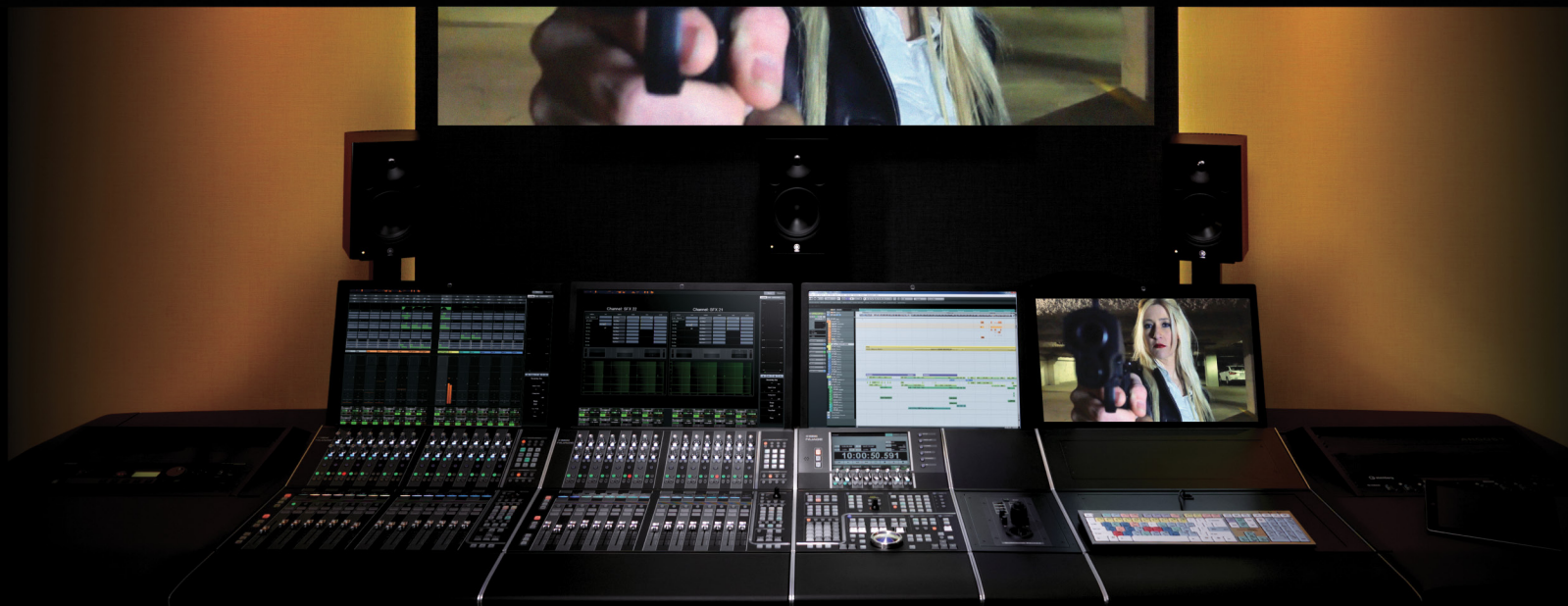


NUAGE

COURSEWARE

POST PRODUCTION AND MUSIC RECORDING WITH NUENDO AND CUBASE



BY ASHLEY SHEPHERD

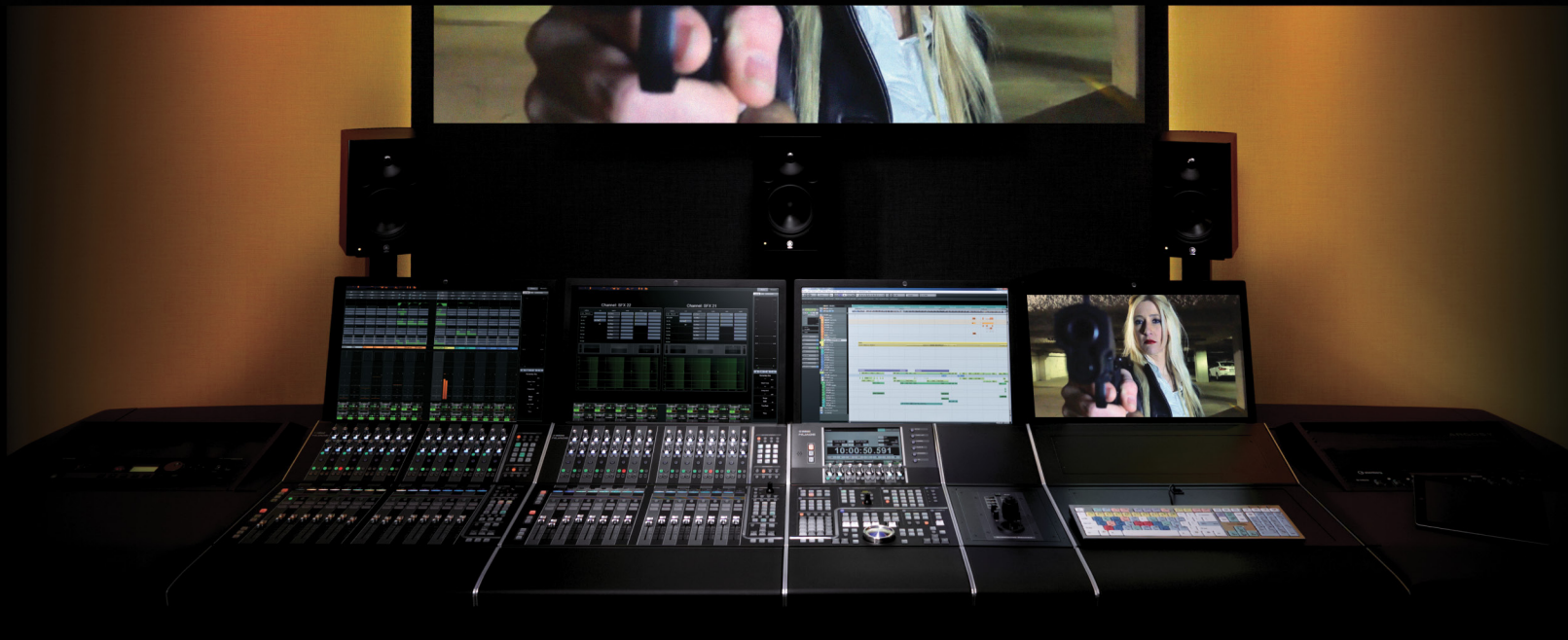


Post Production and Music Recording with NUENDO and CUBASE
Ashley Shepherd

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by Ashley Shepherd

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by Ashley Shepherd

Introduction



NUAGE

Introduction

- ❖ The System
- ❖ Audio Hardware
- ❖ Dante (by Audinate)
- ❖ Yamaha Nuage
- ❖ The Course

Audio production has come a long way since its inception in the early 20th century. With the advent of digital audio recording and cheap computer processing, the possibilities have become virtually unlimited today. However, all of these possibilities can only be achieved through the interactions of the audio engineer and the sounds themselves. That's where the computer comes in. Now that we have digital audio workstations such as Nuendo and Cubase, the audio engineer is given all the tools necessary to manipulate sound in endless ways.

The interface between the sound itself and the audio engineer is made up of three parts: the DAW software, audio interfaces, and hardware controls. This composite interface is critical because it allows the creative decisions made by the engineer to be applied to sound in the digital medium. Mastering this interface is the skill set needed to be a successful audio production engineer today.

Nuage Courseware is designed to give you the skills necessary to apply your creative decisions in audio production using the software tools from Steinberg and audio hardware and tactile controllers from Yamaha. Yamaha Nuage Integrated Audio Production System is the most advanced hardware and software solution available today for audio post-production for video, sound for gaming, and music production.



Figure IN.1
Edison wax
cylinder phono-
graph c. 1899

The System

The Nuage system can be broken down into three areas: audio software, tactile control, and audio hardware (AD/DA conversion).

Audio Software

The DAW

At the core of audio software in any audio production system is the DAW (Digital Audio Workstation). For our purposes, this will consist of either Nuendo or Cubase software. The DAW software is the engine that allows editing, recording, and mixing of all the audio in any production. This is the single most complex piece of software you will use. However, there are other pieces of software that will be involved in the process.

Plug-ins

Plug-ins are modular pieces of software that work within the DAW software and process audio in various ways. Plug-ins can be from other software manufactures such as Universal Audio (UAD), Waves, or SoundToys. The great benefit of this is that you may use any tool necessary to achieve the sonic results you desire. Both Nuendo and Cubase come with built-in plug-ins such as the ModMachine delay shown in Figure 3, that are very effective and provide great results for most situations. However, the ability to choose a third-party plug-in adds flexibility to the system.



Figure IN.2 Nuendo and Cubase DAWs



Figure IN.3 ModMachine delay plug-in

Video

When working with audio for video post-production or sound for gaming, it is necessary to synchronize audio and video. We have to be able to see the video in order to create appropriate sounds to go along with it.

Both Nuendo and Cubase provide a software video engine that allows for video files to be played in sync with audio. The video engine relies on the video capabilities of the host computer in which Nuendo or Cubase is installed. You will need to become familiar with various types of video files and formats in order to work with them inside Nuendo and Cubase.

Synchronization

It can be necessary to synchronize one DAW with another system either for video or more audio. There are various methods to do this, some using software only and others that require hardware devices such as Steinberg's SyncStation, shown in Figure 4, to interface with other systems outside the DAW.



Figure IN.4 Steinberg SyncStation

Tactile Control

In order to control all of the software, there needs to be some sort of physical interface between the human and the software. We have to use our hands, eyes, and of course our ears to control the software and then hear the results.

This is such a crucial aspect of the system because it is where the creative decisions are translated into actual commands to the software. Any delay, confusion, or misinterpretation of your intentions as a result of bad interface design will result in perhaps a less-than-perfect audio output.

In order to minimize these problems, great care has been taken to design the graphical user interface of the software, the tactile controllers for Nuage, and even the language of instructions given here and in the manuals.

Keyboard and Mouse

In its most basic form, tactile control is the combination of the keyboard and mouse of your computer such as the ones shown in Figure 5. With just a keyboard and a mouse you can control every aspect of the DAW, the plug-ins, and synchronized video. There are definite limitations to this basic tactile interface.

The first and foremost limitation is that you can only do one thing at a time with a mouse: point and click. Your hands, however, are capable of controlling several different things at once. And your brain, of course, can think about many different things at once. With the mouse, you can only click on one thing at a time.

The next limitation is the keyboard. An ASCII keyboard is designed primarily for typing words, not controlling DAW software. We have come up with solutions such as key commands and modifier keys to overcome this limitation, but the realities remain the same. The keyboard is designed for typing.

Finally, there are only buttons on the keyboard and the sliding action of the mouse. Our hands are capable of operating other types of mechanical devices such as knobs and faders.

There is a reason for having faders on a mixing console. Faders are very intuitive for adjusting the levels of audio signals. Also, knobs are the logical choice for adjusting everything from plug-in parameters to transport controls.

The mouse is capable of mimicking all of these types of mechanical devices, but only in a limited fashion. There comes a point where using dedicated hardware controls will seriously increase the efficiency and efficacy of your work.



Figure IN.5
Standard key-
board and
mouse

Control Surfaces

The idea behind a dedicated control surface is the creation of mechanical devices that are ideally suited for the purpose of controlling various parameters. The Nuage Master and Fader units shown in Figure 6 have been designed from the ground up to provide tactile controls for Nuendo and Cubase in a tightly integrated system.

When you operate the DAW software using one of these tactile controllers, there is no delay between your action and the result in the software. Furthermore, you may operate multiple parameters at the same time and get instant feedback and results from your actions. This helps promote the creative process, allowing you to conceive, execute, and evaluate creative decisions much more quickly than when using just a keyboard and mouse.

The Nuage controllers each have a constellation of faders, knobs, buttons, and the control wheel to give you access to every feature within the software. Bringing the features out of the key command and menu system and into your hands right in front of you has an amazing effect on the operator.



Fig IN.6 Nuage Master and Fader units

MIDI

MIDI (Musical Instrument Digital Interface) is a technical standard that describes a protocol, digital interface, and connectors, allowing a wide variety of electronic musical instruments, computers, and other related devices to connect and communicate with one another.

While MIDI is most commonly used to transmit musical information between devices, it has been harnessed to provide tactile control of DAW software. This allows hardware devices such as MIDI keyboards, pad controllers, and even portable devices such as smartphones and tablets to control DAW software.

Through the use of Generic MIDI and the Mackie Control protocols, access is gained to parameters such as channel volume, pan, aux sends, plug-ins, and other commands within Nuendo and Cubase.

Using these tools you could call up the Quantize function in Nuendo simply by pressing the low C note on a MIDI keyboard. You could create a remote control for your DAW by using an iPhone to operate the transport controls in Cubase using the Cubase iC app.

Multi-Touch Screens

Multi-touch screens are now becoming commonplace with the advent of Windows 8 and other operating systems such as iOS, shown in Figure 7 with the iPad. They can utilize multiple points within their GUI, thus controlling multiple parameters at once. As these systems become more developed, you will be able to take advantage of multi-touch within the DAW.



Fig IN.7 iPad running TouchOSC



Fig IN.8 Windows 8 Multi-Touch screen

The ability to touch and activate more than one item simultaneously within the GUI offers unprecedented utility from the screens. However, touching graphic elements on the screen is still very different from touching real knobs, faders, and buttons on a tactile control surface. The ability to feel your way across the control surface rather than searching with your eyes across the GUI delivers a much more immediate response. That being said, multi-touch screens offer a bright future for the graphical user interface.

Audio Hardware

The third element in the system is the audio hardware itself. It is where the audio signals are converted from analog into the digital medium and vice versa. This is the critical step in the quality of sound for any digital audio system.

While the other elements of the system are designed to help the operator interface with all the controls within the DAW, the audio interfaces allow your ears to interface with the sound directly. This is, after all, the end goal of audio production: to hear the sound that we imagine in our minds.

Studio AD/DA Converters

The Nuage system can use various audio interfaces, depending on the needs of the studio and the type of recording required. There are three studio audio interface configurations called the Nuage I/O's. Each unit has 16 inputs and 16 outputs:

- ❖ 16A (16 analog inputs and 16 analog outputs)
- ❖ 16D (16 AES/EBU digital inputs and 16 AES/EBU digital outputs)
- ❖ 8A8D (8 analog and 8 digital inputs and 8 analog and 8 digital outputs) (Figure 9)



Fig IN.9 The Nuage IO 8A8D

Additional Yamaha Audio Interfaces

Other interfaces within the Yamaha product range can be used directly with Nuage. All of the R-series interfaces are controllable remotely from the Nuage hardware units, providing microphone preamps and AD and DA conversion all in one unit such as the Rio3224-D shown in Figure 10.



Fig IN.10
Rio3224-D
Stage Box

The RMio-64D shown in Figure 11 is designed to work with existing MADi interfaces (Multichannel Audio Digital Interface) for large-scale setups involving third-party equipment. It converts 64 channels at 44.1 or 48 kHz (32 channels at 96kHz and 16 channels at 192kHz) of audio on MADi to the Dante network protocol.



Fig IN.11 The RMio-64D MADi to Dante interface



Fig IN.12 AD8HR remote-controlled microphone preamp

The AD8HR shown in Figure 12 is a remote controlled, 8-channel studio microphone preamp that can be directly operated by the Nuage hardware.

Other Yamaha audio consoles, such as the QL and CL series, can interface with Nuage in more complex scenarios involving live sound, broadcast feeds, and multi-track recording all within one event, such as the Grammy Awards for example.

Dante (by Audinate)

All of these audio interfaces have one thing in common. They all use the Dante audio networking protocol to route signals between devices.

Dante is an audio networking protocol that utilizes Gigabit Ethernet to route up to 512 audio signals between various devices. The result is that you can use off-the-shelf networking hardware (with certain exceptions) to build a scalable audio network for use in the studio or in live applications. (See www.audinate.com.)

It also happens that the Nuage hardware controllers also use Gigabit Ethernet to communicate control signals between hardware units in the DAW software. This makes it extremely easy to set up an entire system using one Gigabit Ethernet switch and very little cabling to route a great number of audio channels and controller data all within one system.

Other Audio Interfaces

Both Nuendo and Cubase will operate with just about any audio interface available, including the audio on most laptop computers. This offers a great deal of flexibility when moving projects between studios, working at home or while traveling, or simply exchanging project data between various contributors.

Steinberg offers a complete line of audio interfaces suitable for Nuendo and Cubase. The only requirement is that the audio interface is ASIO compatible. In the Windows environment, this is a function of the driver software. In Mac OS X, if the audio interface is compatible with the Mac, then it will work with Nuendo and Cubase.

This opens up a world of possibilities for audio interfaces including devices from RME, Apogee, Focusrite, Universal Audio, and many more.



Fig IN.13 Third-party audio interface brands

Yamaha Nuage

Yamaha Nuage is the integration of all three parts of the system: software, control surfaces, and audio interfaces. The partnership between Steinberg and Yamaha has allowed for an incredibly tight integration of these three parts to make a whole that is greater than the sum. The workflow and output quality are the result of this integration and workflow improvements.



Fig IN.14 The complete Nuage system

The Course

This course will teach you how to produce audio for any type of multimedia using this system and its components in a fashion that affords greater creativity while also maintaining efficiency in achieving superior results. It will take you through the process of setting up a system, recording various types of projects, editing those projects into a final form and then mixing the projects in preparation for delivery in the final format.

We will use real-world examples including lab material prepared just for this course so that you will learn by doing. Of course there will be sections purely devoted to operating the software and understanding key functions, but those functions will then be used in real-world examples that put your skills to the test, and you'll finish with a final product that is tangible.

Hopefully you will find this experience rewarding and come out of it with a strong skill set that will allow you to pursue a career in audio production.

Prerequisites

This is not a basic audio course. There are some assumptions about basic audio knowledge that you'll need to succeed in this course.

Basic Audio Theory

It is assumed that you have fundamental knowledge in the following areas:

- ❖ fundamentals of sound waves, speed, and propagation
- ❖ anatomy of sound waves: amplitude, frequency, phase, polarity, etc.
- ❖ decibels: dB SPL, dB FS
- ❖ dynamic range: noise floor, operating level, headroom
- ❖ audio processing
- ❖ equalizers
- ❖ compressors
- ❖ time-based effects: delay, pitch change, reverb, etc.
- ❖ gain staging: mic level vs. line level vs. speaker level
- ❖ signal flow
- ❖ mixing, summing of signals, panning

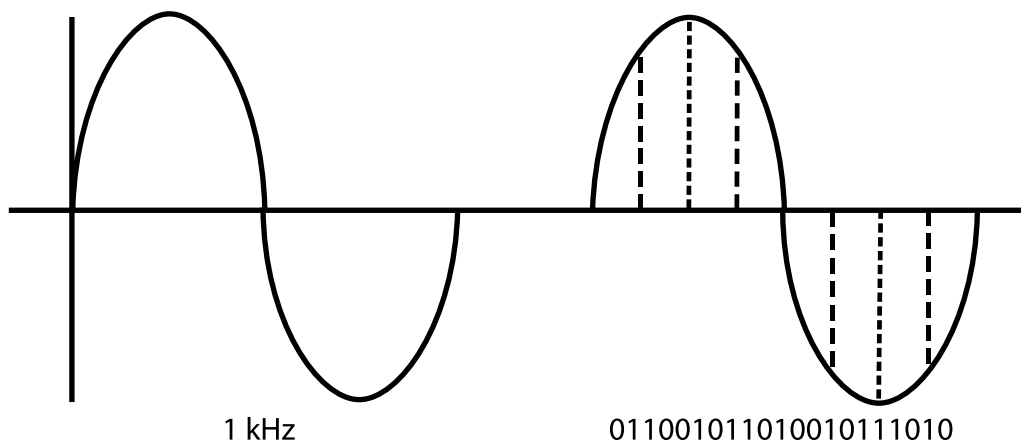


Fig IN.15 Analog versus digital

Basic Digital Audio Theory

In the area of digital audio, it is assumed that you have fundamental knowledge in the following areas:

- ❖ Nyquist theorem
- ❖ Bit depth and dynamic range
- ❖ Dithering
- ❖ 32-bit floating point vs. 24-bit fixed point audio
- ❖ Digital file formats: WAV, AIFF, MP3
- ❖ Digital level metering: peak vs RMS, K-system, LUFS

Basic Computer Knowledge

Is also required that you have a basic understanding of the computer system that you will be using for this course, whether Windows or Mac OS X operating system. You should have knowledge in the following areas:

- ❖ File system navigation: drives, paths, folders, etc.
- ❖ RAM vs HD (Hard Disk) storage
- ❖ File formats: .wav, .npr, .mpeg
- ❖ Digital video files, QuickTime
- ❖ Computer connectivity: PCIe, USB, FireWire, Thunderbolt, Ethernet, DVI, HDMI, VGA, etc.
- ❖ Software installation conventions
- ❖ Internet file downloads
- ❖ Basic Ethernet: 100baseT, Gigabit, switch, router, hub

Nuendo and Cubase

Nuendo and Cubase are very similar. The only differences that exist between the two are cosmetic differences in the GUI and additional functionality that's only found in Nuendo. Every feature in Cubase is also in Nuendo but not all features that are in Nuendo can be found in Cubase.

For example, the networking operation features found in Nuendo do not exist in Cubase. The ability to have more than one video track is a feature exclusive to Nuendo.

The audio engine and processing in Cubase are the same as in Nuendo. If you mix a project in Nuendo, you can open that project in Cubase and it will sound exactly the same so long as the same plug-ins are available on both systems. This makes it very easy to move projects back and forth between Nuendo and Cubase workstations.

For the purposes of this book and for the course, we will refer only to Nuendo throughout the text, except to note when the function under discussion is not available in Cubase. For all intents and purposes, the interface and functions are the same for both pieces of software except for those features available only in Nuendo.

A note about Nuendo and NEK (Nuendo Expansion Kit (optional)): Nuendo alone is missing some features designed primarily for music production (certain VSTi sound modules for example). In order to have those features available, the NEK package must be installed for Nuendo. Then Nuendo truly has all the features of Cubase. For this course we will also assume that the NEK package has been installed for Nuendo.

The Method

The method of teaching in this course is based around workflow. Instead of just explaining a bunch of features and functions of the software, we are going to go through the process of doing real work. This will show you how all the features and functions work together to achieve results. This course is as much about the creative process of audio production as it is about the details and specifics of the software and hardware.

Then there is the collaborative aspect of any multimedia production. When working on any type of project, whether film, video, gaming or music, you are working within a team of individuals. It is imperative that you understand how to interact with and share your work with others on the team.

The need for teamwork is most apparent when dealing with video. The video editor and the audio engineer have to work closely together to maintain proper synchronization between the visual image and the sound. This involves some technical steps when you exchange information between the video editing workstation and the audio workstation. Nuendo provides specific features that help this process run smoothly.

It is also necessary to be able to share audio material between workstations from different manufacturers. This requires an intermediate exchange format that allows both workstations to access the same project with certain limitations. Formats such as AAF and OMF are most commonly used for this purpose.

It is quite possible that you will have to work with somebody who is using a DAW that is not Nuendo or Cubase. For example, many audio engineers use Avid Pro Tools software and it is quite common to have to share material created in Pro Tools with Nuendo and vice versa. This course will take a close look at how to exchange projects between Nuendo and Pro Tools.

Lab Material

In order to learn how to produce audio you must work with real material. To that end, we will be working with lab materials created specifically for this course.

50/50 Film Production

These materials include a complete film production focused on sound design. The scenes include interior and exterior locations, dialogue, action sequences with firearms and cars, slow motion, and other surreal cinematics. Every aspect of film sound is represented in this production.

You will use all of the raw material from this production to create your own final mix for the project. This is the best way to learn how to do it. There is no substitute for the real thing.



Mathew Senatore

Fig IN.16 Scene from 50/50

Music Recording: Live Band

We will also cover techniques for music production. Although the primary focus of the course is audio production for video, we will have some music recording material for you to work with.

In addition, there will be music in the form of the score for *50/50*. Mixing music for cinema poses different challenges than mixing music alone. This will test your skills in both areas of music production.

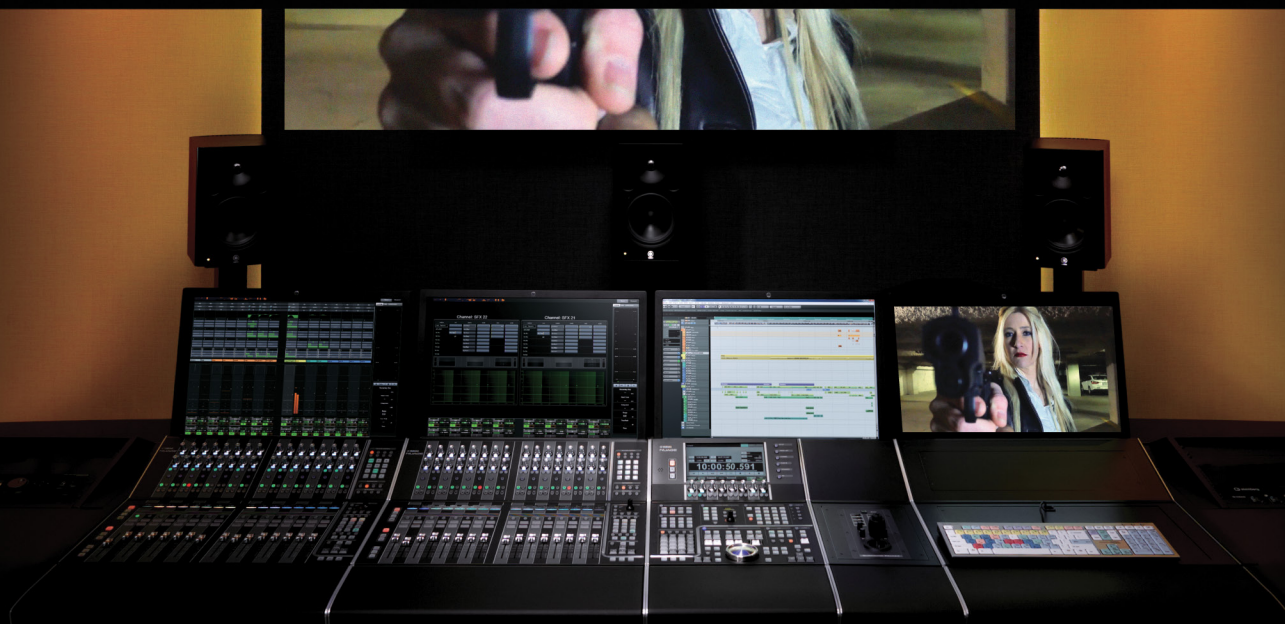


Fig IN.17
Drums in the
studio

NUAGE

COURSEWARE

PART I: SETTING UP



by Ashley Shepherd

In the first part of this course we will cover setting up a Nuendo system starting with the computer itself and all the hardware of a Nuage system. Then we will move into the configuration of Nuendo's features and preferences. We will also set up a laptop system that has virtually no hardware and that can be used with headphones as an alternative to the full Nuage system.

Nuendo is the centerpiece of your studio environment. We will take a close look at how to connect the Nuage system to all of the other gear in your studio from MIDI controllers and keyboards to microphone preamps and studio monitors.

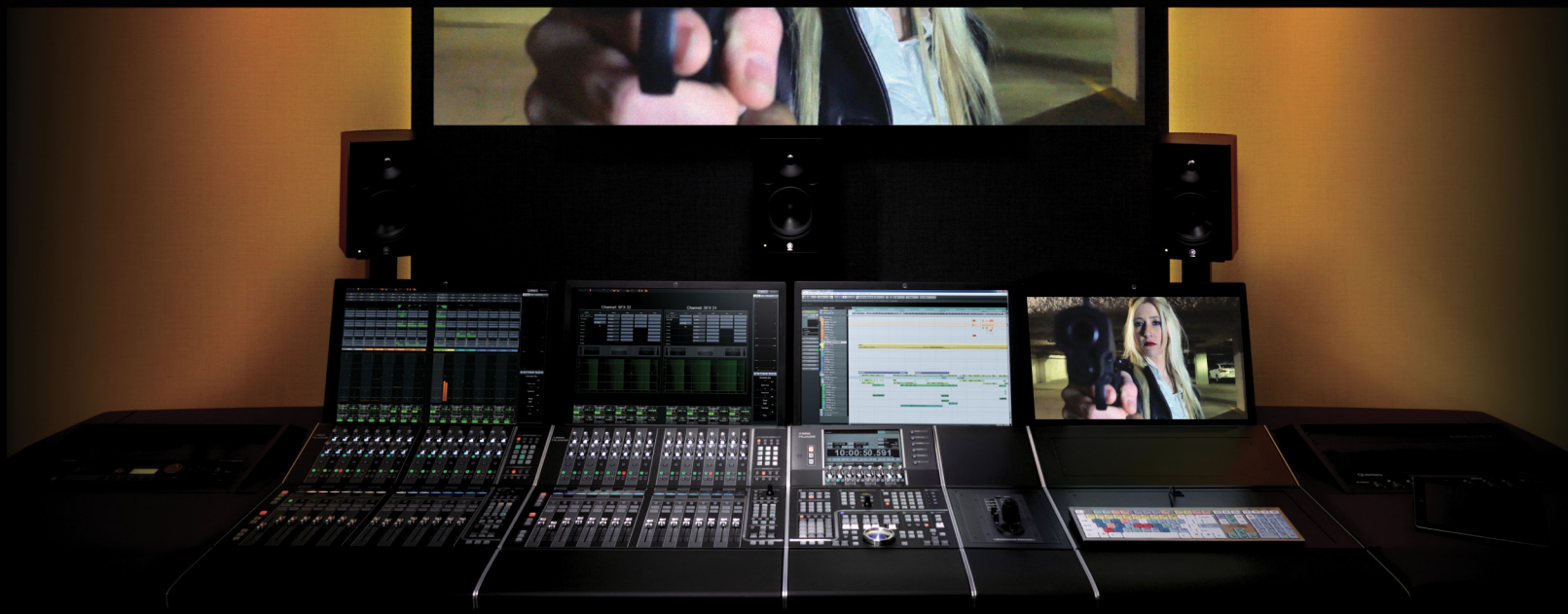
Next, we will examine the file structure of a Nuendo Project and how Nuendo organizes the various files it creates and uses. This will help you keep all of the critical data safe, organized and backed up.

We will then take a tour of the Nuendo GUI, learning its basic layout and the various windows used in Nuendo. Then we will look at the extended layout with additional windows that delve deeper into the software.

Finally, we will cover techniques for navigating the channels and timeline of the project. The ability to move about freely and quickly in a Nuendo project is critical. This is what you need to learn first before we can move on to actually recording audio.

NUAGE

COURSEWARE



PART I: SETTING UP

by Ashley Shepherd

Chapter 1 Planning



NUAGE

Planning

- ❖ Questions
- ❖ Computer Choices
- ❖ Audio Interface
- ❖ Speaker Systems and Monitoring
- ❖ Multiple Workstations

In order to properly set up your system, it is a good idea to sit down and plan everything ahead of time. Knowing what type of audio production you will be involved with, the hardware that's available to you, what type of monitoring situation you will be in, and other possible uses for the workstation are all necessary to properly set up a system.

Questions

First, consider a few questions about what type of audio production you intend to do. Of course Nuendo can be reconfigured later if your needs change, but it helps to outline your intended uses before moving ahead with installation and configuration.

- ❖ **Are you producing music or mostly sound design?** Nuendo has extra options specifically for music production contained in the NEK package that might not be necessary for sound design or dialog work alone.
- ❖ **How many speakers will you monitor through?** Will you primarily mix in 5.1 surround or in traditional stereo? It could be both. It is also possible to have multiple sets of monitor speakers, including headphones, all controlled by Nuendo.
- ❖ **What type of audio interface will you be using?** It could be as simple as the built-in audio of your laptop or a Dante Accelerator card with 128 ins and 128 outs!
- ❖ **Will you be recording MIDI from a keyboard controller?** This includes drum programming with a pad controller or drum triggers.
- ❖ **Will you be using some type of control surface?** This could be in the form of a simple MIDI controller, the Steinberg CC-121, an iPhone, or a complete Nuage controller system with three Fader units and one Master unit.
- ❖ **Will you be working to picture and require video playback?** Nuendo supports the use of Apple QuickTime video inside the program. This can be displayed onscreen or through special video playback hardware such as the Blackmagic Design video cards. External video playback systems may also be used with synchronization.

- ❖ **Will you be synchronizing with other audio and video systems?** You might need to lock to a house sync generator or even integrate Nuendo within a large dubbing theater with other DAWs, consoles, recorders, and video systems. This could require Steinberg's SyncStation to ensure sample-accurate synchronization.
- ❖ **Will you be using any DSP hardware to augment the computer's processing power?** UAD, TC PowerCore, and SSL Duende are just some examples of DSP processing hardware that increases the processing power of your system beyond the host CPU's capacity.
- ❖ **Will you be using an analog console or summing device for mix-down?** Many music mixers use some form of analog summing during mix-down, creating a hybrid mixing environment where the best of both analog and digital can be achieved.
- ❖ **Will you be using outboard gear for processing?** Vintage analog outboard gear never goes out of style. Plus, there are new digital outboard pieces such as the Bricasti and Cedar processors that offer the latest algorithms. Nuendo allows you to seamlessly integrate your existing compressors, EQs, and other analog and digital outboard gear into the Nuendo mixer.
- ❖ **Will you be collaborating with one or more other users on the same project?** Nuendo allows you to collaborate with other users on a single project using network connections between workstations.

Computer Choices

Once you have answers to these questions, you can determine what type of computer is most appropriate for your uses. For many, this choice may already be made, but if you have the opportunity to choose the computer you will use for Nuendo, factor your needs carefully into this decision.

Nuendo is a cross-platform application. It functions identically on both Windows and Mac OS X operating systems. So the choice of operating system is more of a personal preference or perhaps dictated by the hardware that is available.

Laptops

Obviously laptops are most appropriate for mobile work such as location recording or for those users who travel often and need a system that can travel with them. Modern laptops are very powerful and can do an amazing amount of work in a small package.

For example, I used an aging MacBook to record on location for an MTV reality show, capturing 16 channels at 48 kHz for two hours straight directly to the internal drive. This is not for the faint of heart, but I had no complications and I was even jam-synchronized to their time-of-day SMPTE timecode while running house sound out of the interface's mixer at the same time.

Editorial tasks such as dialog editing are easily handled by a laptop computer. Even large complex projects can be "off-lined" to a laptop for basic editing and then brought back to the main system for final mixing. Many EDM (Electronic Dance Music) productions are handled entirely within a laptop. They become more powerful every day.

PLUG-INS ACROSS SYSTEMS

If a project created on a system with special plug-ins is taken to a laptop (or other system) that does not have the same plug-ins or necessary DSP hardware, Nuendo will disable these plug-ins but still retain their settings so that when the project is opened on the original system, those plug-ins will load and operate just as they did before. This allows you to migrate projects across multiple systems without losing any valuable data or settings.

The primary limitation with laptops is the use of large-scale audio interfaces. While USB and Firewire offer a decent choice of I/O options for laptops, professional-level interfaces offering over 24 channels of I/O at high sample rates usually require PCIe cards to move that amount of data. With the advent of Thunderbolt-enabled interfaces, the same level of performance can be achieved on a laptop.

However, with Nuage and Dante, a laptop with Gigabit Ethernet can use the DVS (Dante Virtual Soundcard) to create 64 inputs and 64 outputs over one Cat 5e connection. This does require external Dante interfaces to be used.

The internal hard drives on most laptops are designed for energy conservation rather than streaming data performance. This trade-off suggests that for laptop recording, it is advisable to use an external hard drive with its own power supply and a drive that spins at least 7200 rpm. As the saying goes, “Your mileage may vary,” and internal drives are capable of some amount of recording if necessary.

Desktop Computers

Desktop computers offer a greater amount of processing power and disk capacity than laptops. For many users, a modern desktop is sufficient for just about all tasks in audio production. With modern processors having multiple cores and high-capacity SATA hard drives providing huge amounts of high-speed storage, the modern desktop computer has plenty of power to run Nuendo even in the most demanding situations, such as a feature film mix, which can contain hundreds of audio tracks.

High Performance Graphics Cards

Since so much of our audio work is now handled visually, the GUI (graphic user interface) of Nuendo can get quite large if desired. The dedicated graphics processors in desktop computers handle these needs better than their laptop counterparts. It is quite common to see two or more monitors (computer screens) being used to display all the GUI elements of Nuendo. This can really help speed up workflow as you do not need to search through a bunch of stacked up windows to find what you need.

A typical setup might have the project window (the basic multi-track edit screen in Nuendo) on one monitor, with the mixer and transport controls on another. For Nuage, each Fader unit requires its own dedicated 24-inch monitor to display the channel strip information above each hardware fader. On a full-sized system, you will have a minimum of four monitors (one for each Fader unit, plus another above the Master unit).

An additional monitor could be dedicated to video playback when working to picture. This can be connected to a large flat screen TV in the front of the studio or a projection system for even larger images.

We are now up to five monitors for one computer! Only a high-performance graphics card can handle these demands without putting undue strain on the host processor. Yamaha has recommended video cards that are tested with the system. These and other recommendations can be found at: http://www.yamahaproaudio.com/global/en/products/daw_systems/nuage/lineup.jsp.

Connectivity

Desktop computers offer more choices for connectivity to other devices, including PCIe cards, Thunderbolt, USB 3.0 and FireWire. Having more choices allows the use of the optimum connection for the activity you are doing most. For high-demand activities such as orchestral recording and film mixing, PCIe audio interfaces will offer better performance than USB 3.0 interfaces. Having the choice is easier with desktop computers.

Ever-Changing Technology

Computer technology changes every day, so the choices you have for computers will also change. When configuring a system, it is wise to keep up to date on the latest technology to ensure you take advantage of advances in computer systems.

Audio Interface

The two examples for audio interfaces that we will use in this course are the built-in audio of a standard laptop and a Dante network audio system used with Nuage. There are many other choices for audio interfaces between those two extremes. The best audio interface for your needs is determined by the type of recording you will be doing.

If you are recording many musicians simultaneously, a very high channel interface is the best choice. Conversely, if you will only record the voice with one microphone, a simple two-channel interface might be the best choice.

With Dante, you have greater flexibility regarding audio interfaces. For example, if you are recording large film scores, requiring many inputs for the orchestra, rhythm section, and additional soloists, you could use the Yamaha Rio3224-D as your Dante interface with 32 microphone preamps that you can control directly from the Nuage Fader units.

There are also 16 analog outputs that could be used to feed headphone amplifiers for the musicians. In the studio, you could have a Nuage I/O 16A for speaker monitoring in 5.1 surround plus other inputs such as the talkback microphone.

This entire system is connected by Gigabit Ethernet and Cat 5e cabling. With traditional systems, this complex setup would require a great deal of expensive cabling and hardware.



Figure 1.1
Yamaha
Rio3224-D

Speaker Systems and Monitoring

Nuendo and Cubase both feature a separate mixer designed to operate speaker and headphones systems in the studio called the Control Room Mixer. The Nuage Master and Fader units both utilize this feature. You must consider all of the various speaker systems and headphone systems you will be using in the studio. When using the Control Room features, each speaker channel will need its own audio output from your interface.

For example, if you are mixing 5.1 surround sound, you will need at least six output channels from your audio interface to feed the six speakers and a 5.1 speaker system. If you are using multiple surround sound speaker systems you will need additional audio outputs to feed those speaker channels.

Additionally, each headphone amplifier requires two channels to output channels from your audio interface. When you total it all up, quite a few output channels might be necessary for a complex studio monitoring system.

- ❖ 5.1 main speaker system = 6 channels
- ❖ 5.1 auxiliary speakers = 6 channels
- ❖ Stereo speakers = 2 channel
- ❖ Engineer headphone amplifier = 2 channels
- ❖ Studio headphone amplifier = 2 channels

In this example, we will need 18 output channels to configure the Control Room in Nuendo.

Multiple Workstations

Nuage can control more than one DAW. In fact, the hardware units can control three different workstations on separate computers. The first workstation must be either Nuendo or Cubase. The second and third workstations can be either Nuendo, Cubase, or Avid Pro Tools. Complex studio configurations with multiple workstations can easily be configured together to work with Nuage as one system, total integration.



Figure 1.2 Multiple Workstation Control of Nuendo, Cubase, and Pro Tools

These workstations must be connected over the same Gigabit Ethernet network as the Nuage hardware. The displays from each workstation can be routed to the monitors above each Nuage hardware unit and switched using a set of KVM switchers that are controlled by Nuage. Yamaha recommends the Gefen brand of KVM switchers that offer RS-232 control as shown in Figure 1.3.

The KVM switch will direct the mouse and keyboard to each workstation while also connecting the displays to the monitors above each Nuage hardware unit. Switching between workstations is as simple as pressing one button.



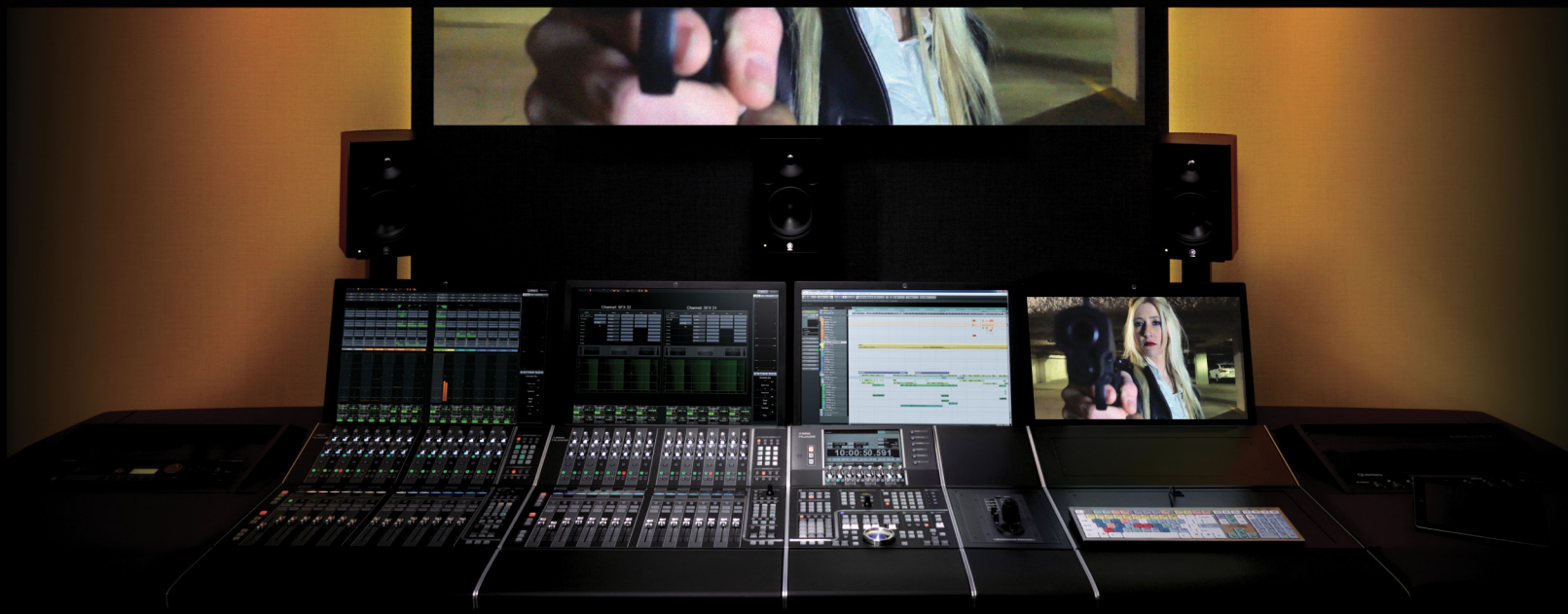
Figure 1.3 Gefen 4x1 DVI KVM DL

You will need one KVM switch to handle the main monitor, keyboard, and mouse plus one video switcher (Gefen 4x1 DVI DL) for each Fader unit in the Nuage system. These will be connected to the Nuage hardware units with RS-232 cabling in order for the switching to be controlled by Nuage.

Now that the planning has been done, it's time to install the hardware and software for the system and configure them to be ready for the first project.

NUAGE

COURSEWARE



PART I: SETTING UP

by Ashley Shepherd

Chapter 2

Hardware Installation



NUAGE

Hardware Installation

- ❖ The Workstation Computer
- ❖ Dante Accelerator
- ❖ Gigabit Ethernet Managed Switch
- ❖ Interface ID Setting
- ❖ Connect it All Together
- ❖ Dante Secondary Port
- ❖ KVM and Monitor Switching

Here is a list of hardware that needs to be installed for the example Nuage system:

- ❖ Workstation computer
- ❖ Dante accelerator card (PCIe)
- ❖ Nuage Master unit
- ❖ Nuage Fader unit
- ❖ Gigabit Ethernet managed switch
- ❖ Nuage I/O 16A
- ❖ Rio3224-D
- ❖ KVM and video switchers

The Workstation Computer

Depending on what type of computer you're using, its installation could be fairly complex or quite simple. For a Nuage system, the main piece of equipment that is necessary is the high-performance graphics card. Ensure that this graphics card is properly installed according to the manufacturer's instructions.

Additionally, you will need to have one 24-inch monitor for each of the Nuage hardware controllers. These should be connected and operational before proceeding.

Install Hard Drives

Depending on your system configuration, you may need to install internal hard drives for audio recording, video, and sample library storage. For laptop systems, these may be external drives. Here are some guidelines for hard drives:

- ❖ Use drives with speeds of 7200 rpm or greater.
- ❖ Have separate physical drives for audio recording, video files, sample libraries and backups.
- ❖ For most applications, the SATA interface is sufficient. For huge track counts (+250) and moderate track counts at higher sample rates (+100 @ 96kHz) it might be necessary to go to a RAID array for greater disk throughput.

- ❖ Use more drives with less space per drive rather than one larger drive. One terabyte per drive is a good size. Larger drives can exhibit performance issues once they get over 50% full depending on their physical platter and head design.
- ❖ Have duplicates of each drive for backups. Hard drives are cheap. Re-doing work due to a hard drive failure without a backup is much more expensive.
- ❖ Keep a spare unused drive around for emergencies.

DISK DOCKING STATION

With several internal hard drives and then duplicates for backups, the number of hard drives one needs to deal with grows every year. One item I have found extremely handy in dealing with so many hard drives is a disk docking station. These units (one shown below) usually have one or two slots in which you can insert a SATA hard drive. They can have USB 3.0, FireWire and/or eSATA interface connections on them to use with your computer. It is possible to “hot swap” drives in and out of the bays without shutting down your computer. This also eliminates the need to temporarily install hard drives in your computer just to see what’s on them. Your costs go down since you do not need to buy an external enclosure for each drive.

Some units can also accommodate the smaller 2.5” drives used in laptops such as the one shown in Figure 2.1. For backup drives, this is a very handy tool. When used with good backup software, these docking stations can make life much easier when dealing with many different hard drives. Using the eSATA interface, any hard drive in the docking station will perform just as well as an internal drive, allowing you to record audio directly to them.



Figure 2.1
Hard drive
caddy

BACK UP YOUR SYSTEM

This point in the installation is where you have the most stability with the hardware you have installed in your system. Creating a backup here ensures you have a stable system to revert to in case of problems in the future. Most system instability problems are due to the interaction between various plug-ins and Nuendo. If a serious system stability problem occurs that cannot be solved otherwise, revert to this system backup to regain stability. You may then add plug-ins one by one to see where the problem lies.

Dante Accelerator

In order to achieve the highest audio performance from the Dante network you will need to install the Dante accelerator PCIe card into the workstation computer as shown in Figure 2.2. Once installed, you'll have access to 128 inputs and 128 outputs from the workstation to the Dante audio network.

1. Physically install the card in an available PCIe slot in the workstation. For both Windows and Mac Pro workstations, install the card into a slot that is a x4 lane or faster slot. For a Mac Pro, the Dante Accelerator must be installed in Slot 2 (right above the one for the graphic card).
2. Install the driver for the card by following the instructions from the software package.

