affect the overall parameter setting. That is to say, if you recorded a ramp, and then selected this option, the ramp would have a physical end where the automation curve returned to its previous value. Keyboard shortcut: **U**.

- **Punch out (to end):** When this option is chosen, the parameter level at the end of the recorded curve will be preserved until the end of the track, and any subsequent automation points will be cleared. Keyboard shortcut: **CTRL + U** (**CMD + U** for Mac users).

7.2 Mapping MIDI controllers to automation parameters

If you have a MIDI controller that has a modulation wheel, or knobs and sliders that produce MIDI events, you can use this hardware to control automation parameters, quickly and easily. You can also do the same with any low cost MIDI-based hardware controller on the market.

To map MIDI controllers to automation parameters, select the "create midi controller mappings" option from the "automation" button (Fig. 7.2.1).
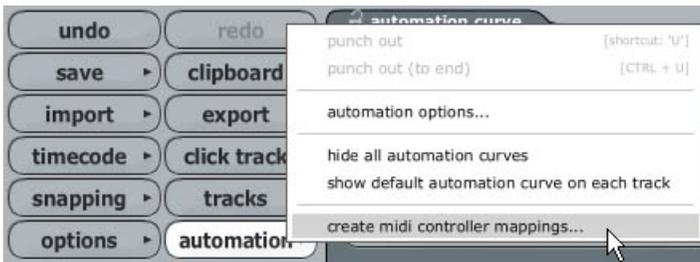
Figure 7.2.1

This option displays the "MIDI Controller Mappings" window (Fig. 7.2.2). The mapping editor is made up of two columns. The left-hand column shows mapped MIDI controllers, and the right-hand column shows the automation parameter currently mapped to the controller.

Figure 7.2.2

To create a new map:

- Click the box labelled "click here to choose controller."

- You will be prompted to move the controller you wish to map.

- Manipulate the controller and Tracktion will detect it.

- Once the controller is chosen, Tracktion will create a new entry in the list.

- Click the parameter box to the right of your controller, and choose a parameter from the pop-up menu.

- Repeat for each controller you wish to assign.

- Close the "MIDI Controller Mappings" window.

- Your selected parameters should now respond when the assigned MIDI controllers are moved.

Once you have assigned your controller(s), you can record automation curves as described in the previous section. For your convenience, Automation mappings are saved with edits.

7.3 Handy automation editing and recording shortcuts

Mac users:
Replace the **CTRL** key with the **CMD** key.

Shift + CTRL + M: display MIDI automation mapping editor.
H: Toggle automation read mode.
Y: Toggle automation write mode.
U: Punch out of automation record mode.
CTRL + U: Punch out of automation record mode, clearing subsequent points.

Chapter 8: Sychronisation, and the time line

8.1 Working with tempos and the time-line

Tracktion's time-line bar serves three purposes. The first, and most obvious, is to give you a visual reference by which you can arrange your songs. Secondly, clicking on the time-line provides options to set the tempo and time signatures used in your songs. The third is that the time-line also controls the grid that the "snap-to-grid" feature utilises.

Beats and bars / frames and seconds

By default, Tracktion will display the time-line in beats and bars. If you right-click (CTRL + Click on the Mac) on the time-line, you will see that in addition to beats and bars, you can work in seconds and milliseconds, or seconds and frames. It should be noted that the grid employed by snap-to-grid is determined by the currently selected metric. As such, snapping behaviour alters when a different time-line mode is selected. For convenience, the T key is mapped as a shortcut for toggling through the time-line modes.

Setting the tempo
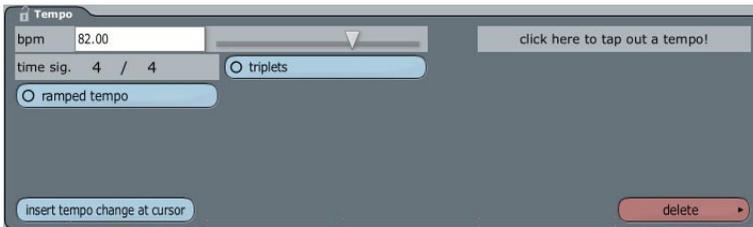
Figure 8.1.1

Clicking on the time-line shows the tempo properties (Fig. 8.1.1). Here you can set the current tempo, or insert tempo changes into the edit. A tempo consists of a speed, measured in beats per minute (BPM), and a time signature.

Edits may contain tempo changes, and these are shown as regions in the time-line. Each region may be clicked on to display the tempo properties at that location.