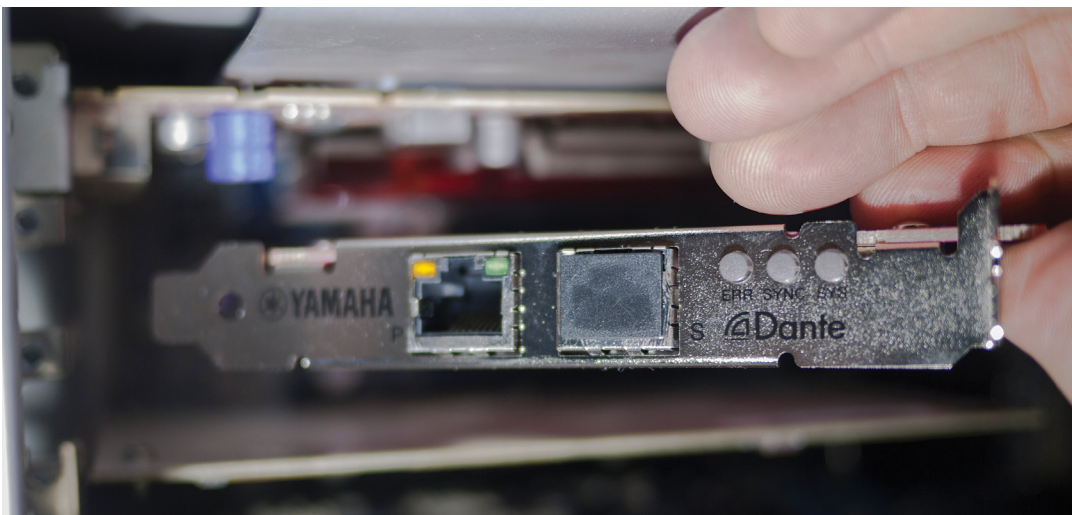


Figure 2.2
AIC-128 Dante Accelerator PCIe card being inserted

Gigabit Ethernet Managed Switch

Dante will run over 100 base T Ethernet networks but it is preferred always to run Dante in a gigabit Ethernet environment. Any gigabit switch will work, but for larger systems, such as a big Nuage system, an “enterprise level” or “managed switch” is preferred.

Managed switches provide QoS (Quality of Service) features. There is a key setting that is part of the QoS features that will improve the performance of Dante. DSCP(DiffServ Code Point) should be set on the switch. It can be referred to as the “trust mode” of QoS or port priority.

Most managed switches are programmed by using a web interface from a computer connected to the switch. Follow the instructions for your gigabit switch in order to configure the DSCP parameters for QoS.



Figure 2.3
Linksys managed switch

Interface ID Setting

Each interface in the Dante network needs to be uniquely identified. This is achieved through the use of ID settings. On the back of each Dante interface there’s a rotary switch used to set this ID, as shown in Figure 2.4. You should set the ID numbers such that the first interface with the lowest ID number is the first interface you want to see listed in the Dante controller.

For our example there are two interfaces, the Rio3224-D and the Nuage I/O 16A. Since I want to see the Nuage I/O first, I will set its ID to 1 and then set the Rio interface to number 2. Only the interface boxes have ID numbers. The rest of the system is self-identifying.

You can have up to eight interfaces in a single Nuage workgroup for a total of 128 channels.



Figure 2.4
Rotary switch
for device ID

Connect it All Together

Now it's time to connect all the devices together. This is the simplest part. Everything is connected to the Ethernet switch. The Nuage Master and Fader units have Ethernet ports on the rear panel. The audio interfaces each have an Ethernet port. Connect each of these ports to the gigabit switch such as the one in Figure 2.5.



Figure 2.5
Connecting the
Nuage system
to a Gigabit
Switch

However, the workstation computer requires two connections to the gigabit switch, one from the Dante accelerator card and the second from the normal network connection on the computer. The second connection is what allows the control surfaces to communicate with Nuendo.

Dante Secondary Port

Each Dante device in the Nuage system has two Ethernet ports: Primary and Secondary. The primary port can be used by itself as described in the previous section. The secondary port can be used in one of two ways: in a daisy chain system or as a redundant backup system. Both configurations are best suited for live situations. They will be briefly discussed here.

Daisy Chain

Yamaha consoles and stage interfaces support a daisy chain mode. No Ethernet switch is required for this configuration and it is most useful where cable runs prevent reaching each device from a central location.

This mode uses the secondary port to carry Dante signals to the next connected device in the chain. The last device will only have the primary port connected, as shown in Figure 2.6. The network is set up automatically but each device in the chain must be set to daisy chain mode.

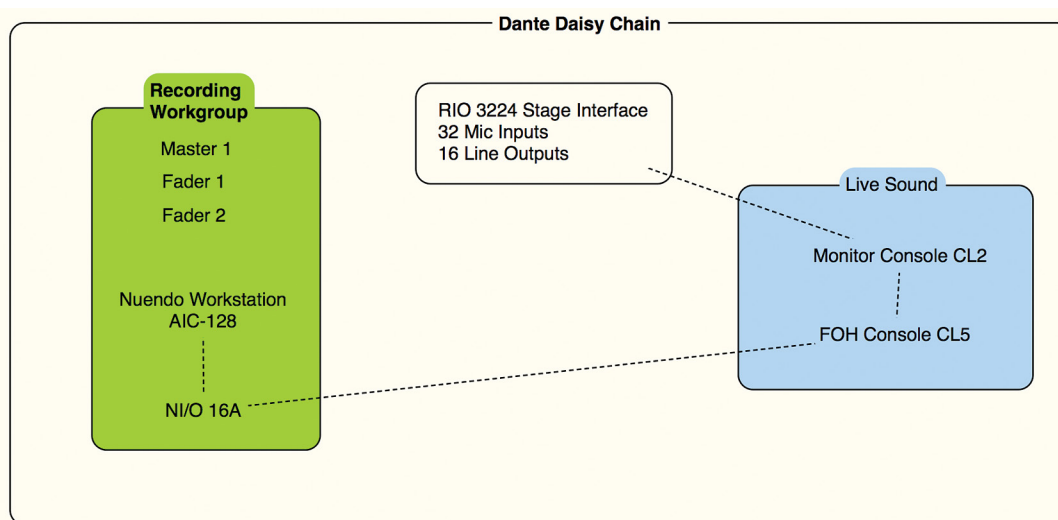


Figure 2.6
Dante daisy chain mode

AIC-128 SECONDARY PORT

Note that the secondary port on the AIC-128 cannot be used to daisy chain devices. It must be the last device in the chain.

The Nuage I/O's have DIP switches on the rear panel to switch the secondary ports between redundant and daisy chain, as seen in Figure 2.4. For normal operation using a network switch, leave this set to redundant.

Dante Redundant Network

It is possible to set up a secondary Dante network for fail-safe operation. In case of a cable or network switch failure, the secondary network will take over instantly so that no audio samples are lost. Figure 2.7 shows how a secondary network could be set up for Nuage in a live event situation.

The two Dante networks should not be connected directly. The switches need to operate completely independent of each other to ensure fail safe operation.

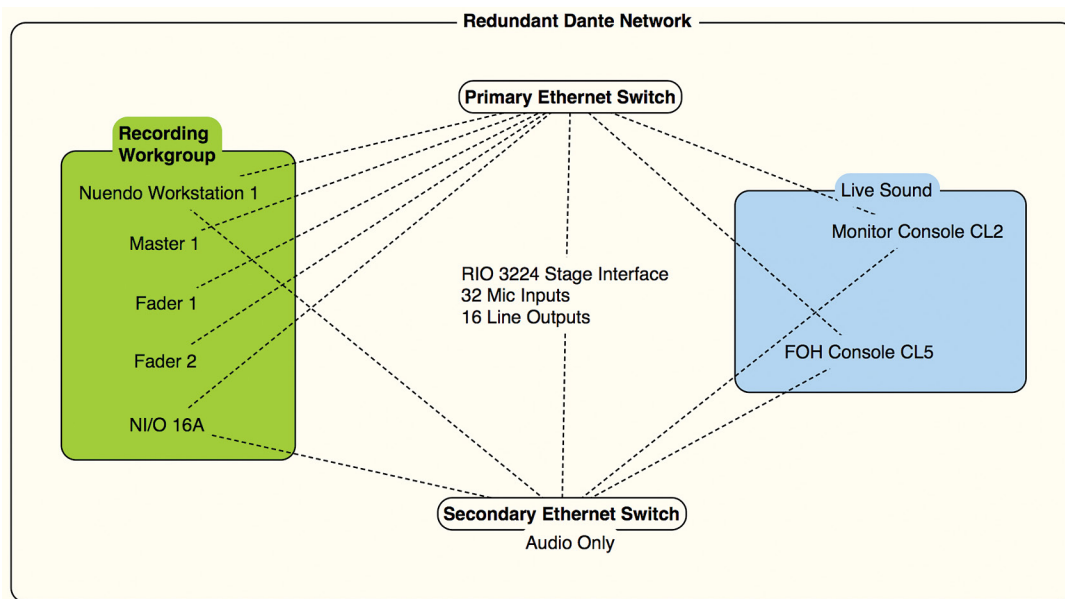


Figure 2.7
Dante redundant secondary network configuration

KVM and Monitor Switching

If you are going to use Nuage with multiple workstations, you will need to connect each workstation to the KVM and video switchers. Then the KVM and video switchers are connected to the displays above each hardware unit along with the keyboard and mouse.

Each switcher is also connected to the Nuage hardware units by a RS-232 serial cable, allowing the Nuage hardware to control the switching. Figure 2.8 shows a diagram of how this is set up.

Video Connections

- ❖ Connect the main workstation's first display output to the first input of the KVM switch.
- ❖ Connect the first display output of the secondary workstation to the second input of the KVM switch.
- ❖ The video output of the KVM switch is then connected to the main display positioned above the Nuage Master unit.
- ❖ Connect the second display output of the main workstation to the first input of the video switcher.
- ❖ Connect the second display output of the secondary workstation to the second input of the video switcher.
- ❖ Connect the output of the video switcher to the secondary display positioned above the Nuage Fader unit.

Now when both switchers change from the main workstation to the secondary, the displays will show the secondary workstation screens.

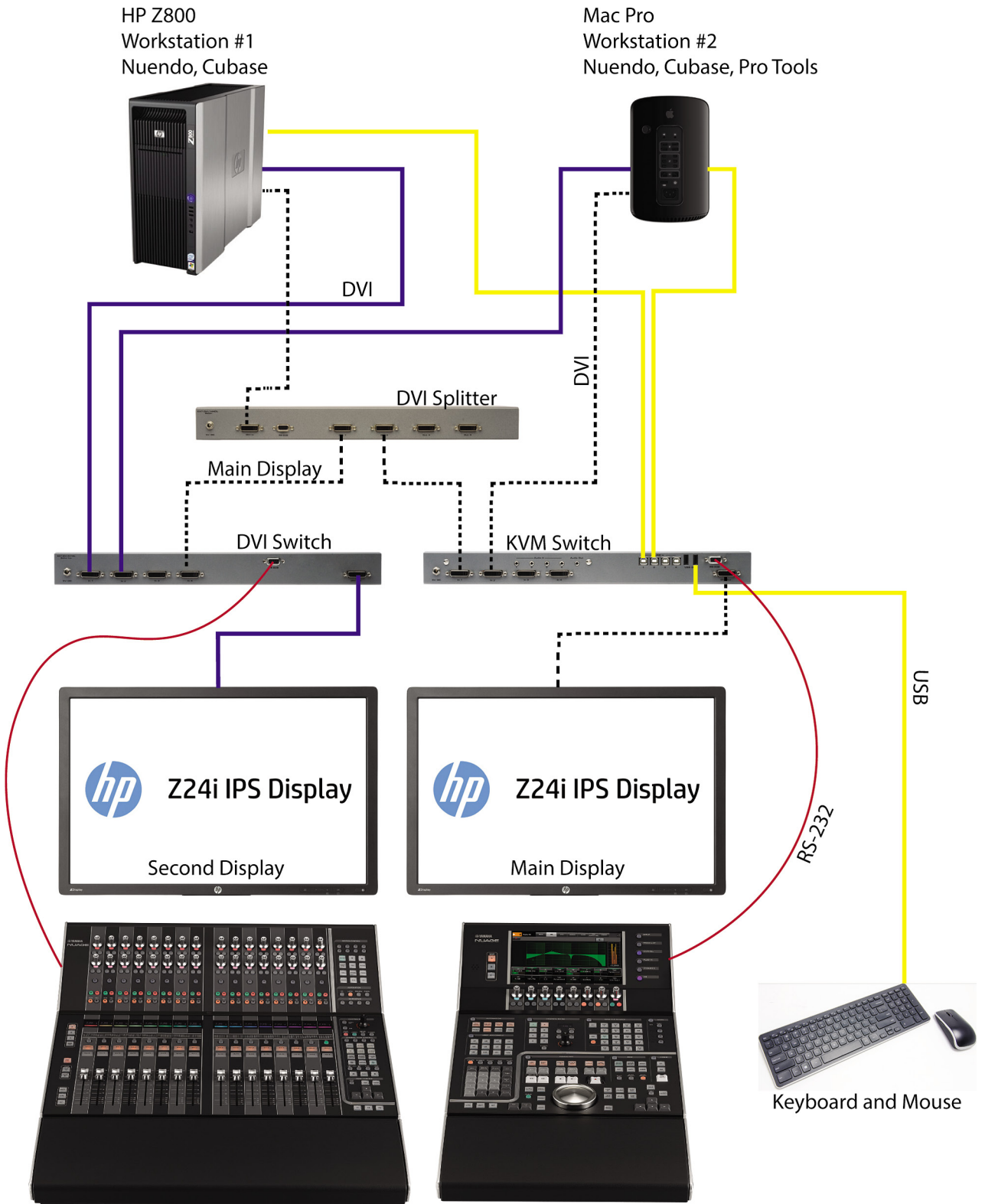


Figure 2.8 KVM and monitor switching diagram

USB Connections

- ❖ Connect the keyboard and mouse to the USB outputs of the KVM switcher.
- ❖ Connect the first USB input of the KVM to a USB port on the main workstation.
- ❖ Connect the second USB input of the KVM to a USB port on the secondary workstation.

Now when the KVM is switched to the secondary workstation, the keyboard and mouse will be directed to that computer.

RS-232 Connections

Using DB9 cabling, connect the RS-232 output of the Nuage Master unit to the RS-232 input of the KVM switch. Also connect the RS-232 output of the Nuage fader unit to the RS-232 input of the video switcher. This allows the Nuage hardware units to operate the KVM and video switchers, making workstation switching happen with the touch of a button.

Video Splitter

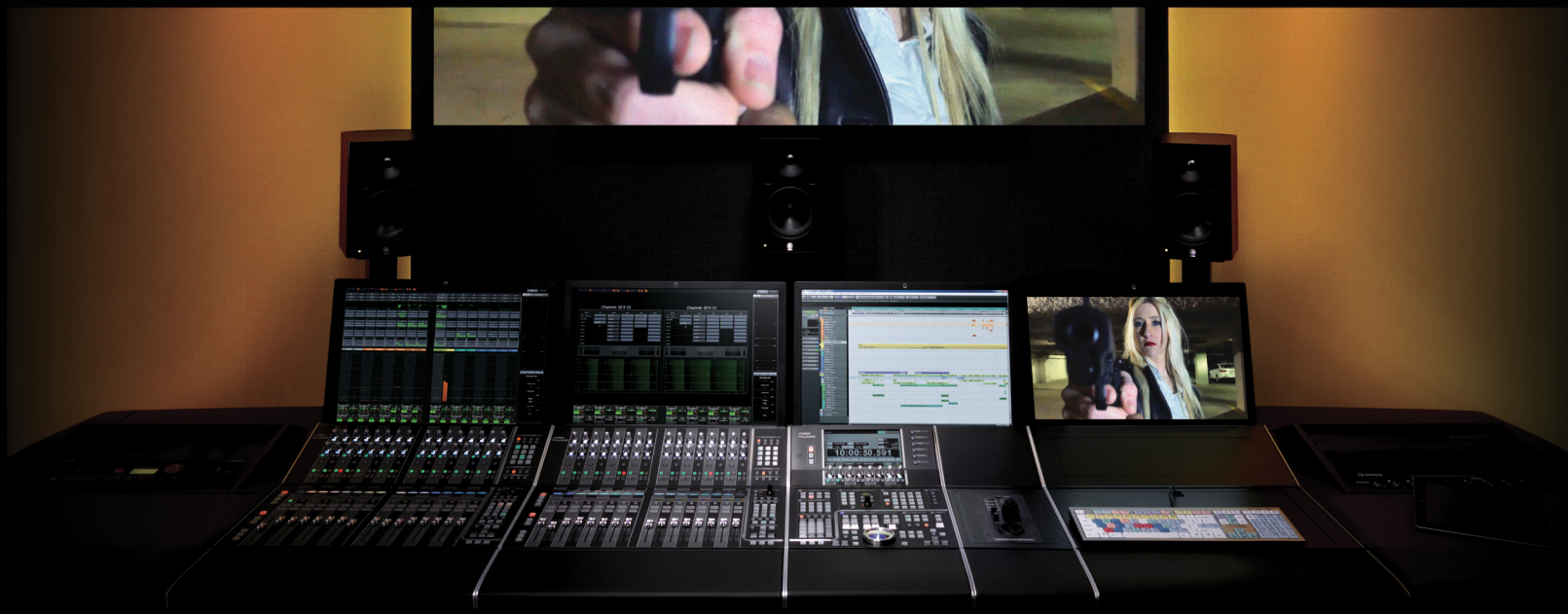
The use of a video splitter facilitates the display of the main screen (the one for the Master unit) on any other display monitor in the Nuage system. By splitting the main display signal and routing it to other inputs of the video switcher, the secondary display can also show the main screen. The permutations of these configurations are specific to the needs of each facility.

The Nuage Workgroup Manager is designed to manage how the KVM and video switchers are controlled. This depends on the specific configuration. For the purposes here, this will be limited to a primary and secondary workstation.

Now that all the connections have been made, its time to install and configure the software.

NUAGE

COURSEWARE



PART I: SETTING UP

by Ashley Shepherd

Chapter 3

Software Installation



NUAGE

Software Installation

- ❖ Install Nuendo (or Cubase)
- ❖ Install Tools for Nuage
- ❖ Dante Network
- ❖ Install Dante Virtual Soundcard (DVS)
- ❖ After Configuration
- ❖ Yamaha Nuage Installation Guides

The Nuage system requires several pieces of software in order to run:

- ❖ Nuendo (or Cubase) 6 or later
- ❖ Tools for Nuage (The Workgroup Manager and drivers)
- ❖ Dante Controller (for administering the Dante network)
- ❖ Dante PCIe accelerator driver (installed with the hardware)
- ❖ Apple QuickTime (for video playback)
- ❖ Dante Virtual Soundcard (for laptops and other computers on the Dante network)

Beyond that, there may be third-party plug-ins that have to be installed, virtual instruments (VSTi), DSP accelerators, MIDI interfaces, or other hardware drivers. Save these for later, after the system is up and running.

Install Nuendo (or Cubase)

To install Nuendo, simply follow the instructions that come with the installer package or DVDs. If you are installing the student version of either Nuendo or Cubase, the process is still the same. You may also need a USB-eLicensor to operate the software once installed. Please follow the instructions that came with your installer package.

32-bit and 64-bit Versions of Nuendo

You may have the choice of installing the 32-bit or 64-bit version of Nuendo. There are only some situations where the 32-bit version is necessary. The operating system, drivers, and plug-ins all need to be 64-bit in order to work together. With a new system and up-to-date software, there should be no need to work in 32-bit.



Figure 3.1 Nuendo 7 Installer Package

The 64-bit version of Nuendo is capable of addressing much more memory than the 32-bit version. This is very helpful to those who use large VSTi sample libraries. Many sample-based VSTi's pre-load portions of their sample data into memory for faster access. This eats up memory. Having 64-bit access to memory solves this problem by giving you access to a much larger amount of memory (RAM).

Also, users in the feature film post-production world can have projects in excess of 400 tracks. Add to that external control surface usage and a pile of editing and you can chew through memory fast. This type of use will also benefit from the 64-bit version of Nuendo.

32-BIT OR 64-BIT?

Understand that the 64-bit version of Nuendo does not sound or operate any differently than the 32-bit version. The only difference is in how much computer memory the application can access. The audio engine uses a 32-bit floating-point audio signal format that should not be confused with 32-bit memory addressing from Windows XP and older versions of OS X (pre-Snow Leopard).

This is also true for other audio hardware and third party plug-ins being used in conjunction with 64-bit Nuendo. The plug-ins and drivers for audio interfaces, PCI cards, and DSP accelerators must also be 64-bit even if the audio they process is 32-bit floating-point.

NEK (Nuendo Expansion Kit)

Nuendo's NEK package installs additional items that are primarily designed for music production. They include additional VSTi's, music notation features, and added MIDI features. While these are intended for music production, they may also find use in a sound design role. For example, the Padshop VSTi is very well suited to creating background ambiences using granular synthesis.

In order to have access to these advanced music production tools, you must install Nuendo and the NEK package separately. Please follow the included instructions with the install package.

Install Tools for Nuage

Tools for Nuage is the software package that installs the Workgroup Manager and drivers for the Nuage control surfaces. Follow the instructions with the latest version of the installer package. It can be found at: http://www.yamahaproaudio.com/global/en/products/daw_systems/nuage/downloads.jsp

There are three tools in the installer:

- ❖ Workgroup Manager (required on primary workstation)
- ❖ Nuage Extension (required on all workstations)
- ❖ PT Bridge (required on workstations using Nuage with Pro Tools)

Nuage Extension and PT Bridge

Each workstation requires either the Nuage Extension or the PT Bridge in order to be part of the Nuage system. The PT Bridge only needs to be installed on computers that are running Pro Tools that you wish to control using Nuage. Nuage can control up to three workstations at once. For example, the main workstation would have Nuendo installed along with the Workgroup Manager and Nuage Extension. A second workstation could have Cubase installed along with the Nuage Extension. A third workstation could have Pro Tools installed along with the PT Bridge. Once each workstation has been configured, all three can be controlled from the Nuage hardware units.

Audio Routing

The hardware control of Nuage is independent of the audio routing. If you are working with multiple workstations, audio routing must be correct in order to hear each workstation in the Control Room of the main Nuendo workstation.

Once the Tools for Nuage package is installed, you should have a new icon in the system tray (Windows) or in the menu bar of OS X as shown in Figure 3.2. This is how you can access the Workgroup Manager.

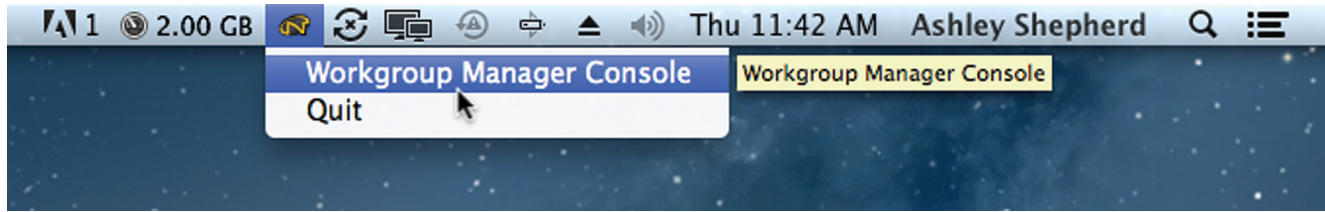


Figure 3.2 Nuage Workgroup Manager icon

Dante Network

The Dante network requires installation of devices, controller software and, optionally, the Dante Virtual Soundcard in computers that have no sound card.

Install Dante Controller

The Dante Controller allows you to configure the Dante network, including clock settings, audio patching, and the naming of devices and pathways in the system. The latest version can be found at: www.audinate.com.

This piece of software can be installed on any computer connected to the same network as the Dante devices. You can control the Dante network from any computer, including one that does not play any audio role in the system. Normally, the Dante Controller would be installed on the main workstation computer for convenience.

Yamaha AIC128-D PCIe Card

The AIC128-D PCIe card is a high-performance, low-latency Dante sound card for the workstation, providing 128 channels in and 128 channels out to the computer. Install the appropriate driver for the operating system of the main workstation (Windows or OS X).

Install Dante Virtual Soundcard (DVS)

For laptop users who plan to work within the Dante network, you will need to install Dante Virtual Soundcard driver. This allows for 64 inputs and 64 outputs from the laptop's Gigabit Ethernet connection. The Virtual Soundcard acts like another audio interface in the system. It will be available as another ASIO driver for Nuendo. Visit www.audinate.com to get the DVS driver software.

When not connected to the Dante network, you will be able to switch back to the built-in audio of the laptop to work using headphones or other speakers. You can quickly switch to the Dante Virtual Soundcard when connected back to the Dante network in order to hear your workstation in the Nuage system.

DANTE AND PRO TOOLS

Dante Virtual Soundcard is compatible with Pro Tools (non-HD). If you are running a workstation with Pro Tools and the PT Bridge in Nuage, you can use the Dante network to route audio signals from Pro Tools into the main Nuendo workstation via the Control Room or to audio tracks within the Nuendo Project. For Pro Tools HD, you must connect the Avid interfaces to the Nuage I/O in order to monitor the Pro Tools system in Nuage.

Now you are ready to configure the Nuage system. There might be other pieces of software such as third-party plug-ins and additional drivers that you desire but it is recommended that you first configure the whole system and ensure that everything is working properly at this stage before adding more software. This is a perfect time to back up the entire system.

After Configuration

Once Nuage has been initially configured, you can continue to add plug-ins and other hardware drivers to the system as your needs require. Before doing this you should back up the system. This ensures that if there is a problem with any additional driver, you can always revert back to this stage.

Install Hardware Drivers

Install all the hardware devices that you will use in your system. This includes MIDI interfaces, video cards, USB keyboards/controllers, DSP accelerators (UAD, Waves SoundGrid, etc.) This step includes installing drivers for video cards, especially HD video cards used for dedicated video playback such as a Blackmagic Design DeckLink.

INSTALL MOTHERBOARD DRIVERS FIRST

For Windows users, the latest motherboard drivers should be installed first, as these affect the basic performance of the computer and need to be in place before installing any other drivers.

Install Third Party Plug-ins

Now you should install any third-party plug-ins you know to be stable and that you plan to use often. Refrain from installing any demos or unknown plug-ins at this stage so that you can establish a very stable system to start out with. Once you have confirmed that the system is stable and created a backup, then you can experiment with demos of new plug-ins and ones by lesser-known creators.

Back up your system yet again.

DATA SECURITY

The creation of these incremental system backups is useful when the computer is being used only for audio work. If you revert to a previously backed up system image, all other data will be lost. If you have email, photos or any other data on your system drive, they will be removed if you revert to a previous backup disk image.

It is advisable to keep all other files on a separate drive so that the system drive can be wiped without any critical loss of data. In a professional environment, down time due to technical issues costs money and that is why the DAW computer should really be a dedicated system that does not perform any other duties.

Yamaha Nuage Installation Guides

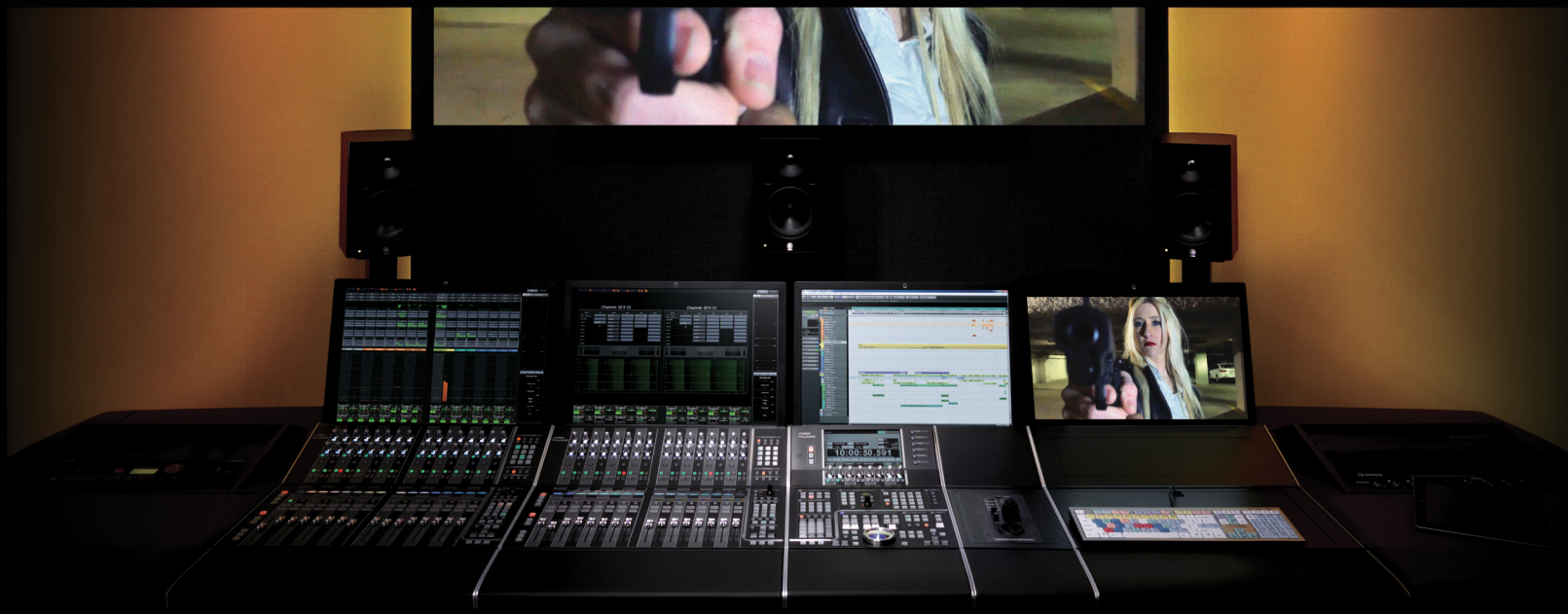
Yamaha provides additional installation guides online at:

http://www.yamahaproaudio.com/global/en/products/daw_systems/nuage/downloads.jsp

Look at the bottom of the page for the installation guides. These guides have up-to-date information on the latest versions of drivers and installation packages. Refer to them for more details.

NUAGE

COURSEWARE



PART I: SETTING UP

by Ashley Shepherd

Chapter 4

Software Configuration



NUAGE

Software Configuration

- ❖ eLicenser Control Center (eLCC)
- ❖ Nuendo First Launch
- ❖ Nuendo Basic Configuration
- ❖ VST Connections
- ❖ MIDI Connections

Since the Nuage system uses several pieces of software working together, each piece requires basic settings in order to operate. Let's begin configuring the pieces of software to work together properly.

eLicenser Control Center (eLCC)

The first thing to do is to ensure that we have the proper license for Nuendo. The eLicenser Control Center or eLCC application was installed during the Nuendo installation process. Open it now. Nuendo and Cubase both use a USB dongle to authorize the program. The eLicenser Control Center application manages the licenses that are contained in the dongle.

Synchronization and Maintenance

The first thing that pops up is the online synchronization and maintenance window. Click to perform maintenance tasks as this will update eLCC with all the latest information about license codes and usage periods for your license. If you haven't done so already, insert the license dongle into an available USB port on the workstation computer. It will be detected by eLCC and the available licenses will be displayed.

Add License Code

From the Actions menu, choose Enter Activation Code and enter your 16-character activation code that came with the installation package. Once you enter this code, eLCC will activate the license on your dongle. Now you will be able to open Nuendo.

Validate Usage Periods

If you are using a time-limited license, you will need to validate the usage period before the license will work. Choose this option from the Actions menu. Once the usage period has been verified, you can then start the usage period to begin using your license.

If you have any other licenses that operate with the eLicenser dongle, you may enter them now to have them ready.

Nuendo First Launch

When you launch Nuendo for the first time you will see the splash screen go through the list of plug-ins and other components including the Nuage extension.

You might be asked what audio driver to use. Choose the Dante Accelerator card. On a laptop, there might not be any choice at all and this pop-up will be skipped. That's all you need to do for now.



Figure 4.1
Nuendo 7
Launch screen

Nuage Workgroup Manager Configuration

Now that you've launched Nuendo, it's possible to configure your Nuage Workgroup.

From the system tray or menu bar, open the Nuage Workgroup Manager Console. The interface consists of an upper window (Workgroup) and a lower window (Device/DAW List), a few menu items and two arrow buttons in the middle. The upper window should be empty at this point. This is where you will build your workgroup.

The lower window should be populated with all the devices in the network that are available as elements of a Nuage workgroup. In our example, there should be the following:

- ❖ Nuage Fader
- ❖ Nuage Master
- ❖ Nuendo DAW
- ❖ Nuage I/O 16A

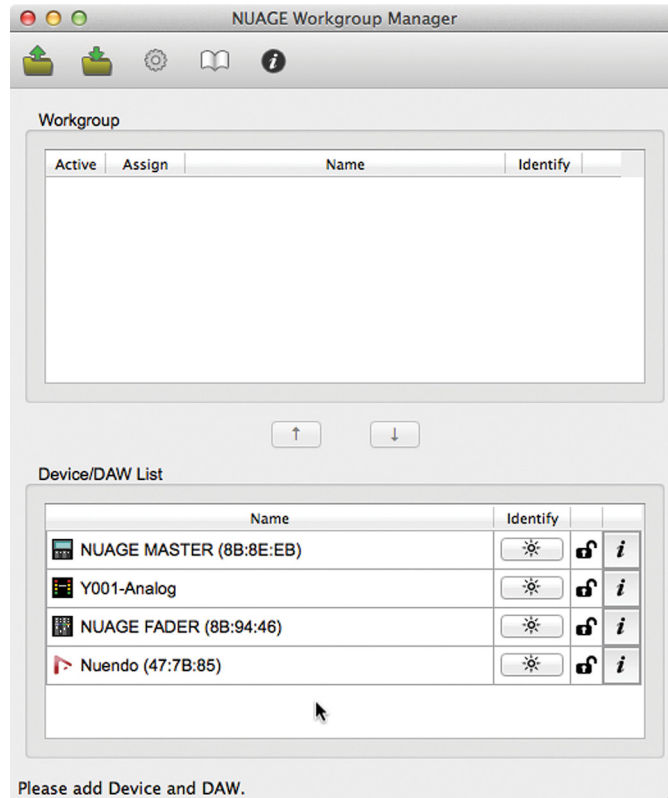


Figure 4.2
The Nuage
Workgroup
Manager

There can be many Nuage-compatible hardware devices and DAWs on the same physical Ethernet network. It's possible to have multiple Nuage workgroups also contained on that same physical Ethernet network. The Workgroup Manager console allows you to choose just the devices you need for your Nuage system and add them to your workgroup.

Other users in the network can create additional workgroups that will not interfere with yours. Any multi-room studio facility will find this capability valuable, allowing studios to share equipment, such as audio interfaces and even DAW workstations, between multiple rooms without physically moving the equipment itself.

Identifying Components

The Workgroup Manager Console can identify components in the system by flashing lights on the hardware units. Simply press the Identify button for the corresponding component to initiate flashing lights.

When there is more than one audio interface or fader unit, unique identification is necessary. Fader units, DAWs and audio interfaces are listed in a specific order within Nuage. This is necessary for their channel order to be presented to you in the proper sequence in Nuendo.

Add Components to the Workgroup

In order to add a component to the workgroup, select it in the Device/DAW List and then press the up arrow. Now the component will appear in the workgroup window. Continue adding components until your workgroup is complete.

ADD FADER UNITS IN ORDER

Fader units need to be added in the order that they are placed physically in the studio from left to right. This ensures that the channel layout from Nuendo will be displayed properly from left to right across all the fader units in your workgroup. The first fader unit added to the workgroup should be the leftmost unit physically.

Once your workgroup is complete, you may save the configuration using the Save folder icon in the upper left. You can also load a preset configuration in the same manner.

Firmware Updates

From time to time it may be necessary to update the firmware of devices in your workgroup. The Fader units, Master unit, and audio interfaces all have updatable firmware.

Pressing the 'i' button for any device will open the properties window shown in Figure 4.3. The properties window will display the name, version number, and MAC address for the selected device.

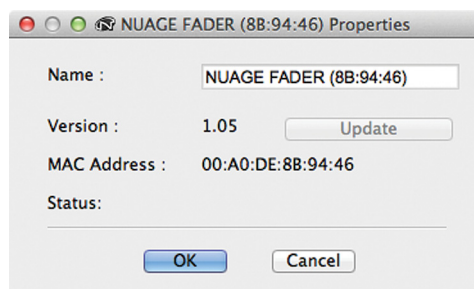


Figure 4.3
Nuage Fader
unit Properties

In order to update the firmware, press Update. You will then be prompted to find the firmware file for this device. Once it is located, you can execute the firmware update process. During the update, ensure that power is not interrupted for either the workstation or the device itself! This can cause permanent damage to the device.

Naming Devices

While you have the properties window open, you may create a custom name for that device so it is more easily identifiable within your network. Simply alter the name in the name field and press OK to rename the device.

Audio Interface Calibration

When you open the properties window for an audio interface, you will be presented with more options. These include analog level calibrations for all inputs and outputs. This will allow you to precisely calibrate the analog levels of your interface to the electrical requirements of your other studio equipment.

External Word Clock Sources

The audio interfaces are capable of utilizing external word clock source from the BNC connector on the rear. By default, the work clock source is set to Dante. You may choose BNC in from the pull-down menu to switch to an external work clock.

Workgroups Sharing a Single Dante Network

Understand that the workgroup and Dante networks are separate but related systems. Several devices may be together on the Dante audio network, but in separate Nuage workgroups as seen in Figure 4.4. This could be the case in a multi-room facility with shared Nuage devices.

Any audio interface on the Dante network must use the same master clock setting. For example, if two studios are sharing audio interfaces on the same Dante network, they must also run at the same sampling frequency, 44.1, 48, etc. If they need to be independent, then the Ethernet networks must be separated physically or logically by VLAN.

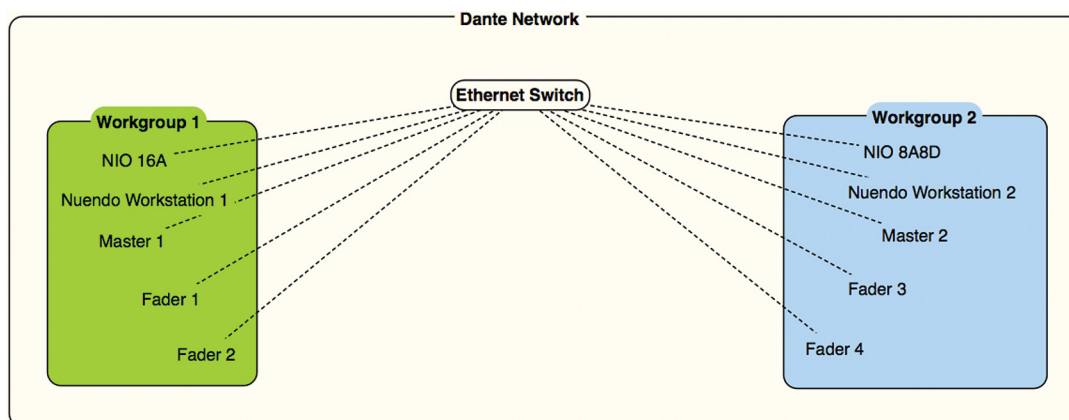


Figure 4.4

Two workgroups sharing a single Dante network

If they can use the same master clock setting, then it is easy to share devices between workgroups. The A studio could be using the first audio interface and the B studio could be using the second. They could even split channels of the same audio interface between them as Dante allows for single channel routings.

A good example of this would be in a live event scenario where Dante devices are being shared between the FOH and monitor consoles while Nuage is recording the event and creating broadcast feeds as shown in Figure 4.5. The stage audio interfaces must be shared by the consoles and Nuage. This is possible even if the audio interfaces are not part of the Nuage workgroup.

One thing to note here is that equipment that is on the same Dante audio network as the Nuage system will not necessarily be able to be part of a Nuage workgroup. In this example, the Rio3224-D will be used as an audio source for Nuage but will not be part of the Nuage workgroup.

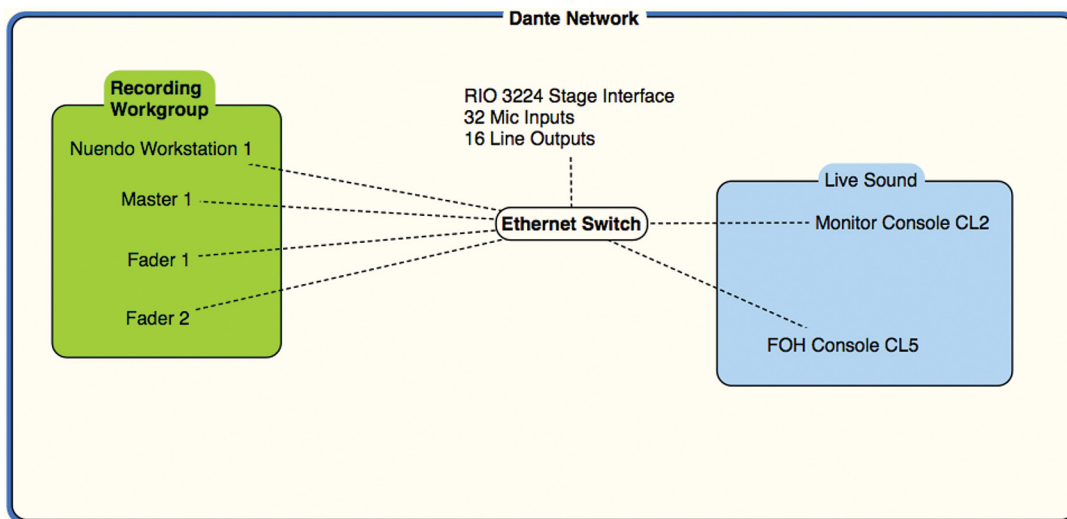


Figure 4.5
Live Event network diagram

Dante Network Configuration

This leads us to the Dante network configuration. The Dante Controller is the piece of software that allows you to change all the routings and clock settings for all the devices in your Dante network. When you first launch the Dante Controller, all of the Dante enabled devices in the Ethernet network (or VLAN) will be discovered and listed in the network view.

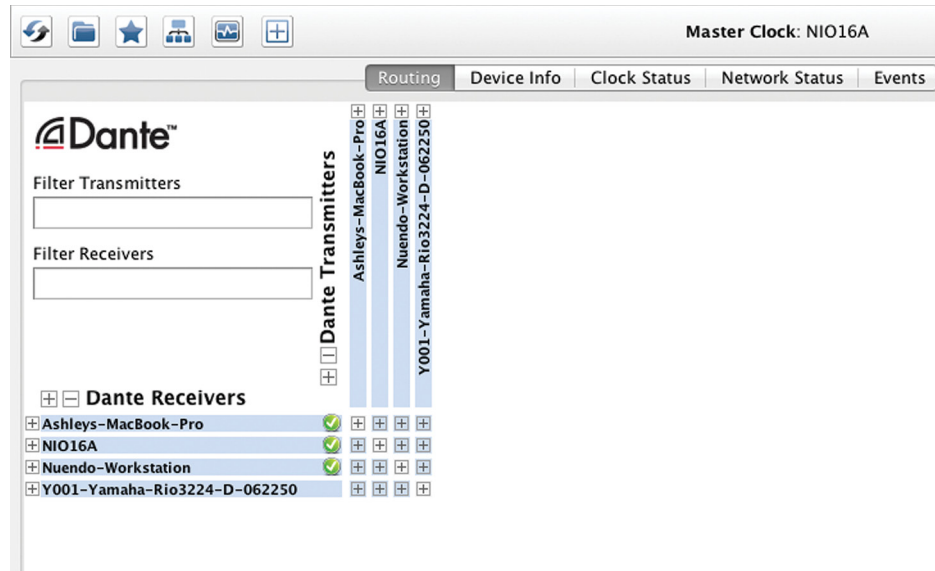


Figure 4.6
Dante
Controller
Routing View

By default, you are shown the routing tab shown in Figure 4.6. Here you will be able to see all of the audio connections between various devices and alter, delete, or add them as necessary. In this example, I have a Nuendo workstation, Nuage I/O 16A interface, Rio3224-D, and my laptop with the Dante Virtual Soundcard driver.

Along the top row you see the Dante transmitters. These can be considered audio outputs from each device. Along the left column, you see Dante receivers, which can be considered audio inputs to the various devices. In order to view the individual connections, open one of the tabs by clicking a plus (+) sign. Doing so will reveal the individual connections for that device.

In Figure 4.7 you can see the transmitter tab for the Nuendo workstation has been opened up along with the receiver tab for the Nuage I/O 16A. The Nuendo workstation transmitters will eventually be connected to the first eight receivers of the I/O. These connections will be used to feed audio to the speaker systems in the studio. But first, before we connect any audio channels, we need to ensure that the audio clock settings are correct.

Dante Clocking

It's imperative in any digital audio system to have one clock source that determines the speed at which samples of audio are played and recorded. This is commonly referred to as the word clock. In Dante, the word clock is transmitted over the same Ethernet connections as audio signals.

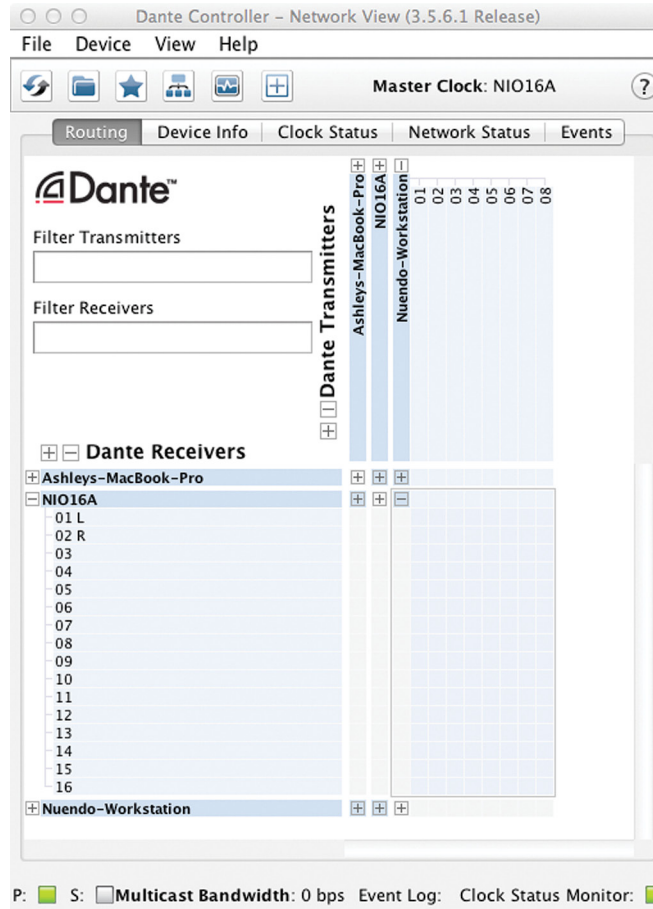


Figure 4.7
Dante with the Nuendo Workstation and NIO opened up

This makes it very convenient when connecting multiple devices together. There’s no need for additional cabling in order to ensure proper clock. You must, however, choose a device to be the master clock source for the entire Dante system. This is done in the Dante Controller software under the clock status tab.

The clock status tab shown in Figure 4.8 displays information relating to clock sources, primary and secondary networks, preferred devices, and external clocks. To begin with, there are several status indicators that should be green if the system is working correctly.

In the lower left corner, there are two indicators for the primary and secondary networks. Dante can have two independent physical networks for redundancy. If the primary network should fail, the secondary will take over at the next sample to prevent any interruption of the audio. This fail-safe is a must for live events where audio interruptions are unacceptable. In our example, there is only one network.

For each device in the system, there is a sync indicator to show that it is receiving proper clock. Then the clock source is shown, which in most cases should be Dante. Sometimes

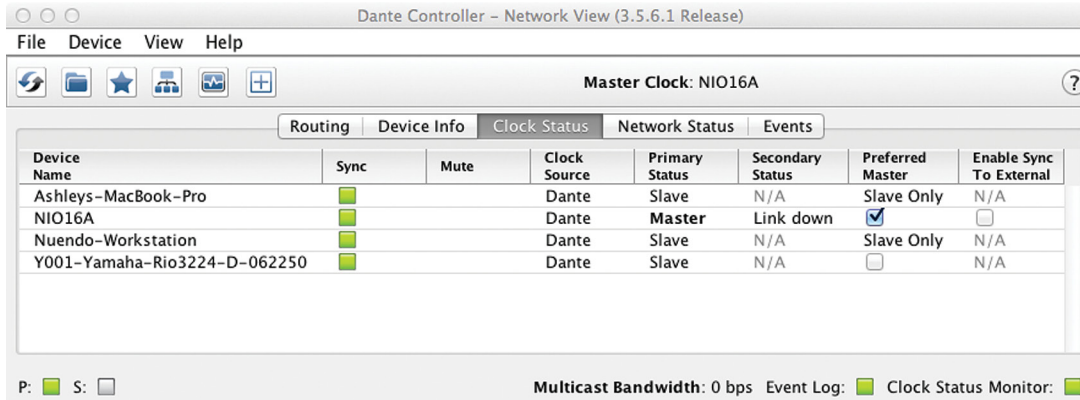


Figure 4.8
Clock Status
Tab

devices may need to use an external word clock source to integrate with other systems. If this is the case, the device using external work clock should be the Master in the Dante network. That way, all clocks in the system are following the external clock.