Tempo changes can be inserted into an edit by displaying the tempo properties panel, and clicking the "insert tempo change at cursor" button. The tempo section in which the play-head cursor is currently positioned will be split in two, with the new section appearing at, and to the right of the beat nearest the play-head cursor position. Tempo changes can also be inserted by using the **CTRL + E** keyboard shortcut (**CMD + E** for Mac users).

You can select between smooth and abrupt tempo transitions by either enabling or disabling the "ramped tempo" option. When the ramped option is enabled, the tempo begins ramping from the start of the current region to the start of the next.

For example, to define the start and end points of a tempo ramp:

- Insert two tempo changes into your edit, one at each end of the ramp period.

- Set the first tempo region to your initial tempo, by clicking on the tempo region in the time-line, and editing the properties.

- Set both the middle and end regions to the new tempo.

- Enable the "ramped tempo" option on the middle tempo region.

- You should now see the bar division periods smoothly transition between the first and last tempo regions.

If you are unsure what tempo your song will be, you can have Tracktion calculate it for you in two different ways:

- Click on the tempo value to display the tempo properties.

- Tap out your desired tempo with your left mouse button on the pad labelled "click here to tap out a tempo!"

Alternatively:

- Record a MIDI or audio clip, or import an existing clip.

- Trim it to such that the clip boundaries mark bar lines for the clip's material.

- Select the clip to display its properties.

- Choose "set edit's tempo based on this clip's length" from the "auto tempo" button, and choose the length that matches your clip's length.

Snap-to-grid

When snap-to-grid is enabled, the size of the grid is automatically adjusted to match the current zoom settings, or in other words, the snap-to-grid can be relied on to be at the optimum grid size no matter how far you are zoomed into, or out of, the current edit.

Figure 8.1.2 shows how it works. In the image on the left, the snap resolution is 1/16 of a beat. As you can see, the area between the first and second beats of bar one is divided into 16 tick marks on the time-line. Equally, the second image shows a snap resolution of 1/4 of a beat, and as such, there are four visible tick marks for each beat.

Figure 8.1.2

Tip: To see the current snap resolution in the pop-up form shown in Figure 8.1.2, simply position the mouse pointer over the time-line for a few seconds.

The zoom level can quickly be adjusted via your mouse-wheel, or by the **CURSOR UP / DOWN** keyboard shortcuts. In addition you can use the **F4** key to zoom into a selected clip, or the **F7** key to zoom to a few seconds either side of the cursor.

8.2 Using markers

Tracktion allows you to set markers on the time-line. These markers act as bookmarks that can be used to quickly jump between sections of a song. You could, for example, set a marker at the start of each verse, chorus, and the middle-eight of your song. Figure 8.2.1 shows the time-line with four markers set.

Figure 8.2.1

The markers are numbered 0-9 and correspond to the number keys on your keyboard. To jump to a marker, simply press the corresponding key. The play-head cursor will then move to the marker location.

Holding the **CTRL** key (**CMD** for Mac users) whilst pressing a number key will set the corresponding marker at the play-head cursor location. Repeating this process will remove the marker.

If you set a marker that has already been placed, the marker will simply move to the new location.

Tip: The play-head cursor will snap to markers even when they are not aligned with the current snap grid. This can be useful when editing audio files as it allows you to zoom right into the file, where you can set markers at points of interest, then zoom back out to make edits.

You can also use markers simply as flags to point out different song locations that you want to have bookmarks for, like verse 1, chorus 1, guitar solo, etc.

8.3 Working with the click-track

In previous chapters we have briefly touched on the click-track. The click-track provides a metronome that performers can use to keep time during recording.

Using a click-track when recording audio is particularly beneficial. Trying to align recorded audio to the tempo of a song, when the performer was not keeping good time, can be very time consuming.

Clicking on the "click track" button (Fig. 8.3.1) displays a number of options for customising the click track.

Turn on click track: This option toggles whether the click track is currently enabled. Keyboard shortcut: **C**. The click-track will only be heard during playback or recording.

Pre-record count-in length: This control allows you to set a period of click track time before recording starts.

Only click during recording: When this option is enabled the click-track will only be active when recording, otherwise the click-track will be heard during normal playback too.

Use loud clicks to emphasise bars: When this option is selected, the first beat of the bar will be emphasised by a louder click.

Figure 8.3.1

8.4 Synchronising to external hardware, and video

Tracktion can send MIDI clock, and MIDI timecode data to external MIDI devices. MIDI clock, and MIDI timecode provide a way for MIDI devices to synchronise tempo with each other. Some hardware delay processors, for example, can use MIDI clock to automatically set the delay time to match the tempo of a song.

You can think of MIDI clock as being like a metronome for MIDI hardware, it simply stamps out a beat pulse by which devices can play in time.

MIDI timecode is generally used when a high level of precision is required for accurate synchronisation. Unlike MIDI clock, the timecode signal contains full time-of-day data, and allows devices to know not just the current tempo, but also the current play-head position in a song.

To have Tracktion send MIDI clock or MIDI timecode:

- Switch to the settings page.
- Select the audio devices tab.
- Select the MIDI output device(s) that should transmit a MIDI clock signal.
- Enable the option "send midi clock."
- Select the MIDI output device(s) that should transmit MIDI timecode.
- Enable the option "send midi timecode."

Tracktion can also slave to (chase) incoming MIDI timecode. Timecode chasing is discussed in the reference manual on your Tracktion install CD.

Scoring to video

If you are scoring film or video, Tracktion provides a video display that automatically synchronises to your edit.

To show the video window:
- Switch to the edit page.
- Click the "options" button located at the bottom-left of the Tracktion interface. This will display a pop-up menu (Fig. 8.4.1).
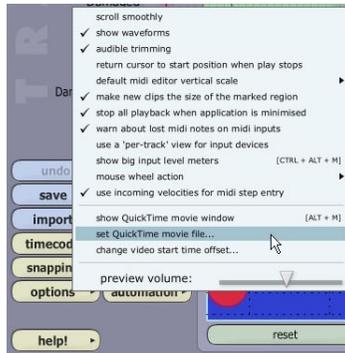
Figure 8.4.1

- From the menu, select the "set QuickTime movie file" option, and navigate to a QuickTime movie file on your hard drive.
- Click the "timecode" button, and select the frame-rate for this video from the pop-up menu.

Further options are available for working with video by right-clicking on the floating video window (Fig. 8.4.2):
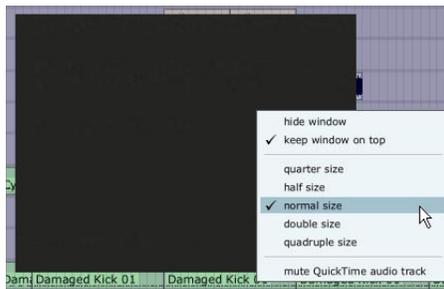
Figure 8.4.2

Hide window: Select this option to close the window.

Keep window on top: Select this to have the window stay on top of other screens even when it doesn't have focus.

Size options: Use these options to set the window size.

Mute QuickTime audio track: This option controls whether the audio track contained in the movie is muted.

8.5 Handy tempo and quantise shortcuts

Mac users:
Replace the **CTRL** key with the **CMD** key.
Replace the **ALT** key with your **CTRL** key.

CTRL: To temporarily toggle the state of the snap-to-grid mode, begin a drag or edit operation on a MIDI note, or clip, and whilst performing the edit, hold down the **CTRL** key.

SHIFT: holding down the **SHIFT** key whilst moving clips or MIDI notes locks them to their current time. In other words, they can be dragged up or down, but not forwards or backwards. This is particularly useful with MIDI notes, as it makes it easy to transpose the notes without losing the groove. You will also find this useful when comping vocals, as you can easily move words from one take to another whilst keeping them locked in time.

Q: Enable/disable snapping.

CTRL + E: Insert a tempo change at the current play-head cursor position.

T: Toggle time-line between beats/bars, seconds/frames, or seconds/milliseconds.

SHIFT + T: Toggle MIDI timecode chasing.

ALT + M: Hide/show the QuickTime movie window.

Chapter 9: Exporting and distributing your music

9.1 Exporting your music as an audio file

If you wish to distribute your music, or even just listen to it in your car, you will first need to export your edit as an audio file.

To an export an edit as an audio file to be burned to a CD:

*   Open the edit by selecting the edit in the items list, and clicking the "open for editing" button in the properties panel.

*   With the edit open in the edit page, click the "export" button in the global controls section, and choose the "export audio file…" option.

*   You will need to set the path and file name for the exported audio, in the "file" field.

*   Choose an audio format.

*   Set the sample rate to 44100.

*   Make sure stereo is selected.

*   Set the sample size to 16 bit.

*   Enable the normalise option if you like.

*   You will probably want to disable all of the other options, although the "render at 1x play-speed" option should be used if you have plug-ins that misbehave when rendering at other than real time speeds.
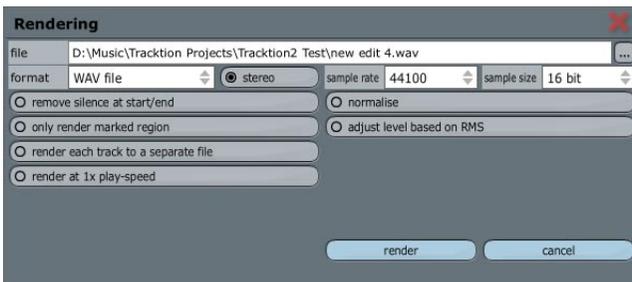
Figure 9.1.1

A progress bar will show indicate that Tracktion is creating the audio file. After a few moments the export will complete. The resultant file will be located at the path specified in the "file" field. You can test the exported audio file by opening it in a media player such as QuickTime or Windows Media Player.