The Primary Status shows which unit is the Master and which units are the Slaves. If you are using the Secondary network, similar status indications will be shown.

The Preferred Master checkbox should be the device most central to your system's functioning. In other words, the Master clock device should be a unit that is never disconnected from the system and has a primary function, such as the main AD/DA converter you are using. In this example, the Nuage I/O 16A is the Preferred Master.

In a live event situation, a Rio stage interface or FOH console might make the ideal master unit. For studio applications, the primary AD/DA should be the preferred master. Once a master has been set, ensure that all devices are running at the same sample rate in order to make audio connections between them.

Changing Sample Rates

In order to change sample rates for the Dante network, all devices must be set to the new sample rate. This can be done using the Device Info tab in Dante Controller shown in Figure 4.9.

Double-click on the line of the primary clock device to open the Device View. Here you will find more specific information for that particular device, including configuration settings in the Device Config tab shown in Figure 4.10. Click the Device Config tab.

In the second block, you can alter the sample rate for this device. Choose the new sample rate from the drop down menu to change the setting for that device. You will get the warning dialog that the connection will be interrupted. This must be repeated for each device in the

Dante network. If a device is set to run at a different sample rate than the others, connections to that device will not work.

For more in-depth information on clocking in Dante, refer to Audinate’s support documents. There is a great deal of information available on this subject.

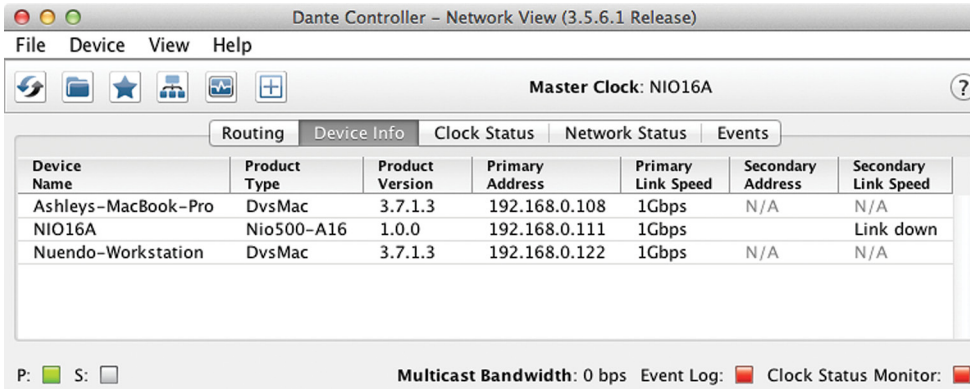


Figure 4.9
Device Info Tab

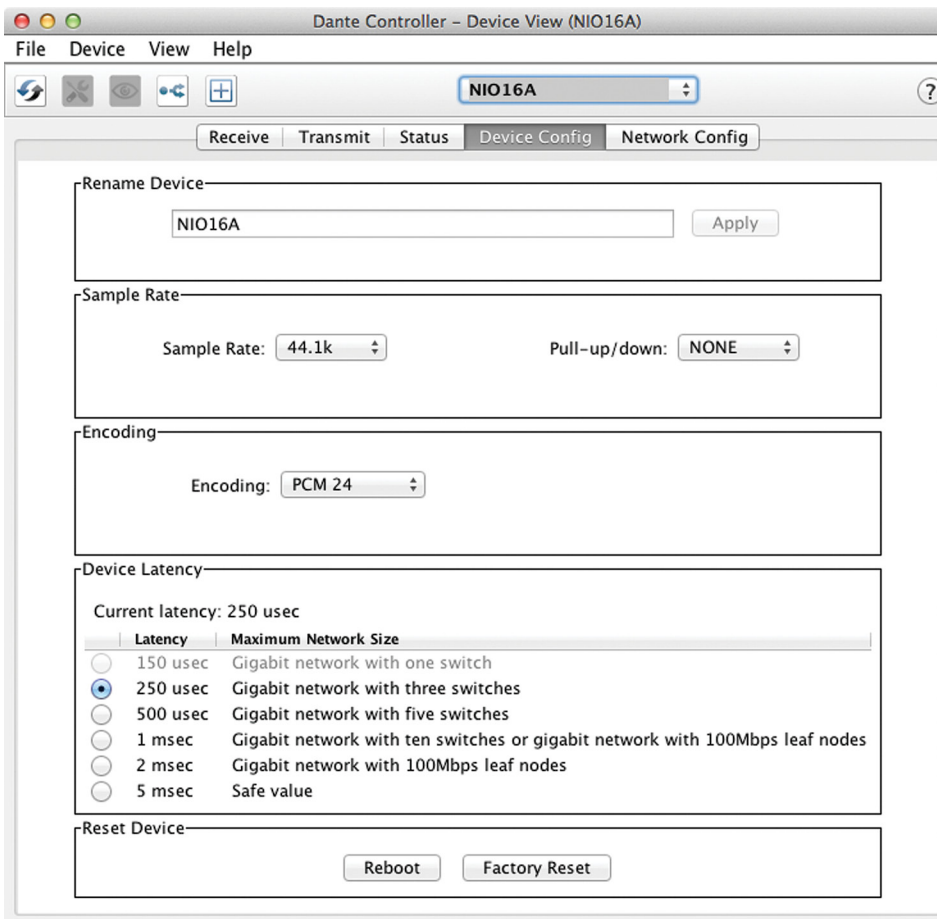


Figure 4.10
Device Config
Tab for Nuage
I/O 16A

Channel Routing (Subscriptions)

Dante uses the term *subscription* to indicate channel routing. Basically, when a receiver is subscribed to a transmitter, it will receive all the audio that comes from that transmitter. In the routing tab, you can make these connections, or subscriptions, simply by clicking in the box where the transmitter column meets the receive row. Icons will appear indicating the progress of connection until the green check is present, telling you the audio connection is working.

You can make these connections one-by-one in any fashion you choose. It is also possible to connect more than one receiver to the same transmitter (multiple subscribers). For example,

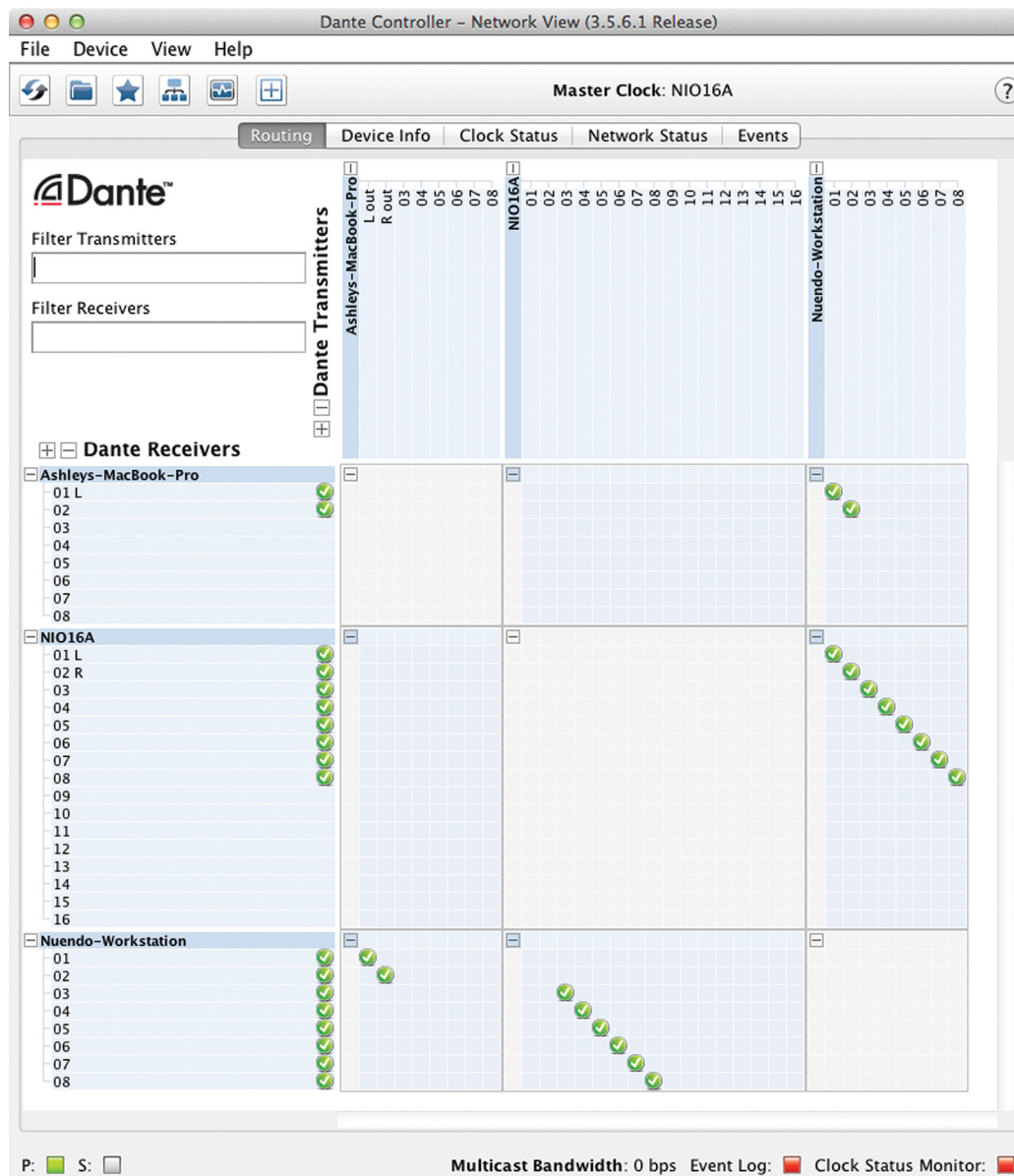


Figure 4.11
Audio routing
in Dante

the first channel on the Rio stage box could be routed to multiple destinations such as the FOH console, monitor console, and a Nuendo workstation for recording.

This system offers a great deal of flexibility. You can create a complex network of audio connections that would be very expensive and difficult to do with analog systems; think “patch-bay on steroids.”

Multiple Routings at Once

With large channel counts and multiple interfaces, assigning channels one-by-one can get tedious. There is one shortcut to routing many channels at once. When you hover the mouse over the [-] indicator at the intersection of two devices, the diagonal row of possible connections will highlight. By holding down the Control key and clicking on the [-], all possible channels will be routed at once as shown in Figure 4.12.

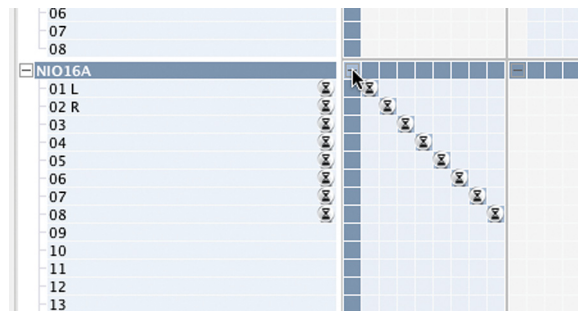


Figure 4.12
Diagonal routing of multiple channels at once

Studio Planning

Now is a good time to consider the configuration of your studio. How many input channels will you use? How many speakers, headphones and other outputs will you need? What about a talkback microphone? Is there a second audio workstation in the studio? We will get into the details when configuring Nuendo, but channel routing in Dante is all part of that same process.

For our example, the following is a list of inputs and outputs to the system:

Inputs

- ❖ Talkback microphone
- ❖ 4-channel microphone preamp
- ❖ iPod input
- ❖ Laptop workstation input, stereo (over Dante)

Outputs

- ❖ 5.1 Surround speaker system
- ❖ Stereo nearfield speakers
- ❖ 1 headphone cue (for talent in the studio)
- ❖ Control room headphone output

For now, we are going to connect the first sixteen outputs (transmitters) from the Nuendo workstation to the sixteen inputs (receivers) of the Nuage I/O 16A as shown in Figure 4.13 in order to connect the two speaker systems to Nuendo's Control Room. Then we will connect the sixteen transmitters from the Nuage I/O 16A to the first sixteen receivers of the Nuendo workstation.

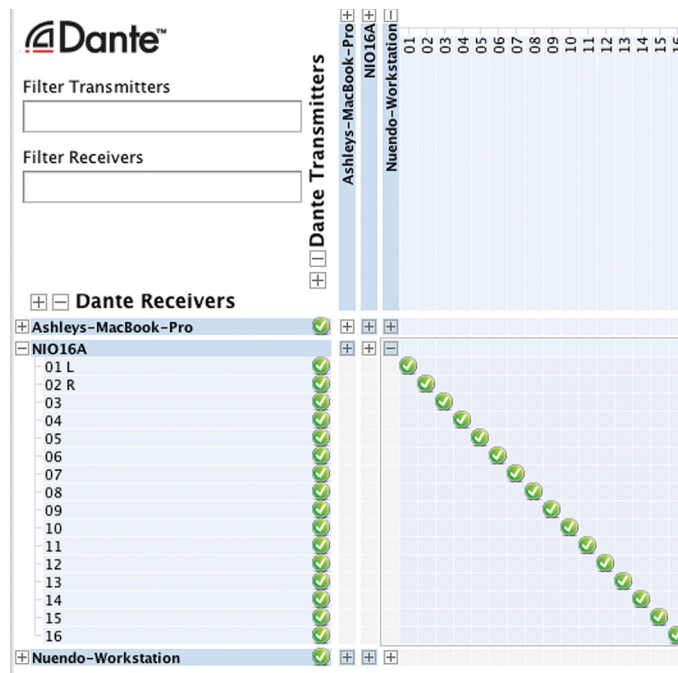


Figure 4.13
Routing 16
workstation
outputs to the
NI/O 16A

Nuendo Basic Configuration

When you launch Nuendo for the first time, you will see the progress as Nuendo goes through any third-party plug-ins, registering them to the system. When that process is completed, you will see the Steinberg Hub shown in Figure 4.14. You may choose to open any recently opened projects, create a new project, or open another saved project. This dialog is optional and can be disabled in Preferences>General, found under the Nuendo menu in OS X or under the File menu in Windows.

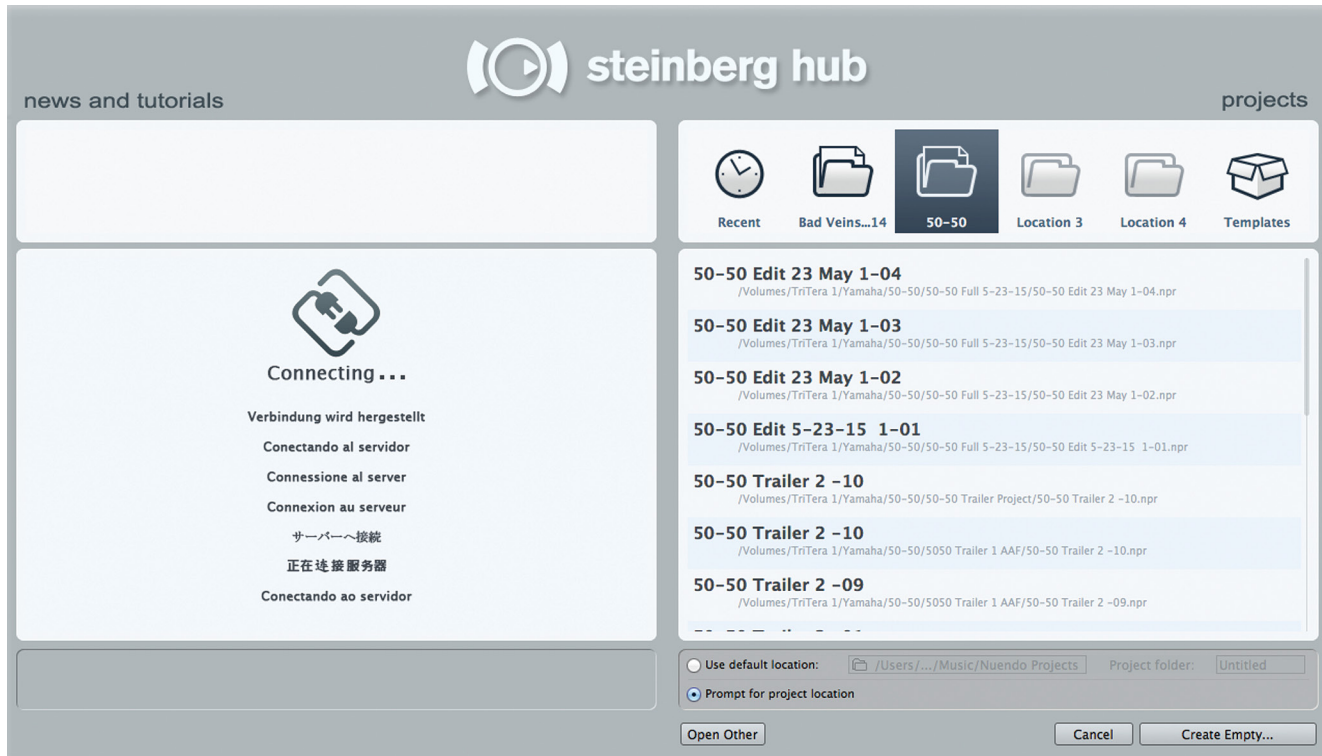


Figure 4.14 Steinberg Hub

For now, cancel this dialog. It is not necessary for a project to be open in Nuendo for the application to be running. You can still configure the software in this state. When Nuendo is running without a project loaded, there will not be much to see on the screen except the transport controls and the menus above.

VST Audio System

The first and most important setting is the ASIO driver for the VST Audio System. This determines which audio interface connected to your system Nuendo will use. To access the VST Audio System settings choose Devices>Device Setup>VST Audio System.

The top menu allows you to choose the ASIO driver for the audio interface you wish to use with Nuendo. Nuendo can use just about any audio hardware driver, even the built-in audio devices for laptops if needed for offline editing or mobile use. However, for best performance in Nuage, we will use the Dante Accelerator PCIe card as shown in Figure 4.15.

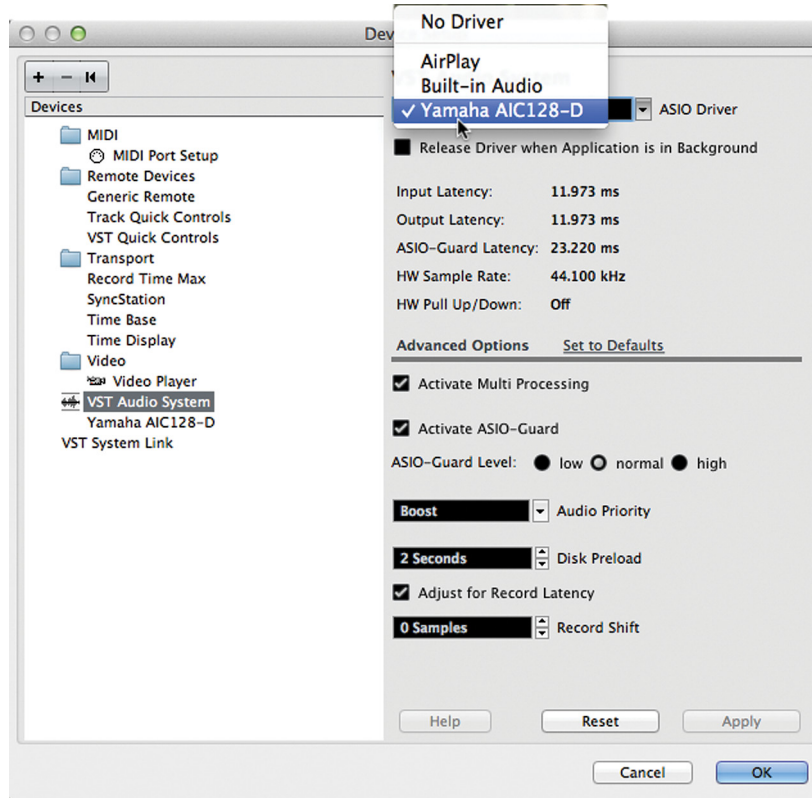


Figure 4.15
VST Audio
System Settings
selecting the
Yamaha
AIC128-D ASIO
Driver

Release Driver in Background

This option makes Nuendo release control over the ASIO driver when the application is not active (hidden or minimized). If you tend to switch between several applications that use the audio driver (Final Cut Pro and Nuendo for example) as a part of your workflow, you can check this box. Understand that this could potentially make the system unstable if the other applications do not handle the ASIO driver well. Constant switching between various applications using the same ASIO driver may cause the audio card to switch sample rates and other settings resulting in clicks and pops in the audio outputs. Use this setting only if you absolutely need this in your workflow.

Advanced Options

These options affect how the system interacts with the ASIO driver. The default settings should work in most cases. If you experience problems with audio playback, changes may be made here to help. Refer to the manual for specific information.

ASIO-Guard

ASIO-Guard is a function to provide better performance when using lower buffer settings for the audio driver. When the buffer is set to 512 or less samples, ASIO-Guard will improve the performance of the system, allowing more plug-ins and instruments to be used without drop-outs, click, or pops. The default setting (normal) should be sufficient for most purposes.

ASIO Driver Settings

In Device Setup>VST Audio Settings, there will be an option right below this that contains all the specific ASIO driver settings for your particular audio device (in this case the Dante Accelerator seen in Figure 4.16). These vary by manufacturer and device but for the most part, contain controls for clocking and direct monitoring options. To access more specific controls for each device such as buffer settings, press the Control Panel button found at the top.

Remember, for Dante all clock settings must be made from Dante Controller. Changing the sample rate from within Nuendo will not work. It must be changed for every device in the Dante network.

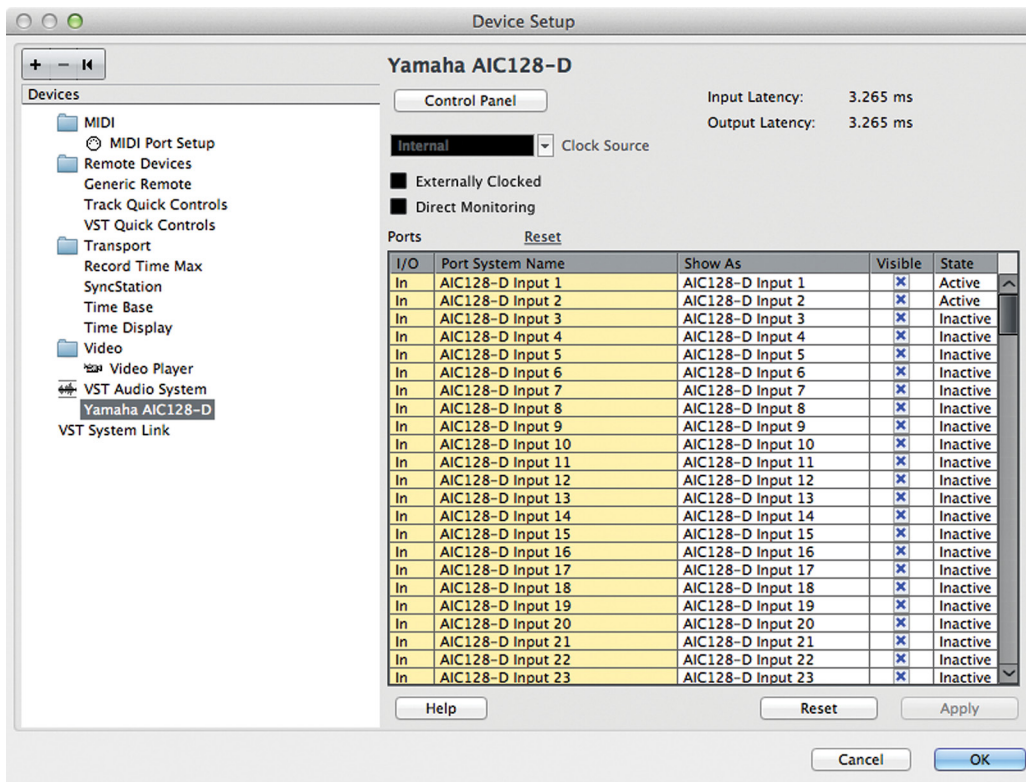


Figure 4.16
ASIO Device
Settings for the
Dante
Accelerator

ASIO Port Naming

In the lower portion of this dialog, each input and output of your audio device will be listed in the table. Here you can rename each port to more effective names and also make inputs and output active or not. The Port System Name is the name the device gives to the operating system. This cannot be changed. However, Nuendo allows you to create a new name that will be shown inside the application. This name can be more appropriate for your studio setup than the system name, making it easier to set up input and output connections later.

By clicking in the “Shown As” field, you can enter a name for that input or output that will be seen whenever that port is being used by a VST channel in Nuendo. Take the time now to name each input and output of your device to something that will make sense later when configuring VST channels.

CHANNEL NAMING LAYERS

There are several layers of names for various audio channels as they make their way into Nuendo. These layers can be confusing if not handled properly from the very start. Depending on the type of interface you are using, there can be as many as four naming layers involved from the hardware unit all the way to VST channels in the mixer.

For Nuage, there is also the Dante system, adding a fifth layer. Here’s how the naming layers break down:

1. Physical Inputs: Nuage I/O 16A
2. Dante PCIe card channels
3. Port System names: Dante 01
4. “Shown As” names: Analog Input 1-16
5. VST Input names: Preamp 1, Preamp 2, etc.

Just getting from one physical input all the way into the program is a bit confusing at first. These abstraction layers do make things easier in the long run by being very versatile and allowing you to name things logically in the program. It takes few minutes to set up, but it is worth the time.

Buffer Settings

Every audio interface uses a data buffer as part of its operation. This buffer gathers sound data (samples) and when it is full, this data is passed on to its destination. This happens in both directions, sound coming in and sound going out of the interface. The size of this buffer is usually measured in samples. The larger the number, the more samples are collected before the buffer passes this data on. The buffering process causes a delay in the audio signal, commonly referred to as “latency.”

The buffer setting is critical to the performance of the audio interface and for the DAW as a whole. Larger buffer settings ease the load on the host processor in part because data is being handed over less often. With lower buffer settings, data is being handed off quickly, requiring more work by the processor. Therein lies the trade-off:

- ❖ **High buffer settings** = More processing power available, but more overall delay in the system.
- ❖ **Low buffer settings** = Less overall delay or latency but much higher processing loads.

The result is that you might need to change your buffer setting depending on what activity you are performing. If you are recording musicians live but not using very many plug-ins, the lowest buffer setting possible will yield the least delay, allowing the performers to hear themselves correctly.

If you are editing or mixing only, the buffer can be set very high, giving you more processing power for plug-ins, without adversely affecting your workflow. There might be some slight delay between the time you press “play” and when you hear the first sound, but unless this is extreme, it should not affect normal editing or mixing.

Listed below are the standard buffer settings available to most professional interfaces. The delay value is the buffer setting times two, one buffer for each direction through the interface. There could be additional delay depending on the device but these numbers give you the general idea of how buffer settings generate latency. The values listed below apply to the standard 44.1kHz and 48kHz sample rates. Higher sample rates will have smaller latency delays.

- ❖ **32 samples** = 1.4ms. This is not very discernible and the ideal for recording.
- ❖ **64 samples** = 3ms. This is still very good for recording and only moderately noticeable.

- ❖ **128 samples** = 6ms. This is still suitable for recording but the delay is noticeable.
- ❖ **256 samples** = 12ms. The delay is noticeable but can still be used for recording of non-rhythmic sounds.
- ❖ **512 samples** = 23ms. This delay is very noticeable and unusable for recording. Processing power is increased dramatically.
- ❖ **1024 samples** = 56ms. Editing a mixing.
- ❖ **2048 samples** = 93ms. Editing and mixing with many plug-ins.

Buffer settings are accessed via the control panel for the audio interface. By pressing the control panel button in the VST Audio System dialog, you will open the corresponding control panel for the selected interface shown in Figure 4.17.

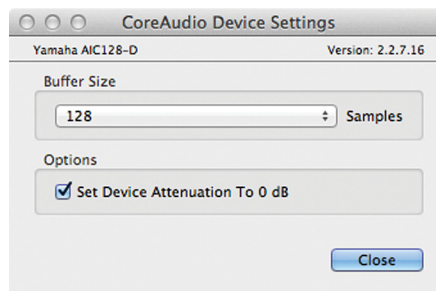


Figure 4.17

Dante
Accelerator
Control Panel
Buffer setting

VST Connections

Open the VST Connections window from the Devices menu (F4). This is where all of the audio connections will be made into and out of Nuendo shown in Figure 4.18. This window maps your audio interface's physical inputs and outputs to Nuendo's virtual inputs and outputs. There are many possibilities here including simple inputs and outputs of Nuendo's mixer but also more complex routings such as external FX inserts, external MIDI instruments, control room monitoring, and headphone channels.

Using a large multi-channel audio interface, many intricate connections can be made. Presets can be made that can be called up in any project. Flexibility in routing, and the quickness with which routing changes can be implemented, are powerful aspects of Nuendo. You can switch from a 5.1 film mixing workstation directly to a multi-track band recording setup in a matter of moments.

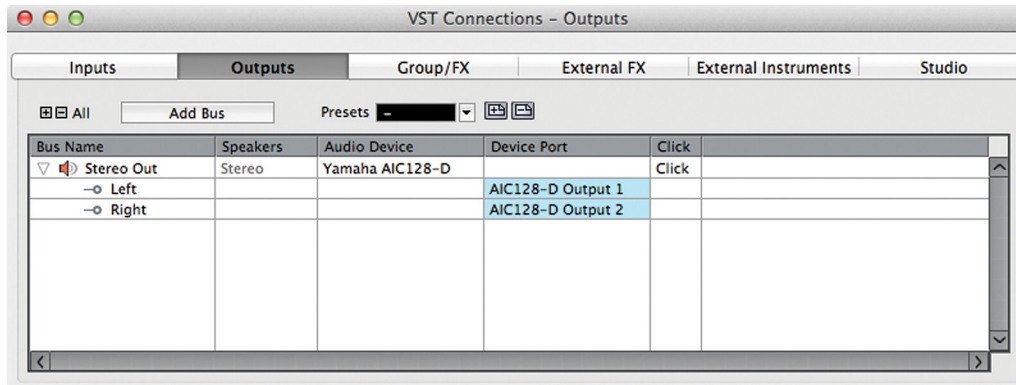


Figure 4.18
VST
Connections
window

VST Inputs

The VST Inputs tab contains the current list of inputs available to Nuendo. By default, a stereo input is created. Understand that this is a virtual layer between your audio interface and the Nuendo application. There can be many inputs created here, more than your interface has or less than the available inputs. The idea is that you only create the number and type of inputs you need for a specific project. There's no need for 56 inputs if you are only recording a voice-over.

Inputs have several attributes:

- ❖ **Channel width** – Each input can have its own channel width starting with mono and continuing with stereo, 5.1, and on up to 13.1 Auro surround.
- ❖ **Sharing of physical inputs** – Inputs can share physical interface inputs as much as you desire. For example, a mono input can use the first channel on your interface while a 5.1 input can use that same interface channel (1) plus 5 more (2-6) to make up a single 5.1 source.
- ❖ **Child buses** - Multi-channel inputs automatically generate mono “child” buses. Each channel of a multi-channel input is available as a mono input within Nuendo. You may also create multi-channel child buses of surround buses. For example, you can create a stereo child bus for a 5.1 surround bus out of the front left and right channels.
- ❖ **“Not Connected”** - Input buses can be set as “Not Connected.” This can happen when a project from a larger system is opened on a system that does not have the physical inputs available to match all the VST Inputs. These input buses can remain in the project and when it is reopened in the larger system, they will connect back to their physical inputs on that system.

Go through your studio and figure out what will be connected to the inputs of your audio interface. This is a highly customizable part of Nuendo and will be different for each studio and setup. In my studio, I name the inputs by the microphone preamp that is normally connected to that input as shown in Figure 4.19. This helps me keep track of what preamp was used on a particular track. If you are using a patch bay, this layout can change every session. You can change the labels of each input used in a project so it will be saved with the project file, preserving your routing information.

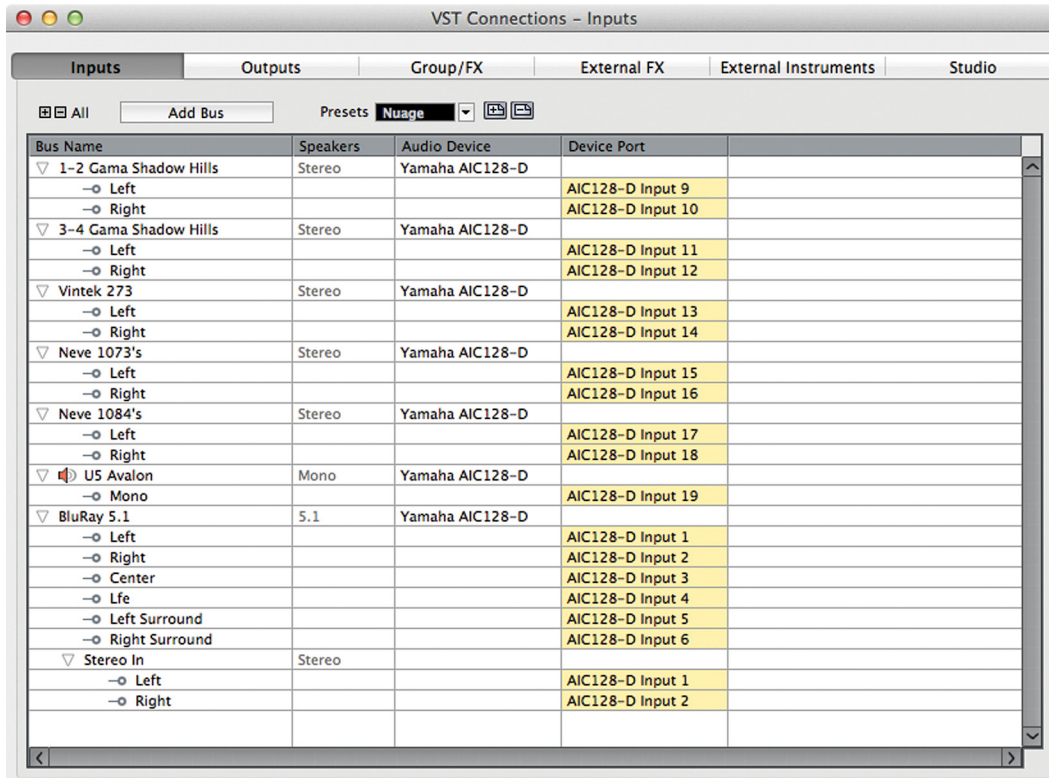


Figure 4.19
Various input buses

In order to create a VST Input, follow these steps:

1. Press the Add Bus button at the top of the window. The Add Input Bus dialog opens shown in Figure 4.20.
2. From the configuration pull-down menu, choose the channel width and format.

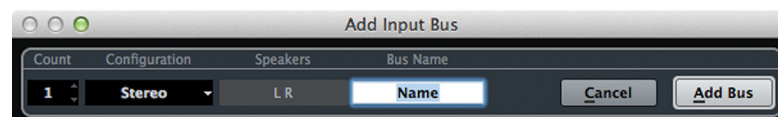


Figure 4.20
The Add Input Bus dialog

3. If you wish to create more than one of the same type of bus, increment the count.
4. Device ports will automatically be assigned to each channel of the bus, usually incrementing up from the last used port. You may change these assignments by clicking on the device port name and choosing another port from the pull-down menu seen in Figure 4.21.
5. Name the input bus, entering it in the Bus Name field. If you are creating more than one bus, a number will be added to create unique names.
6. Continue adding buses until all the inputs you will use have been setup.

ASSIGNING DEVICE PORTS TO MULTIPLE VST CONNECTIONS

You can assign device ports to multiple VST connections at once. To do this, hold shift while selecting multiple connections. Then click and hold Shift while selecting the first device port. Device ports will be assigned incrementally for all selected connections.

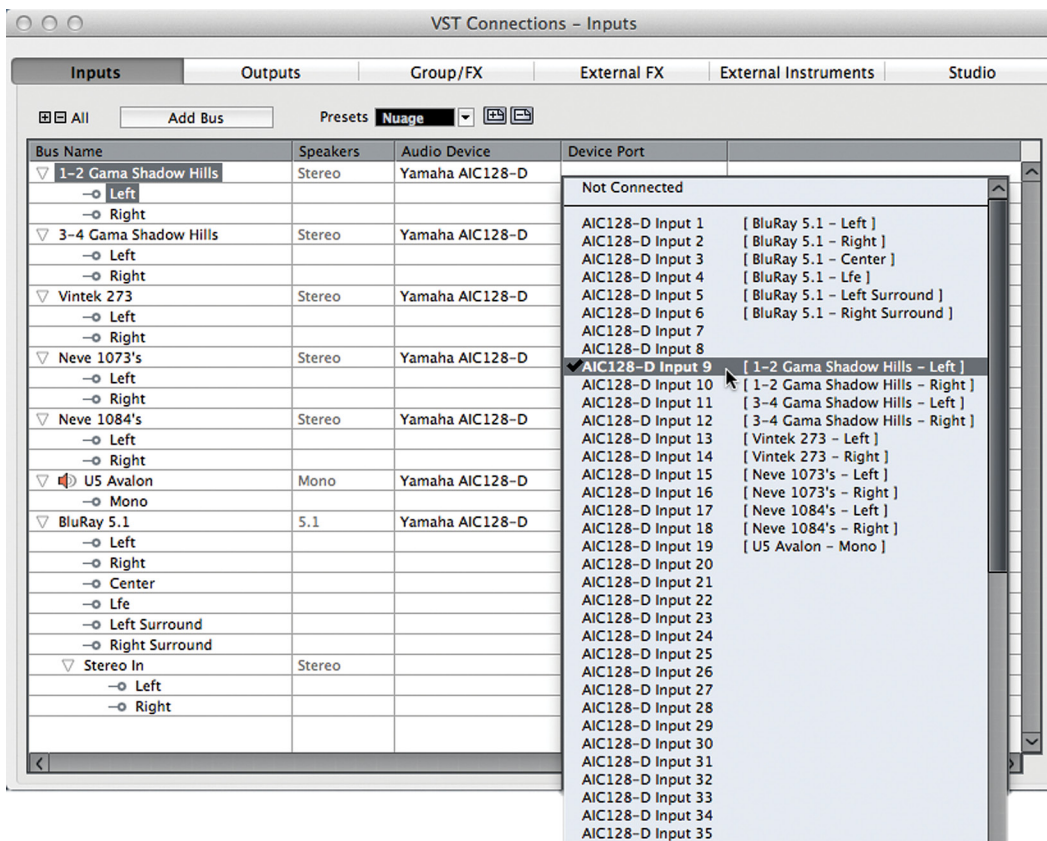


Figure 4.21
Device port assignment pull-down menu

Once a set of inputs has been created and labeled, you can save this as a preset using the preset tools at the top of the window. Creating a preset named “default” will force Nuendo to use that preset when creating a new project as seen in Figure 4.22.

UPDATING PRESETS

By adding a preset and typing in the exact name of an existing preset, you can modify or update that preset with the current settings. This is true for all presets in VST Connections. Having a good set of presets that covers the basic ways you work everyday can save valuable time setting up projects in Nuendo.

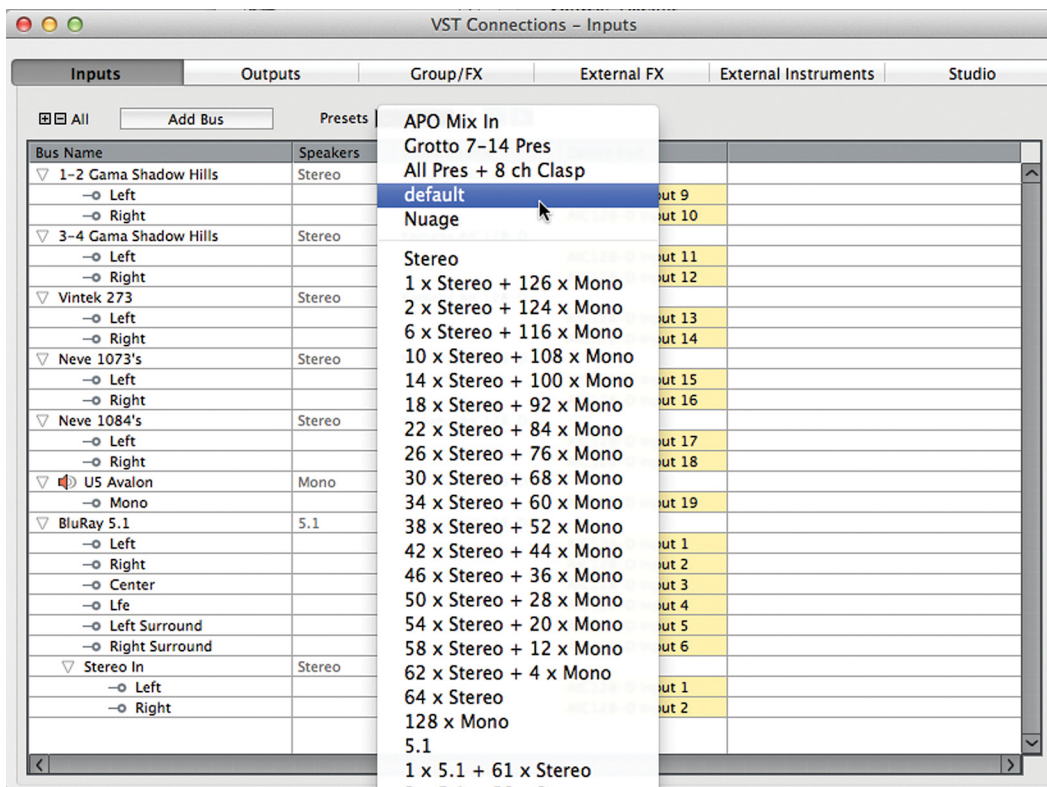


Figure 4.22
VST Input
Presets

VST Outputs

The VST Outputs tab functions in many of the same ways as the inputs tab. You can create output buses in the same fashion, assigning various device ports to the channels in each buss. You can name each bus and save the entire list of output buses as a preset.

For simple stereo projects, only one stereo output bus might be needed. If you use an external analog mixing desk, individual mono output buses can be used to feed each channel of a mixer. For a film dubbing project, multiple surround output buses may be needed to act as stem outputs.

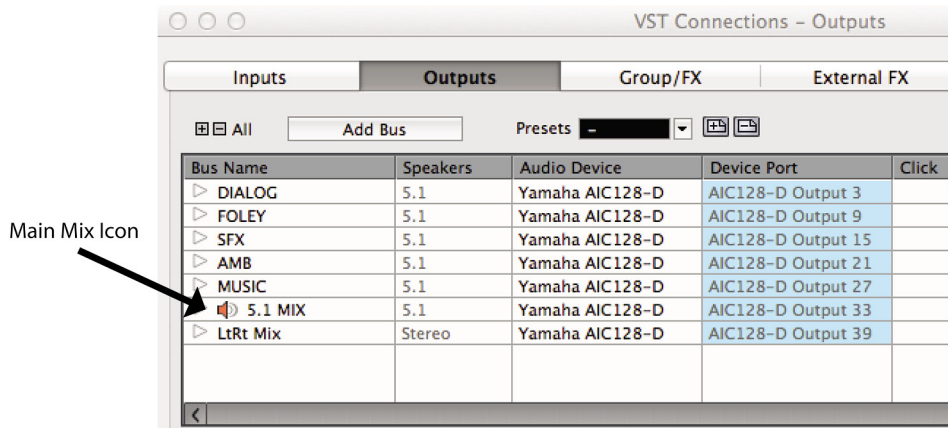


Figure 4.23
Film Dub Preset with Main Mix set to '5.1 MIX'

Each one of these possible scenarios can be saved as a preset and called up whenever it is needed. The presets menu comes populated with various configurations to start. You can modify these to meet your needs and save them as new presets.

Output Child Buses

In complex surround sound mixing, there is a need to have specific types of child buses available for each surround bus. To create specific child buses for an output bus right click (Win) or control+click (Mac) on an output bus's name and choose an option from the Add Child Bus menu shown in Figure 4.24. All possible formats for that size output bus will be displayed for you to choose from.

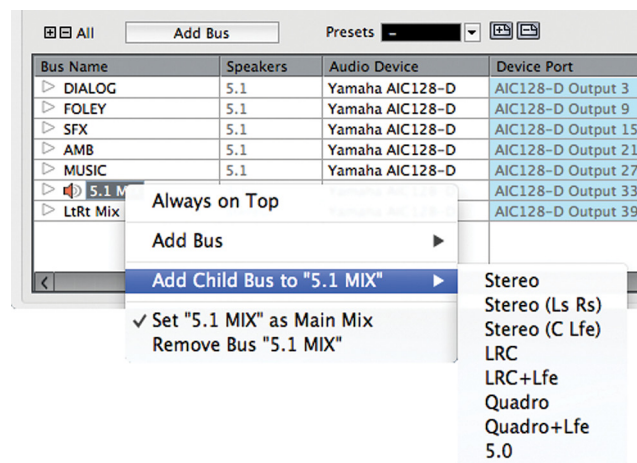


Figure 4.24
Add Child Bus menu

“Main Mix” Designation

If you will notice in Figure 4.23, there is a speaker icon next to the 5.1 MIX output bus. This icon indicates that this bus is the Main Mix. The Main Mix designation has to do with monitoring through Nuendo’s Control Room features, covered later in this chapter. Since Nuendo can have multiple output buses, one of these must be designated the Main Mix for monitoring purposes through the Control Room mixer.

In order to set any output bus as the Main Mix, right click (Win) or control+click (Mac) on the name of the bus to access the contextual menu shown in Figure 4.25. Check the “Set as Main Mix” option and notice the speaker icon next to the bus name.

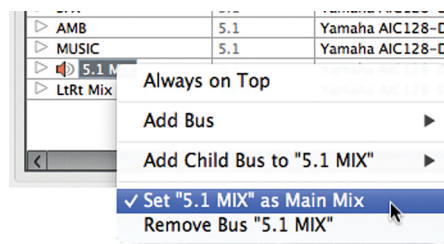


Figure 4.25

Set as Main Mix option

Output Bus Not Connected

It is possible and common to have output buses not connected to any device port directly. Instead of monitoring the output buses directly, Nuendo can route these signals through the Control Room mixer, which is connected to the device ports for monitoring. Using the Control Room features, you can monitor various points in the mixer’s signal chain through dedicated monitor outputs. Final mixdown files can still be created from any output bus whether it is connected to a device port or not.

It might feel counter-intuitive, but output busses that are “not connected” still generate audio. The audio can be written to a disk file, routed to the Control Room mixer, or even routed to another VST output using an aux send.

WHEN TO CONNECT VST OUTPUT BUSES

VST Output buses should only be connected to device ports when the signals need to be fed into an external console, recorded by an external device, routed to a broadcast feed or if the Control Room is not active for monitoring.

Click Option

The last column in the output bus tab is the click option. The internal click generator in Nuendo can be routed in multiple ways, one of which is by checking the click option for any output. This routing is separate from the Control Room where you can also route the click to various outputs. The Control Room does not have to be active for the click option in Output buses to function.

You may only activate click on the entire output bus, not child buses or single channels within the bus.

Group/FX

The Group/FX tab does not pertain to actual inputs or outputs from Nuendo. Rather it deals with internal mixer routing options within the Nuendo project. This will be discussed in great detail in Part IV: Mixing. Group and FX channels that are a part of the active project will be displayed here. It is also possible to create new group and FX channels in this tab and save presets of multiple group and FX channels.

External FX

The External FX tab allows the creation of outputs and inputs that can be routed to external processing devices such as compressors, equalizers, and reverb units that you wish to use inside Nuendo's mixer. Once created, these external FX can be inserted just like plug-ins on any audio channel in the mixer.

Audio will pass out of the assigned outputs to your external device and then return through the assigned inputs back into Nuendo's mixer. You can mix plug-ins with external FX on the same channel if you wish. In this way, all of your favorite analog equipment can be used inside the digital mixer just like any other plug-in processing.

If the external device is MIDI controllable, a MIDI device can be associated with the External FX so that when it is inserted, its MIDI device panel will open just like a plug-in GUI. This allows you to remote control the device and save the parameters within the Nuendo project for later recall.

To create an External FX, follow these steps:

1. Press the Add External FX button. The Add External FX dialog will open shown in Figure 4.26.
2. Click in the name field and enter the name of the device.
3. Choose the send channel configuration. How many inputs does the device have?
4. Choose the return configuration. This may be different than the send. For example, many reverb units have a mono input but a stereo output. There is no need to waste device ports on unused channels.
5. If the device is MIDI controllable, and you have created a MIDI device for it in Nuendo, you can attach that to the External FX by pressing the Associate MIDI Device button and choosing the appropriate MIDI device.
6. Click OK and the device will appear in the list.
7. Assign device ports to the inputs and outputs that will be connected to the external device.