9.2 Burning your music to CD, or creating an MP3

If you've read this far you should be well on your way to writing and producing songs in Tracktion. The only remaining question then is how to make your music available for others to hear and/or purchase.

The two most popular means of distribution at this time (other than a record deal) are the venerable audio CD or Internet download. Both approaches have the advantage of being cheap and easy, so since this manual can't tell you how to land a record deal, let's have a look at what is involved in burning audio CDs and uploading music to the Internet.

To write CDs

At the most basic level you simply need a CD or DVD drive capable of burning audio CDs. Most modern PC and Mac computers come as standard with such drives. Typically, software for burning CDs will also be present. If your drive came without software however, or if you are just looking for an easy interface that is the common to both Mac and PC, then read the "iTunes" section below.

To distribute over the Internet

A good way of reaching a wide audience is to distribute music over the Internet. To get started you will need either some Web space, or alternatively an account with an on-line music hosting company. Whilst having your own Web-site will give you the maximum flexibility over how your music is presented, not to mention a place to post news about live performances or merchandise, using a dedicated music hosting company presents a far simpler approach. A Web search for "web hosting" or "music hosting" will provide you with some places to start seeking suitable providers.

Once you have found a place to host your music on-line, you will need to look into audio compression software. Audio files tend to be large, and ill-suited to Internet distribution. A typical audio file will take few hours to download over a dial-up Internet connection, and even with DSL or cable Internet, the download time is not insignificant. The solution is to compress your audio with one of the many MP3 encoders. These encoders will reduce the file size to something in the region of a tenth of its original size, without too great a compromise on quality.

Burning audio CDs, and creating mp3s, with Apple's iTunes

If you are looking for software capable of burning CDs and converting audio files to mp3, then Apple's iTunes software may be just what you are searching for. It comes as standard with Macs, but PC users can download it, completely free of charge, from: http://www.apple.com/itunes/

To burn a CD using iTunes:

• Add your songs to the play-list - (select "Add File to Play-list" from the "File" menu).

• Create a new play-list - (select "New Play-list" from the "File" menu).

• Drag your songs into the new play-list and arrange them in the order you would like them to appear on the CD (Fig. 9.2.1).

• Make sure the play-list is selected and click the "Burn Disc" button.

• iTunes will begin burning your tracks to CD.

Figure 9.2.1

To convert songs to MP3:

• Select the "Preferences" option from the "Edit" menu ("iTunes menu on the Mac) (Fig. 9.2.2).

• Click "Importing" to edit the settings for iTunes encoding method.

• If iTunes is not currently set to import material using mp3, then select "MP3 Encoder".

• Choose your desired compression rate for the "Setting" field. Generally 128kbps is considered the best compromise between quality and file size.

• Approve any changes you have made by clicking "OK".

• Add your songs to the play-list (select "Add File to Play-list" from the "File" menu).

• Select you songs and click the "Convert Selection to MP3" option from the "Advanced" menu.

- After a few moments the conversion will be complete and your tracks will be in MP3 format.

Figure 9.2.2

9.3 A few final words

Hopefully, this user's guide has given you a feel for how powerful and easy to use your new sequencing software is. There are a great many more features and tools available in Tracktion that simply could not be covered in this user's guide. One of Tracktion's great strengths though, is the ease with which it can be learned. As such, we are confident that you are already in good stead to start making great music.

We want to ensure that you can get the most out of Tracktion, however, so there is also a full reference manual in Adobe Acrobat format. This manual explains the advanced tools that were not covered in this guide. It also provides some useful walk-throughs for common recording and mixing scenarios. Finally, because it is a reference manual, it details every feature and option within Tracktion. So, if you find yourself wondering what a particular option does, the reference guide is where to find the answer.

If you ever get stuck, you can always visit the Tracktion forum on the Mackie website (http://forums.mackie.com/). There you will receive help from Mackie staff, and other users.

Tracktion has a thriving user community at the Raw Material Software forum (http://www.kvraudio.com/forum/viewforum.php?f=22). There you will find many enthusiastic Tracktion users.

All that is left to say at this point is that we at Mackie, and Raw Material Software, hope you enjoy using Tracktion as much as we enjoyed creating it.

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