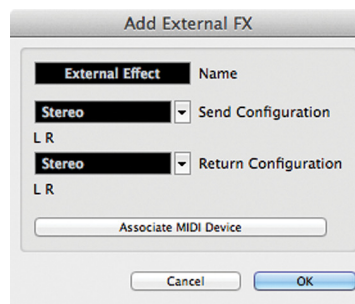


Figure 4.26
Add External
Effect dialog

If this is an external FX that you plan on using often, add it as a Favorite so that it may be recalled in other projects easily. This is similar to the presets in the Inputs and Outputs tabs. To add an External FX as a favorite, right click (Win) or control+click (Mac) on its name and choose Add to Favorites from the menu. Now this device will be available from the Favorites button in any active project.

External Instruments

External Instruments allow you to use MIDI keyboards and other external MIDI devices such as an Akai MPC workstation in Nuendo as if they were a part of the program, similar to a VSTi virtual instrument. Much like External FX, External Instruments have a MIDI device associated with them but only have audio inputs as a part of their configuration. Each external instrument can have multiple mono and stereo inputs associated with it. In order to create an external instrument, follow these steps:

1. In the External Instruments tab, press the Add External Instrument button. The Add External Instrument dialog will open as shown in Figure 4.27.
2. Click in the name field and enter the name of the new instrument.
3. Choose the amount of mono and stereo inputs the instrument will have in Nuendo.
4. If you have created a MIDI device for this instrument, press the Associate MIDI Device button and add it to the instrument.

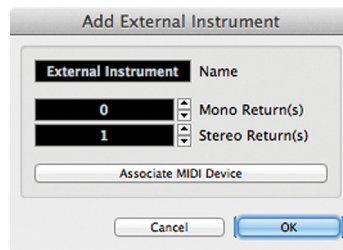


Figure 4.27
Add External
Instrument
dialog

The newly created instrument can be added to a project just like any other VSTi. You will be able to create MIDI tracks for this instrument and automatically have that routed to the device and have the resulting sounds come into the project mixer.

Device Port Sharing

Some VST connections can share device ports with others. For example, you could create a stereo Input bus that uses device ports 1 and 2. You could then create another mono Input bus that also uses device port 1, and so on. This can be useful for naming various inputs or having alternate input bus names for the same device ports. The same is true of Output buses. Just be sure to be aware of any VST connections that share device ports as this can be a source of confusion.

External FX and External Instruments, however, cannot share either input or output device ports with any other VST connection. If you have device ports used by an External FX or Instrument and you wish to use it for something else, you must either remove the external device from the VST Connections or set their device ports to “Not Connected” in order to make that port available.

Device ports that have been assigned to exclusive VST connections are denoted in the device port list in red and cannot be shared. If you select this port for another VST connection, it will break the current connection. A dialog box will open shown in Figure 4.28, indicating that the selected port is already in use. You can continue and break the previous connection or cancel the operation.

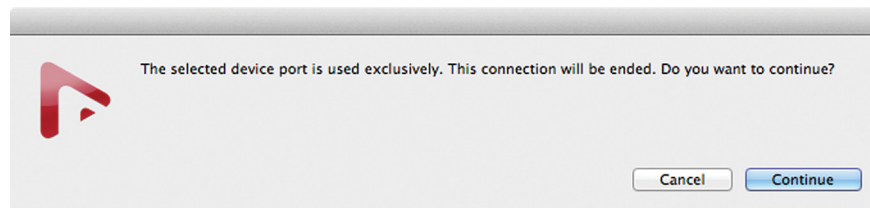


Figure 4.28
Device Port
sharing
warning

Control Room and the Studio Tab

The features of Nuendo’s Control Room Mixer are valuable for day-to-day use in a real studio environment. The ability to listen to external sources, route headphones and talkback signals to various cue outputs, and manipulate speaker configurations and calibrations adds a great deal of functionality all within the software.

Think of Control Room as a secondary mixer, with its own set of inputs and outputs, that controls monitor sources, external inputs, the talkback along with speakers and headphones in the studio. Signals, such as Nuendo’s project mixer outputs, external sources (DVD, iPod etc.), talkback microphones and cue sends, are processed by the Control Room mixer and routed to the speaker and headphone systems.

The Control Room is scalable in its configuration. You can use as many or as few of its features as you need. Just like the other tabs in VST Connections, you add only the channels you need and nothing more. To enable the Control Room, go to the Studio tab in VST Connections and enable the power button for Control Room, as seen in Figure 4.29.

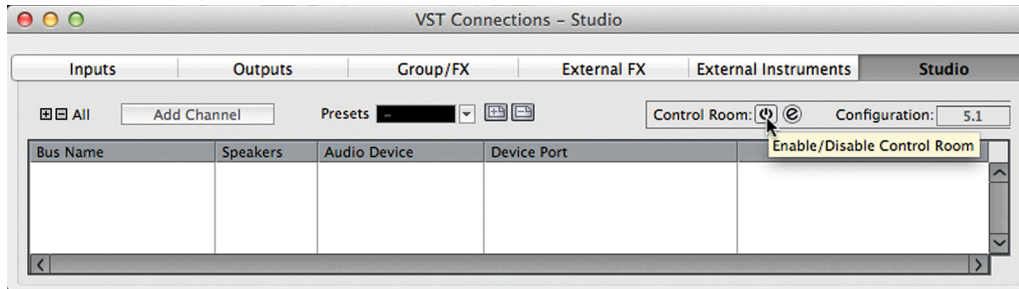


Figure 4.29
Studio Tab in VST Connections, enable Control Room

Control Room Overview

Initially, the Control Room Mixer will contain one Monitor output channel. A Monitor output channel is designed to be connected directly to a speaker system. You must have at least one Monitor channel for Control Room to operate.

Open the Control Room Overview from the Devices menu as shown in Figure 4.30. This window visually represents all of the Control Room channels and their current configuration. Highlighted items are active while grayed out items are not active but are available to add.

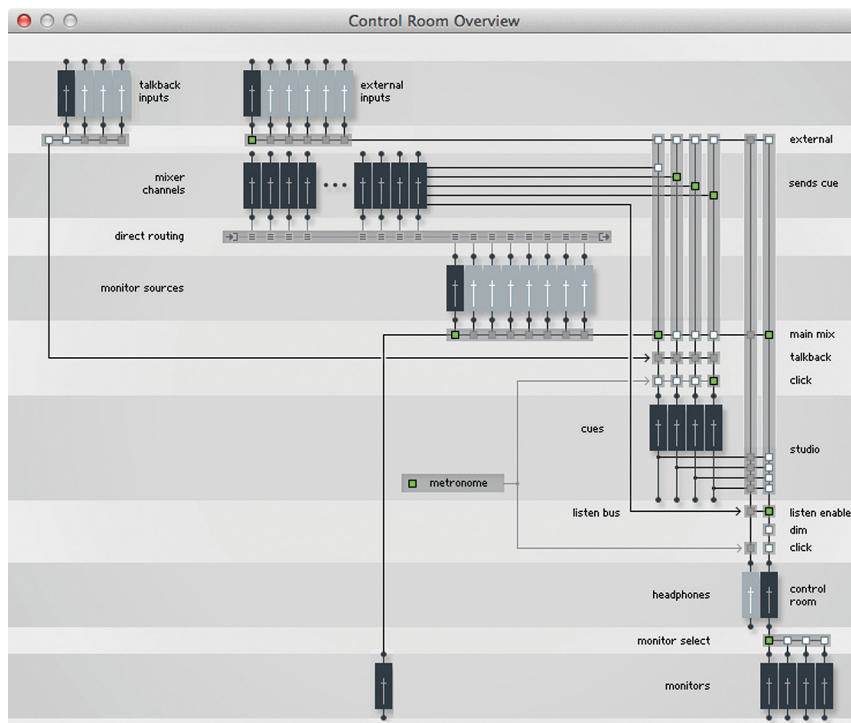


Figure 4.30
Control Room Overview

Control Room Channels

The following is a list of all the possible Control Room channels you can create.

- Monitor** A monitor channel is connected to a set of speakers. Consider them speaker channels. All formats from mono to 8.1 channel surround and more are supported. Up to four (4) monitor channels may be created. They can share outputs if necessary and do not need to be the same channel configuration.
- Headphones** One (1) dedicated stereo headphone channel is available. This should not be confused with the Studio channels that are designed to feed headphones or monitors for musicians and performers in the studio while recording. This headphone channel is primarily designed for the engineer to monitor sounds in the control room, including the Listen bus.
- Cues** The Cue channels are for performers to hear themselves and the rest of the mix during recording. There are four (4) stereo Cue channels available. They can be connected directly to headphone amplifiers, multi-channel headphone systems such as the Aviom or even a set of speakers in the recording studio.
- Meter Channel** This output should be connected to an external metering device such as a Dorrrough meter. It cannot be removed from the setup and has its own channel configuration.
- External Inputs** External Input channels allow you to listen to other sources outside Nuendo. This is handy for listening to CD and DVD players or perhaps a smartphone. There are eight (8) External Inputs available in formats up to nine channels wide (8.1 Cine).
- Talkback** Four (4) talkback channels can be created, which allows the engineer and producers to communicate with performers in the studio and provides useful functionality such as dimming the main speakers when the talkback is on and auto-off during recording.

Monitor Sources Monitor Sources are signals created by the Nuendo Project. The VST Output designated the Main Mix is the default monitor source. You can create additional sources from any VST Input, Group channel or other VST Output in the currently active project mixer. You can define up to eight (8) monitor sources in a project. These choices are saved with the Project file and change with each active project.

You can add various channels to the Control Room by using the Add Channel button found in the Studio tab. Choose the type of channel you wish to add and a dialog will open up that allows you to name the channel and choose a channel configuration.

Once you have added all your desired channels, you can assign device ports to each one just like other VST connections. This is where things can get a bit confusing as many VST connections can share device ports.

For example, if you have a VST Output from the project connected to device ports 1 and 2 and a Control Room Monitor also connected to device ports 1 and 2, then those signals can both go to the device ports at the same time. This can cause overloads in the output converter and improper signal levels. If possible, have all VST Outputs “Not Connected” when using Control Room to prevent accidental level increases.

Main Mix Control Room Configuration

The Control Room has an overall channel width configuration (stereo, 5.1, etc.). This is determined by the channel configuration of the Main Mix of the active project. The current configuration is displayed at the top right of the Studio tab in VST Connections. The example below shows a well-populated Control Room preset for film dubbing. Notice the configuration of the Control Room matches that of the Monitor Source “5.1 Main Mix” as shown in Figure 4.31.

Device Port Sharing in Control Room

All channels in the Control Room, with the exception of Monitors, use exclusive device ports. This means that once you assign a particular device port to a Control Room channel, it will not be available to any other VST connection.

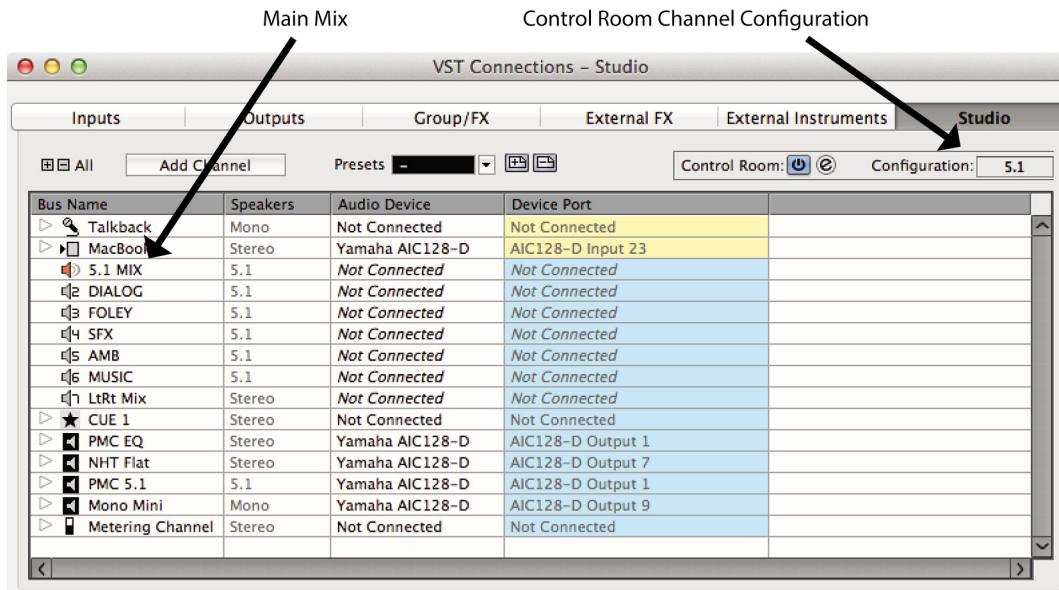


Figure 4.31
Control Room
configured for
film mixing

For Monitor channels, there is a preference to choose whether or not they use exclusive device ports. This helps avoid the issue of the Main Mix and Monitor outputs sharing device ports and causing signal overloads and improper monitoring. Preferences>VST>Control Room>Exclusive Device Port for Monitor Channels.

On the other hand, it can be helpful for surround speaker systems to share device ports between Monitor Channels so that you can create a stereo monitor pair from the main left and right speakers in a surround setup. This makes it possible to change from a surround system to a stereo playback system using the same speakers. This is similar to the child bus concept for VST Outputs.

To create a stereo Monitor using shared device ports from a surround speaker system, follow these steps:

- ❖ Create a 5.1 Monitor channel and assign it to device ports that are connected to the corresponding speakers.
- ❖ Create a stereo Monitor channel and assign it to the same device ports as the main left and right speakers of the surround Monitor channel.

You can now switch easily from surround to stereo monitoring using the same speaker system. Operation of the Control Room Mixer is covered in the next section.

BE CAREFUL WITH VST OUTPUT ROUTING

Trouble can arise if you inadvertently assign a VST Output bus (especially the Main Mix) to the same device ports as a Monitor channel. This results in both signals being combined on the shared device port. If the Main Mix bus is assigned to the same device ports at the current Monitor channel, a doubling in volume of the sound will be heard at the output of the audio interface potentially causing harm to speaker systems and your hearing. Also, none of this clipping will be visible in Nuendo's meters since it is taking place at the audio interface and not inside Nuendo.

To avoid this possibility, go to Preferences>VST>Control Room and check the option for "Exclusive Device Ports for Monitor Channels."

CREATING CONTROL ROOM SETUP PRESETS

Create a preset for your Control Room Setup in the Studio tab. This makes all of the complex settings in Control Room recallable. You might create two presets, a simple setup for stereo music recording with more studio channels and then a more complex surround setup for film mixing. Control Room channels take up system resources so only use the channels that you need. Flexibility is the idea here.

Control Room Mixer

The Control Room Mixer allows you to adjust every channel you have created in the Studio tab of VST Connections. It expands or contracts depending on the type and number of Studio channels you have made. Just like the project mixer, portions of the GUI can be hidden from view to save space if not being used.

The Control Room Mixer can be viewed in several locations: in its own window, at the right side of the Project Mixer and at the right side of the Nuage screen above each fader unit. Its appearance is the same in all three locations. There are two main views of the Control Room accessed from two tabs at the top.

- ❖ Control Room: This view has controls for all Control Room channels.
- ❖ Meter: This view displays the Control Room Main Meter.

Each view has two panes accessed from tabs at the bottom. The Meter modes will be discussed later. The Control Room panes are:

- ❖ Mixer: This pane offers controls for normal use.
- ❖ Setup: This pane offers access to more parameters, including inserts.

Each section in the Control Room mixer has separate controls that are only visible when that section has been expanded. Clicking on the section name will expand the available controls. These sections appear in both the Mixer and Setup panes.

Mixer Pane

Clicking on the Mixer tab at bottom puts the interface in its standard operating mode for everyday use: the Mixer pane.

External Inputs Section

Starting at the top, if you have more than one External Input defined, then the External pane will be shown. The only control in this pane is a pop-up menu that lets you choose which external input signal to use as shown in Figure 4.32.

Cues Section

Next, the Cue 1 pane has been expanded.

The source for each Cue can be either the Mix source, External or the Cue buss (1-4) from Nuendo's project mixer.

Channels Section (Speaker channels)

The next section is called Channels shown in Figure 4.34 and has to do with the various speaker channels in a surround system. Here, you can solo individual speaker channels and route the rear speakers to the front, among other things.

MIXCONVERT ACCESS

If you double-click in the black area between the speaker channels, you will open up the MixConvert settings for the current down mix. Here you can make adjustments to the downmix to suit your needs.

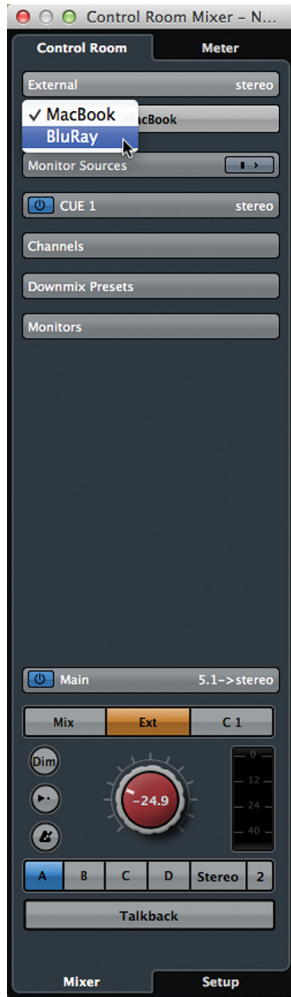


Figure 4.32
External input
pane with
popup input
select

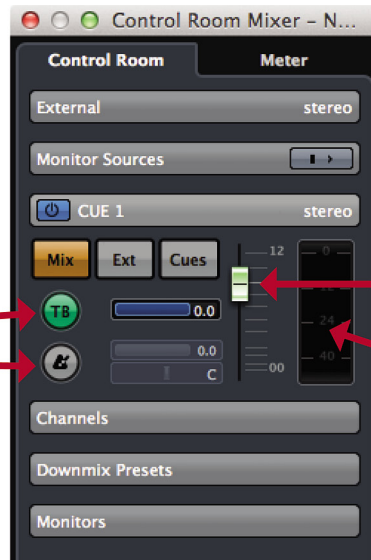


Figure 4.33
Cue 1 Control
Room detail

Talkback controls
Click controls

Cue output level
Output meter

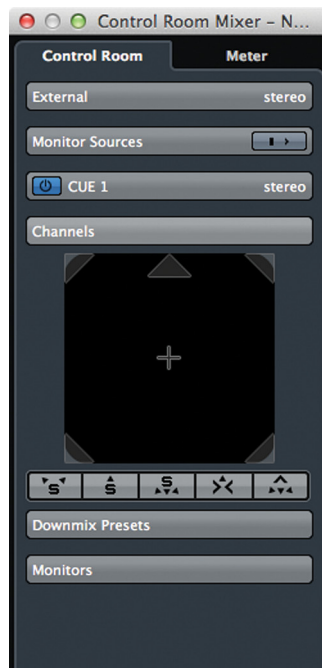


Figure 4.34
Channels section
of the
Control Room
Mixer

Downmix Presets Section

When working in surround sound, it is helpful to be able to preview your mix in stereo. This requires a “downmix” of signals from 5.1 channels to two. Nuendo provides a downmixing process called MixConvert that does this automatically as needed. This pane allows you to switch between various downmixing presets. This is the same as checking your mix in mono for music mixing, just with more channels. There are four downmix presets available as shown in Figure 4.35.



Figure 4.35
Downmix
Preset Pane and
corresponding
MixConvert
settings

Monitors Section

The Monitors section allows you to switch between various speaker systems in your Control Room setup. There are four possible Monitors designated A, B, C and D. Beneath the selector is a meter that shows the actual output level for the current volume setting.

Phones Section

If you have a Phones channel defined, it will be beneath the Monitors section. By default, the source select, level (green knob) and click enable control are always visible. If you expand the section, level and pan controls for the click and Listen bus are displayed in Figure 4.37. The Listen bus is for soloing in AFL/PFL mode, discussed later.

Main Section

At the bottom is the Main control room section, with the large, red level control used for the overall level of your monitors.

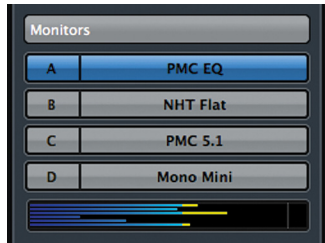


Figure 4.36 Monitors Section with output level metering



Figure 4.37 Control Room Phones section



Figure 4.38 Control Room Main section

Here is a condensed collection of controls you would use most often.

- ❖ **Input Selector:** Main monitor source, external input and cue sends from the project mixer.
- ❖ **Control Room Level:** The actual output level sent to your monitor speakers (red knob).
- ❖ **Dim:** reduces the CR level by a preset amount so you can quickly lower the volume.
- ❖ **Reference Level:** A user-defined volume setting for calibrated mixing environments, mostly film and broadcast mixing.
- ❖ **Click Enable:** This routes the built-in click sound to the selected speakers.
- ❖ **Monitor Select:** Quickly choose from up to four speaker systems.
- ❖ **Downmix Preset:** Toggle between four downmix presets.
- ❖ **Talkback:** Activate the primary talkback input.
- ❖ **Talkback 2:** Up to four talkback inputs can be added, each of which will have a separate enable button.

- ❖ **Talk Off:** Deactivates all talkback inputs at once.
- ❖ **Click Mix:** Pan and volume for the click
- ❖ **Listen Bus:** Switch between AFL and PFL solos, enable Listen bus output, Listen bus level.
- ❖ **Talk Dim:** Reduces the CR output level by this amount when the Talkback is turned on.
- ❖ **Listen Dim:** Reduces the CR output level by this amount when one or more channels are routed to the Listen bus.

Setup Pane

There are some additional controls and options for each Control Room section visible when you enter the Setup pane by clicking the Setup tab at the bottom. Once again, you must click on each section to expose all of the options.

Talkback Setup

When you enter the setup view, the Talkback setup section becomes visible. There are eight insert slots available for plug-ins. For example, you could insert a compressor on the Talkback channel to ensure that everyone can be heard over the talkback microphone as shown in Figure 4.39.

Beneath the inserts are a level meter and input gain adjustments for fine tuning the talkback signal.

External Setup

Each External input has six available inserts, a phase/polarity switch, and an input gain setting as shown in Figure 4.40. Selecting a different External input will access its individual settings.

Cue Setup

Each Cue channel has eight available inserts.

Monitors Setup

Each Monitor channel has eight inserts, phase, and input gain as seen in Figure 4.41. The setup controls correspond to the currently selected Monitor. Switching Monitors in the Main section will change the inserts seen in the Monitor setup.



Figure 4.39 Talkback setup with a compressor inserted

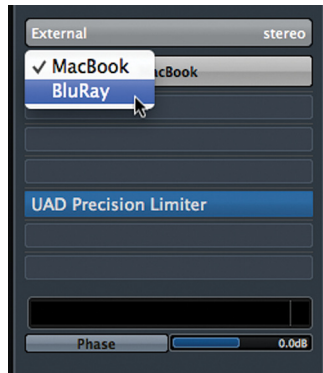


Figure 4.40 External Input setup switching

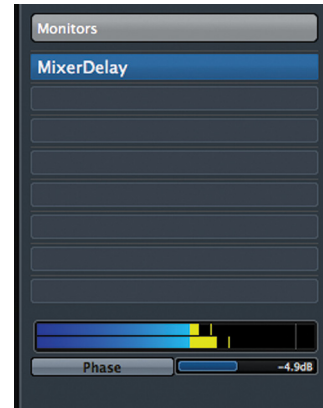


Figure 4.41 Monitors Setup with IK Room insert

The Monitor inserts could be used for room correction equalization. Certain speaker systems can require corrective EQ to flatten the room response. There are various third party plug-ins designed to do this by measuring the response with a calibrated microphone and applying a corrective EQ curve with a plug-in.

The insert slots of the Monitor in Control Room are the ideal locations for this type of processing. That way, the corrective EQ is only applied to the signal feeding your monitors and not to the mix itself. When you switch to another set of speakers in Control Room, the inserts are unique so this corrective EQ will only be applied to the one set of speakers where it is required.

Another option would be to insert a bass management plug-in for use in a small surround sound system with a shared subwoofer. It should be noted, however, that the Nuage I/O interfaces have built-in bass management functions available that do not use any CPU processing power.

In most other DAWs, this type of processing must be inserted on the mix bus itself and needs to be bypassed in order to output a proper final mix. Since the Control Room Mixer is a totally independent mixer from the Project mixer, there is no need to bypass its processing during export.

Phones Setup

The Phones channel has eight inserts.

Main Setup

The Main channel also has eight inserts. The first six inserts are positioned before the Control Room Level while seven and eight are after the level control. The pre-fader inserts could be used for metering plug-ins or spectral analyzers as seen in Figure 4.42 while the post-fader inserts could be used for a protective limiter set to prevent overdriving a speaker system.

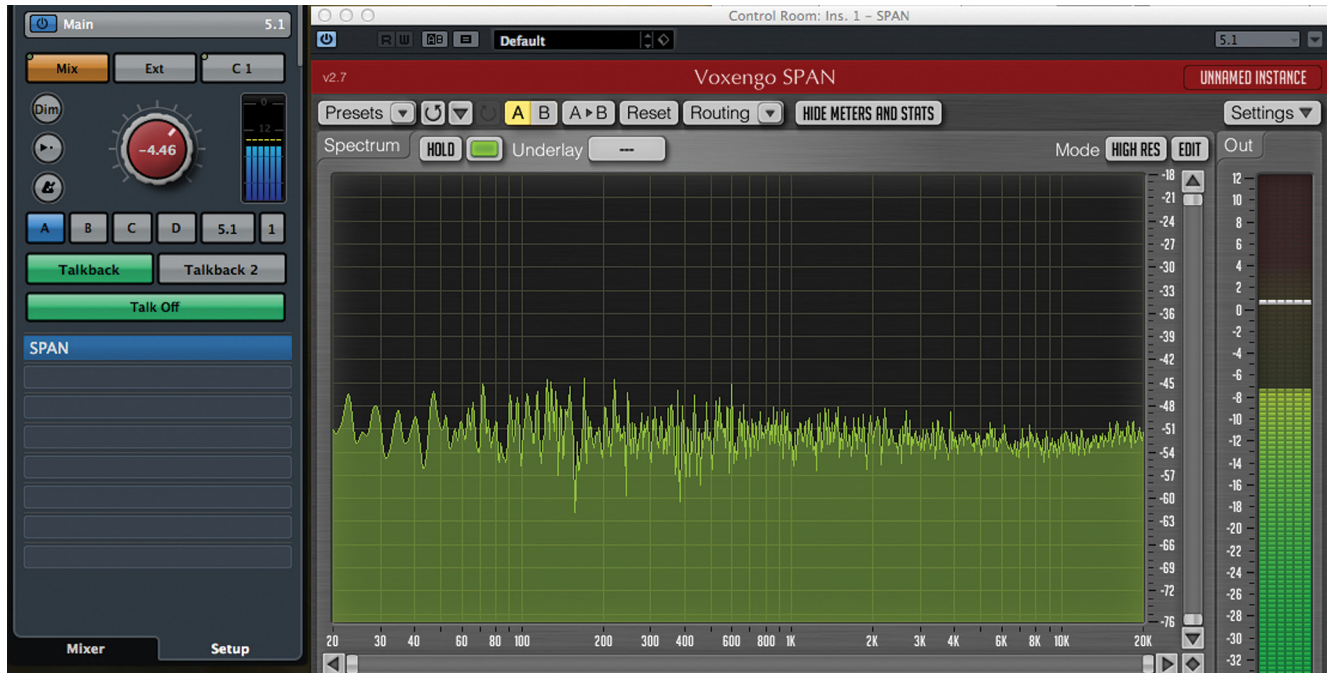


Figure 4.42 Main setup with Span inserted showing the spectrum analyzer

The Listen Bus (AFL/PFL solo)

Typically, most DAWs use a form of solo known as Solo-in-Place (SIP). It works simply by muting all other channels in the mixer that are not in solo, leaving that channel by itself. However, this interrupts all of those signals from continuing on to the mix bus, aux sends, and other routing, which may or may not be a good thing. For example, soloing a channel to check a problem during a live broadcast would interrupt the entire mix and that is just not acceptable. This is where the Listen Bus can be helpful.

Traditional analog consoles have another form of solo that uses a dedicated bus to route solo signals to the monitors without affecting the mix of all channels together. A channel placed in solo has its signal routed to this dedicated bus and the monitors are switched to the solo bus as the source. Now you will hear this one signal by itself in the speakers but the complete mix continues uninterrupted. This signal could be taken either before the channel fader (PFL) or after the channel fader (AFL).

This functionality was needed in the DAW environment. The Listen Bus is Nuendo's answer to the need for AFL/PFL solos with some added functionality only a digital system can provide. Listen-enabled channels are routed directly to the Control Room either AFL or PFL. What's different is that the whole mix can be added to this solo bus to keep soloed sound in perspective with the overall mix while still bringing it forward for closer examination. Imagine soloing a channel and just having the whole mix dim down 6 dB under the soloed channel?

The real world application of this is that you can solo any channel in the mixer and have it be prominent in the monitors while still hearing the entire mix at a certain level below that, thus bringing that sound "forward" but not completely out of perspective with the other parts of the mix. This helps when making equalization choices and other adjustments that relate better to the mix as a whole. No more EQing in a vacuum. Plus the Listen Bus is separate from any mix bus, allowing you to solo channels without interrupting the mix in a live or broadcast situation.

SOLOING REVERB RETURNS

One application of the Listen Bus is soloing reverb and other effects returns. Using Solo-in-Place to solo the reverb return ends up muting all the tracks feeding that reverb bus so you won't hear anything. Using the Listen Bus, you can solo up just the reverb sound by itself, which is very handy for making EQ adjustments that help the reverb fit in the mix better.

Control Room with Nuage Hardware

One main advantage that the Nuage Master unit provides is access to all the Control Room functions with dedicated hardware controls. Adjusting Control Room level and speaker selection are two of the most common tasks performed by audio engineers. Providing hardware access to these common functions improves workflow and ergonomics.

The Control Room level is placed in the center of the Master Unit shown in Figure 4.43, with a clear numeric readout of the level in dB. To the left, the Monitors can be switched along with the downmix preset. At right are the Monitor Sources and External inputs. The four Cues are to the very right. They can be quickly enabled or muted.



Figure 4.43
Master Unit
Control Room
sections

Headphones Channel

Pressing the Phones button switches the controls to the Headphones channel. You can choose any Monitor Source or External Input to monitor on the Headphone channel while the main monitors listen to another source.

A headphone icon will appear in the numeric volume display to indicate the Headphone Channel is selected. Changes made to the Control Room or Monitor Source sections now affect the Headphones channel only. For example, the Headphones could be listening to an external input while the Main Monitors could be listening to the mix from the project mixer.

Control Room Touchscreen

The rest of the Control Room functions are found on the touchscreen when the blue Control Room section button is lit as seen in Figure 4.44. The Main page has controls for the Phones and Control Room channels including click track level and pan, solo mode (SIP, AFL, PFL), and meters.

The Speaker Control page allows you to switch between the four Monitors and control the downmix preset that is applied. For surround Monitors, you can use the graphic representation to solo individual speaker channels such as the center channel as seen in Figure 4.45.



Figure 4.44
Main touch-screen page

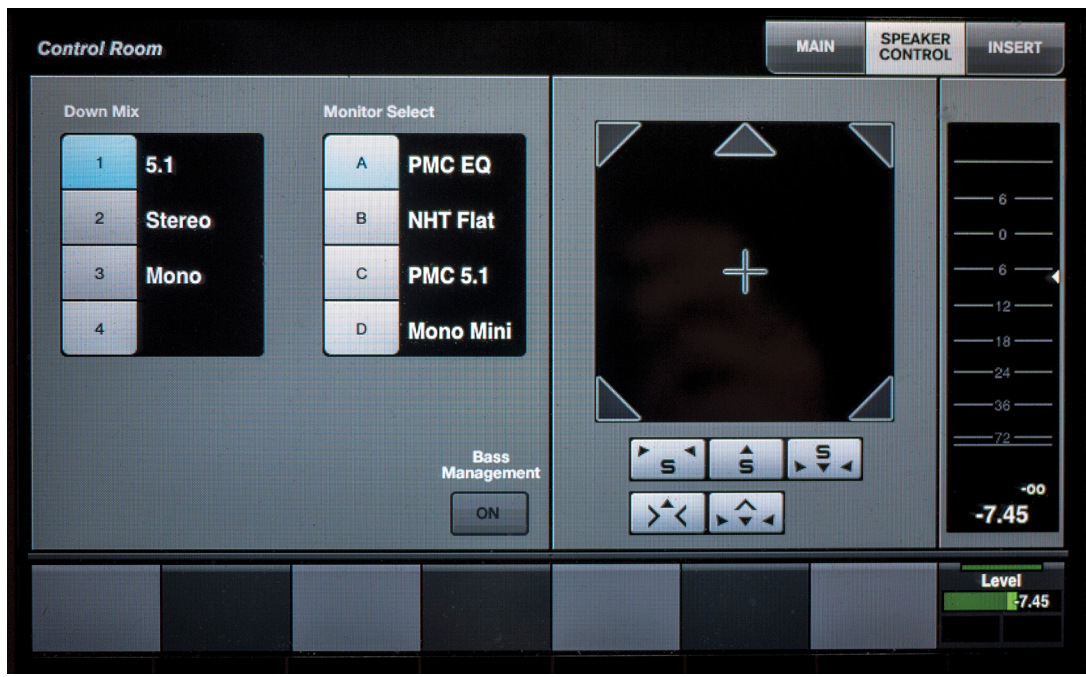


Figure 4.45
Speaker Control page

The Inserts page gives you access to all the insert slots available for all the Control Room channels. Press the channel along the top row and the insert slots for that channel are displayed on the screen as seen in Figure 4.46. You can add and edit plugins right there on the touchscreen.



Figure 4.46
Control Room
Inserts page set
to Main
channel

MIDI Connections

MIDI connections are handled in much the same way as audio connections in Nuendo. You can manage the input and output ports and then configure various MIDI devices that use these ports similar to VST Connections and audio device ports.

MIDI Port Setup

MIDI connections are accessed from the MIDI Port Setup found under the Devices menu. Similar to the VST Connections window, all the available MIDI ports are listed here. You can rename them by clicking in the “Show As” field and typing in a new name.

Unless you have an extensive vintage MIDI keyboard collection, most MIDI setups are relatively simple. In this system, besides the virtual Nuage MIDI ports, there are only two other devices having a total of three MIDI inputs and two MIDI outputs shown in Figure 4.47.

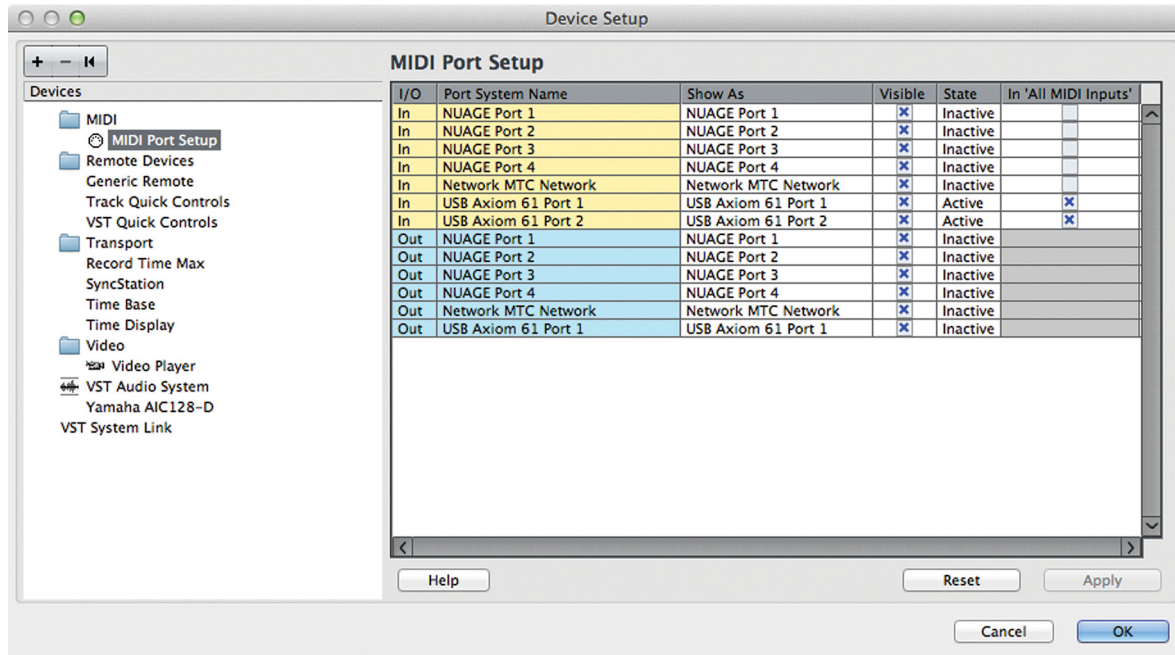


Figure 4.47 MIDI Port Setup

Here's a description of each MIDI port in the example system shown in Figure 4.47. Every Nuage system will always have the four Nuage MIDI ports:

- ❖ **Axiom 61:** This M-Audio MIDI controller has 61 keys plus 8 drum pads and a variety of knobs and sliders for use as MIDI controllers. The Axiom uses a USB interface to connect to the computer directly so no MIDI interface is needed. The two MIDI inputs are for the keyboard itself and the second for its own MIDI-In jack that can be used to accept incoming MIDI from another external device. The output port goes directly to the MIDI-Out jack as the controller itself has nothing to control with MIDI. It does not generate any sounds.
- ❖ **Nuage MIDI 1-4:** These ports are created by the Nuage Workgroup and are used for Pro Tools workstation control.
- ❖ **Network MIDI:** It is possible in OS X to create a network MIDI port for use between multiple workstations on the same network. Synchronization of two workstations using MTC over this MIDI connection is a common purpose for Network MIDI ports.

rtpMIDI

For Windows workstations, rtpMIDI is a free driver for creating compatible network MIDI ports for Windows operating systems. These network ports can connect to Apple computers and other devices such as iPads, Android tablets, and more. Visit: <http://www.tobias-erichsen.de/software/rtpmidi.html>

If there are MIDI ports that you do not intend to use, you can hide them by unchecking the port in the Visible column. Making a port invisible will also disconnect it from anything in Nuendo.

'All MIDI Inputs' Option

The checkbox for *In 'All MIDI Inputs'* determines if that port is included in this special MIDI input option for recording. If a MIDI track uses 'All Inputs' as its input source, MIDI data from these selected inputs will be merged and recorded together onto the MIDI track. In the MIDI Port Setup above, note that the Nuage ports are not selected to be part of 'All MIDI Inputs' as the data from those ports would not be recorded on a MIDI track.

This can be useful, for example, when using more than one MIDI controller to program drums. A normal keyboard could be used for most of the drums while a separate MIDI triggering device could be used for foot-operated triggers for the kick drum and hi-hat performance. The 'All MIDI Inputs' will merge the data from both controllers onto the MIDI drum track.

BE CAREFUL WITH CONTROL SURFACE CONNECTIONS

It is best not to include ports connected to MIDI control surfaces (such as HUI, Nuage, Euphonix, etc.) that you are using to adjust the mixer or plug-in settings, as that data could get recorded on a MIDI track along with the relevant keyboard controller data you intend to record. Uncheck the 'All MIDI Inputs' boxes for these devices to avoid this problem as shown in Figure 4.47.

MIDI Device Manager

Once you have your MIDI ports set up, you can create MIDI devices for each external MIDI module you have connected. These devices can be associated with External FX or External Instruments for MIDI control over these external devices. MIDI devices can be anything from keyboards and external processors to digital consoles and MIDI control surfaces. Once

created, these devices are used in Nuendo to connect MIDI tracks and controls to and from the device.

For example, I often use a vintage Line 6 Echo Pro rack mount delay unit for mixing. It is MIDI capable, and every parameter of the unit can be controlled by MIDI from Nuendo. Also, I am able to store settings from the unit as system exclusive data in a Nuendo project for later recall.

For every external device connected via MIDI to Nuendo, you should create a MIDI device that represents it. Follow these steps to create a new MIDI device in the MIDI device manager.

1. Open the MIDI Device Manager from the Devices menu (Fig 4.48).
2. Press the Install Device button and the Create MIDI Device dialog will open showing you a list of common brand name devices to choose from (Fig 4.49).
3. If your device is listed, select it and click OK as this will load a pre-configured device of that kind.
4. If the device is not listed, select “Define New...” and the Create New MIDI Device dialog will open (Fig 4.50).
5. Click in the name field and enter the name of the device.
6. Click on all available MIDI channels in the Identical Channels box that the device will use.
7. Click OK to create the device. Its Device window will open showing the available MIDI channels (Fig 4.51).
8. Back in the MIDI Device Manager, you will see the new device listed. Click on it and you will see the MIDI output pull-down menu. Choose the MIDI port that is connected to the new device (Fig 4.52).



Figure 4.48
Empty MIDI
Device
Manager

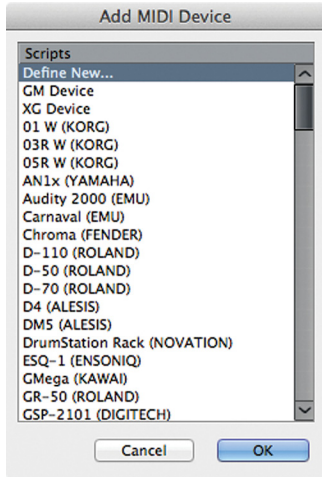


Figure 4.49
Create MIDI Device dialog

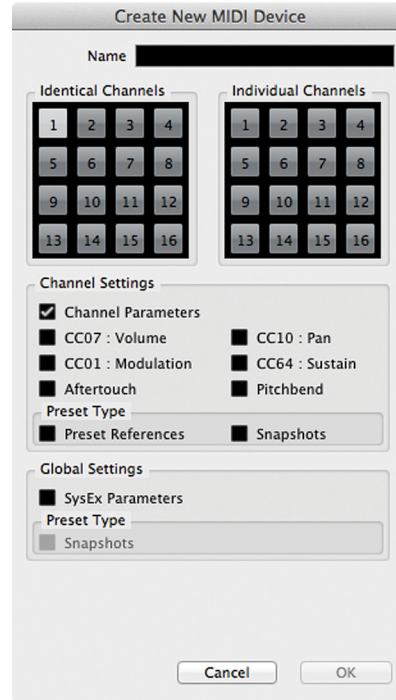


Figure 4.50
Create New MIDI Device dialog

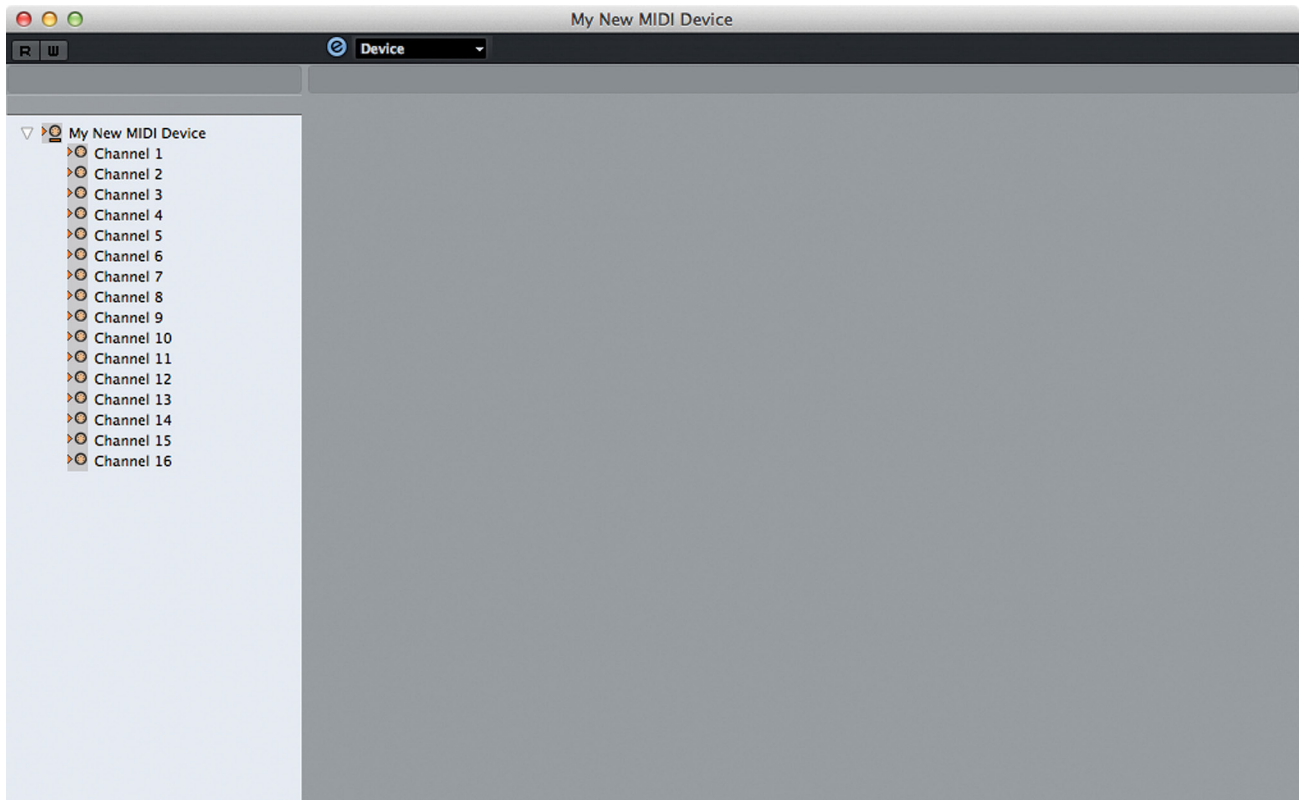


Figure 4.51 Basic 16 channel MIDI Device

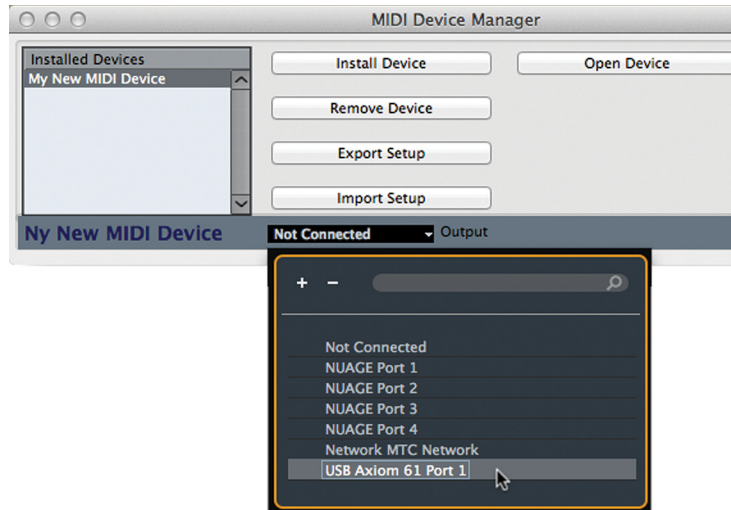


Figure 4.52
MIDI Port Selection

Your MIDI device is now set up and ready to be used. Take a look at a fully configured MIDI device utilizing various “device panels” that allow complete MIDI control of the device from inside Nuendo (Fig 4.53).

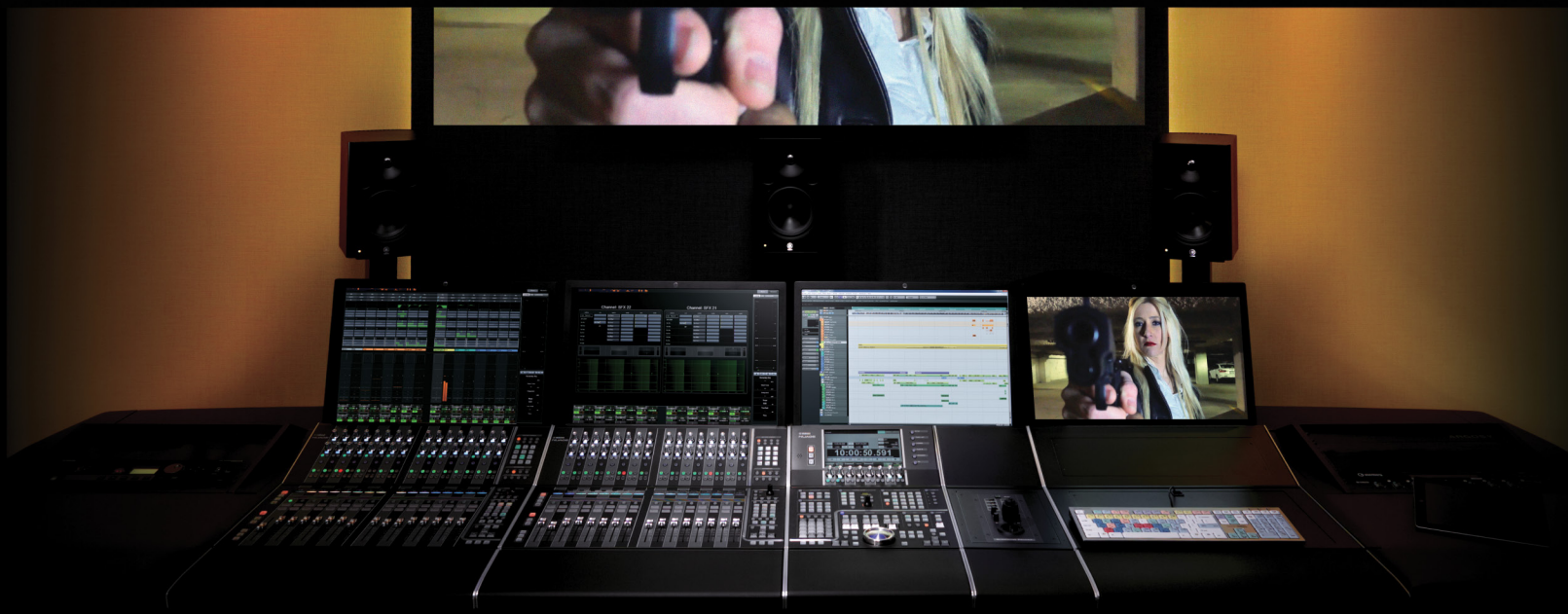
This example gives you an idea of what is possible. Creating this amount of detail in a MIDI device is a complicated process that is outside the scope of this material. Understand that you can create custom “device panels” for MIDI devices that allow direct access to various parameters of your choice. If you wish to explore the creation of MIDI device panels, refer to Steinberg’s documentation on MIDI Devices contained in a separate PDF file with your install data. The creation of basic MIDI devices allows you to connect those devices to MIDI tracks easily by name as opposed to MIDI port.



Figure 4.53
Fully configured MIDI device for the TC Finalizer

NUAGE

COURSEWARE



PART I: SETTING UP

by Ashley Shepherd

Chapter 5

Project File Structure

NUAGE

Project File Structure

- ❖ Project Folder
- ❖ Anatomy and File Structure of a Nuendo/Cubase Project
- ❖ Hard Drives for Audio Recording
- ❖ Create a New Project

Let's create a new Project. A Project is the basic file structure in Nuendo. A Project consists of a folder (directory) containing one or more Nuendo Project files (.npr) or Cubase files (.cpr) and any amount of associated audio and video files along with other data Nuendo uses to display the audio waveforms and backup project data. All of these files are usually stored in one folder together. This is called the Project Folder.

VIDEO FILES

Video files can be excessively large. They can also use a great deal of disk bandwidth during playback. For these reasons, they are often stored outside of the project folder, often on another dedicated hard drive to reduce the workload of the audio drive.

Project Folder

The project folder is the parent folder of the entire project file structure. All files related to the project should be contained within this folder with some exceptions.

Video files are often stored in another location, perhaps on another hard drive. For long-form projects such as TV drama and feature films, these files can be quite large and also require dedicated disk bandwidth. Having them stored on another hard drive eases the strain on the main audio drive in complex productions.

It is possible to import audio files into Nuendo without copying them into the Project Folder. In this case, the audio file remains in its current location and Nuendo references this in order to locate the file when it needs to be played back. This is often the case with large sound effects libraries stored on shared drives between multiple studios. Instead of copying every sound effect into the project folder, they can remain in the library location to save disk space.

Issues can arise when trying to back up and archive projects that reference files that are not in the Project Folder. At that point, it will be necessary to consolidate every file into one location for a proper backup to be created. Nuendo has tools to perform this task easily.

Audio

When you record audio into a Nuendo project, it will be stored in the Project Folder, inside another folder called simply “Audio.” The Nuendo project file (.npr) contains a reference to that folder location and will look to the Audio folder to find audio files that are part of the project. This is a very important relationship to remember and understand.

Images

Nuendo needs to create data that allows it to display the audio waveforms onscreen. Nuendo creates a waveform display file for each audio file that is a part of the project. Those files are stored in a folder called “Images” within the Project Folder.

Edits

When you perform a processing operation on all or part of an audio file, Nuendo copies the changed portion of the file into a folder called “Edits” and leaves the original file untouched. This “Offline” processing can then be “undone” or adjusted in the future, leaving all possibilities available to you. When you use Nuendo’s Offline Process to alter the audio, you are not stuck with the result.

Track Pictures

Track pictures are graphics or actual photos that can be displayed in the mixer window to help identify the track. For example, the snare track of a drum kit could have a graphic image of a snare drum displayed above the fader in the mixer window to make it easier to quickly identify the track among the many other drum channels. These images are stored in the “Track Pictures” folder.

PRO TOOLS TIP

When creating a new session in Pro Tools, the session folder is automatically created. In Nuendo and Cubase you must first create the folder yourself and then save the project inside it. Nuendo will then create all the necessary folders (Audio, Images, etc.) within this folder. This method is more flexible as you can create a new project within an existing project folder without any problems. The new project will adopt the existing Audio and other folders that are present.

Anatomy and File Structure of a Nuendo/Cubase Project

Project Folder

- .npr

- .cpr

- .bak (project backup files)

- Images Folder

- Waveform display files (.peak)

- Audio Folder

 - .WAV

 - .AIFF

 - .BWF

 - .MXF

- Edits Folder

 - Offline processes (.wav)

 - Portions of audio files that have been modified: pitch-shifting, VariAudio tuning, plug-ins, etc.

- Track Pictures Folder

 - .jpg images to identify each mixer strip (drum, guitar, bass, etc.)

- Video Files

 - .mp4

 - .dv

 - .MOV

 - .AVI

 - Large video files are commonly stored on a separate, dedicated hard drive.

This structure might seem simple and obvious at first, but when things start to get complicated and files outside the Project Folder are used within a Nuendo project, trouble can arise in the form of missing audio files and project backups that do not work correctly if you do not understand this file structure. Nuendo provides some simple tools to help avoid these issues

when backing up projects while still providing the flexibility to use files outside of the Project Folder as needed (e.g., sound effects libraries on a shared network drive). If you have a clear understanding how the project file structure works, any problems can be avoided or corrected.

Hard Drives for Audio Recording

Modern computer systems and hard drives are capable of recording a great number of audio tracks at once without difficulty. Still, there are few things to consider when choosing the location of your Nuendo project:

Do Not Record on the System Drive

The system drive of a computer is the hard drive that contains the operating system (Windows, OS X) and is used to boot up the computer. On Windows systems, this is typically the C drive. In OS X, open the system preferences and click on Startup Disk to see the name of the system drive.

System drives are bad for audio recording because they are constantly used by the operating system for system-related activities. It is best to use another dedicated hard drive in your system for audio recording.

For laptops, this means an external drive is necessary for serious recording. The internal drive may be suitable in some situations but everything should be transferred to an external drive eventually. For desktops, other internal drives may be used or external drives so long as they can operate at reasonable speeds for audio recording.

Here are some criteria for audio hard drives:

- ❖ Use hard drives with 7200 rpm speeds or greater
- ❖ Internal SATA
- ❖ USB 3 (USB 2.0 for modest projects)
- ❖ FireWire
- ❖ RAID 0 for higher speeds
- ❖ Fibre Channel for shared storage

Create a New Project

To create a new project, select New from the File menu. The new Project dialog opens up, Figure 5.1. Here you will see the list of supplied templates along with the option to create an empty project. Choose “empty” so we can start from scratch.

Project Location

You will be prompted to set the project folder. Navigate to the directory where you want to store your project. You should create an empty folder for Nuendo to use. It is possible to use an existing folder, and this is where mistakes are often made. If you do not create a new folder for the project, the current directory will be used, no matter what other files might be present. It is best to create a new, empty folder for any new project to keep things organized.

Remember, the Project is the entire file structure, folders and all, not just the .npr/.cpr file.



Figure 5.1
New Project dialog

PRO TOOLS TIP

When you create a new session in Pro Tools, the name of the session is given to the enclosing folder that Pro Tools creates for you. In Nuendo, you create this folder yourself and can name it whatever you like or use an existing folder. The project file (.npr) is saved inside this folder and can have another name if you choose.

KEEPING FOLDERS STRAIGHT

I have had many clients who create project folders within other project folders inadvertently. Or they do not create separate project folders for unique projects (like different songs on an album). So what ends up happening is the audio files for all the projects are in the same Audio folder. This can cause a lot of confusion later on when trying to copy various projects to other systems or for backing up. Try to figure out where “Audio_01.wav” goes when you have 500 of them in the same folder and you get the idea. This happens with both Nuendo and Cubase, as they have the same file structure. Always take the time to ensure you have created a file structure that is logical and confirm that audio files are being stored in the correct location.

OK, now you should have an empty Nuendo project open in front of you. It should look something like Figure 5.2.

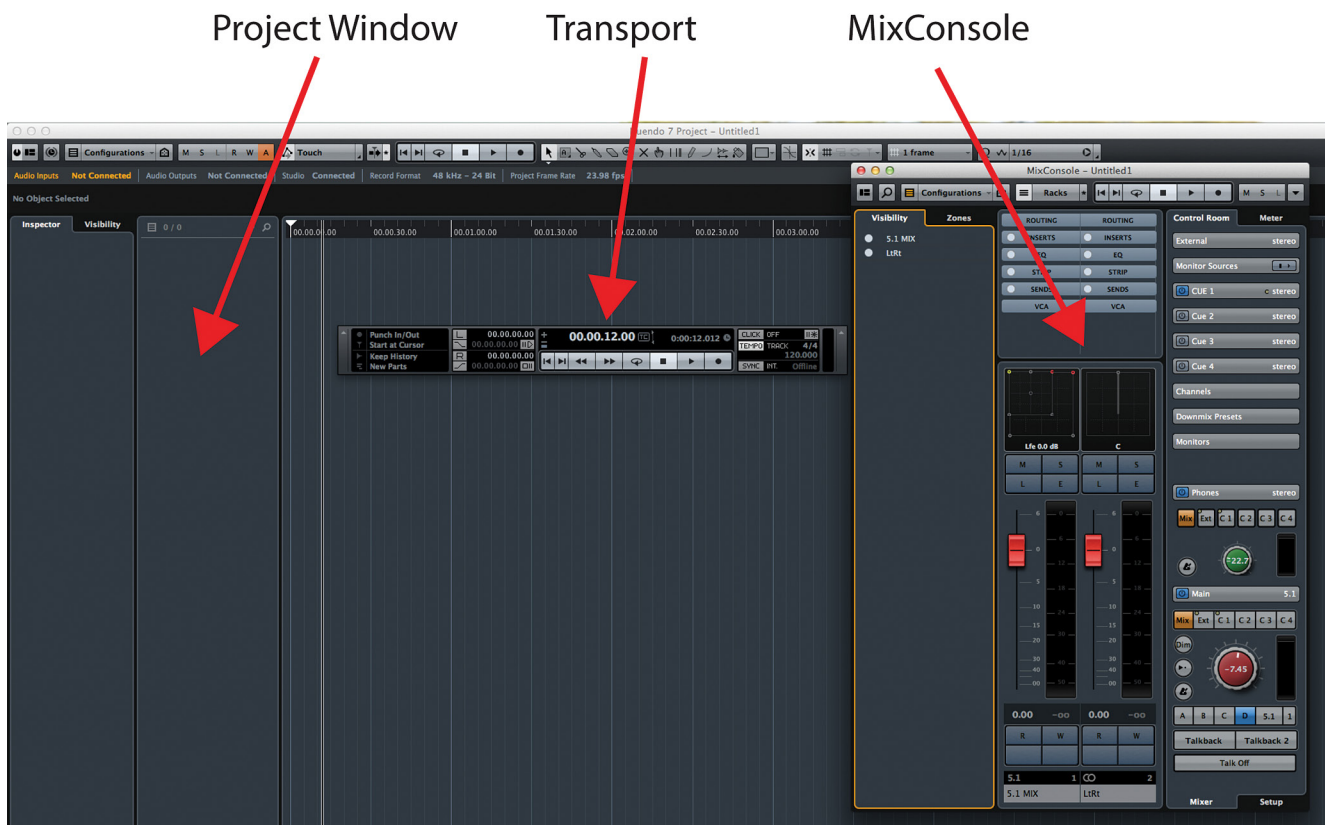


Figure 5.2 Empty Project

The top window is called the Project window. This is the main edit screen in Nuendo and is the place where you spend a lot of time. The middle window is called the transport for obvious reasons. It has a number of controls that pertain to locating, playing, recording, and counter displays. At the bottom is the mixer.

Notice that the mixer has two channels representing the VST Inputs and VST Outputs. If you have already configured VST Connections for your studio setup, the mixer might show different channels. A new project that does not use a template will adopt the default VST Connections that you must create. Otherwise, the previous connections will be used again.

Default VST Connections

In order to create your default VST connections, open VST Connections window from Devices menu, and configure the Inputs and Outputs tabs to your preferences. Then create a new preset called "default" for both inputs and outputs. Now, all newly create projects will adopt these input and output settings.

Project Setup

When you first create a project, there are some basic settings that you should determine before beginning any work. To access these basic settings we want to open the Project Setup window by selecting it from the Project menu or pressing Shift+S. For now, we just need to set the very basic settings for audio formats. At the bottom of this window, shown in Figure 5.3, are the audio settings.

These settings affect what type of audio file is created when recording. Setting the sample rate, bit depth, and file type determines how audio files are written to the hard disk.

You must ensure that these settings match the settings for your audio interface so there is no mismatch later. For example, if your audio converters use an external word clock to set the sample rate, it must match the sample rate set in the Project Setup. Many audio interfaces can be controlled by Nuendo and will adjust their settings to match the Project Setup but this is not always the case. Double-check everything before recording!

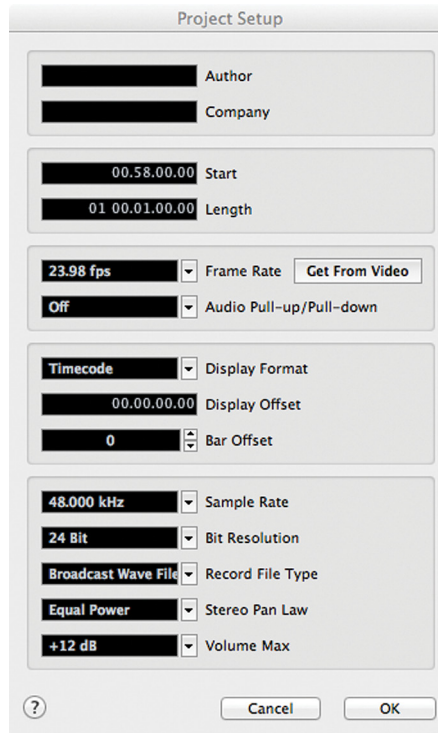


Figure 5.3
Project Setup
window

For some Dante devices, the only way to alter the sample rate is by changing it in Dante Controller.

- ❖ **Sample Rate** – Nuendo can record at all sample rates including some not-so-common ones. This is only limited by the capabilities of your audio hardware.
- ❖ **Bit Resolution** – For 99% of the time this should be 24 bit. 16 bit is only useful when using much older audio hardware that is only capable of 16 bit audio. 32 bit floating-point resolution is only useful if you are processing signals with plug-ins on the VST Input channels.
- ❖ **Record File Type** – Nuendo is capable of recording in various file formats depending on your needs. The current most widely used format is Broadcast Wave File. Even the MXF format is supported for film and post work.
- ❖ **Stereo Pan Law** – This setting determines how Nuendo performs stereo panning in the mixer. Common practice is to use -3 or -4.5 dB for the pan law, however the Equal Power method is more psycho-acoustically appropriate.
- ❖ **Volume Max** – (+6 or +12 dB) This setting affects the mixer's range above 0 dB on the faders. If set to +12, the faders can reach a value of +12 over 0 (unity).

The rest of the settings in the Project Setup have to do with timecode and will be discussed later in context with those topics. Now that you have the basic settings ready to go, we can take a look at the layout of a Nuendo project in the next chapter.

Project Signal Flow: Input to Output

In the diagram below is a graphic representation of the signal flow from input to output of a Nuendo Project. This should help give an idea of where in the signal chain various portions of the DAW are located.

The graphic shows the signal path starting with the audio source and progressing through the physical stages until it enters the software at the VST Input. Next, signal can either be recorded to disk or routed through Control Room as an external input to be monitored.

Once an audio file has been recorded, it can be edited and processed before being played back through the Mix Console and then sent on to the VST Outputs. VST Outputs can either go directly out of the software to the audio interface or through the Control Room mixer as a monitor source (see Figure 5.4).

Sounds created by virtual instruments within the project using MIDI begin their signal flow at the Mix Console.

Audio File Structure

Once an audio file has been recorded onto the hard disk, Nuendo creates a structure that it will use to play that file back, edit and process parts or all of the file, and maintain a history of these actions as part of the project. It does this using three levels of the audio file structure:

- Audio File (parent)
 - Audio Clip (child)
 - Audio Event (grandchild)

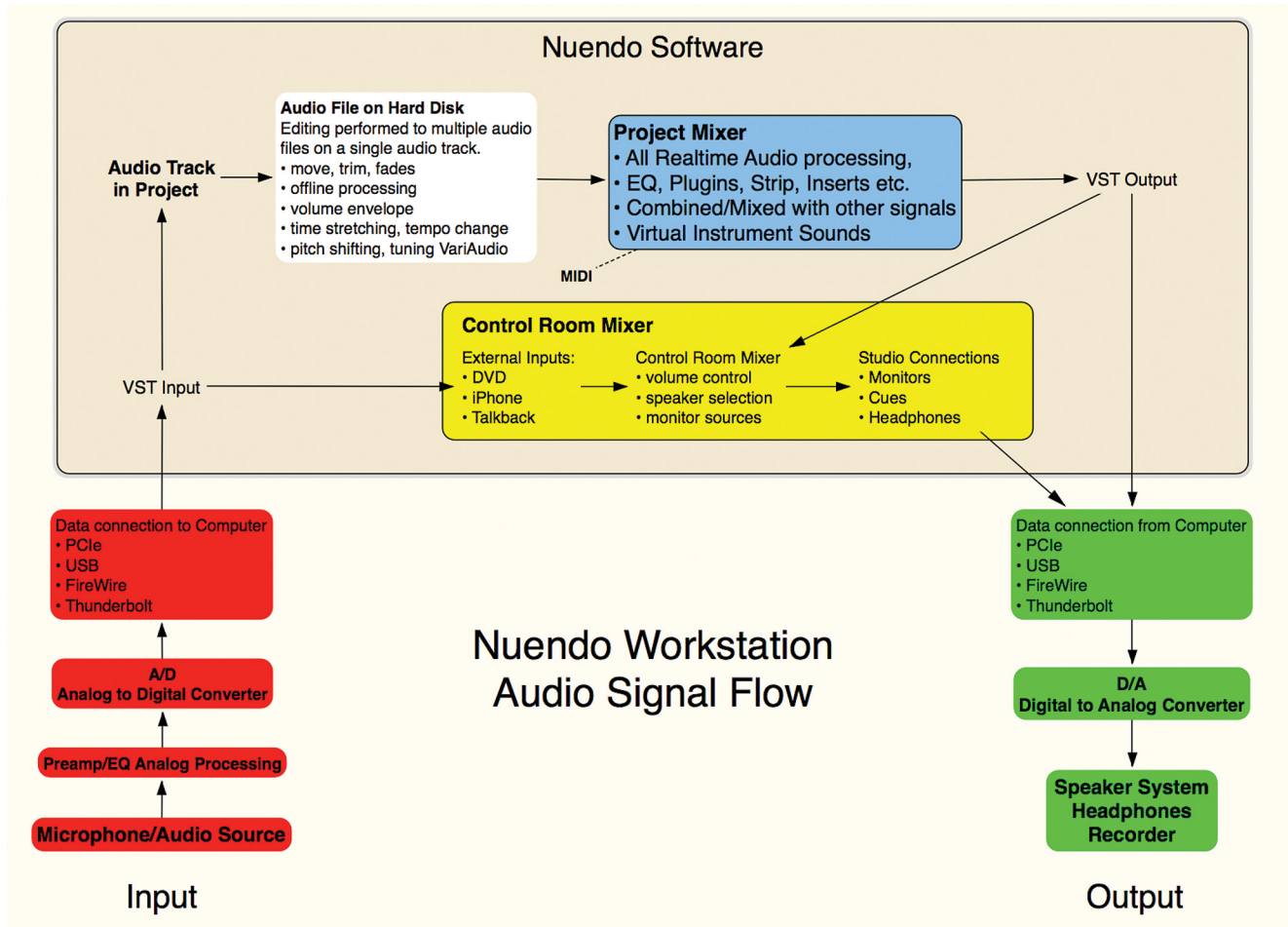


Figure 5.4 Nuendo Workstation Audio Signal Flow

Audio File

The audio file is the complete file written to the hard disk, the original recording itself. This file will remain untouched and in its original form regardless of the processing applied to it or how many edits have been made to it in the project. Originally recorded files are not altered by Nuendo.

Audio Clip

The Audio Clip is a reference to the audio file and any processed portions of that file that are in the Edits folder. For example, if you take a portion of an audio file and time stretch to twice the original length, that portion will be stored in the Edits folder and the Audio Clip will reference that in order to play the audio back with the section of time-stretched sound in the correct position relative to the rest of the audio file.

With this method, you can always return to the original audio recording, undoing the time-stretch easily. This is an important distinction in the file structure. Audio Clips reference the original file and processed portions of the file together so they can be played back as one.

Audio Event

An Audio Event is the portion of an Audio Clip that is in the Project on a track so it can actually be played. Audio Events are how Nuendo associates audio with the timeline of the Project, playing back the bits of audio exactly when they are supposed to be played.

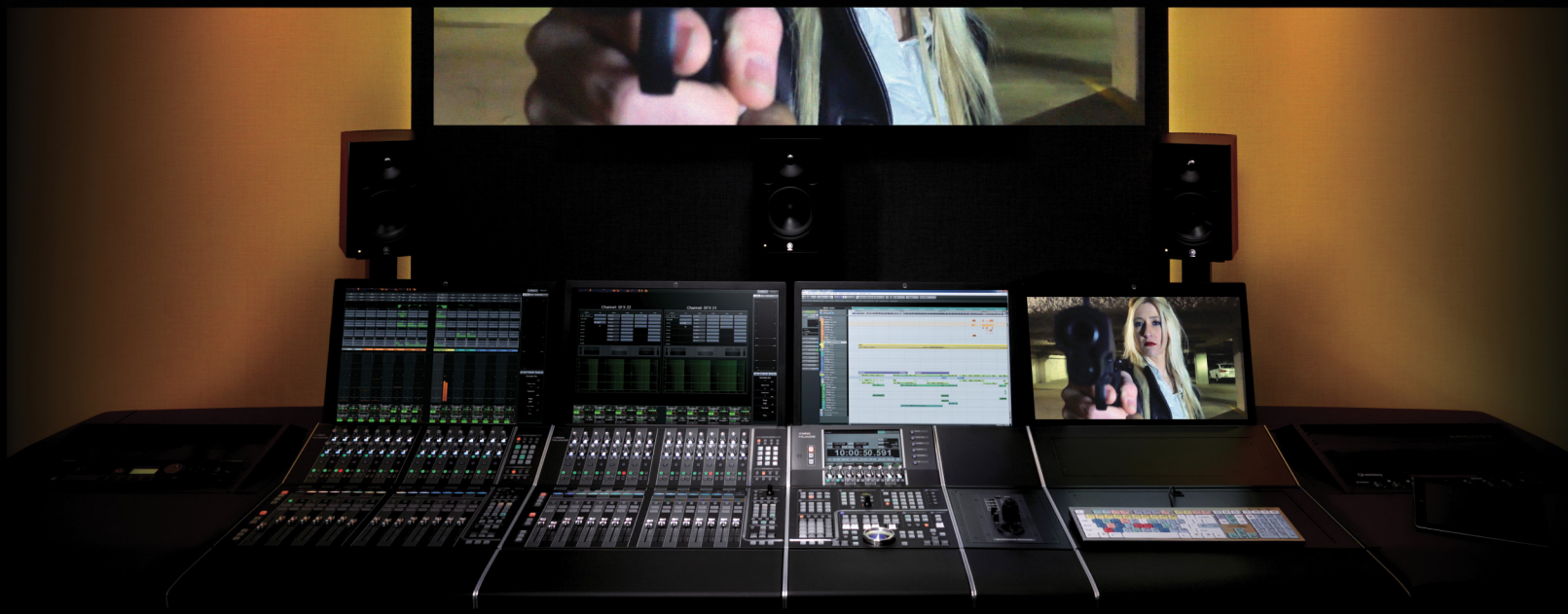
Editing audio in Nuendo means changing parameters of Audio Events in the Project until they are playing back as desired. Those parameters include the following:

- ❖ Start time
- ❖ End time
- ❖ Length
- ❖ Volume (equivalent to Pro Tools' Clip Gain)
- ❖ Fade-in time
- ❖ Fade-out time
- ❖ Transpose (for musical audio)
- ❖ Lock status

It's important to understand the distinction between the audio file, clip, and event as you work in Nuendo so you can use this file structure in creative and efficient ways.

NUAGE

COURSEWARE



PART I: SETTING UP

by Ashley Shepherd

Chapter 6

Nuendo's Basic Layout



NUAGE

Nuendo's Basic Layout

- ❖ Create New Tracks
- ❖ The Project Window
- ❖ Transport Panel
- ❖ The MixConsole

In this chapter, we will get familiar with the various elements and interface of Nuendo's main windows. We'll start with one audio and one MIDI track and take a look at how the GUI works.

Create New Tracks

To create an audio and a MIDI track, follow these steps:

1. Select Add New Track from the Project menu. A submenu with all the various track types will open (see Figure 6.1).
2. Select Audio Track. The Add Audio Track dialog will appear (see Figure 6.2), allowing you to choose the quantity and configuration of audio tracks to be added. The choices for track configuration are diverse to say the least. For now, choose one mono track.
3. From the Add Track menu, choose MIDI Track. The Add MIDI Track dialog will open. Select one and press Add Track. One MIDI track will be created.
4. You should now have two tracks in the Project window. It will look something like Figure 6.3.

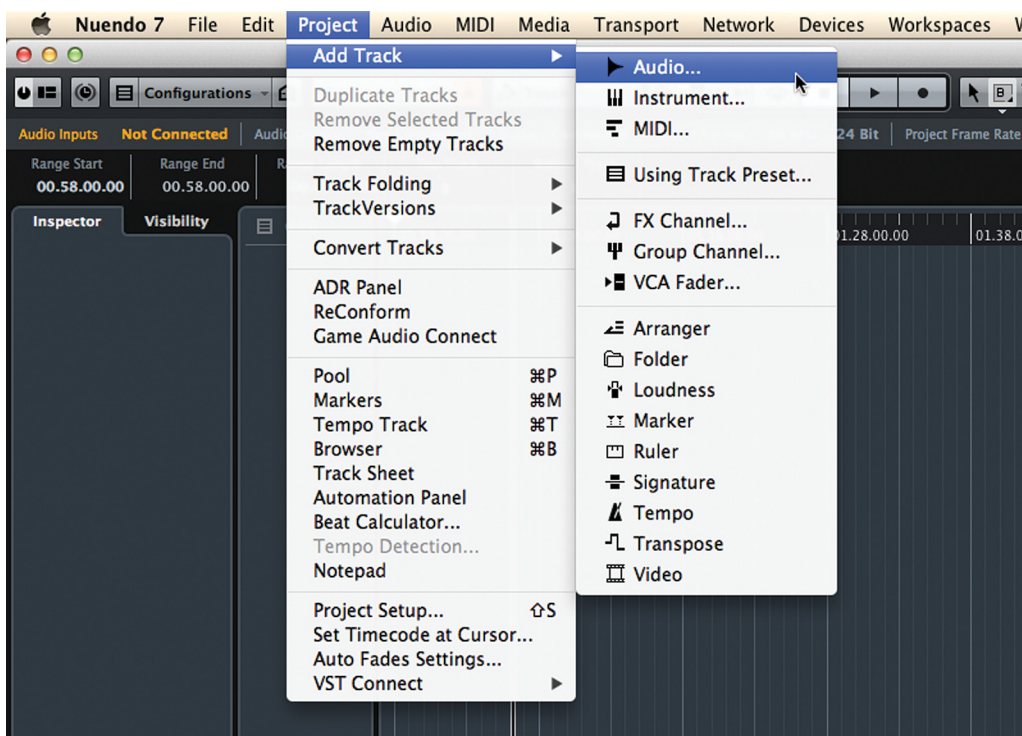


Figure 6.1
Add Track submenu

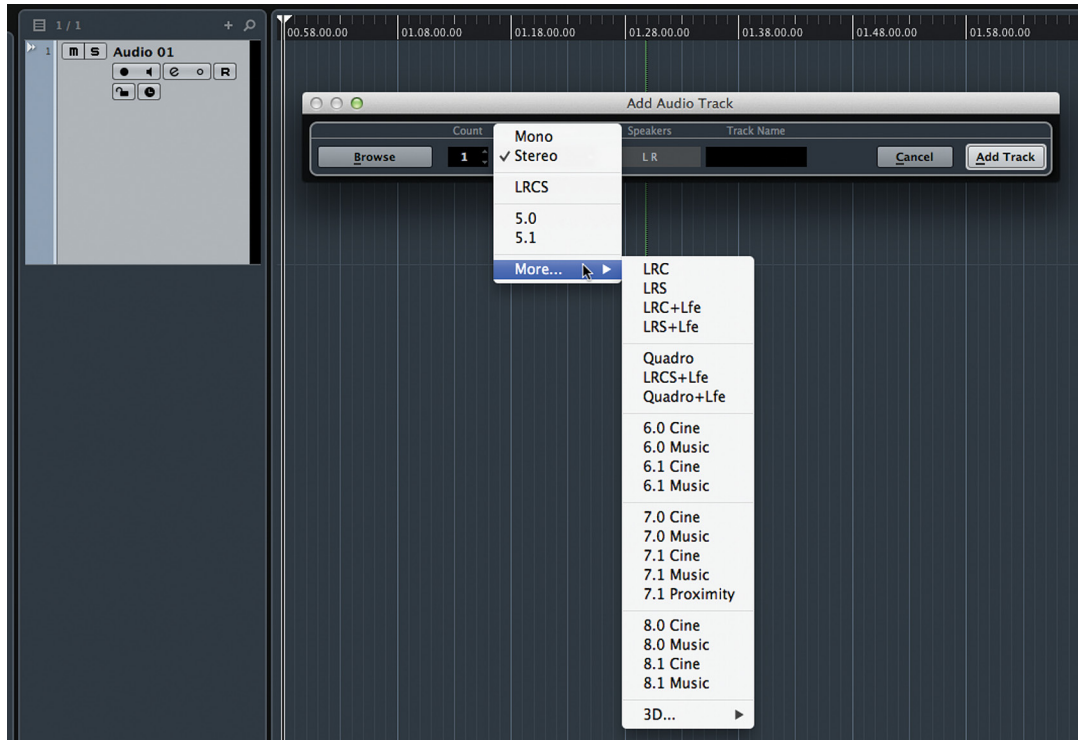


Figure 6.2
Add Audio Track configuration menu

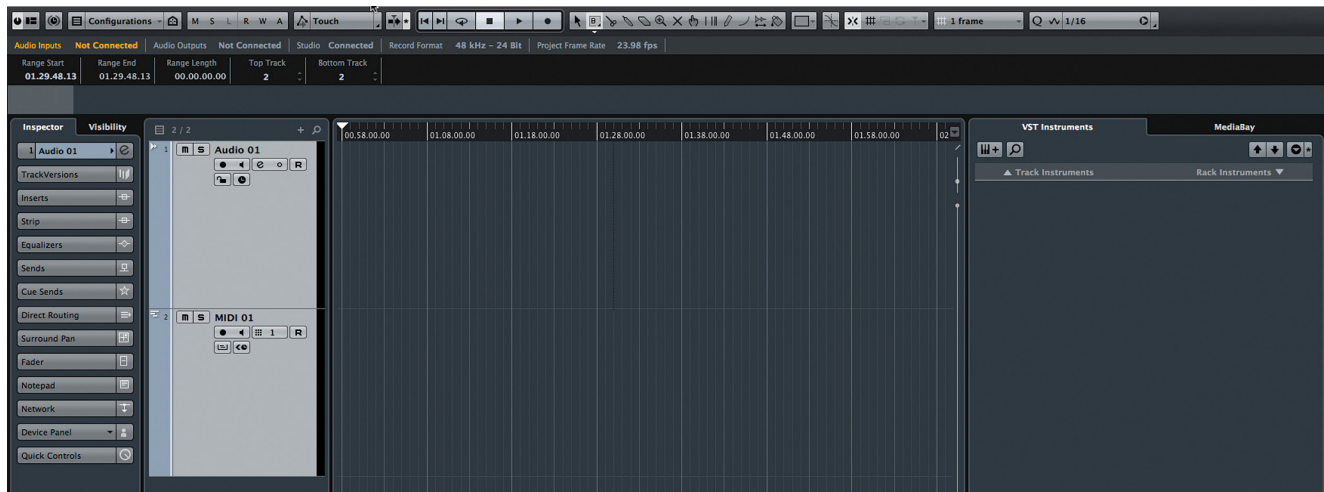


Figure 6.3 Project window with one audio and one MIDI track

The Project Window

The Project window is the main edit window in Nuendo where most of the action takes place. In fact, you could do just about any type of editing or mixing just in this window alone. It is configurable to meet your needs, only displaying the information you want and nothing more.

There are nine areas in the Project window (see Figure 6.4), seven of which are shown by default.

1. Toolbar
2. Status Line
3. Info Line
4. Inspector/Visibility Pane
5. Track List
6. Event Display
7. Ruler
8. Racks Pane (VST Instruments and Mediabay)
9. The Project Overview

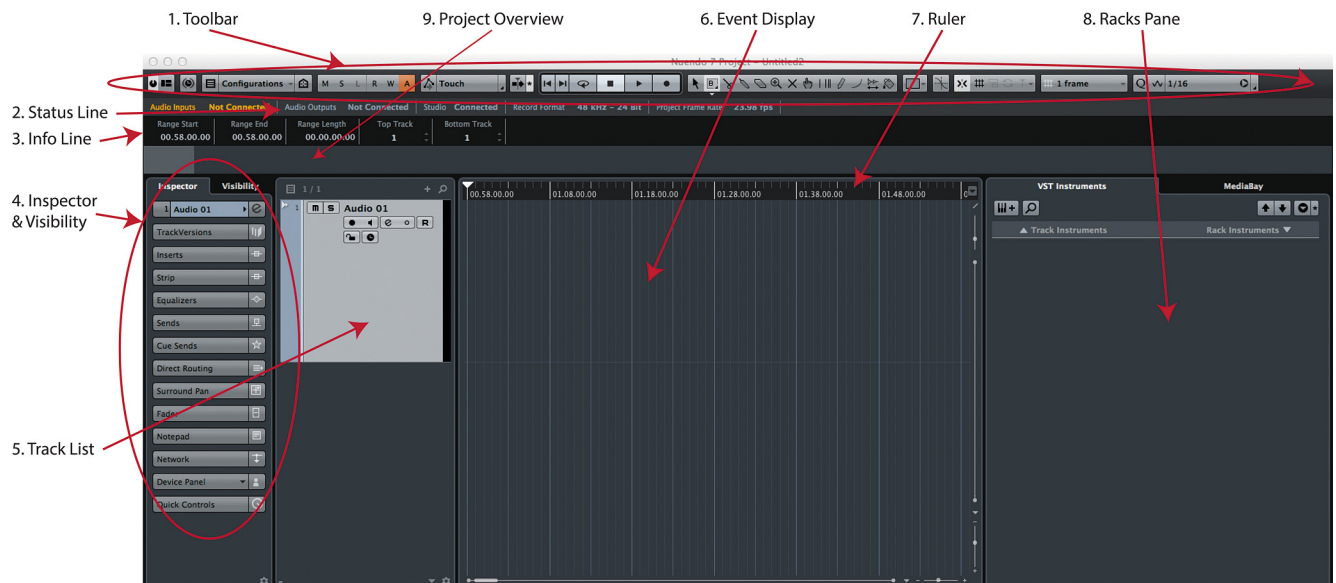


Figure 6.4 The Project window

Window Layout

There are five areas of the Project window that are optional. You may turn them on to see more information or turn them off to make more room. To turn them on or off, press the Setup Window Layout button in the toolbar at top. The Project window will gray out, revealing the display options (see Figure 6.5).

Many windows in Nuendo have this setup option. Just look for the same Setup Windows Layout button in any window to see optional areas.

Check the Overview Line and then click anywhere in the Project window to return. A new line appears below the Status Line showing a black and grey area in our example. This is how you can turn on or off the five optional areas of the Project Window.

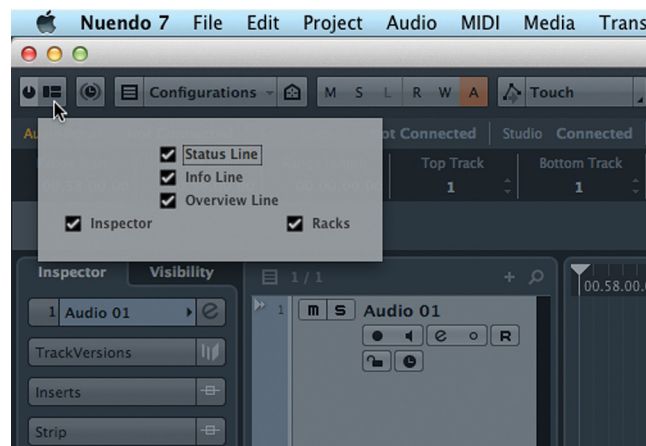


Figure 6.5
Setup Windows
Layout options

Project Overview Line

If there is material in the Project, this Overview Line would show an overview of the entire project. This is useful for navigating very large projects such as feature film or long form television episodes.

Figure 6.6 shows an example of the Overview Line in music project. The gray area indicates the portion of the project that is visible in the Event Display at the current zoom level.

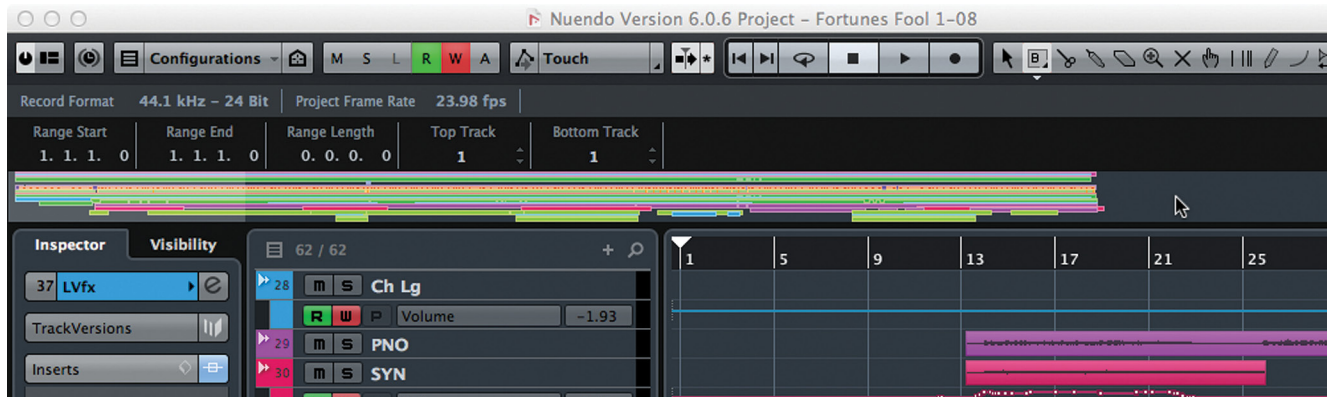


Figure 6.6 Project Overview Line showing several tracks

Project Toolbar

In its basic configuration, the toolbar (see Figure 6.7) contains a slew of editing tools and other controls. The toolbar is configurable to show just the items you wish to use. As each section deals with differing functions within Nuendo, they will be covered in detail in relevant sections of the book. Here, I will give brief descriptions of each to provide the general idea of what each tool can do.

Default Toolbar Controls

1. **Activate Project** – Think of this as a power button for the project. Since Nuendo can have more than one project open at a time, only one can be active. Pressing this button activates the project. The button becomes highlighted when the project is active.
2. **Setup Window Layout** – As discussed above, this allows you to show or hide the optional areas of the Project window.

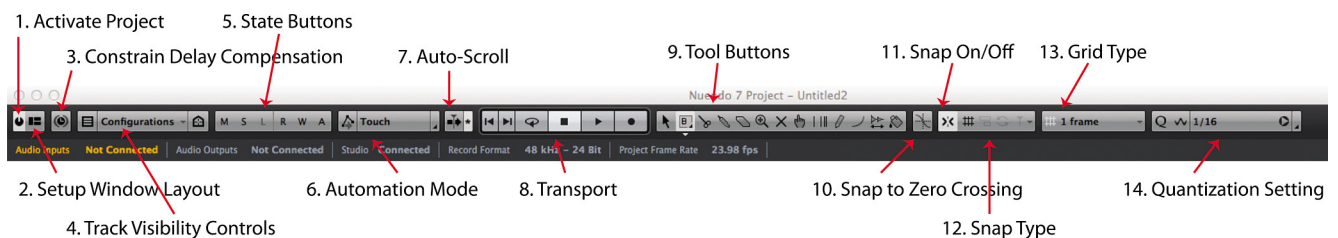


Figure 6.7 The Toolbar with default controls

3. **Constrain Delay Compensation** – This control defeats plug-ins that cause significant delay in the mixing engine so that you may record new material into a project without any monitoring latency.
4. **Track Visibility Controls** – Macros for viewing or hiding tracks.
5. **State Buttons** – These are global controls for tracks affecting solo/mute/Listen and automation status.
6. **Automation Mode** – This allows you to change the basic automation mode for Nuendo: Touch, Auto-Latch or Cross-Over. These are just the very basic write modes of the automation system. Nuendo's automation system is very sophisticated and will be covered in depth in Part IV: Mixing.
7. **Auto-Scroll** – This turns Auto-Scroll on or off, allowing the event display to follow the playback cursor as it moves through the project.
8. **Transport** – These are the basic transport controls. Complete transport controls are available from the Transport panel.
9. **Tool Buttons** – These buttons activate editing tools for use in the Event Display. These buttons are used to select the various tools and also to indicate which tool is currently active. Complete discussion of all the tools can be found in Part III: Editing.
10. **Snap to Zero Crossing** – When editing audio, this setting will force the edit to snap to points where the waveform crosses the zero point, avoiding pops and clicks in playback.
11. **Snap On/Off** – This activates the Snap function for editing in the Event Display. There are a tremendous number of uses for Snap, and they will be covered in Part III: Editing.
12. **Snap Type** – This determines the type of Snap that is being used. There are eight choices for greater flexibility in editing.
13. **Grid Type** – When the grid is used for Snap editing, this defines the grid values. A complete discussion on the grid and its uses will be in Part III: Editing.
14. **Quantization Setting** – This gives you quick access to common quantization settings. Complete quantization tools are available from the MIDI Menu>Quantize Setup.

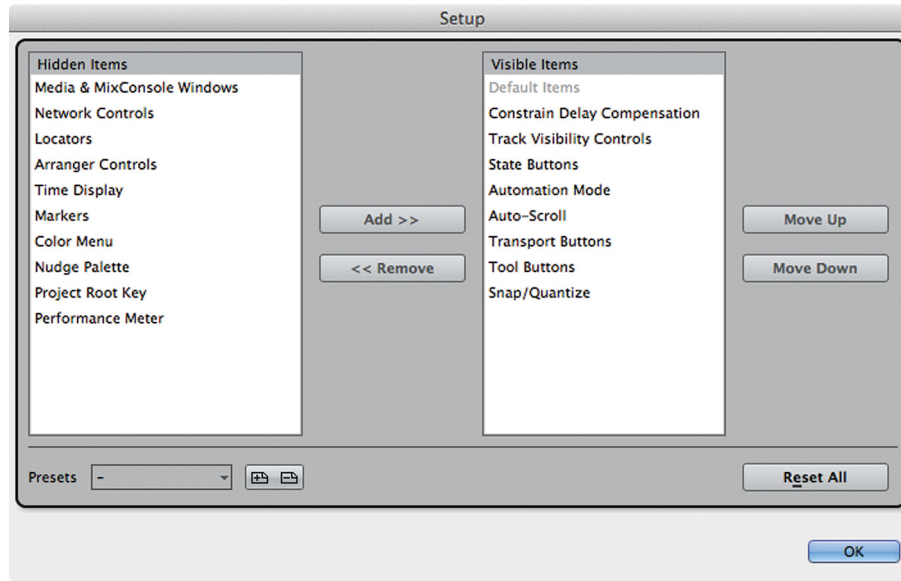


Figure 6.8
Toolbar Setup
dialog

Those are just the default controls. By right-clicking (Windows) or control+clicking (OS X) anywhere in the toolbar, you will open a popup menu with all the available controls for the toolbar plus a Setup option to configure how they are displayed (see Figure 6.8). Select the Setup... option to open the Toolbar Setup.

Certain controls are grouped together for display, such as Snap/Quantize. In the Setup dialog, you may select which controls are visible and in what order they appear on the Toolbar. To make controls visible, select them in the right window and press the left arrow button to move them to the “Visible” side. Once there, you can select controls and either press the Move up or Move down buttons to change the order in which they appear in the Toolbar.

Since these tools are things that are used literally hundreds of times per session, their configuration and position in the Project window can be critically important to workflow efficiency. The Toolbar Setup allows you to customize the toolbar to meet your needs and workflow.

Once you have configured the toolbar to your preference, that setup can be saved as a preset using the preset tools at the bottom right of the dialog. You could create several presets designed for different types of work where tools that are most important can be put in convenient places on the Toolbar.

CUSTOMIZE GRADUALLY

This high degree of customization is available throughout Nuendo, accommodating a variety of workflow styles to match the needs of users. It takes some time to explore these possibilities and come to the right solution for your needs. The best advice is to work using the default settings and identify tasks and tools you use most often. Then search for the most efficient shortcut or preference that will help speed up those operations, one at a time. That way, the customization can be worked in gradually. This should yield the best working setup without overwhelming you with all the possibilities of customization.

I will attempt to provide examples of customization that have helped my workflow as starting points for you to create your own customized workspace and tools.

CUSTOMIZATION TIPS

I tend to use the default settings for the Toolbar minus hiding the automation mode, as I use the Automation Panel exclusively. The other tools I use as a visual reference since the display also indicates which tools are active and what their status is. For example, I can easily see which editing tool I am currently set to use. The transport tools quickly allow me to see if I am in play or record modes. I use key commands to switch tools and modes more often than clicking the buttons on the Toolbar. With Nuage, many of these functions and more are accessed from the hardware units.

Alternate Toolbar Controls

There are nine hidden controls in the default Toolbar setup (see Figure 6.9). The following is a brief description of each of those tools.

1. **Media and MixConsole Windows** – These buttons open mixer windows (Main mixer and Control Room mixer) and media management windows (the Pool and MediaBay).
2. **Network Controls** – Nuendo can have multiple users editing one project over a network. These are the basic controls for activating and updating the network.
3. **Left and Right Locators** – The left and right locators are fundamental to many tasks in Nuendo. These tools are just one of many ways to utilize these important items.

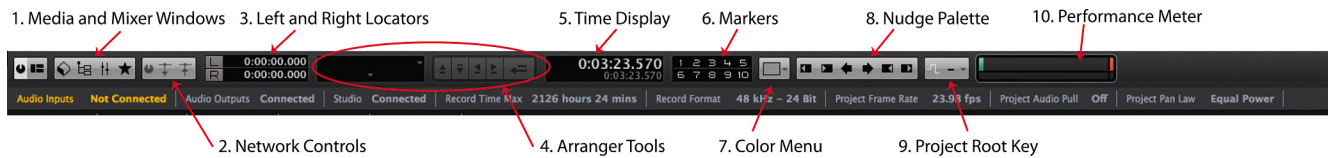


Figure 6.9 Alternate Toolbar controls

4. **Arranger Tools** – The Arranger tool is a compositional tool used to quickly rearrange portions of a project to try out various arrangements of a song.
5. **Time Display** – Shows the position of the playback cursor in various formats: Bars:Beats, timecode, etc.
6. **Markers** – An unlimited amount of markers may be placed on multiple marker tracks in a Project. These controls allow access to the first 10 markers on the active marker track.
7. **Color Menu** – Each track and even each event can have different colors.
8. **Nudge Palette** – The nudge palette allows for controlled editing of events in the project. Nudging will be covered in Part III: Editing.
9. **Project Root Key** – The Project Root Key works with the Arrangement tools to aid composition by allowing a global key change of the entire project.
10. **Performance Meter** – These two indicators show the status of the CPU and hard disk usage.

The Status Line

The Status Line (see Figure 6.10) displays the basic settings from the Project Setup window. Clicking on the Info line will open the Project Setup in order to make changes.

It is possible to change what is displayed in the same fashion as the Toolbar. Right-click (Windows) or Control-click (OS X) anywhere in the Status line to access the Setup popup window and uncheck items you do not want to see. You may also use the Setup dialog to create presets for the Status line.

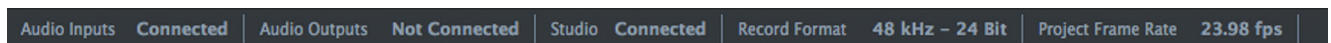


Figure 6.10 The Status Line

Available Record Time

The one added display is the available recording time as calculated by the audio format choices and the amount of audio tracks in record. For example, if you have one mono audio track in record, the available record time could be many hours depending on the hard disk space available. If you were to add a 5.1 audio track and place it in record, the available record time would diminish greatly as you have added six additional channels.

This display will count down while you are recording to give you a real-time idea of how much space you have left on the hard disk. This can be an indispensable tool for live recording.

LARGER TIME DISPLAY

If you click on the available record time, a larger floating display window will open that can be seen from across the room!

The Info Line

The Info line is a powerful part of the Project window interface. For every item or event in the Event display, there are a series of details associated with that event. The details depend on what type of event it is, whether an audio event, MIDI note, etc. The Info line lists these details and allows you to edit them directly. Figure 6.11 shows the complete Info line for an audio event.

The Info line for an Audio event is one of the most complex as there are so many details for this type of event.

1. **File Name** – This is the actual name of the audio file recorded on disk referenced by this audio event. Changing this field will actually change the name of the file on the disk.
2. **Description** – This field allows for a unique description of this specific event. This information is only for within Nuendo and does not affect the audio file on disk. It will change the event's name in the Event display.

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
File	Description	Start	End	Length	Offset	Snap	Fade-In	Fade-Out	Volume	Lock	Transpose	Fine-Tune	Global Transpose	Root Key	Mute
Audio_01_01	Audio_01_01	00:58:00.00	00:58:05.17	00:00:05.17	00:00:00.23	00:58:00.00	00:00:00.00	00:00:00.00	0.00	-	0	0	Follow	-	-

Figure 6.11 Audio Event Info Line

3. **Start** – This field shows the start time for the event. It will be displayed in the same format as the Ruler line. This can be changed at any time to represent the start time in another format such as SMPTE timecode or minutes and seconds. All the time-based fields in the Status line reflect the format of the Project Ruler.
4. **End** – This field indicates where the event ends in time.
5. **Length** – This field indicates the amount of time between the start and end of the event. Editing this value will result in the End value changing/moving.
6. **Offset** – This field indicates how far the visible audio is from the beginning of the actual audio file. It is related to Sizing Moves Contents editing mode and will be discussed in detail in Part III: Editing.
7. **Snap** – This field indicates where the Snap Point is located within the event. That will be the position that the Snap function will use to line up this event.
8. **Fade-in** – This field indicates the length of the fade-in for this event. Fades in Nuendo are calculated in real time and are not rendered files as in Pro Tools, so this value can be changed on the fly without any need to render a fade file.
9. **Fade-out** – This field indicates the length of the fade-out for this event.
10. **Volume** – This field indicates the gain adjustment applied to this event. With a range of +20 dB to -infinity, the gain adjustment is a simple and powerful way to adjust the volume of various audio events before they enter Nuendo's mixer, perfect for vocal comping.
11. **Lock** – Various elements of an audio event can be locked from further editing. This field indicates what they are, and the lock status can be edited directly here.
12. **Transpose** – This field allows an audio event to be pitch shifted to follow musical key changes, in half-step increments.
13. **Fine-Tune** – This field allows you to apply pitch shifting in amounts as little as 1 cent (100 cents = 1 semi-tone).
14. **Global Transpose** – This field determines if this audio event will follow any global transpositions or if it is independently transposed.
15. **Root Key** – This field determines what the root key of this audio event is, which will affect how it reacts to global key changes.
16. **Mute** – This field indicates whether this audio event is muted or not.

Name	Start	End	Length	Offset	Mute	Lock	Transpose	Global Transpose	Velocity	Root Key
MIDI 01	00.58.00.18	00.58.03.13	00.00.02.19	00.00.00.00	-	-	0	Follow	0	-

Figure 6.12 MIDI Event Info line

As a comparison, Figure 6.12 shows the Info line for a single MIDI note. Info lines are different for all objects in the event display. As each event is discussed, the Info line will be used to change various aspects and behaviors of the event.

The Ruler Line

The Ruler line displays time in several formats. The format of the Ruler line also defines the time display in many other fields within Nuendo. Changing this format will change how data is displayed in other places such as the Info line. Changing the Ruler line to display Timecode will cause all of the time-based fields in the Info line to show timecode values. This also affects things like the grid values for the Snap function and much more.

To change the Ruler line format, right-click (Windows) or control-click (OS X) to access the time format popup menu (see Figure 6.13). Choose from one of the 7 possible time formats.

Ruler Timebase

The other option available in this menu is how time is scaled in the Ruler. This relates to tempo changes and how they are displayed. For example, if the tempo changes from 120 bpm to 80 bpm, how will that be shown in the ruler? Will the beats be farther apart? Will timecode frames be closer together after the tempo change? It depends on how time is scaled in the ruler or the timebase.

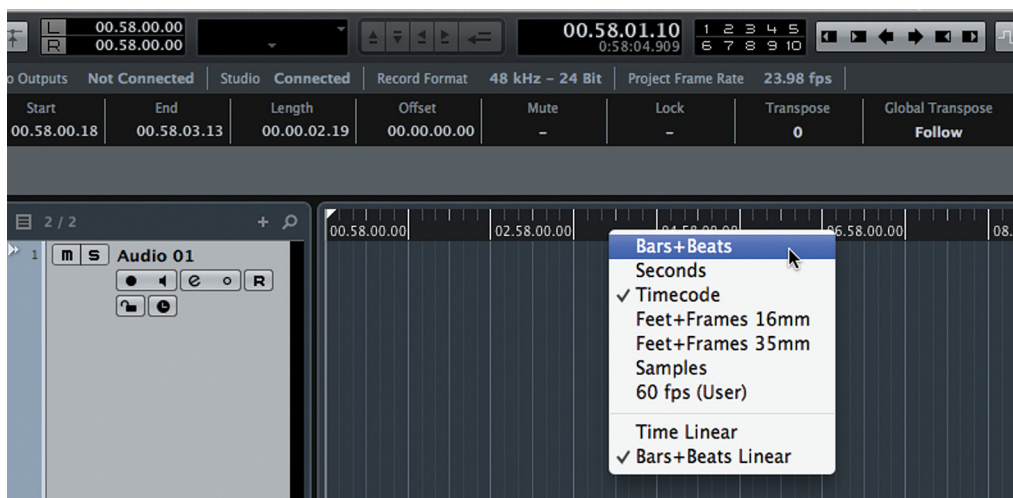


Figure 6.13 Time format popup menu

CLARIFIED TERMINOLOGY

Steinberg uses certain terms that could lead to some confusion, especially when you're first becoming familiar with their software. Most of their terminology is based on industry-standard words but some have overlapping meanings and should be clarified:

- ❖ **Event** – An Event is anything that can be played back in Nuendo, be it audio, MIDI, video, automation, or a tempo change for example. You could think of it like this: “Anything that happens in a project is considered an Event.” The chunks of audio in the project window are called Audio Events, the point at which the tempo map changes is called a Tempo Change Event, each MIDI note is a MIDI Event, and so on. This is fundamental to the way Nuendo and Cubase are described in their documentation and in this material.
- ❖ **Track** – A track traditionally referred to a tape machine track on which audio could be recorded. In Nuendo, a track refers to any display of information on the Track List and in the Event Display that can change over time or be recorded in real time. For example, automation data will occupy a *track* in Nuendo since it can be changed over time. Tempo can be changed so it too will occupy a track. Even markers can change over time. Hence, it's called a Marker track.
- ❖ **Channel** – A channel refers to anything that will be displayed in Nuendo's MixConsole. Every channel has a fader that adjusts the volume of some signal, whether it be audio or MIDI. Since all channels can be automated, they will be represented in a track. For example, a Group Channel Track is the representation of a Group Channel from the MixConsole in the track list and the event display will show automation data for that Group Channel. A Folder Track does not have a corresponding Folder Channel since there is no signal to control for a Folder.
- ❖ **Bus** – A bus is defined as a signal path where more than one signal can be combined together, hence the terms 'Mix Bus' or 'Group Bus.' This is a standard audio term that is often misused. Buses are often referred to as paths that take a signal to some destination, such as a recording track or effects unit. While that is true, any audio path can route a signal to some destination but what makes a bus unique is the ability to combine or mix multiple signals together.

BUSES AND INPUTS

Steinberg's VST Inputs are not technically buses since they cannot combine multiple inputs together in any way. Multiple signals cannot be combined on a VST Input except through the use of an external *bus* before the signal enters Nuendo. Otherwise, the term “bus” is used properly in Nuendo. I will still refer to the VST Inputs as buses to remain with Steinberg's conventions.

If set to the default Time Linear mode, musical bar indicators will be spread out further when the tempo is 80 bpm to match the greater time between beats. If the timebase is set to Bars+Beats Linear, bar indicators will remain at the same distance from each other while time-code values would be placed closer to each other when the tempo is slower and further from each other when the tempo is fast.

This can be most helpful in scoring to picture as drastic tempo changes can make it hard to edit musical events if they are placed too close together or far apart. Bars+Beats Linear keeps them the same distance from each other regardless of tempo.

The Track List

The track list is to the left side of the Project window where every track in the Project is displayed. A variety of controls can be accessed here along with the ability to resize and re-order the tracks. There are many types of tracks that can be added to a project and each one has its own default settings for what is visible in the track list. Figure 6.14 shows the track list with one of each type of track displayed with their default controls. (Note that some track types are available only in Nuendo.)

1. **Audio Track** – Record, edit, and playback audio events.
2. **MIDI Track** – Record, edit, and playback MIDI events.
3. **Instrument Track** - An Instrument Track combines a MIDI track with a virtual instrument (VSTi) making it quick and easy to start sequencing music with virtual sounds.
4. **Folder Track** – Folder tracks are merely containers for other tracks. They are very helpful in organizing a large number of tracks. Related tracks of any sort may be placed in a folder track. The folder track can be closed to hide these tracks from the track list. Folders can also be used to enable group editing of tracks inside the folder.
5. **Group Channel Track**– Group Channel tracks are audio buses used to process and mix combinations of audio signals from other tracks in the project. For example, you would use a group channel to bus a bunch of background vocals together in order to process them as a whole (EQ, compress, etc.) and mix them back in with the rest of the music. When a Group Channel is created, it is placed in a folder called “Group Tracks.”



Figure 6.14
Track List with
all types

6. **FX Channel Track** – This track type is almost exactly like a Group Channel track except that the Add Track dialog allows you to choose a plug-in for the first insert slot. Typically, auxiliary sends (aux sends) would be routed to FX Channels for the purposes of generating reverb, etc. In the routing pulldown menus, FX Channels have their own submenu area for easier routing at the top of the destination list. Also, newly created channels can have their aux sends pre-configured to FX channels as a preference. Their controls are identical to Group Channels. When an FX Channel is created, it is placed in a folder called “FX Channels.”
7. **VCA Channel Track** – VCA Channels are used to control the levels of multiple channels at once without actually routing those signals together on a Group Channel. The VCA Channel track is used to see and edit automation written by the VCA fader.

8. **Marker Track** - As the name implies, Marker tracks are used to place identification points along the timeline of the project. Markers can be single points or a range of time called a Cycle Marker. You may have multiple marker tracks in one project (Nuendo only), very handy for film work and cue sheets.
9. **Ruler Track** – A Ruler Track is used to represent time in various formats along the event display. In addition to the Ruler at the top of the event display, you may place multiple ruler tracks within the track list at any point.
10. **Loudness Track** - The Loudness Tracks can record the measurement of loudness units a project is generating to make a visual representation of the loudness measurement over time.
11. **Video Track** – Video Tracks are for placing video files as video events in the timeline of a project. Video events can be edited just like other events.
12. **Tempo Track** – Every project contains a tempo track. Creating this track in the track list just allows you to view the information right in the event display. Tempo change events can be edited directly in the event display. By default, there is always one tempo event at the very start of the project.
13. **Time Signature Track** – Changing the time signature alters how many beats there are per bar and what value each beat has. This track displays any time signature events. By default, there is always one time signature event at the very start of the project.
14. **Transpose Track** – This track type displays any transpose events that occur in the project.
15. **Arranger Track** - The Arranger Track is a composition tool for quickly auditioning various musical arrangements using cycle markers.
16. **Chord Track** – The Chord Track is a compositional tool to create harmonic structures that other MIDI and Audio tracks will follow, allowing you to audition changes in harmony in real time.
17. **VST Input Channel Track** – It is possible to create a VST Input Channel track by recording automation using the mixer on a VST Input Channel. Only then will a track be created in the track list to display those automation events.

18. **VST Output Channel Track** – The same is true for automation written for a VST Output Channel. Writing automation with that output channel in the mixer causes a VST Output Channel track to be created in the track list. Otherwise, they will not be visible.
19. **VSTi Channel Track** – Virtual Instruments may be loaded as Rack Instruments (unlike Instrument Tracks) so that multiple MIDI tracks can then be routed to the one VSTi. Multi-output VSTi's create multiple VSTi Channels, one for each output. When a VSTi is loaded as a rack instrument, its channels are placed in a folder called "VST Instruments."
20. **Rewire Tracks** – When Rewire is enabled, Rewire tracks are created for each Rewire channel in the mixer.

Signal Meters

Every track that passes either an audio or MIDI signal has a meter associated with it. For MIDI, the signal meter displays the velocity level of notes and a fixed level for continuous controller data.

In the Track List, the meters are just to the right of the list.

Track Control Settings

In the track list, various controls for each track type are displayed. By default, not all available controls are shown. In order to configure which controls are visible in the track list, right-click (Windows) or control-click (OS X) on a track in the track list and choose Track Control Settings from the popup menu or click the settings icon at the bottom of the list. This will open the Track Control Settings dialog (Figure 6.15) that should be familiar after seeing the Inspector and Toolbar Setup dialogs.

Select the type of track by tab at top and you can then choose which controls are visible and change the order to your preference. These settings may be stored as a preset for later recall. You may enter the number of characters in the length field to determine how many characters of the track name will be shown before being cut off in the display.

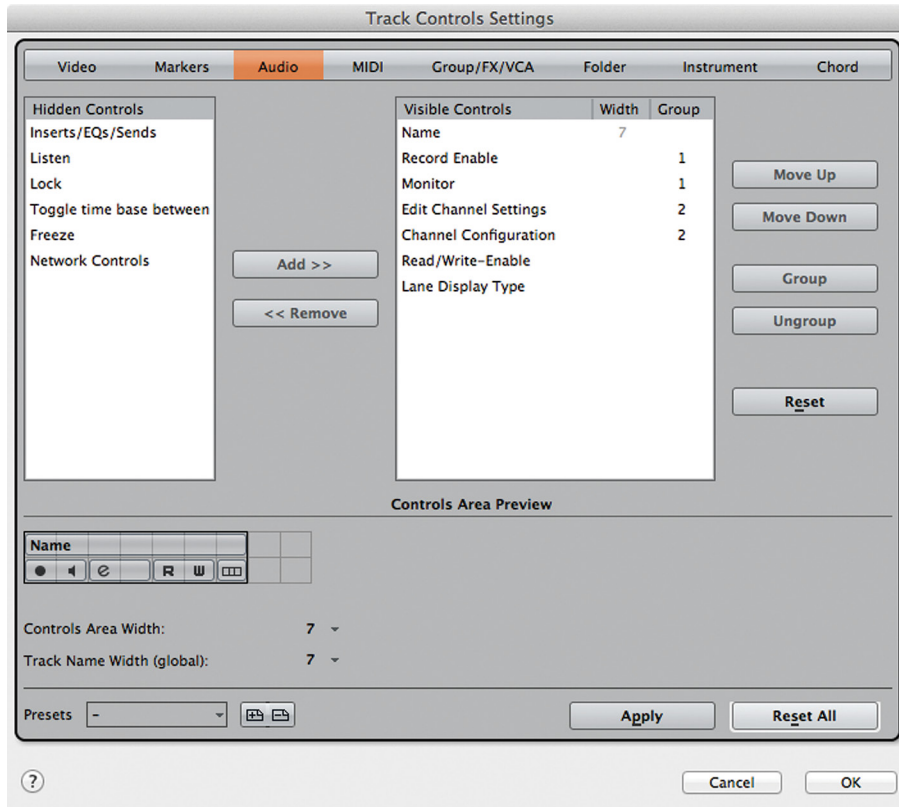


Figure 6.15
Track Control Settings

Track Control Position and Grouping

In the lower area of the Control Settings window there is a preview of how the controls will be displayed in the track list. The outlined box represents the width of the control area and can be changed to fit best with certain workflow methods, as seen in Figure 6.16.

Since these settings can be saved as presets, you can quickly reconfigure the controls based on the type of work you are performing at the time; for example, you could have one setup for editing and another for mixing.

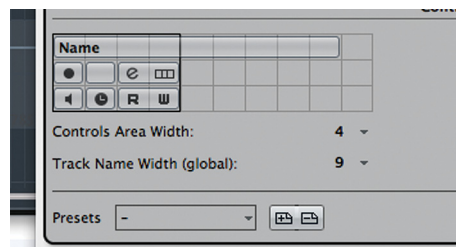


Figure 6.16
Control Area Preview

DEEP CUSTOMIZATION

The depth of Nuendo's customization capabilities can be daunting for first-time users. Just about every function in Nuendo has some form of customization available, including preferences. Every command in Nuendo has the ability to be assigned to a key command. Macros can be made to perform a series of commands all at once. The list goes on and on.

I could not imagine any one user actually using all of this customization. But that's really the point. The customization is there because everyone works differently and needs to perform different tasks that require specific tools and workflows. Nuendo gives you the flexibility to create custom workspaces and toolsets to meet just about any need.

However, if you are a first-time DAW user or are new to Nuendo, just start with all the default settings, which should get you through most tasks quite easily and are well thought out. After using the software for a while, you will inevitably find some tasks that you perform that are repetitive or not convenient in the default configuration. At that point, explore the possibility of creating a key command or reconfiguring how the controls appear to improve your efficiency.

Many of these controls are things you could easily use thousands of times a day. The ability to precisely position and configure them can save hours of valuable time in the long run. Customization at this deep level should be taken one step at a time to be effective. The possibilities are endless.

The Inspector

The Inspector displays all relevant controls and settings for the selected track in the track list. Once you select a track from the track list, the inspector displays information about that track. If no track is selected, the inspector is empty.

Each track type has a unique set of controls. Selecting a track of a different type will change the information displayed in the Inspector. Controls are grouped into expandable tabs. Depending on your screen size, there is room to open more than one tab, letting you see the equalizer and inserts or an audio track, for example. There are many controls and a great deal of information contained in the Inspector, so the ability to view only certain tabs keeps the GUI focused on just the relevant information.

Figure 6.17 shows the Inspector for both an audio and a MIDI track. By default, the Inspector starts with only the top tab open. This tab is called "Basics" since it contains fundamental controls and information about this track, including its name.

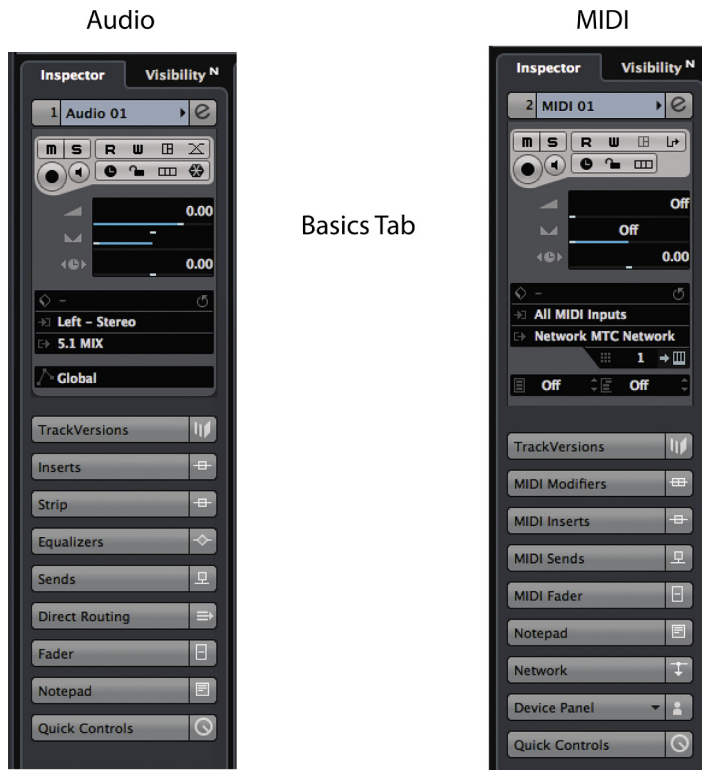


Figure 6.17
The Inspector for an Audio and MIDI track with Basics tab open

The Basic tab contains a condensed set of controls that cover many functions. At the top is the name of the track and what number it is in the track list. You can double-click here and change the name of the track. The little triangle icon accesses the color palette for that track. The “e” button opens up the Edit Channel Settings window, which is discussed later in this chapter. And that’s about all that is shared between the two different track types, Audio and MIDI.

Audio Track Inspector

There are a total of 14 possible tabs for an audio track. By default, only six are displayed but all 14 are available and may be placed in preset configurations for various types of working methods. Just like the Toolbar, the Inspector has the same customization dialog (see Figure 6.18). You can access this setup dialog by right-clicking (Windows) or control-clicking (OS X) anywhere in the Inspector or by clicking the settings icon at the bottom of the Inspector pane.

The following is a breakdown of all the Inspector tabs for an Audio track.



Figure 6.18
Inspector Setup
dialog

The Basics Tab

The Basics tab (see Figure 6.19) contains a blend of controls that affect editing and mixing. It is the most complex of all the tabs. The controls are duplicated in several other places in the GUI, as are most things in Nuendo, giving you more versatile access to the things you use most.

1. **Track Name** – Name of the track.
2. **Track Number** – Number of the track in the track list. Moving tracks up or down in the track list will change this number.
3. **Mute** – Mutes this track just like on any mixer. There is a duplicate of the same button on the MixConsole.
4. **Solo** – This solos the track using the solo-in-place method, which mutes all other tracks.
5. **Automation Read** – Enables automation reading.
6. **Automation Write** – Enables automation writing.
7. **Record Enable** – This places the audio track in record-ready.
8. **Monitor** – Enabling Monitor allows audio from the input to pass through the channel for monitoring purposes. This can automatically be enabled when Record is enabled via a preference setting. Complete details can be found in Part II: Recording.

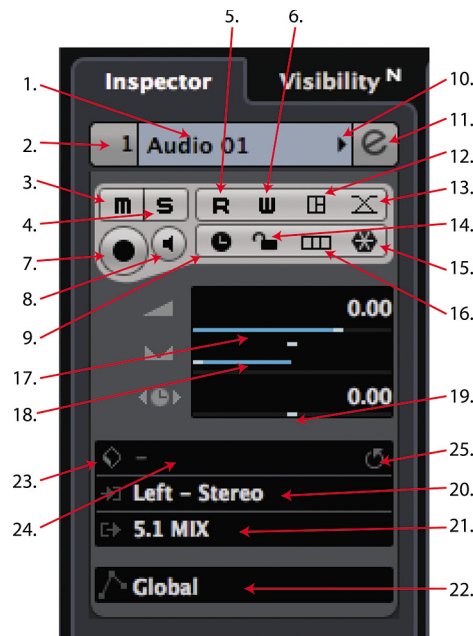


Figure 6.19
The “Basics”
Inspector tab
for an audio
track

9. **Timebase Toggle** – Audio tracks can reference a linear timebase (default) or musical (bars+beats) timebase that will follow tempo changes, time-stretching the audio accordingly. In Linear mode, audio will always play back at the same speed regardless of tempo changes.

Note: I have encountered clients who, recording at home, have inadvertently set audio tracks to musical timebase. Sometimes this happens by default in Cubase. Any tempo changes applied to the project cause re-positioning of all audio files on these tracks. Always double-check the timebase on audio tracks when changing tempos and avoid this problem.

10. **Device Panel** – Opens the Device Panel editor for this track. Device Panels are the same as MIDI device panels where you can create a custom set of controls for this track.
11. **Auto-Fade Setting** – This button opens the auto-fade dialog to turn auto-fades on or off and make adjustments to them. This is covered in Part III: Editing.
12. **Lock** – Enabling lock on an audio tracks prevents any further editing of audio events in the event display.

13. **Freeze** – This button invokes the Freeze function, which effectively records the processed audio through the channel to disk and disables all plug-ins to conserve DSP resources. Information on freezing tracks is in Part IV: Mixing.
14. **Lane Display Type** – This popup enables the use of recording “lanes,” which allow multiple takes of audio to be “stacked” on one track. The lanes can then be compiled (comped) into a finished performance by editing. Lanes are covered in Part II: Recording and Part III: Editing.
15. **Channel Fader** – This horizontally oriented slider is the main channel volume fader. It operates just like its larger counterpart in the mixer.
16. **Channel Pan** – This panner operates just like the pan in the mixer. There are three stereo modes that are covered in Part IV: Mixing.
17. **Track Delay** – Don’t let the name fool you. Not only can this control delay the signal through the channel but negative settings will cause the signal to arrive earlier, very handy for adjusting the phase between multiple microphones on a single source (think “drum rooms mics” or “lavalier and shotgun”). Use shift when adjusting to get fine resolution of less than 1 ms.
18. **Input Selection** – This pulldown menu lists all available inputs, including group channels, the Talkback and Control Room External Inputs, as recording sources. The channel width of the input must match that of the audio track in order for it to be available. Child buses can be an answer to this and mono channels of any input are available to mono audio tracks. For example, a stereo audio track cannot record from a mono or 5.1 input.
19. **Output Selection** – This pulldown menu allows you to select the main output channel for this track. All FX channels, Group channels, and VST Output buses are available as destinations regardless of the channel width. Nuendo handles down-mixing automatically (5.1 > Stereo) and uses a panner when the output width is larger than the track width (Mono > 5.1).
20. **Automation Mode** – You can set the audio track to follow the global automation mode or set it independently using this pulldown menu. For example, the dialog group could be in Trim mode while the SFX group is in Latch.
21. **Preset Management** – You can save all the current settings for this channel as a preset. It is possible to attach attributes to help categorize presets; vocal, drums, dialog etc. You can create huge libraries of presets that can be easily searched and recalled (see Figure 6.20).



Figure 6.20 Load Track Preset browser with attribute search

22. **Track Preset Menu** – This small icon opens up a powerful media browser to help you search for Track Presets, audition them, and then load them into the track.
23. **Reload Preset** – If you load a preset and then adjust some controls, you may reload that preset to revert to its original settings.

THE PRESET MANAGEMENT ICON

Wherever you see the Preset Management icon (see Figure 6.21), you will have access to the preset browser. This icon appears in many areas of Nuendo and is a global tool you can recognize.



Figure 6.21
Preset Management
Global Icon

Track Versions

This tab allows you to view, create, or delete Track Versions. Track Versions are variations on the editing for this particular track. For example, if you have multiple takes of the lead vocal of a song, you can create an edited composite and then create a new Track Version to try a variation on the edit. It is possible to switch between each Track Version to hear the two composite vocal edits.

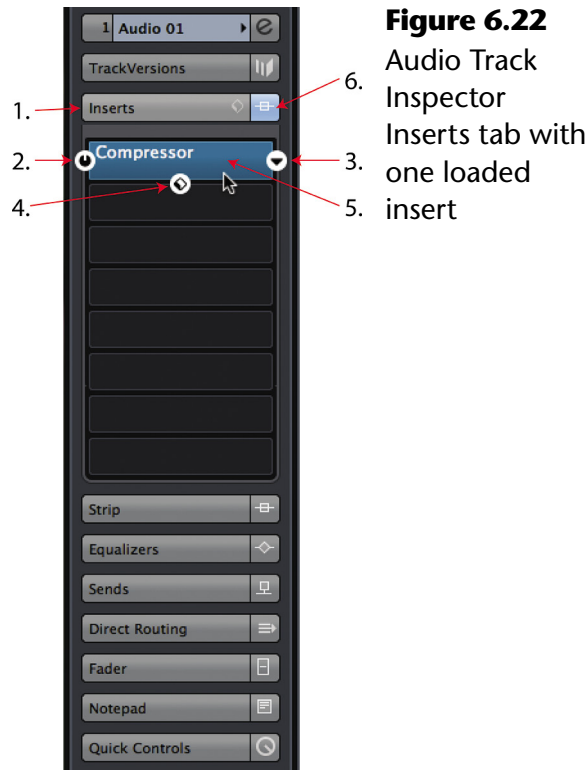
PRO TOOLS TIP

Pro Tools users will recognize this feature as similar to “playlists.” A Track Version is a new playlist for this track. You can duplicate the current version to try variations or create a blank version to start with a clean slate. However, you do not need to create a new Track Version to simply record another take of a performance. Nuendo has a system of Lane Recording to record and then edit between multiple takes. This will be discussed in detail later.

Inserts Tab

Here’s where so much of the fun lies: inserts, plug-ins, all the toys we use to manipulate and process audio. Each channel in Nuendo has eight inserts, six pre-fader and two post-fader. The Inserts tab (see Figure 6.22) allows you to choose inserts for each slot, open plug-in GUIs for editing, disable or bypass inserts, and save or recall groups of inserts and their settings as presets.

1. **Insert tab expansion toggle** – Clicking on the name of the tab causes that tab to open and all other tabs to collapse, leaving you with just the information you are working with. To open more than one tab, hold Ctrl (Windows) or Command (OS X) while clicking the second tab.
2. **Insert Bypass** – This is a true bypass button for the insert that can be used in real time or with automation to bypass an insert.
3. **Select Insert Menu** – Clicking in this area brings up the Insert Selection menu, offering all the available plug-ins in your system. With the plug-in manager, this list can be customized to show only those plug-ins you use.
4. **Insert Preset Management** – This preset browser is for managing individual insert presets.



5. **Edit Insert** – This opens the insert’s GUI for editing. It will turn blue when the insert’s GUI is open even if it is not visible as the front-most window. You can have many insert GUI windows open at the same time.
6. **Master Insert Bypass Indicator** – This button appears blue when there are active inserts on the track. Clicking on it will bypass all inserts and will turn it yellow. It appears gray when there are no inserts loaded.
7. **Inserts Preset Management** – Opens the preset management browser for inserts. These presets are for chains of plug-ins, not just one at a time. If you have created the ultimate bass tone using several plug-ins, you can save the whole thing as a preset here.

Strip Tab

The Strip Tab provides basic controls for the dynamics processors. There are six slots in the strip section, each containing a type of dynamics processing. Some slots have more than one option for the type of processor.

- ❖ Gate
- ❖ Compressor
 - Standard
 - Vintage
 - Tube
- ❖ EQ Position: Dragging this block up or down will change the position of the equalizer in the signal flow of the strip.
- ❖ Tools
 - De-esser
 - Envelope Shaper
- ❖ Saturation
 - Magneto II
 - Tape Saturation
 - Tube Saturation
- ❖ Limiter
 - Brickwall Limiter
 - Maximizer
 - Standard Limiter

In the Inspector, you can only enable these processors and choose presets. In the MixConsole you have access to all the parameters for each processor.

Equalizers Tab

Every Nuendo audio channel has a built-in equalizer that is quite capable. With a choice of filter types and full parametric control for each of the four bands, you have a great deal of tonal shaping ability right from the start on every channel (see Figure 6.23).

1. **Equalizers tab expansion toggle** – Open and close Equalizers tab.
2. **Equalization Curve Display** – This provides a graphic representation of the EQ curve and can also be used to edit each band by dragging the numbered EQ points around in the display.

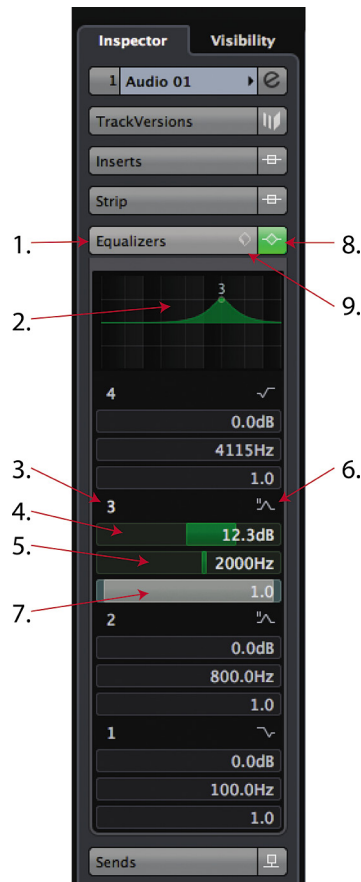


Figure 6.23
Inspector
Equalizers Tab
with one band
active

3. **Band Activation** – For each EQ band there is this activation button. This can be used in real time or with automation to bypass each band.
4. **Gain** – You can move the slider or enter a number in dB to the gain field.
5. **Frequency** – Move the slider or enter a frequency in Hz. Each band has the full range of frequencies, 20 Hz to 20 kHz.
6. **Filter Type Pulldown Menu** – Since the addition of VST 3 plug-ins, the Nuendo equalizer has several filter types to choose from. The original EQs from earlier versions are labeled type I. The newer filters are II, III and IV. For band 1, there are parametric, high shelving and low pass filters (LPF) (see Figure 6.24). For bands 2 and 3 there are parametric only, and for band 4, there are parametric, low shelving, and high-pass filters (HPF).
7. **Q or Bandwidth** – Adjust the slider or enter a Q value in the field to control the bandwidth or slope of the EQ filter. Try using this control on Shelving II, III, and IV or with HPF/LPF II.

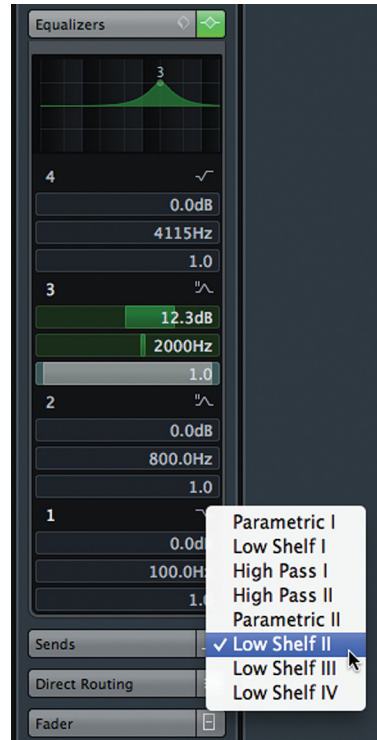


Figure 6.24
Filter type pull-down menu for band 1

8. **Master Equalizers Bypass Indicator** – This button appears green when there are active bands in the equalizer. Clicking on it will bypass all bands and it will turn yellow. It appears gray when there are no active bands.
9. **Equalizers Preset Management** – Opens the preset management browser for equalizers.

Sends Tab

Every audio channel in Nuendo has eight available auxiliary sends (see Figure 6.25). They can be used for a variety of things, including sending signals to effects channels such as reverb, routing signals to other channels for parallel or alternate processing, or routing signals to outputs of the mixer for external use. The possibilities are endless, and much will be discussed about creative use of sends in Part IV: Mixing.

1. **Sends tab expansion toggle** – Open and close Sends tab.
2. **Master Sends Bypass Indicator** – This button appears blue when there are active sends. Clicking on it will bypass all sends and it will turn yellow. It appears gray when there are no active sends.
3. **Send Activation** – For each send there is an activation button. This can be used in real time or with automation to enable or disable the send.

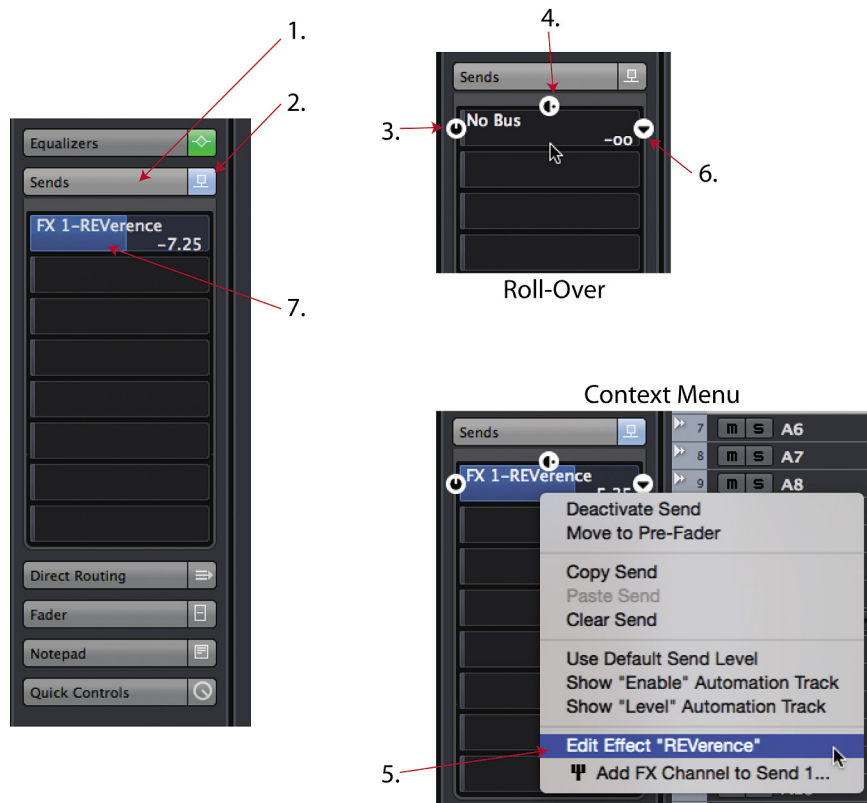


Figure 6.25
The Sends, roll-over and context menu

4. **Pre/Post Fader** – This determines where the signal for the send is derived in the signal flow of the channel. Blue=post-fader, green=pre-fader.
5. **Edit FX Channel Insert** – If the send is routed to an FX Channel, this button will open the first insert on that FX channel for editing. This is just a quick shortcut to the plug-in GUI and is very convenient. It will be grayed out if the destination is not an FX channel.
6. **Send Destination Select** – This pulldown menu will show all available destinations for this send. They could include FX channels, Group channels, VST outputs and even side-chain inputs to certain VST 3 plug-ins.
7. **Send Level** – You can move the slider or enter a number in dB to the level field.

ACCESSING SEND PAN CONTROL

Sends also have a pan control if the destination has more than one channel. This is not visible in the Inspector but can be accessed in the Edit Channel Settings window discussed in the next chapter, Extended Layout.

Cue Sends Tab

The Cue Sends (see Figure 6.26) are specialized auxiliary sends used in conjunction with the Control Room for creating cue sends for performers to monitor during recording. There are four Studio Sends possible. Only the ones that have been defined in VST Connections will be available in this tab. Use of the Studio Sends will be covered in Part II: Recording.

Direct Routing Tab

The Direct Routing function (see Figure 6.27) in Nuendo is primarily intended for film mixing but has applications in music mixing and live broadcast as well. When more than one VST output is defined, direct routing can be used to send a channel's output to one or more of those outputs (up to eight) with a simple click. This function can be automated, and the signal can be routed to more than one output at a time. This function will be explored more in detail in Part IV: Mixing.

Surround Pan Tab

When a channel is routed to a multi-channel bus such as a 5.1 surround bus, Nuendo's surround panner is invoked and this tab provides quick access to a basic joystick control of the panner (see Figure 6.28). Double-clicking on the panner opens up the complete Surround Panner V5 interface that will be discussed in depth in Part IV: Mixing.



Figure 6.26 The Cue Sends tab



Figure 6.27 The Direct Routing tab



Figure 6.28 The Surround Pan tab

Fader Tab

The Channel tab (see Figure 6.29) for an audio track includes tools that are similar to, or duplicate, tools found in the Basics tab, plus some others, all in a new constellation that is handier for mixing than is the collection of tools on the Main tab. So much of the user interface in Nuendo is about the ever-changing needs of working in a studio situation, constantly switching tasks from recording to editing to mixing. You will find that having these duplicate controls in various locations throughout the GUI can be very helpful.

1. Surround Panner
2. Mute
3. Solo (Solo-In-Place)
4. Listen Enable (AFL/PFL Solo)
5. Edit Channel Settings
6. Channel Fader
7. Channel Meter
8. Numeric Channel Volume

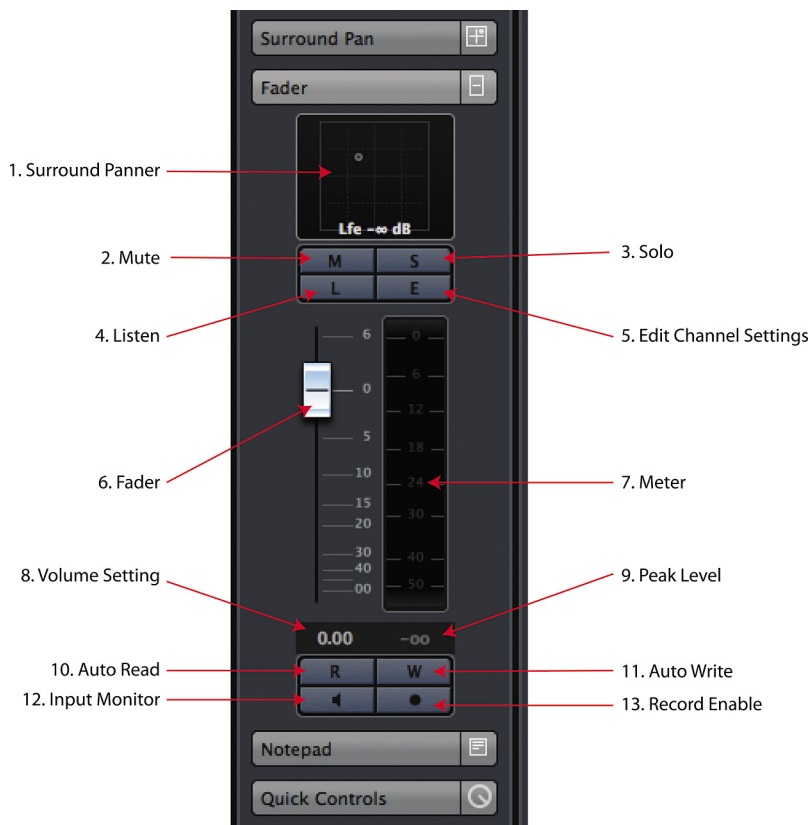


Figure 6.29
Audio Track
Fader tab

9. Numeric Peak Level
10. Automation Read
11. Automation Write
12. Input Monitoring
13. Record Enable

Notepad Tab

One of my favorite tabs is the Notepad tab, as it allows you to jot down notes about this track (see Figure 6.30). I use them to document recording techniques used for a particular sound, such as the type of guitar and amplifier used, microphone choice, mic preamp, compressor, etc. These notes are saved with the project file and are helpful for recalling settings on out-board equipment and many other things. The Notepad icon appears blue if there is any text written there.

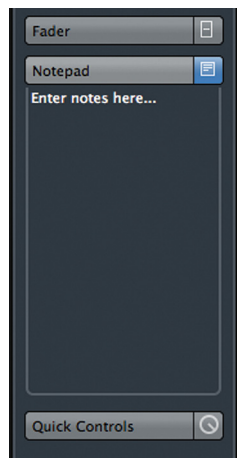


Figure 6.30
The Notepad
tab

PROJECT NOTEPAD

There is also a Project Notepad available from the Project menu. It's a great place to paste the lyrics to a song.

Network Tab

The Network tab (see Figure 6.31) provides access to the network settings for this audio track. Network setting can vary from track to track, allowing access by only certain network users to specific tracks in the Project.

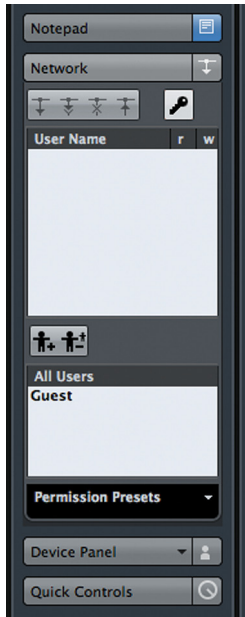


Figure 6.31
The Network
tab

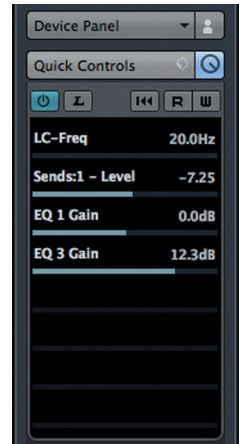


Figure 6.32
The Quick
Controls tab

Device Panel Tab

In this tab, MIDI control user panels can be displayed for devices associated with this track. This could be an externally controlled MIDI device or simply a few select parameters from an internal VSTi. User Panels for the Inspector should be formatted to fit the limited space and fixed width of the Inspector.

Quick Controls Tab

Quick Controls are just what they sound like, controls that let you get at what you really need right away (see Figure 6.32). These are customizable controls that can consist of any combination of available parameters. There are some presets already made for you to try. Here's the first one: Volume, Pan, Pre Filters, and Sends.

MIDI Track Inspector

The MIDI track has a very different type of Inspector, since it deals with a completely different type of data than an audio track. Many of the controls are the same and function in a similar manner to their audio counterparts but there are also plenty of MIDI-specific controls to take a look at. Unless otherwise noted, controls work the same as for audio tracks.

MIDI Basics Tab

The MIDI Basics tab (see Figure 6.33) looks very similar to the audio basics tab with some notable exceptions including the presence of MIDI channel assignments and program patch fields.

1. Track Name and Color
2. Edit Channel Settings
3. Mute and Solo
4. **MIDI Input Transformer** – This button opens a powerful tool for filtering and transforming incoming MIDI data as it's being recorded, allowing for creative use of MIDI controller data. Imagine mapping aftertouch to breath controller while you record.
5. Timebase, Lock and Lane Display
6. Record Enable and Monitor Status
7. **MIDI Volume** - This slider looks like the audio volume control but is actually sending MIDI volume controller data to the output destination.
8. **MIDI Pan** – This is a MIDI pan controller data and is not the same as audio pan.

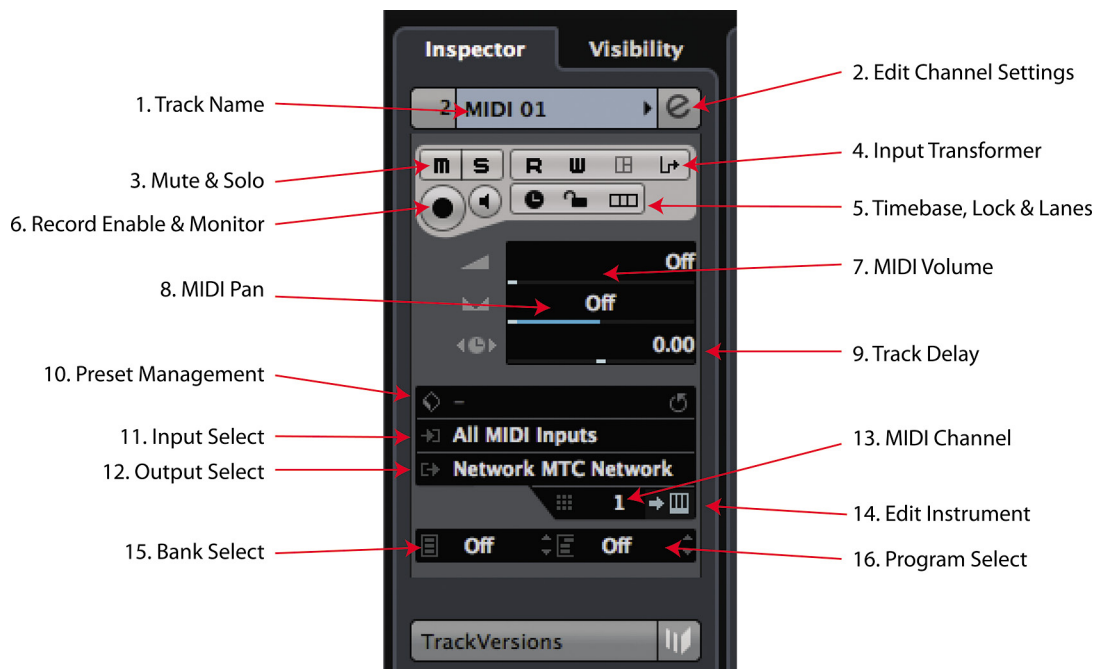


Figure 6.33
The MIDI Basics tab

9. **Track Delay** – The MIDI track delay works in the same fashion as the audio track delay, allowing you sub-millisecond time shifting of elements on this track.
10. **Track Preset Management** – Works the same as for audio tracks.
11. **Input Selection** – Works the same as for audio tracks, just for MIDI inputs only.
12. **Output Selection** – Works the same as for audio tracks, but only to MIDI destinations.
13. **MIDI Channel** – Defines the MIDI channel on which data will be transmitted.
14. **Edit Instrument** – Opens the VSTi editor or a device panel for an external device that the MIDI track is routed to.
15. **MIDI Bank** – For choosing banks of presets on the MIDI device or VSTi.
16. **MIDI Program** – This allows direct access to programs stored in the connected VSTi or MIDI device. You can change programs remotely in order to audition various sounds or patches.

MIDI Track Versions

MIDI tracks also have track variation capacity just like audio tracks, so you can try different versions and edits of the MIDI data.

MIDI Inserts Tab

MIDI tracks can also use processing inserts in much the same way as audio tracks. MIDI inserts process the MIDI data as opposed to audio data for plug-ins. MIDI inserts include things like arpeggiators, MIDI echo, and quantizer. The MIDI inserts tab operates in the same way as for audio tracks, inserting and editing MIDI plug-ins. There are four MIDI inserts per track.

MIDI Fader Tab

Similar to the Audio Channel tab, the MIDI Fader (see Figure 6.34) has controls for record enabling, mute, solo, and automation. However, these controls only affect MIDI data, not audio.

MIDI Notepad

This is another notepad just like the one for audio tracks.

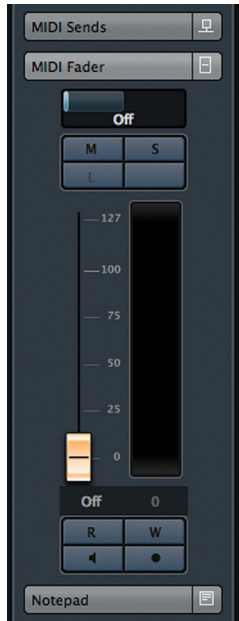


Figure 6.34
The MIDI Fader
tab

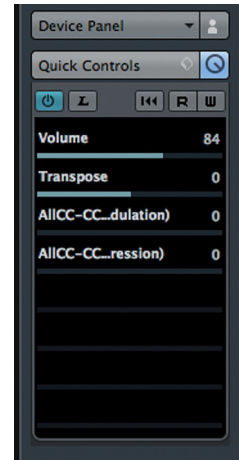


Figure 6.35
MIDI Quick
Controls tab
with some MIDI
controls

NOTEPAD DIFFERENCES

All tracks have the same notepad tab except specialized tracks such as Ruler tracks and Marker tracks.

MIDI Quick Controls Tab

There are some specialized tools available for MIDI Quick Controls such as the transpose and modulation controllers (see Figure 6.35). When you create a custom set of Quick Controls, you may save the entire setup as a track preset using the tools at the top of the Inspector.

MIDI Instrument Tabs

In order to give you immediate access to the audio associated with this MIDI track, there are the MIDI Instrument tabs. These tabs provide direct access to duplicate audio settings for the VSTi or External Instrument that MIDI track is routed to. Clicking on the tab's name reveals more tabs from that VSTi track. This makes for fast editing of sounds and rough mixing while working with MIDI tracks.

In this example, the MIDI track is assigned to an instance of Groove Agent. In Figure 6.36, the MIDI Instrument tab is opened and the Audio Fader tab for Groove Agent has been opened, gaining access to the actual audio level of the VSTi.



Figure 6.36
The MIDI
Instrument tabs

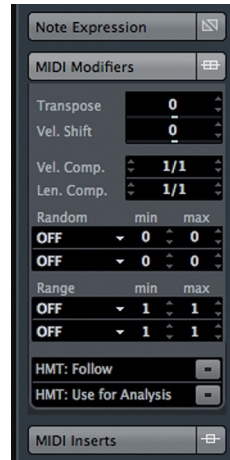


Figure 6.37
The MIDI
Modifiers tab

MIDI Modifiers Tab

This tab (and those that follow) are not in the default view of the MIDI track Inspector. In order to see this tab you must right-click (Windows) or control-click (OS X) in the Inspector and check MIDI Modifiers in the visible list.

The MIDI Modifiers tab (see Figure 6.37) provides a way to manipulate or modify the playback of MIDI data by transposing the notes, changing velocity and timing or randomizing aspects of each MIDI note.



Figure 6.38
The MIDI Sends
tab

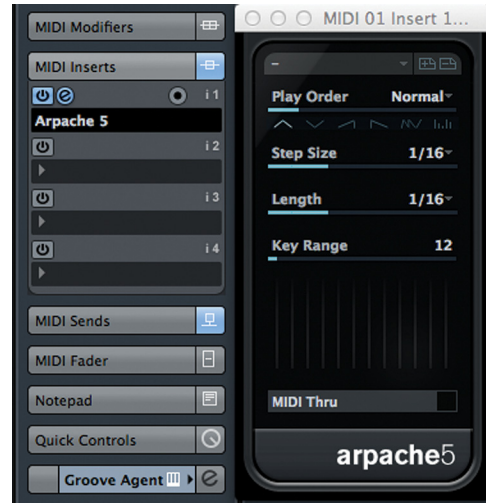


Figure 6.39
MIDI Inserts
Tab

MIDI Sends Tab

MIDI sends (see Figure 6.38) work in the same way as audio sends except that the destination for a MIDI send must be a MIDI device such as a VSTi or External Instrument. They do not have a level control but MIDI effects can be applied to the sent data.

MIDI Inserts Tab

MIDI tracks may also have inserts. These inserts process the MIDI data much like audio plugins modify audio data. For example, an arpeggiator can be inserted that will modify chords into arpeggiated lines. Figure 6.39 shows the Arpache 5 arpeggiator plug-in inserted into slot 1.

MIDI Network, Quick Controls, and User Panel Tabs

These tabs function in exactly the same way as for audio tracks.

Other Inspector Tabs

The remaining track types all have their own combination of Inspector tabs. As we move into using each track type, those Inspector tabs will be explored. Many share tabs with either the Audio or MIDI tracks and will be familiar. Others, such as Marker Tracks, have their own special Inspectors. The idea here is to get the essential track types explained with an overview of the rest.

Nuage Inspector

The Nuage Master Unit can view and edit many of the same Inspector Tabs found in the Project window. In order to access the Inspector tabs, first select a channel in the Project. Next, select the blue "Channel" button to the right of the touchscreen. You should now be on the MAIN tab in the Nuage touchscreen.

Nuage MAIN

The Nuage MAIN tab is very similar to the Basics Inspector tab in the Project. There are a collection of controls including input and output assignments, filters, input gain, polarity, and the level control on the right hand knob.

Nuage EQ

The Nuage EQ tab gives you touchscreen control over the channel equalizer in the MixConsole. You can also use the knob set beneath the touchscreen to make further adjustments to the EQ.

Nuage DYN

The Nuage DYN tab is the same as the Strip Inspector tab in the Project window. Here you have control over the dynamics processors of Nuendo.

Nuage SENDS

The Nuage SENDS tab gives you complete control over the eight (8) sends for each channel. If the send is routed to an FX Channel, you can open the plugin GUI for that FX Channel directly from the touchscreen.

Nuage CUES

The Nuage CUES tab has access to the four cue sends of the MixConsole.

Nuage PAN

The Nuage PAN tab gives you touchscreen control over surround panning with the knob set providing advanced surround parameters on two pages of controls.

Nuage INSERT

The Nuage INSERT tab allows you to insert and then adjust the parameters of plugins on the selected channel.

Nuage QUICK CONTROL

The Nuage QUICK CONTROL tab shows the available Quick Controls that are defined for the selected channel. Each knob will control one of the eight possible parameters.

Channel Types

For channels other than Audio tracks, the Nuage Inspector tabs remain the same, only becoming active for channels that have similar controls.

Visibility Pane

The Visibility Pane is in the same location as the Inspector and is accessed by clicking on “Visibility” at the top of the Inspector area. The Visibility pane allows you to show or hide any track in the project, even entire folders full of tracks.

To hide a track, click on the white dot to the left of the track name. The dot will turn to a circle and the track will be hidden from the track list. The track is still active and audio there will still be present in the mix. This just removes it visually from the track list and event display.

Folders are noted by the triangular tab and can be toggled open or closed by clicking on this tab. If you hide a folder, all enclosed tracks will be hidden together.

Sync Channel/Track Visibility

The same visibility features are also available in the MixConsole. You can show or hide channels in the mixer in the same fashion as tracks in the project window. You can also synchronize the visibility between the mixer and project window.

There is a hidden menu in the Visibility tab area that is only visible when you roll over it with the mouse. Roll the mouse just to the right of the word “Visibility” and a white dot will appear. Click on this dot and the Sync Track/Channel Visibility menu (see Figure 6.40) will pop up. There are several options:

- ❖ Sync Project and MixConsole: When checked, this option synchronizes the visibility of channels and their tracks between the project and MixConsole. Whatever channels are visible in the project will be the only ones visible in the MixConsole.
- ❖ Sync Project and MixConsole (2, 3, 4): The same for the alternate MixConsoles

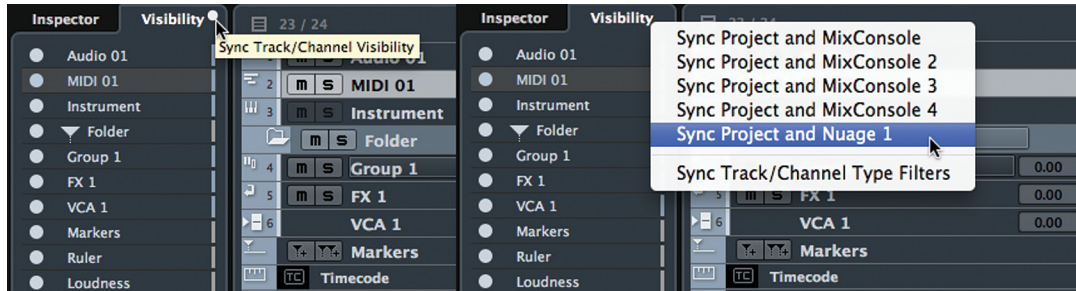


Figure 6.40
Sync Track/
Channel
Visibility button
and menu

- ❖ **Sync Project and Nuage 1:** Synchronizes the channel visibility between the project and Nuage Fader Units. If there is more than one fader unit in the workgroup, there will be individual sync options for each fader unit.
- ❖ **Sync Track/Channel Type Filters:** Since you can also display tracks by their type, this option allows you to synchronize the type filter between the Project, MixConsole, and Fader Units.

This is a powerful feature that helps organize what you see in the interface. With large projects in the hundreds of tracks, the ability to hide channels and tracks helps streamline workflow, displaying only what you need to see and nothing more.

Event Display

The Event Display is the main editing area of Nuendo (see Figure 6.41). It is here that so much of the work is done. Every type of event in Nuendo can be represented here. Other items in the event display include viewing options (zoom, scroll, etc.) and navigation tools as described below.

1. **Cursor** – The playback cursor is a vertical line that lays across the entire event display area. It marks where the transport is located in time. When Nuendo is in play, the cursor will move across the event display indicating its current position.
2. **Audio Event** – Audio Events are portions of audio files that will be played back at certain points on the time line.
3. **MIDI Events** – MIDI Events consist of notes and controller data that are played back on the time line.

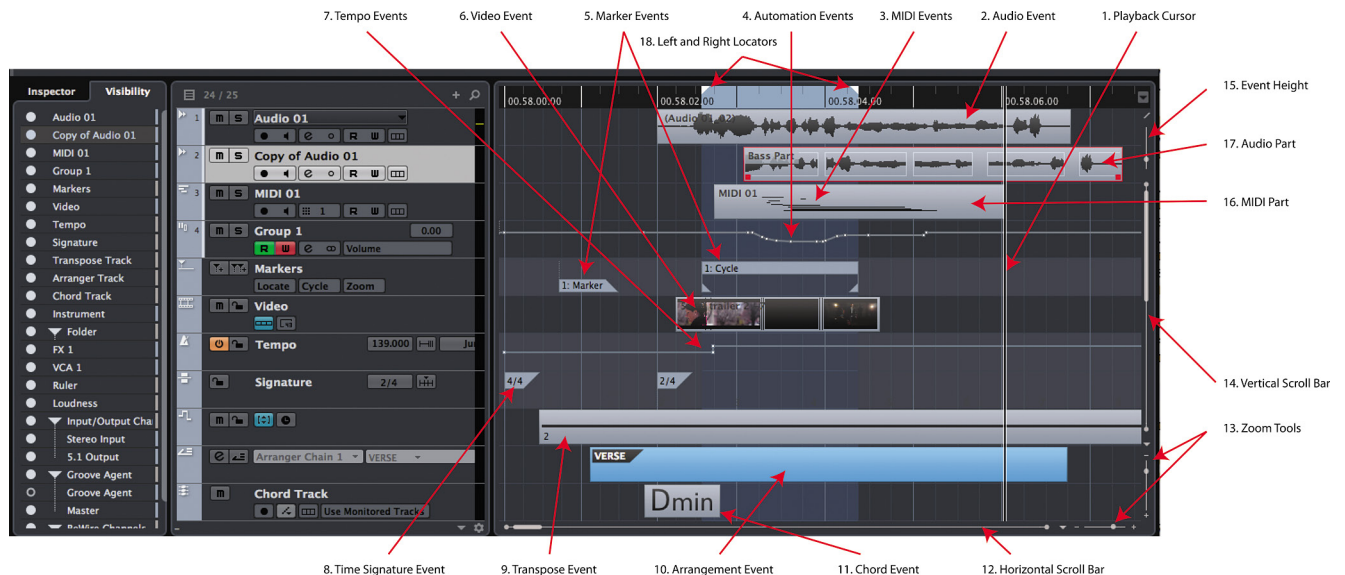


Figure 6.41 The Event Display showing all possible event types

4. **Automation Events** – Automation Events are points on the time line where an automated control has reached a certain value. Automation data changes smoothly between these individual events to make up complex automation curves.
5. **Marker Events** – Both Markers and Cycle Markers are events that reside on Marker tracks.
6. **Video Events** – Video Events are portions of video files that play back at certain times in the project.
7. **Tempo Events** – Tempo Events mark when the tempo of the project changes. This can happen suddenly with a jump or gradually over time.
8. **Time Signature Events** – Time Signature Events mark when the time signature of the project changes.
9. **Transpose Events** – Transpose Events mark when the global key of the project changes either up or down.
10. **Arrangement Event** – When writing music, entire sections of multiple tracks can be defined as a section (verse, chorus). Then these sections can be played back in different orders using Arrangement events.

11. **Chord Event** – A Chord Event is where the harmony of the music changes structure. Using the Chord track and Chord events, entire pieces of music can be created quickly and changed easily.
12. **Horizontal Scroll Bar** – This scroll bar can be used to navigate the timeline of a project. Slide the block left to move earlier in time or right to move later in time.
13. **Zoom Tools** – These sliders adjust the horizontal and vertical zoom level for the event display. There are little popup menus that give you other choices for the zoom level such as Zoom to Selected or Zoom to Full.
14. **Vertical Scroll Bar** – Sliding this scroll bar will move the event display up or down to show tracks that do not fit in the current window size.
15. **Event Height** – This slider increases or decreases the height of Events in the display. For example, turning this slider up will cause audio waveforms to be taller/thicker in order to provide more accurate editing of quiet signals.
16. **MIDI Part** – A MIDI Part is a collection of more than one MIDI Event in a container so that all the events within the part can be moved and edited as one unit. This can be used to create musical parts such as “Verse Bass Part” for example. It becomes much easier to copy the bass part to other sections of a song.
17. **Audio Part** – An audio part is the same structure as a MIDI part only with audio events instead of MIDI events. You can also create the “Verse Bass Part” out of audio events that you’ve edited together to create a performance of the bass. Now, the entire bass part can be moved or copied easily.
18. **Left and Right Locators** – The left and right locators are important tools in Nuendo, very useful for editing, mixing, navigation, and even recording in cycle mode.

Racks Pane

If the Racks pane is turned on in the Project window layout, the right side of the Project window shows the VST Instruments inserted in the project or the MediaBay file management tool.

VST Instruments

When the VST Instruments tab is selected, any VSTi in the current project will be listed here. There are two types:

- ❖ Track Instruments – VSTi inserted into an Instrument track
- ❖ Rack Instruments – VSTi inserted on their own, without an instrument track

Here you can open up the GUI of the instrument to change sounds or make adjustments.

MediaBay

MediaBay is Steinberg's file database management system for keeping track of and searching for all types of media in your system. The MediaBay tab gives you access to this system right in the Project window.

That covers all the GUI elements and layout of the Project window. While there is still so much to explore in functionality of the project window, this section was designed to give you a basic overview.

Transport Panel

The Transport Panel is used to operate Nuendo's timeline (see Figure 6.42). It can be used to play the project, record events into the project, and locate to various positions along the timeline for starters. It is configurable just like so many other windows in Nuendo. Let's take a look at its default configuration first and then follow up with all the other controls it has available.

1. **Performance Monitor** – This is a readout of the processor load on the computer.
2. **Record Mode** – There are different modes of recording for both Audio and MIDI tracks. These modes are critical to how recordings are retained when you record more than one take of a particular section. These will be discussed in Part II: Recording.
3. **Locators** – The left and right locators are displayed here along with functions that relate to them such as auto punch in and out plus the pre- and post-roll values for playback.

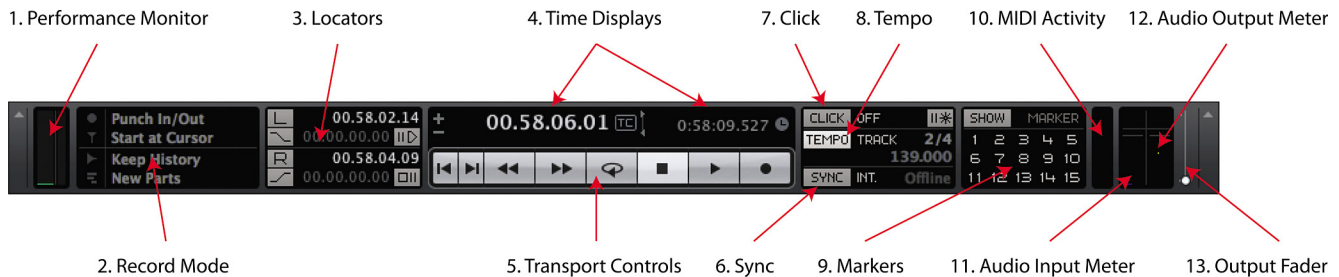


Figure 6.42 Default Transport Panel

4. **Time Displays** – This time display shows the current cursor position using the same format as in the Main Ruler in the Project window. Changing the format here for this counter will also change the format of the main counter. The secondary display can show another time format.
5. **Transport Controls** – Basic transport controls that are also found in the Project window.
6. **Sync** – This area contains the activate sync button and displays the current sync status. Synchronization is covered in Part V: Accessories.
7. **Click** – This button turns the internal metronome on or off and is highlighted when active.
8. **Tempo** – This area gives you access to the basic tempo track functions. Simple tempo settings can all be made here.
9. **Markers** – These buttons allow you to create and then jump to the first 15 markers.
10. **MIDI Activity** – This indicator shows MIDI in and out activity.
11. **Audio In Meter** – This audio meter shows the level coming into the Default Input Bus as defined in VST Connections. It will be in the same channel width as the default bus.
12. **Audio Out Meter** – This displays either the level of the Control Room channel if it is active or the Main Mix bus as defined in VST Connections.
13. **Output Fader** – This mini-fader controls the level of the “Main Mix” VST Output.

That is a lot of control packed into a relatively small space in the GUI. But there's more. Right-click (Win) control-click (Mac) to open the Transport panel configuration popup menu. There are several configurations for the Transport Panel that can be useful. If you wish to configure your own, either check all the items you wish to see or go to Setup for complete access to position of all controls.

The only three items not visible in the default Transport are the Jog/Shuttle and Arranger controls, shown here in Figure 6.43.

Jog/Shuttle - The Jog/Shuttle controls allow movement of the playback cursor at various speeds, similar to shuttling an analog tape machine.

Nudge - In the very center of the Jog/Shuttle wheel are two buttons for bumping the transport +/- one timecode frame at a time. This is very helpful for film and post-production work in trying to find one particular video frame.

Arranger - The Arranger tools are for on-the-fly rearrangement of compositions or songs.

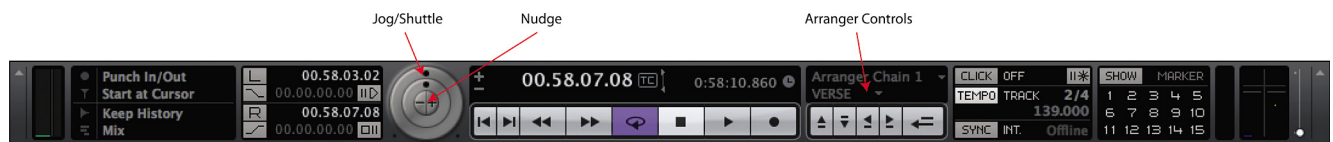


Figure 6.43 The Jog/Shuttle and Arranger controls

Virtual Keyboard (NEK)

The Virtual Keyboard is a handy musical keyboard built in to your QWERTY computer keyboard (see Figure 6.44). By selecting this option, the Transport adds this to the display:

The Virtual keyboard is also available from the Devices menu. This is very handy for a long flight with the laptop and no access to a proper MIDI keyboard. When the keyboard is active, most key commands are blocked so the keys can be used for notes. Only key items such as save, play, stop, and record are working.



Figure 6.44

Virtual
Keyboard in
Transport Panel

The MixConsole

The MixConsole contains many of the same controls found in the Inspector except they are displayed for all the channels in the project at once. It allows you to see and adjust the sound for many tracks together instead of one at a time, giving you a different perspective on the overall mix. This follows the more traditional concept of a “mixer” or “mixing desk.”

Pressing F3 or selecting it from the Devices menu will bring up the MixConsole (see Figure 6.45). The default layout shows the faders for all the channels in the active project side by side in the same order in which they appear in the Project window, plus a toolbar at top.

Just like other windows in Nuendo, the layout of the MixConsole can be changed to meet different needs. Clicking the “Setup Window Layout” button in the upper left will show you the layout options (see Figure 6.46). There are eight options, six for the areas above the faders and two for the side panes.



Figure 6.45
Default
MixConsole
View

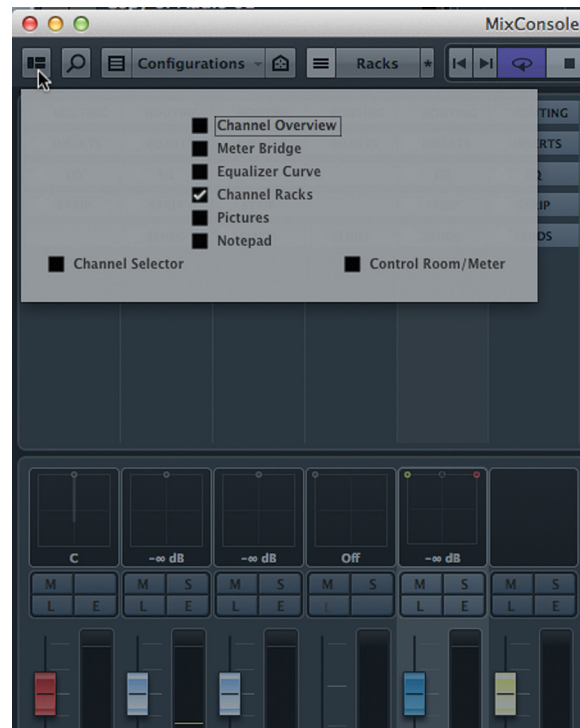


Figure 6.46
MixConsole
Setup Window
Layouts

The six areas above the faders contain information and controls for individual channels:

- ❖ Channel Overview: Level meters for every channel in the mixer at once, with navigation
- ❖ Meter Bridge: Individual level meters inline with the fader
- ❖ Equalizer Curve: Adjustable graphic representation of EQ settings
- ❖ Channel Racks: Inspector tabs, EQ, strip, sends, etc.
- ❖ Pictures: Customizable pictures to identify channel
- ❖ Notepad: Notepad for each channel

The two side panes offer channel selection, metering, and control room access.

- ❖ Channel Selector: Show/Hide and Select channels
- ❖ Control Room/Meter: Metering and Control Room access

Click on any of these options to show them in the MixConsole. Each section of the MixConsole is elastic and can be resized simply by grabbing the border between sections and dragging it to the desired size. (See Figure 6.47)



Figure 6.47
MixConsole
with all sections
open

Channel Fader Section

The main section of the MixConsole shows the faders, pan control, mute/solo, automation and record enable functions. Figure 6.48 shows a diagram of the fader section.

1. Pan – For positioning the signal within a multi-channel mix bus, i.e. stereo, 5.1, etc.
2. Mute/Solo – These buttons will mute the signal or solo that channel.
3. Listen (L) – The Listen button will solo that channel using the AFL/PFL Listen bus directly to the Control Room without disrupting the mix of all the channels.
4. Edit Channel (E) – This will open up the Channel Edit Settings window for complete access to all parameters for that channel.

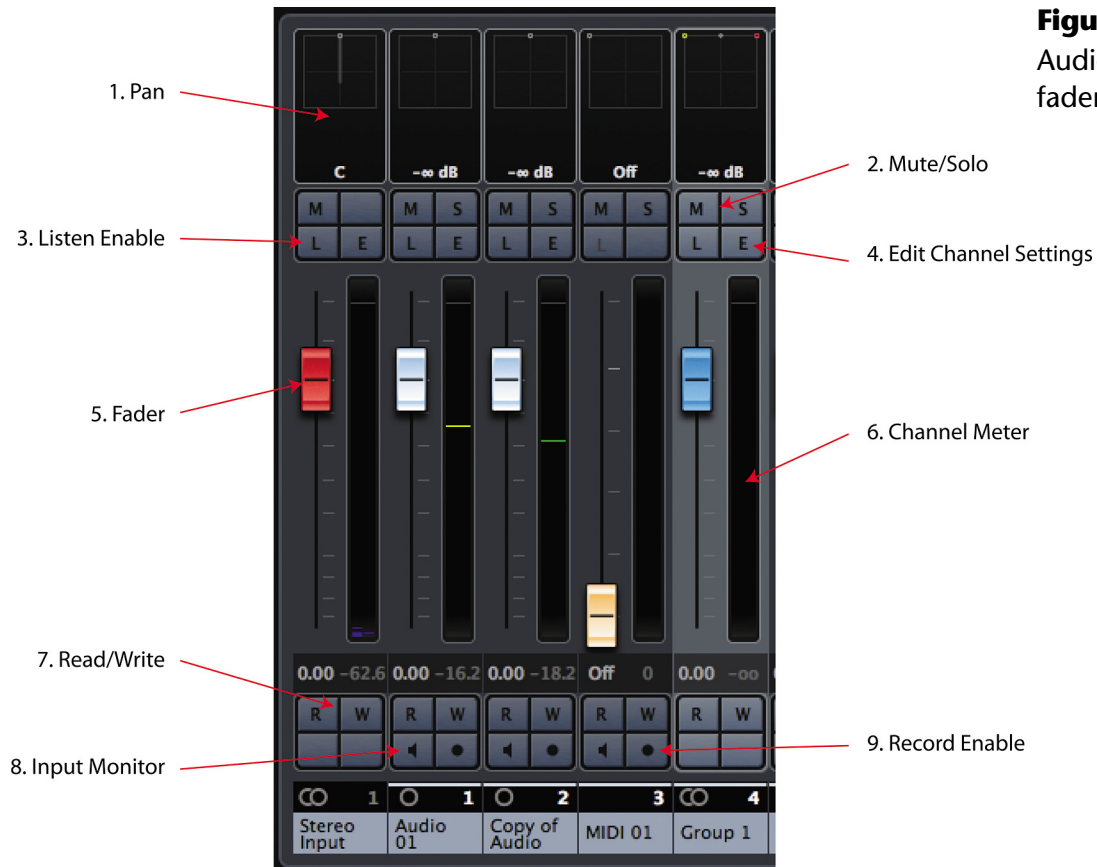


Figure 6.48
Audio Channel
fader section

5. Fader – Sets the level for that channel.
6. Channel Meter – Shows the level for this channel.
7. Read/Write – Enables the automation mode for that channel.
8. Monitor – Allows you to listen to the input for that track, whether MIDI or audio.
9. Record Enable – This places the track into record where either MIDI or audio can be recorded into the track.

Toolbar

Much like the toolbar in the Project window, the MixConsole toolbar has a variety of controls and is also configurable. Some of these tools are the same as in the Project window, others are unique to the MixConsole. Right-clicking in the toolbar gives you access to the setup options (see Figure 6.49).



Figure 6.49 Default Toolbar Set

Find Track/Channel

This is a quick and easy way to locate a specific channel by text search. Simply click this button and start typing the channel name. The list will be filtered to show you the results. Clicking on the name will select that track.

Channel Visibility

This is the same toolset as in the Project window. You can filter by channel type, use intelligent channel agents, and save visibility configurations.

Transport Controls

Duplicate transport controls are shown here for convenience.

State Buttons (Global Commands)

The state buttons apply to every channel in the project. They are global commands that affect the status or state of all channels at once.

- ❖ Deactivate Mutes: Unmutes every channel.
- ❖ Deactivate Solo: Clears all the soloed channels. This is for the Solo In Place (SIP) mode only.
- ❖ Deactivate Listen: Clears all Listen-enabled channels. The Listen function is for AFL/PFL solos.
- ❖ Activate/Deactivate Read: This will either enable automation Read mode for every channel if none are active or deactivate Read mode for all channels if there are any currently in Read mode. The button turns green if any channel is in Read mode.
- ❖ Activate/Deactivate Write: If the button is red, some channels are already in Write mode and this will deactivate it for all channels. Otherwise, it will activate write on every channel in the project.

- ❖ **Bypass Inserts:** Clicking this button while holding Option (Alt) will bypass the Inserts rack for every channel in the mixer. Clicking it again will re-enable all of the inserts.
- ❖ **Bypass EQs:** This is the same function for the equalizer rack for all channels.
- ❖ **Bypass Channel Strip:** This is the same function for the Strip dynamics rack for all channels.
- ❖ **Bypass Sends:** This is the same function for the Sends rack for all channels.

Link/Unlink Selected Channels

These tools are for linking parameters of the selected channels together, including VCA Fader control. Details will be covered in Part IV: Mixing.

Locators (Optional)

Optional tools start with the Left and Right Locators. You can manually enter locator positions and then move the cursor to that locator by pressing the L or R buttons.

Time Display (Optional)

The main and secondary time displays can be shown in the MixConsole's toolbar.

Markers (Optional)

Push-button access to the first ten Markers is available.

Zoom Palette (Optional)

Since the MixConsole is scalable, zoom tools are available to increase or decrease the horizontal and vertical aspects of the mixer elements. You can choose the number of channels visible in the current window size, for example.

Performance Meter (Optional)

A small performance meter can be displayed in the toolbar.

Setup...

As with most windows in Nuendo, the toolbar can be customized. The MixConsole toolbar has the same Setup window allowing you to choose which elements are visible and what order they appear in the toolbar (see Figure 6.50).

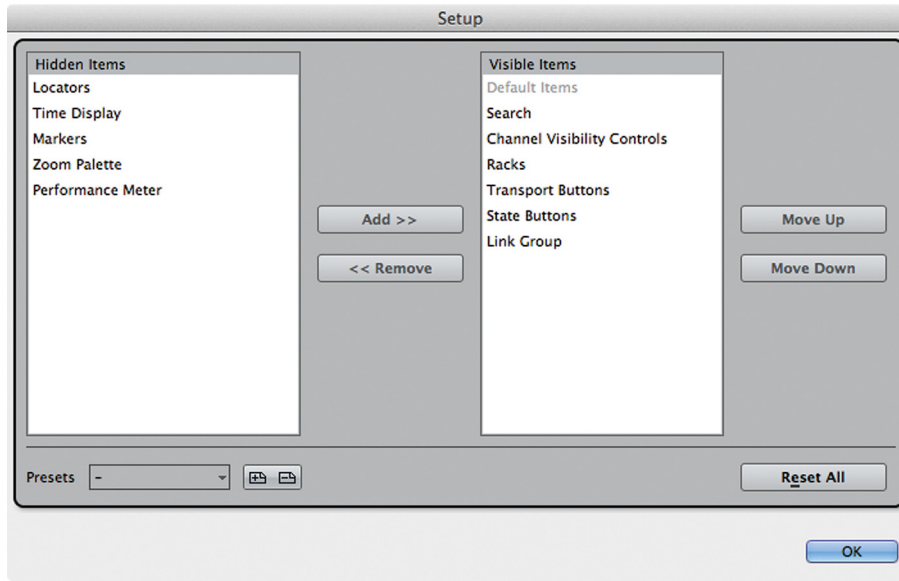


Figure 6.50
MixConsole
Toolbar Setup

Channel Selector (Left Side Pane)

When the Channel Selector is enabled, a track list appears on the left side of the MixConsole. It has two panes; visibility and zones.

Visibility

The visibility pane is exactly the same as the visibility pane in the Project window, allowing you to show or hide channels in the MixConsole (see Figure 6.51). If Sync Track/Channel Visibility is enabled for the Project window and MixConsole, changes made to visibility in either window will be reflected in the other window.

Zones

The Zones pane is unique to the MixConsole and allows you to lock channels to one side of the MixConsole (see Figure 6.52). Once locked in position, scrolling through the channels in the mixer will not affect the locked channels. They will remain either at the left or right side of the MixConsole.

This is helpful when you want to maintain control over specific channels, such as the lead vocal or dialog stem, while scrolling through the rest of the project.



Figure 6.51 Visibility pane



Figure 6.52 Zones pane

Control Room/Meter (Right Side Pane)

Enabling the right side pane gives you access to the Control Room Mixer right there in the MixConsole. This is handy since the Control Room settings are used constantly in most studios. Metering is also something used constantly and that is also accessible in this pane.

Control Room

The Control Room pane has two tabs: Mixer and Setup.

Mixer

The Mixer tab has the operational settings for Control Room such as the main volume, speaker selection and monitor source selection (see Figure 6.53).

Setup

The Setup tab allows you to insert plug-ins into the various Control Room channels along with other settings.

Meter

The Meter pane displays the Main Mix Meter. There are two types of meters, normal (Master) and loudness.

Master

The Meter Master tab displays the normal level meter. This meter measures the level of the Main Mix as defined in VST Connections. It has various calibrations to choose from, including Peak, K-System, and AES17 standards (see Figure 6.54).



Figure 6.53
MixConsole
Control Room
Mixer

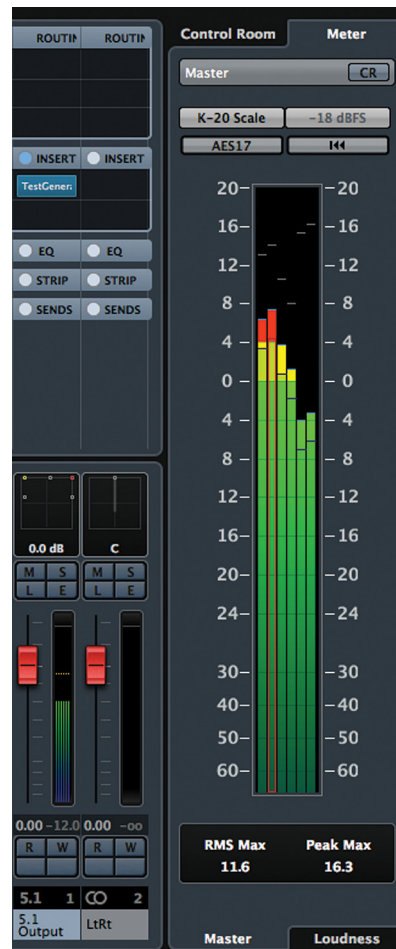


Figure 6.54
MixConsole
Master Meter

Loudness

The Loudness meter is designed to help maintain the dialog level in order to meet broadcasting standards put in place by various networks (see Figure 6.55). This combats the problem of having commercial breaks sound so much louder than the movie or show. To fight the loudness wars, the level of material is restricted to a certain loudness measurement. Nuendo's loudness metering follows the accepted standards and is adjustable to meet your requirements.

Control Room – Meter Combination

At the top of each meter tab is a power button marked "CR." Enabling this will add a condensed version of the Control Room parameters to the meter pane. Since metering and Control Room are used so often during the course of recording sessions, the ability to have them all together in one display can be very helpful to your workflow (see Figure 6.56).

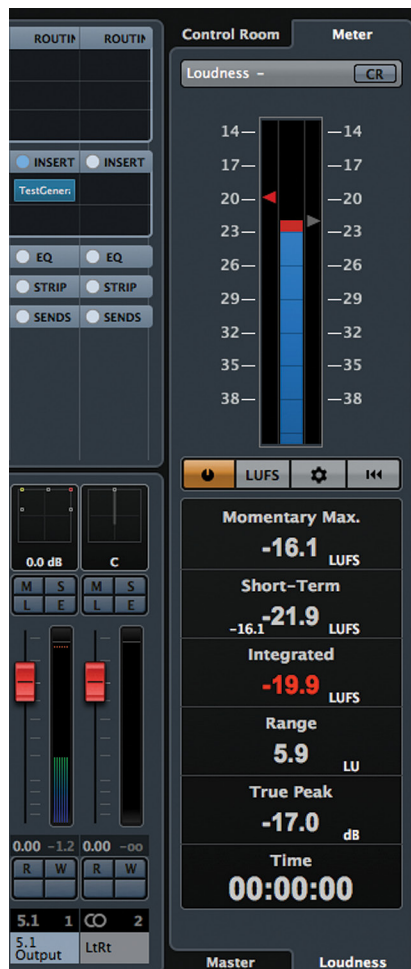


Figure 6.55
MixConsole
Loudness meter



Figure 6.56
Control Room –
Meter
combination

Channel Overview

The Channel Overview is at the top of the MixConsole. It is a small meter bridge that will display levels for every channel in the project. Larger projects will have smaller level meters so that they all fit together here. You can fit more than 100 channels on a typical laptop screen. Of course larger screens will display more meters (see Figure 6.57).

Clicking anywhere in the Channel Overview will scroll the MixConsole to those channels. The blue line beneath the meters indicates what channels are currently displayed below.

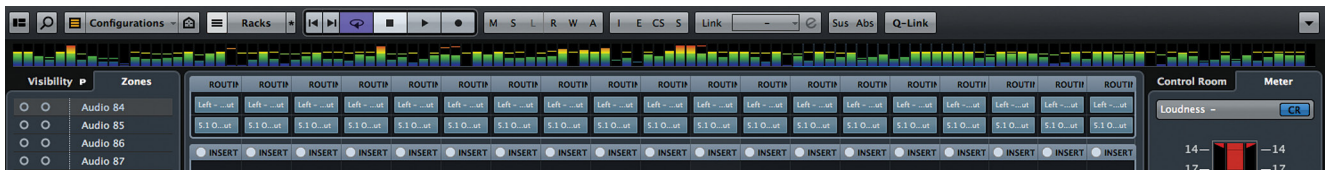


Figure 6.57 MixConsole Channel Overview 115 channels

Meter Bridge

The Meter Bridge should not be confused with the Channel Overview. The meter bridge simply adds a row of meters above the channel faders. They duplicate the metering seen next to each channel fader (see Figure 6.58).

Right-click on any meter to access the metering settings (see Figure 6.59). You can alter the meter signal position, peak options and reset the peak indicators from this pop-up menu.

You can also choose to view the Wave Meters, which display the audio waveform as a vertical display in the meter bridge. This type of meter display allows you to see sounds before they happen, on a vertical timeline (see Figure 6.60).

The center hash mark indicates the current cursor position. Waveforms that appear below this hash mark have not been heard yet. They approach the hash mark and can be heard as they cross this line. This is a helpful meter view when mixing film and television long form, as you can anticipate mix moves before they happen by viewing the wave meters.



Figure 6.58
MixConsole
Meter Bridge

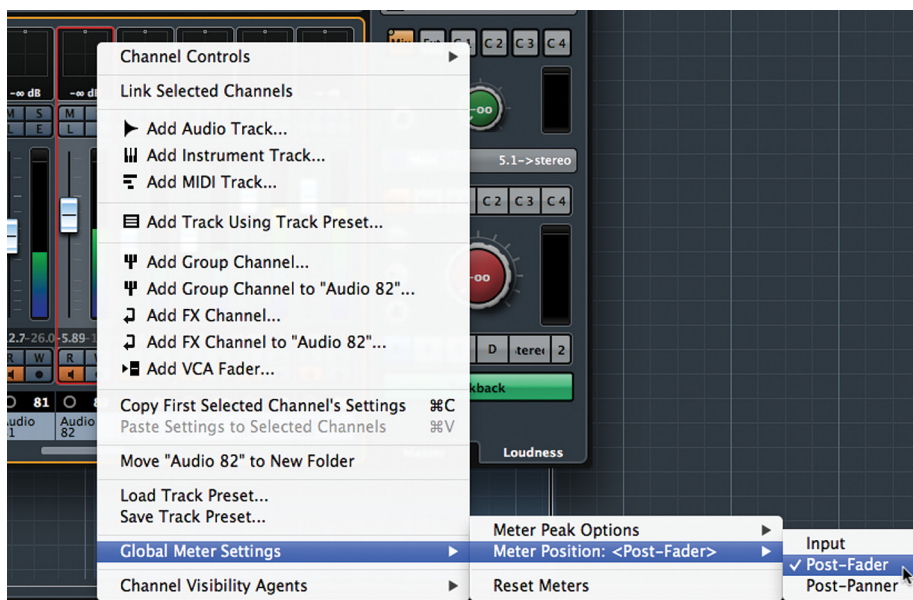


Figure 6.59 Meter Settings pop-up

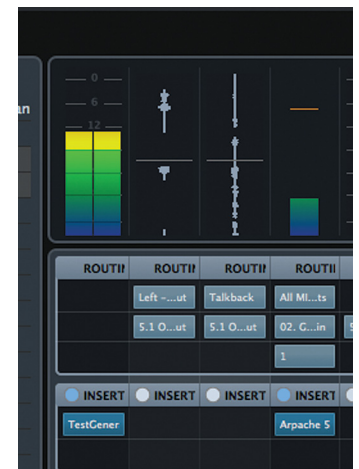


Figure 6.60 Wave
Meters in action

Equalizer Curve

Enabling the Equalizer Curve in the MixConsole adds a row of displays above the channel faders that represent the EQ curve that is being applied on each channel (see Figure 6.61).

Clicking on this display will open a pop-up window that allows you to control the equalizer graphically. Click anywhere in the display to start modifying EQ bands. Moving left or right adjusts the frequency while moving up or down adjusts the gain. Holding Shift while moving up or down will adjust the Q or bandwidth for that band (see Figure 6.62).

Repeated clicks will enable additional bands of EQ. You will notice that a spectrum analyzer is embedded in the display to assist in EQ decisions.



Figure 6.61 Several channels with EQ curves displayed

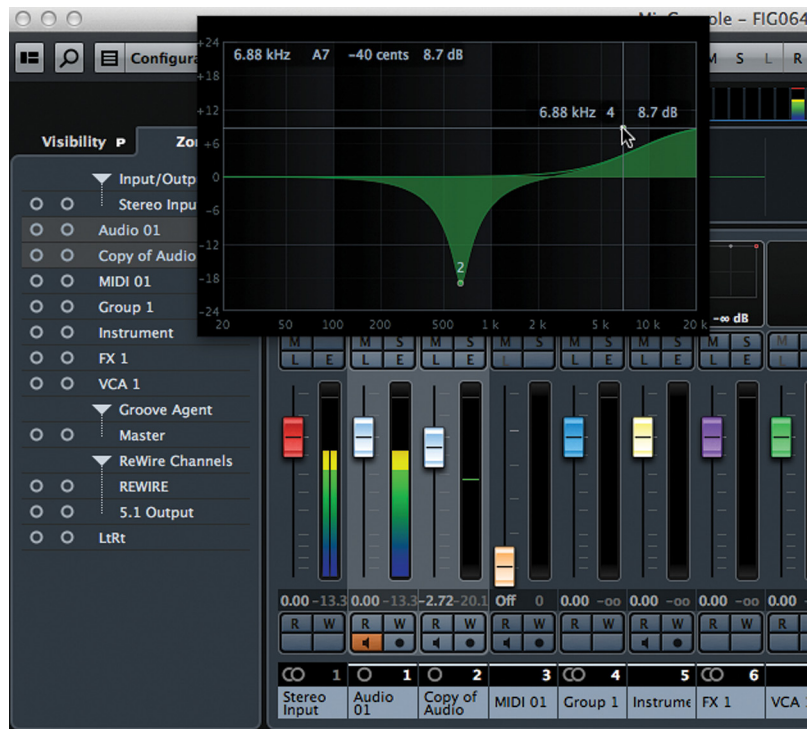


Figure 6.62 Equalizer Curve Pop-up control

Channel Racks

Channel Racks are most similar to Inspector tabs. They provide the same controls over all the settings for each channel. There are ten racks available, five of which are optional and not displayed by default.

Once you have enabled Channel Racks in the window layout, the five default racks appear above the channel faders (see Figure 6.63).

Clicking on the Select Racks button in the Toolbar allows you to show the remaining five racks or remove any rack from the display. This way you'll see only the controls that you need to see (see Figure 6.64).



Figure 6.63
Default
Channel Racks

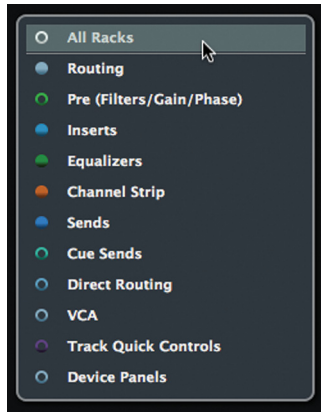


Figure 6.64
Select Racks menu to enable/disable each rack



Figure 6.65
Routing Rack Audio and MIDI channels

Routing

The top rack is the Routing rack (see Figure 6.65). Here you can set the input and output for each channel. Certain channel types only have outputs such as Group and FX channels. MIDI channels also have inputs and outputs but they are for MIDI ports. Additionally, MIDI tracks have a MIDI channel field.

Pre (optional)

The Pre rack (see Figure 6.66) contains controls similar to those found in the input section of a traditional analog console:

- ❖ Input Gain
- ❖ Phase Invert (Polarity Reverse)
- ❖ High-pass Filter
- ❖ Low-pass Filter



Figure 6.66 Pre rack

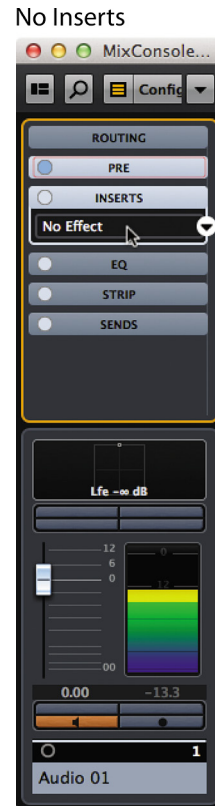


Figure 6.67 Insert racks, no plug-ins and first plug-in inserted



Inserts

The Inserts rack is where VST plug-ins can be inserted into each channel. There are eight total insert slots per channel, six located pre-fader and two located post-fader. Initially, when you first open the Inserts rack, you will only see the first insert slot. As you add plug-ins, the remaining slots will become visible one at a time (see Figure 6.67).

Fixed Slots Option

There is an option for the Inserts rack that will show all the available inserts at once so you may choose which slot to insert a plug-in into. For instance, if you wish to insert a brickwall limiter after the fader on the Main Mix, you would need to see all eight slots at once to choose a post-fader position for the limiter.

This option is available from the Rack Settings menu located in the Toolbar. Select the “Fixed Number of Slots” option to show all eight slots (see Figure 6.68).

Now it is possible to insert the limiter into slot number seven to be positioned after the channel fader in the signal flow of the channel (see Figure 6.69).

Equalizer

The Equalizer rack combines the functionality of the EQ Curve with dedicated controls for all four EQ bands together (see Figure 6.70). You can change settings by clicking in the curve display or adjusting the individual parameters below.



Figure 6.68 Rack Settings menu, fixed slots option



Figure 6.69 Limiter inserted into slot seven

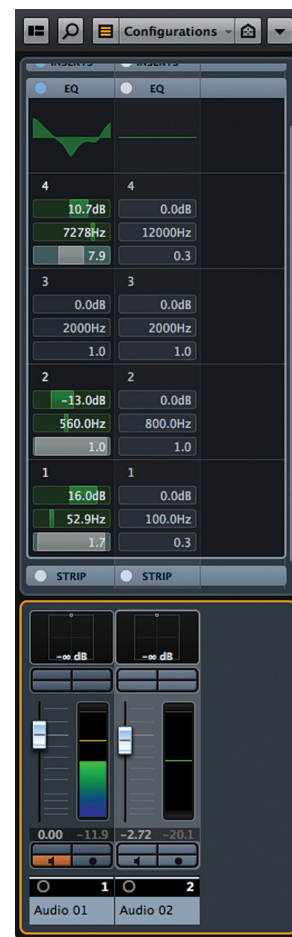


Figure 6.70 Equalizer rack

Dragging EQ Bands

One unique feature of the Equalizer rack is the ability to copy EQ bands between channels by dragging them in the MixConsole (see Figure 6.71). Click in the header of an EQ band and drag it to another channel EQ to copy the settings. You can only copy settings to the same band of another channel, i.e., from band 3 of CH 11 to band 3 of CH 14, etc.

The red highlighted band indicates the source settings. Once you let go, the settings are applied to the destination band.

Strip

The Strip rack opens up the dynamics section of each channel. Here you have access to the gate, compressor, tools, saturation and limiter. Clicking on the name opens up the parameters for that dynamics processor and activates it (see Figure 6.72).

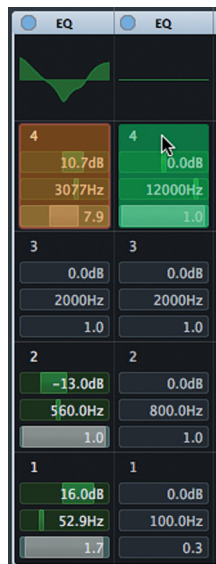


Figure 6.71
Dragging EQ
band settings

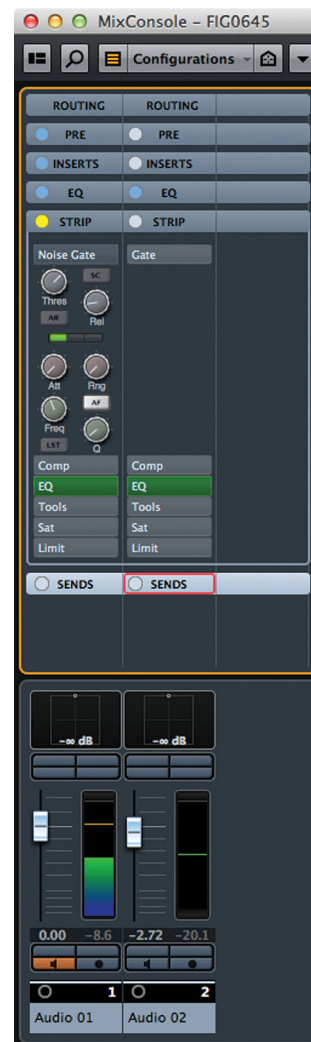


Figure 6.72
Strip Rack with
activated gate

Equalizer Position

You even have access to the EQ here in the strip. Clicking on the EQ tab opens up controls for the four band EQ. But there is another reason for the EQ to be present here in the Strip rack.

Dynamics processors are affected by the frequency response of input signals. Therefore the position of the equalizer in the signal flow of the channel can greatly affect how the dynamics processors function and sound.

For example, compressors will react more to low frequencies because their energy is greater than high frequencies at the same operating level. If the EQ is before the compressor in the signal flow, boosting low frequencies can cause the compressor to overreact and create “pumping” artifacts. A possible solution would be to move the equalizer after the compressor in the signal flow.

In the Strip rack, you can drag the EQ tab up and down to change its position in the signal flow. The top tab (Gate) is the first position in the signal flow. If you drag the EQ tab to the top, the signal flow will be changed to process the EQ first (see Figure 6.73).

You can freely position the EQ at any point in the Strip rack for optimum results.



Figure 6.73
EQ Tab moved to the first position in the channel's signal flow

Exclusive Expanded Rack Option

At this point, you might notice that the Racks have taken up a great deal of vertical space in the MixConsole. On most monitors you would need to scroll up and down a bit to see all the open Racks. If this is not convenient for the current workflow, the option exists to force only one Rack to be open at a time, keeping the MixConsole a bit more tidy. The Rack Settings menu has the option for “Exclusive Expanded Rack,” which will force only the current rack to be open and the rest to automatically close (see Figure 6.74).

Sends

The Sends rack (see Figure 6.75) accesses the eight auxiliary sends for each channel. This rack also responds to the “Fixed Slot” option and will only display the used sends unless that option is checked.

Aux sends can be routed to many destinations, providing a great deal of routing flexibility. Of course they are perfect for sending signals to FX channels (for reverb, delay, etc.) but they can also be used to create parallel routing schemes for drum mixing and dub-style side-chain compression, for example. For surround mixing, the sends include surround panners and downmixing abilities that are automatically inserted when needed.

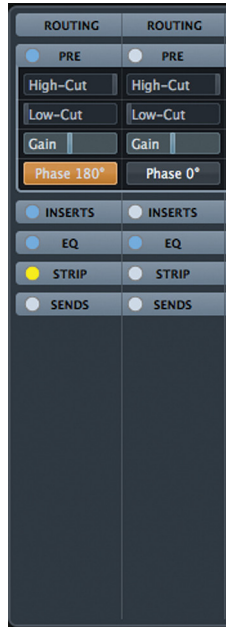


Figure 6.74
Pre Rack
Exclusive

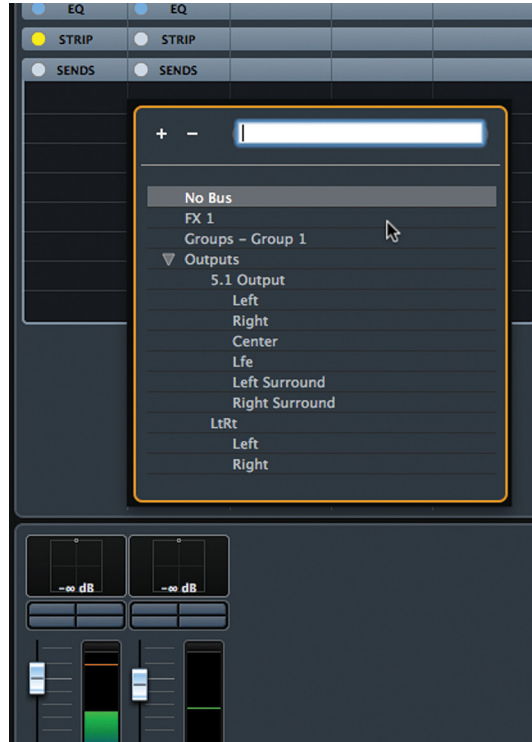


Figure 6.75
Sends Rack

The Sends can be routed to any of these destinations:

- ❖ FX Channels
- ❖ Group Channels
- ❖ VST Outputs
- ❖ VST Plug-in Side Chain Inputs

Pre- or Post-Fader

By default, aux sends are routed post-fader. In other words, the aux send takes its signal from right after the channel fader. This makes sense for reverb and delay sends since as you turn the channel fader down, the send to the reverb is also reducing, thereby lowering the reverb amount together with the source itself. This makes mixing signals together easy, with proportionate amounts of FX like reverb and delay.

There are however, times when it is necessary to have these signals levels be independent of each other. This requires a pre-fader send, where the signal is sourced just prior to the channel fader. In order to do this, right click on the aux send in the rack and choose "Move to Pre-Fader." This will change the color of the send level from blue to green to indicate pre-fader status (see Figure 6.76).

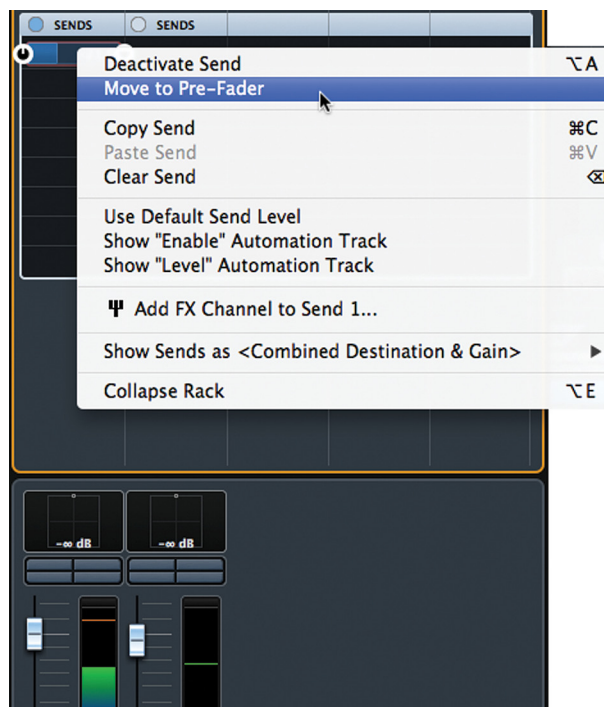


Figure 6.76
Send Context Menu – Move to Pre-Fader

PRO TOOLS NOTE

Pro Tools routing requires the use of buses as an intermediate step between the source and destination. In Nuendo and Cubase, this step is eliminated. Once you create a channel that can be a destination for routing, i.e. FX, Group, output etc., that channel becomes available as a destination in any routing menu. The “bus” is automatically created. If you add a 5.1 Group channel to your project, it immediately becomes a destination for either output routing or send routing.

Nuendo also handles the channel configuration automatically. If you are routing from a mono channel to a 5.1 Group, a surround panner is inserted. Conversely, if you route a 5.1 channel to a stereo Output, a downmix converter (MixConvert) is inserted, combining the six channels into two. There is no limitation on the number of destinations in a Project except for the processing power of the workstation (see Figure 6.77).

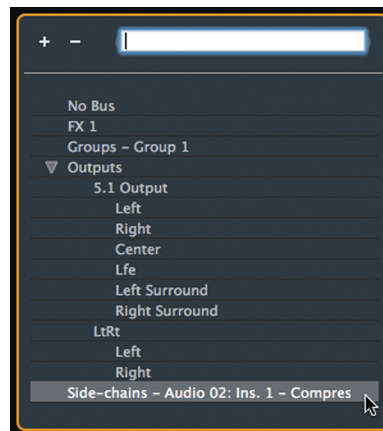


Figure 6.77
Sends Routing
Menu: All
Destinations

Cues (optional)

The Cues rack accesses the four stereo Cue Sends available in the Control Room. These are designed to create monitor mixes for talent in the studio to hear themselves as they perform.

Only the Cue sends that have been created in Control Room will be seen in the Cues rack. Each Cue has a level, pre/post fader and pan control in the Rack. Hovering over the center of the slider will reveal the pre/post fader option (see Figure 6.78).



Figure 6.78 Four Cue Sends pre/post fader

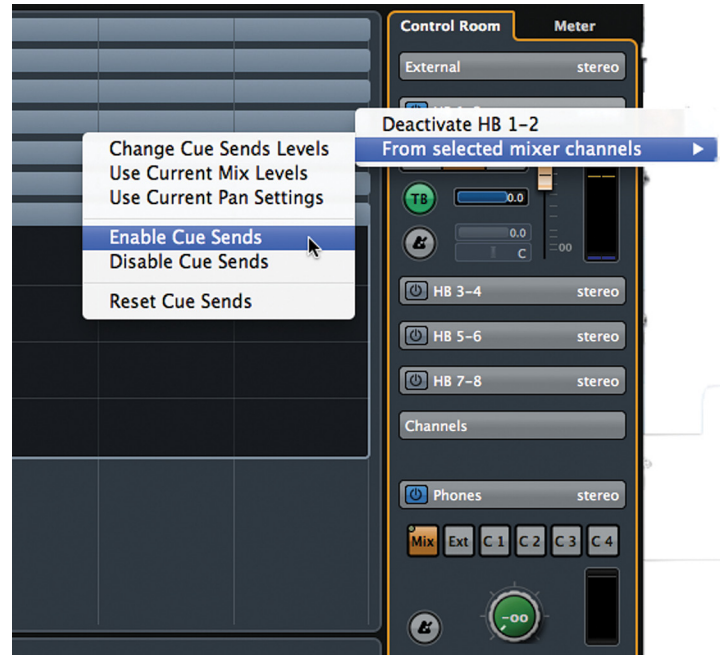


Figure 6.79 Control Room contextual menu

Quick Cue Send Creation

Creating Cue sends can be time consuming on a project with many tracks. There are macro functions for the Cues that alleviate tedious tasks in this process. A common scenario is duplicating the main mix blend from the channel faders into a Cue. The idea is that the Cue can then remain static for the performer while allowing changes to be made to the main mix for monitoring in the control room.

Let's say you have a blend of the drum channels on the channel faders that sounds good and you want to transfer that blend to the first Cue for the drummer to hear while performing. Here's a shortcut.

1. Select all the drum channels you wish to include in the blend.
2. Access the Control Room mixer either by itself or in the MixConsole.
3. Right-click over the Control Room mixer to open the context menu (see Figure 6.79).
4. Select Cue 1>From selected mixer channels>Enable Cue Sends
5. Select Cue 1>From selected mixer channels>Use Current Mix Levels
6. Select Cue 1>From selected mixer channels>Use Current Pan Settings



Figure 6.80
Duplicated
blend on Cue 1

Now, the same blend of channels, including the panning, is duplicated on Cue 1, and the sends have all been set to pre-fader (see Figure 6.80). So any changes made to the channel faders will not affect the balance of the Cue send. This process can be performed with many channels at once instantly so you don't have to manually set each Cue send.

Direct Routing (optional)

The Direct Routing rack accesses the eight Direct Routing slots for each channel (see Figure 6.81). This allows you to switch the output destination of a channel between eight different destinations. This happens in real time, without switching noise. You can also automate these routing changes.

It is possible to route the channel to two different destinations at the same time. A special "Summing Mode" is enabled from the Direct Routing contextual menu by right-clicking on the Direct Routing tab in the MixConsole (see Figure 6.82).



Figure 6.81 Direct Routing rack

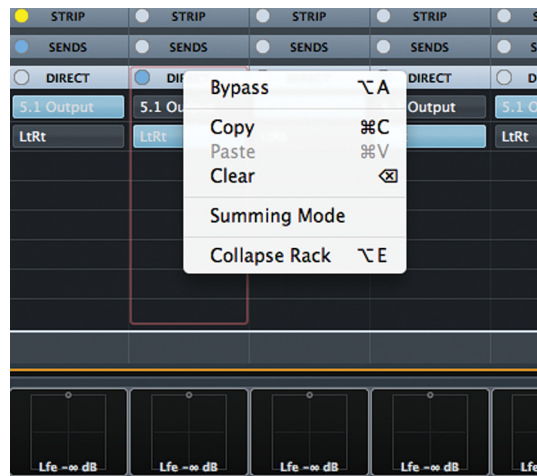


Figure 6.82 Direct Routing contextual menu

Once enabled, clicking on a second routing will not disable the primary routing, thus sending the signal to two destinations. This offers yet another layer of routing flexibility in the MixConsole.

All told, including Direct Routings, Sends and Cues, each channel can have up to 20 destinations at once!

Track Quick Controls (optional)

The Track Quick Controls rack offers eight slots for easy access to any control in the entire channel itself. You can custom configure a set of Quick Controls or choose from presets available in the Inspector tab of the Project window. Any parameter from any Rack can be placed into one of the Quick Control slots to create a custom set of controls for just the items you need (see Figure 6.83).

Device Panels (optional)

If a Device Panel has been assigned to this channel, the first eight parameters of the panel will be available here in the MixConsole .

Pictures

Pictures are a great way to visually identify channels in the MixConsole. Anyone familiar with the method of using white tape to label a traditional analog console will understand the fun of using colors, shapes, and other markings to label the console. It also makes for quicker identifying of the various channels in a large project (see Figure 6.84).



Figure 6.83
Quick Controls
- Preset

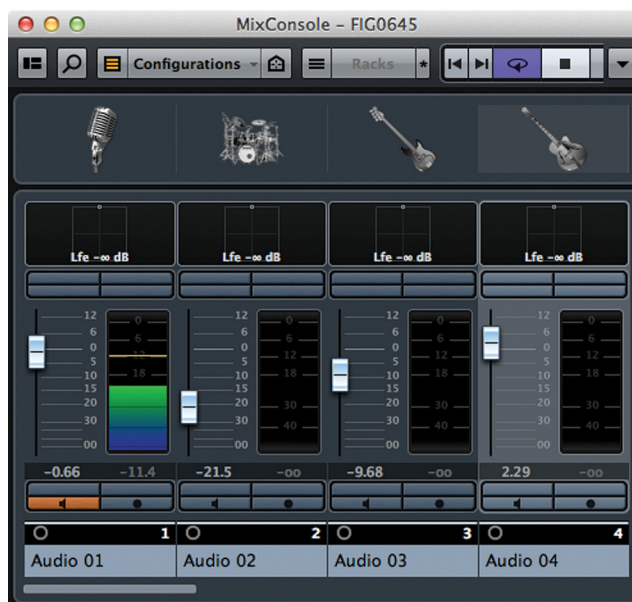


Figure 6.84
Pictures label-
ing the
MixConsole

Clicking in the Pictures area opens up the Track Pictures Browser. There is a whole factory library of graphics to depict various instruments. You may also use your own photos or images to label channels. Import photos of actual instruments and equipment to add a level of detail to the MixConsole, including mic positioning and equipment settings (see Figure 6.85).

Notepad

Finally there is the Notepad. Each channel can have a note attached to it to provide details concerning that track. This can be used for anything: descriptions of microphone setups, tunings, equipment settings, etc. It is convenient to see these notes just above each channel fader (see Figure 6.86).

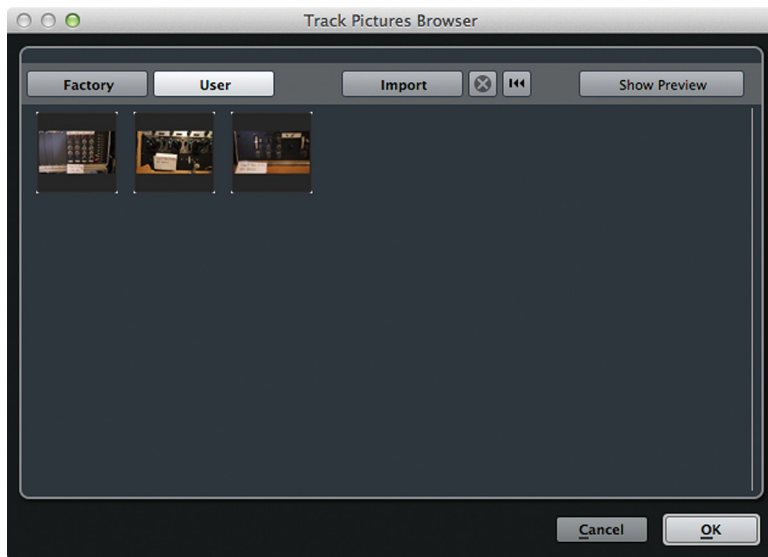


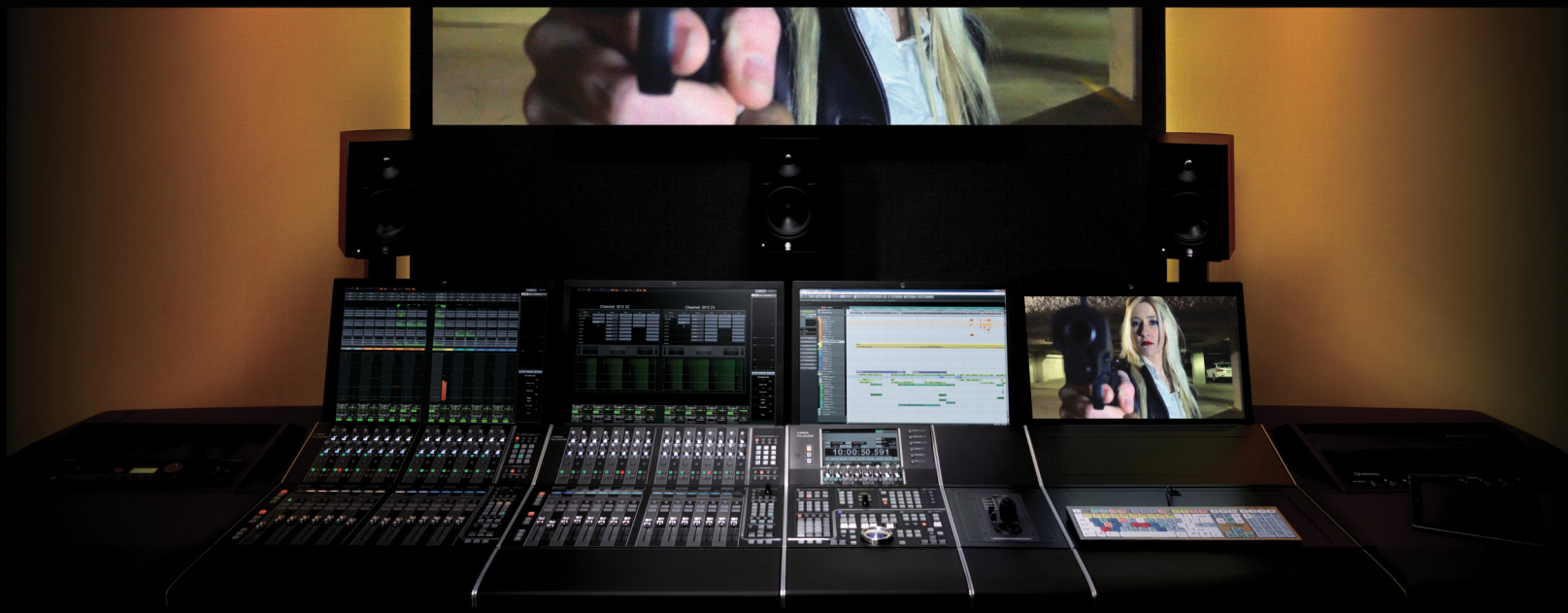
Figure 6.85 Track Pictures Browser



Figure 6.86 The Notepad

NUAGE

COURSEWARE



PART I: SETTING UP

by Ashley Shepherd

Chapter 7

Nuage Fader Unit and Control Room



NUAGE

Nuage Fader Unit and Control Room

- ❖ Nuage Fader Unit Channel Section Control
- ❖ Editing Plug-In Parameters
- ❖ Flip Mode
- ❖ Nuage Control Room

In this chapter, we will explore the Nuage Fader Unit and how to access the various parts of the MixConsole with hardware controls. Then we will explore the Control Room features on both the Fader and Master units.

NUAGE TUTORIAL VIDEO



This chapter covers material found in the tutorial videos associated with this text. If there is a video on the subject, the topic heading will have a note indicating the video title.

Nuage Fader Unit Channel Section Control



(tutorial video: “Section Control”)

The area in the upper right of the Nuage Fader unit is labeled Section Control. These buttons give you access to each rack in the MixConsole. For example, if you press the EQ button, the equalizer rack of the mixer will open up above that Fader unit, as seen in Figure 7.1.

Parameter Display

The multi-function knobs are now assigned to equalizer parameters, two per channel. Those parameters are displayed directly above the multi-function knobs to clearly identify the knob parameters along with functions for the two buttons just below each knob.

Initially, the upper knob controls the gain for this EQ band and the lower knob controls frequency. If the lower button Q is pressed, the lower knob will switch to control the Q or bandwidth of the EQ band. The upper left button turns the band on or off. The upper right button performs an “invert gain” function that reverses the direction of the gain setting. This is helpful for finding problematic frequencies and then reducing them using the Invert button.

Understand that the knobs and buttons will perform different functions depending on which part of the MixConsole is assigned to them. The labeling is clear on the screen, so that understanding which parameters are being addressed is simple. Plus when you touch a knob, the corresponding parameter label above it becomes highlighted.

Slot Switching

Of course two knobs are not enough to control the complete parametric equalizer in Nuendo. That is why there are eight slot buttons in the section control of the Fader unit. For the equalizer, there are four slots corresponding to the four bands of EQ. You can change to another EQ band by pressing the corresponding slot number. For example, if you press slot 4, the knobs will operate the parameters for the fourth band of the equalizer, as seen in Figure 7.2.

If you change the section to the Sends as shown in Figure 7.3, there are eight slots available, one for each aux send in Nuendo. The slot buttons are slightly lit to indicate what slots are available in that section. The brightly lit button indicates the active slot.



Figure 7.1
Section Control set to EQ and display of parameters

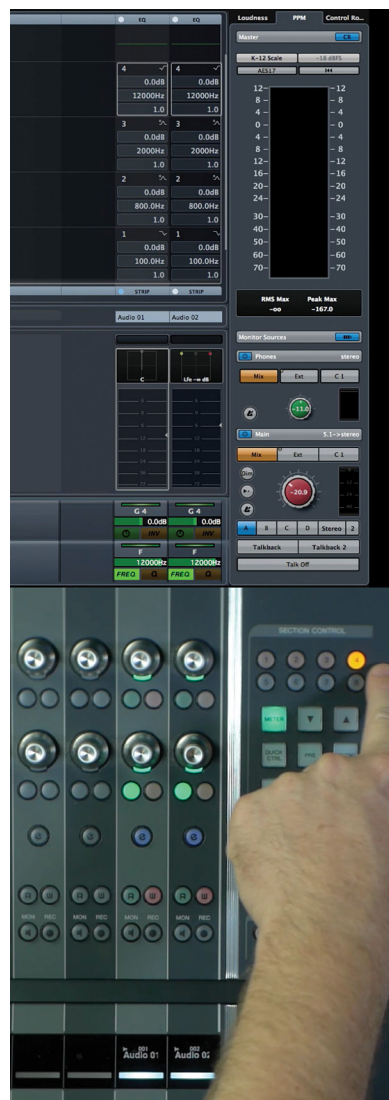


Figure 7.2
Slot 4 switches the knobs to the fourth band of EQ

Each section of the mixer has differing controls assigned to the multi-function knobs. The knobs adapt to the parameters assigned to them. For example, if the pan section is selected, then the pan control is assigned to the top knob. If the channel is routed to a surround destination, the pan controls expand to 16 parameters instead of the simple L-R control. Now all eight slots become active for that channel, giving you access to 16 panning parameters as seen in Figure 7.4.

Explore each section of the MixConsole using the Section Control to see how the parameters are mapped to the knobs. Note that when there is no section selected, the knobs default to the pan controls.



Figure 7.3
Section Control
set to Sends 1-8



Figure 7.4
Surround panner
with all 8
active slots

Meter Switching

The meter button switches the channel metering between normal Graph meters and the time-based Wave meters. The Wave meters are useful for speeding up the mixing process. Using Wave meters, you can see the sound waveform as it approaches the playback zenith, allowing you to prepare your fader moves without stopping playback, like seeing into the future.

Section Control Customization

With the addition of the VCA section, there are now more than nine sections to the MixConsole. With only nine buttons to switch between sections, it is not possible to select them all. Using the Nuage Fader Setup window in Nuendo, these buttons can be customized to switch sections of your choosing.

To customize the section controls, open Devices>NUAGE FADER Setup in Nuendo and click the Section Control tab. You will see a graphic representation of the Section Control shown in Figure 7.5. Each of the section buttons is now a pull-down menu used to choose the section that opens when the button is pressed. This will allow you to rearrange the section control to your preference.

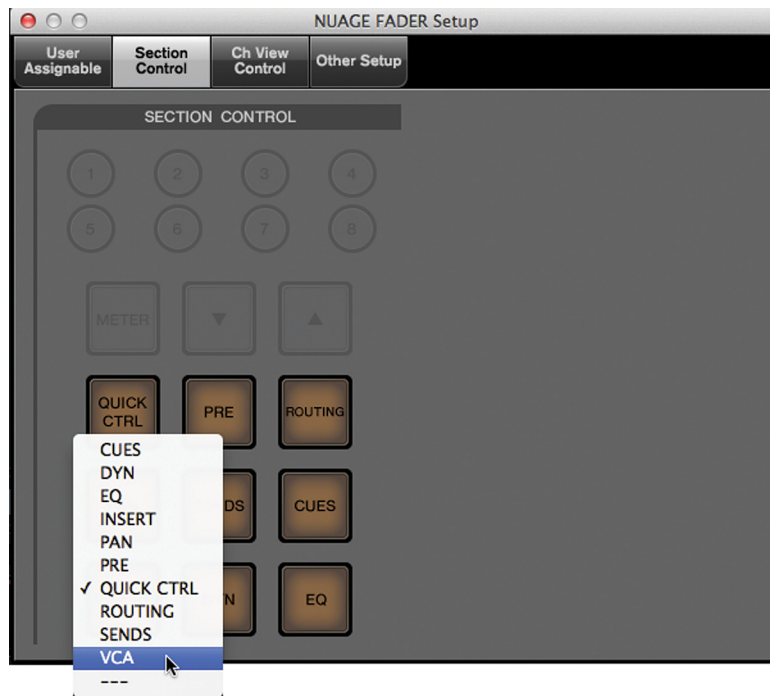


Figure 7.5
Nuage Fader
Setup window

BUTTON LABELS

If you customize the section control, you might need to change the labels for each button. The clear plastic caps on each button can be easily removed so that the underlying label can be changed. Use your fingernail or small plastic knife to pry the caps off. Additional labels are available from Yamaha or you can make your own.

Channel Settings Block Mode

Since there are only two knobs per channel strip, only two parameters of any channel can be addressed in the normal mode. However, there is channel block mode, which changes the arrangement of the knobs so that they all address one channel at a time, 32 knobs at once.

By pressing the [e] button for any channel, the fader unit will enter Channel Settings block mode for that channel, as shown in Figure 7.6. The display above that fader unit changes to show just one channel and the knobs all address its parameters.



Figure 7.6 Channel Settings Block Mode Dynamics

In Figure 7.6, the section control is set to dynamics with the first four processors enabled. You can see all the various parameters for each processor assigned to the knobs below. This makes it much easier to address everything about the dynamics at once.

Notice that there is a fifth processor, the limiter. Using the slot buttons, additional pages of parameters can be accessed. Pressing the slot 2 button, as seen in Figure 7.7, shows the fifth dynamics processor mapped to the knobs.

So even in Channel Settings mode, the section control and slot buttons work in the same fashion as their normal mode, switching between the various racks of the MixConsole but just on one channel at a time.

NO SECTION SELECTED

When in block mode and no section is selected in the Section Control, a composite channel strip is mapped to the knobs with limited access to all sections of the channel at once.



Figure 7.7 Slot 2 showing the limiter

Channel Settings Dual Block Mode

Since mixing is really about the relationship between channels, not just one channel in isolation, it can be useful to see and address all the settings for more than one channel together.

Nuage provides a dual block mode to see two channels at once on the screen and have two blocks of 16 knobs address both channels. Figure 7.8 shows two channels in dual block settings mode on the EQ section. The complete set of equalizer parameters are mapped to each block of 16 knobs, giving you total control over these two channels.

The section control works as before, switching both channels between the various parts of the mixer. Since there are only 16 knobs per channel, an extra slot is necessary in the dynamics section to access all the processors.

Each Fader unit in a Nuage system can display two different channels in dual block mode. If there are three Fader units, a total of six channels can be edited in block mode. If the units are not linked, each unit can display different sections for the two channels.



Figure 7.8 Channel Settings dual block mode with EQs

Editing Plug-In Parameters

Plug-ins traditionally are edited onscreen with custom GUIs that allow the mouse to control each parameter visually. When working with the Nuage Fader unit, plug-ins are controlled with the multi-function knobs. The following step-by-step procedure takes you through the process of opening and editing a plug-in using only the Fader unit.

1. Switch to the Inserts section using the section control on the Fader unit.
2. Select slot one and pick a channel to insert a plug-in. Figure 7.9 shows several channels with the first insert slot selected.



Figure 7.9
Insert slot one
selected

3. Press knob 1 on the channel you've chosen. This opens a list of plug-ins available on your system.
4. Turn knob 1 to scroll through the list of plug-ins shown in Figure 7.10. (Press knob 1 again to toggle any folders open or closed within the plug-in list.)
5. Scroll to the desired plug-in.
6. Press knob 1 again to select and insert that plug-in. The plug-in's GUI will open on the screen full size and the entire set of knobs will be assigned to each plug-in parameter, as shown in Figure 7.11.



Figure 7.10
Scrolling
through the
Plug-in list



Figure 7.11 The StereoDelay plug-in mapped to the knobs on the Fader unit

You can now use the knobs to control the parameters of the plug-in.

Rearranging the knob assignments is easy using the padlock icon buttons to unlock the knob assignments and freely choose others. Follow these steps to change the assignment of a knob from one parameter to another.

1. Turn off the assignment lock by pressing the right button of the chosen knob.
2. Using the mouse, move the cursor over the new parameter that you want to assign to that knob. Notice that as you roll over various parameters, their data appears in every unassigned knob's value display, as seen in Figure 7.12.
3. Once the desired parameter is being shown in the knob's display, press the assignment lock button again to lock that parameter to the knob.
4. Repeat for all desired knobs and parameters. If you leave the assignment lock turned off, that knob will become unassigned or blank.



Figure 7.12 Freely assigning parameters to unlocked knobs

Now you have the plug-in parameters laid out on the knobs just the way you prefer, customized to your workflow. When you next load this plug-in, the knob layout is saved and will open up the same way.

BRING THE KNOBS TO YOU

This method can be used to configure plug-in parameters that are closer to your central mix position, lessening the need to reach and lean to the side to get to a desired parameter. Non-essential parameters can be left unassigned to eliminate cluttering the display above the knobs. Esoteric parameters can still be adjusted by a mouse on the screen when necessary, helping keep the display efficiently uncluttered and clean.

Flip Mode



(tutorial video: “Flip Mode”)

At any point in time, you can flip the parameters controlled by the knobs down to the faders. This is called Flip Mode and allows you to use the faders instead of the knobs to adjust any parameter of the channel. This is very useful for writing automation that might otherwise be cumbersome using a knob.

For example, when automating aux sends, flipping them to the fader is much more convenient as the sends level is presented just like the channel level, as a fader. However, any parameter can be flipped to the fader. Automating surround panners can be more effective on several faders rather than using the touch screen graph or X-Y knobs.

The multi-function knobs are continuous controls while the faders are absolute, having a maximum and minimum position. This can be helpful when you need to execute jumps in parameters such as panning during a film mix. Faders make this type of automation move easier and more intuitive.

In order to flip parameters from the knobs to the faders, you must use the two flip buttons located on the left side of the Fader unit. You can flip one row of knobs to the faders by using the KNOB 1 or KNOB 2 button. Figure 7.13 shows the aux send levels from knob 1 flipped to the faders. Notice the KNOB 1 button is lit up indicating which knob has been flipped to the faders.



Figure 7.13
Knob 1 flipped
to the faders

FLIP MODE ANYTIME

The knobs may be flipped to the faders at any time regardless of what parameters are assigned to the knobs. If no parameter is assigned to a particular knob, when flipped, the corresponding fader will move to $-\infty$ (-inf).

Nuage Control Room

Both the Nuage Fader and Master units have dedicated Control Room features. The Fader unit controls are limited while the Master unit has a complete Control Room section with multiple touch screen pages.

Speaker selection, monitor source selection and volume adjustments are very likely the most used operations in any studio. With the talkback, cues, and studio calibration abilities, understanding and being able to access all the Control Room functions is critical to creative and efficient recording, editing and mixing.

Control Room Basics



(tutorial video: “Master Control Room Basics”)

The basic Control Room features are the volume setting, speaker selection, and downmix presets. All of these reside in the Master unit’s Control Room section, shown in Figure 7.14, along with the condensed controls found on the Fader unit.



Figure 7.14
Master and
Fader Unit
Control Room
Sections

Control Room Level

Probably the most used knob in the entire studio is the Control Room level, which determines how loud the speaker system is set. In most situations, this is adjusted quite often during sessions. Although in certain situations, the Control Room level should be set at a constant reference level, such as when film mixing in a calibrated dub stage.

On both the Master and Fader units, the Control Room level is adjusted by the black knob in each Control Room section. As you adjust this knob, a numeric readout on the Master unit details the current volume setting in decibels. The range is from $-\infty$ to +12 dB.

AVOID CONTROL ROOM OUTPUT CLIPPING

Since Control Room uses the DA converters directly connected to speaker systems, ensure that the output levels do not level exceed 0dBFS to avoid digital clipping and possible speaker damage. If you find that comfortable listening levels consistently are causing clipping of the Control Room output, the physical speaker system's level should be increased to provide more headroom. Metering of the Control Room output is available in Nuendo's Control Room Mixer and the touchscreen of the Nuage Master unit.

Reference Level

In calibrated mixing rooms such as film and television mixing stages, standards require setting the speaker system to a pre-defined absolute volume level. Standards set by broadcast stations, networks, and formats such as Dolby include calibration of the dB SPL levels in the mixing studio.

The Control Room has an adjustable reference level that can be defined in two ways: a preference setting or manually using the Master unit. Once you have determined what your reference level needs to be by following the specific calibration procedures, you can set the reference level in Nuendo's preferences, as seen in Figure 7.15. The reference level is defined as the dB gain of the Control Room Level.

When the Ref button is pressed on the Master unit, the Control Room level will be changed to -7.5 dB.

To manually set the reference level using the Master unit, adjust the volume setting to the desired value. While holding the Master unit's [Alt] key, press the Ref button. The new reference level is set.

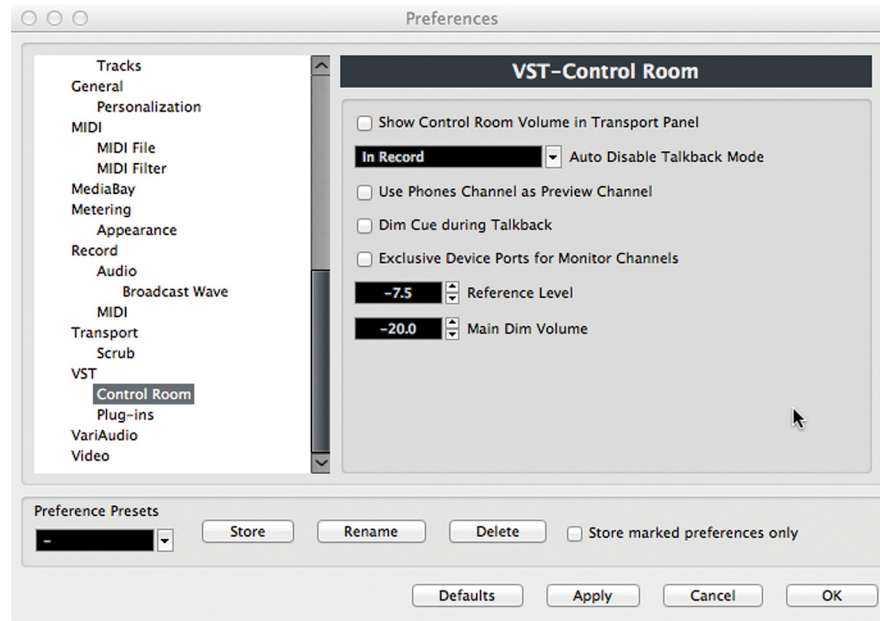


Figure 7.15
Control Room preferences with the Reference level set to -7.5 dB and the Dim set to -20 dB

Dim Setting

It may be necessary to quickly turn down the level of the Control Room in order to hear another conversation in the studio without stopping playback or for any number of other reasons. The Dim button will reduce the Control Room level by a set number of decibels according to the preference setting, as seen in Figure 7.15. For example, if the Control Room level is currently set to -10 dB and the Dim button is pressed, the resulting level will be -30 dB, reflecting the sum of both settings.

Mute Button

As the name implies, the Mute button will silence the Control Room output immediately.

Monitor Select

In most professional studios there are several speaker systems that can be used for monitoring. The purpose of this is to hear the mix in different types of playback systems, whether multi-channel versus stereo or mono, or small, medium, and large speakers that mimic various consumer listening environments.

Control Room provides the ability to easily switch between four independent speaker systems that can vary from mono, stereo, 5.1, and on into multi-channel theatrical systems. On the Nuage Master unit, you can switch between them with the touch of a button, as shown in Figure 7.16.

Monitor
Speaker
Selectors



Figure 7.16
The four
Monitor selec-
tors A, B, C, D

DEFINITIONS: MONITOR

The word “monitor” can be used in several ways in audio parlance: as a verb when describing the act of listening (“We are monitoring the surround mix”); as a noun when describing speaker systems (“The large studio monitors are very heavy”); and even as an adjective when describing an audio signal (“Switch the monitor source to the DVD player”). In Nuendo’s Control Room, a monitor is considered a speaker system. A monitor source is an audio signal that is available in Control Room. And the act of monitoring something is the combination of a signal source, speaker system, and level setting while listening.

To switch Monitors (speaker systems) simply press the desired button on the Master unit: A, B, C, or D. Channel routing, downmix and any calibration that has been assigned to each speaker system is automatically switched by Control Room.

Downmix Setting

The downmix setting is located just to the left of the Monitor switches, as seen in Figure 7.16. Control Room can take multi-channel mixes (surround, stereo) and reduce the number of speaker channels used to play the source signals. This is helpful for two reasons: to preview how your mix will sound on various playback systems and to accommodate studio monitors that have fewer channels than the source signal (listening to a 5.1 mix on stereo speakers, for example).

There are four downmix presets per Monitor in Control Room. Depending on the widest signal (number of channels) in Control Room, these presets can be different. Typically they start with 5.1 surround and reduce to mono.

1. 5.1 Surround
2. Stereo
3. Mono
4. - empty -

The fourth preset would be used if the widest signal was greater than 5.1, such as 7.1 or Atmos. If a Monitor has fewer channels than the source signal, a downmix preset must be used in order to hear the signal completely. This is handled by Nuendo automatically. However, you can further downmix the signals by choosing a narrower downmix preset.

The downmix preset that is chosen for a particular Monitor will be remembered the next time that Monitor is selected. This makes for fast and efficient speaker system selection with minimal fuss, keeping you in the creative mindset.

Monitor Source Select



(tutorial video: [Master Monitor Sources](#))

Nuendo's Control Room can have multiple signal sources available for monitoring. These can be a combination of mix sources from within the currently active project, external sources, and cue mixes. All of these sources can be selected on the Master unit in the Monitor Source section, shown in Figure 7.17.



Figure 7.17
Monitor Source section

Mixes

Mixes are signal sources from within the currently active project. They can come from VST Output buses, Group channels, or VST Input buses. These mixes change depending on the active project and its contents.

Additionally, mix sources can be combined together in Control Room using the Sum button, seen in Figure 7.17. When “Sum” is active, you may select more than one of the mixes to monitor together. This is most helpful in film mixing when you wish to combine various stem signals together, such as dialog and Foley, without hearing the remaining sound effect and music stems.

SUM MODE ONLY FOR MIXES

The sum mode is only for Mix sources, not external inputs or the cues. Each Control Room output can monitor either the Mixes, an external input, or one of the cues.

External Inputs

External inputs can be anything connected to the audio interface inputs, including iPods, DVD players, other computers, etc. External inputs can be any supported channel width and will be routed to Control Room Monitors automatically based on their configuration.

In order to hear an external input, you must press the EXT button to switch Control Room to external monitoring and then choose one of the eight possible external sources.

Cues

Cues are the four Control Room outputs designed to provide monitoring for talent in the studio, usually on headphones. It is possible to monitor each Cue in the Main Control room channel by selecting it as a Monitor Source. This is handy for ensuring that the talent is receiving a proper mix for the task at hand.

Phones Channel

The Phones Control Room output is designed to feed headphones used by the engineer in the studio as opposed to the cues for talent in the studio. The Phones channel can also be controlled by the Nuage Master unit. By pressing the Phones button in the Control Room section, the level and mute controls are switched over to the Phones channel. In the display above the level knob, a headphone icon appears, shown in Figure 7.18, indicating that you are operating the Phones channel.



Figure 7.18
Control Room
OLED display in
Phones mode



Figure 7.19
Cue send mute
buttons

The Monitor Sources also switch to the Phones channel. The Phones channel can monitor a source other than the main channel, such as mix, external, or cue.

Cues

The four Cue sends have very simple mute controls on the Master unit as seen in Figure 7.19. This allows you to quickly turn off any Cue with a button push. Additional Cue controls are found on the touchscreen.

Control Room Touchscreen Pages

Each part of the Control Room has a touchscreen page on the Master unit, providing hardware control over even more parameters. To access these pages, press the blue Display Access button for the Control Room. Pressing Display Access repeatedly will step you through each page.

Main

The main control room page, shown in Figure 7.20, has duplicate controls for each hardware knob and button. The row of multi-function knobs beneath the touchscreen addresses these additional features, including click level and pan, Listen bus level, and Listen Dim settings.



Figure 7.20 Control Room Main page

Speaker Control

The Speaker Control page accesses Monitor selection, downmix presets, hardware bass management (available on Nuage IOs) and speaker channel soloing. By tapping on a channel button in the display (shown in Figure 7.21), that speaker will be soloed, which is very handy for resolving center channel issues, among other things.

Inserts

Each Control Room channel may have multiple plug-in inserts. This touchscreen page accesses them all, including inputs such as the Talkback and External. In Figure 7.22, the tabs along the top of the screen access each channel's plug-ins. For both External Inputs and Monitors, you must use hardware control to switch between each one to see its available insert slots.

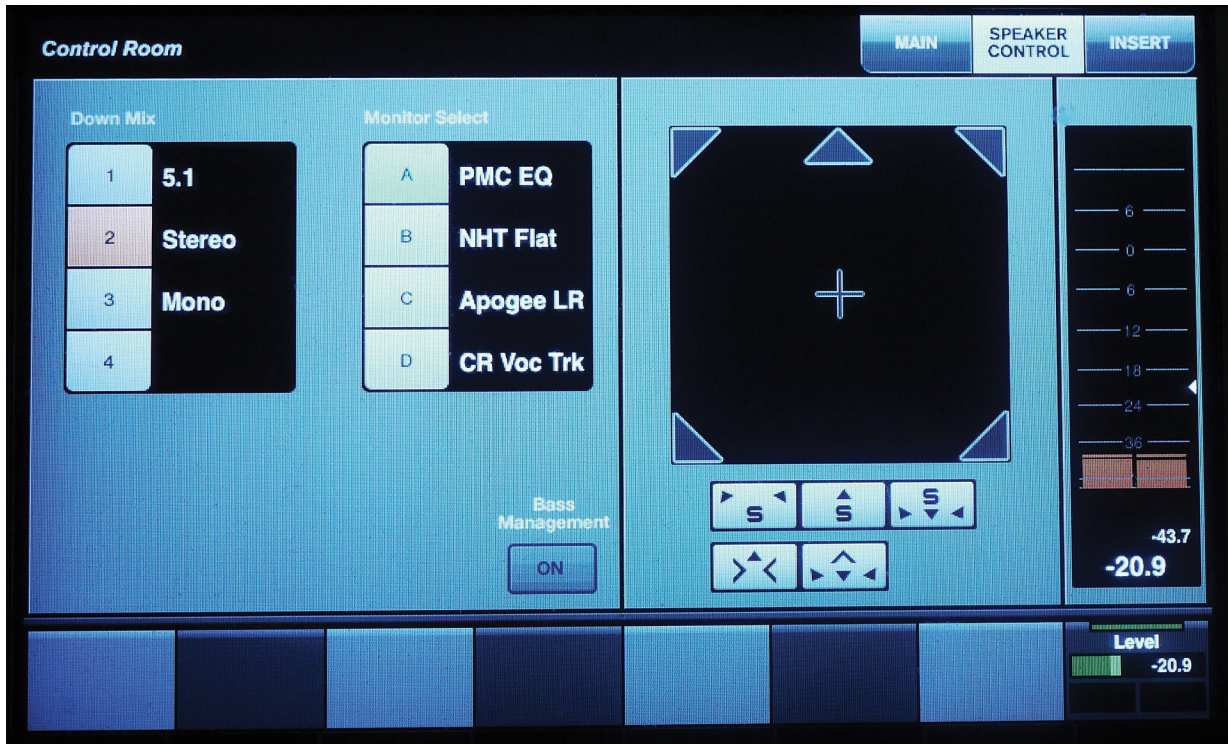


Figure 7.21 Speaker Control page



Figure 7.22 Control Room Inserts page



Figure 7.23 Monitor Sources page



Figure 7.24 Cues page

Monitor Sources

The Monitor Sources page shows you all the Control Room outputs and their source selection, as seen in Figure 7.23. This gives a quick glance at what signals are being monitored for each output. You access this page by pressing the Display Access button for the Monitor Source.

Cues

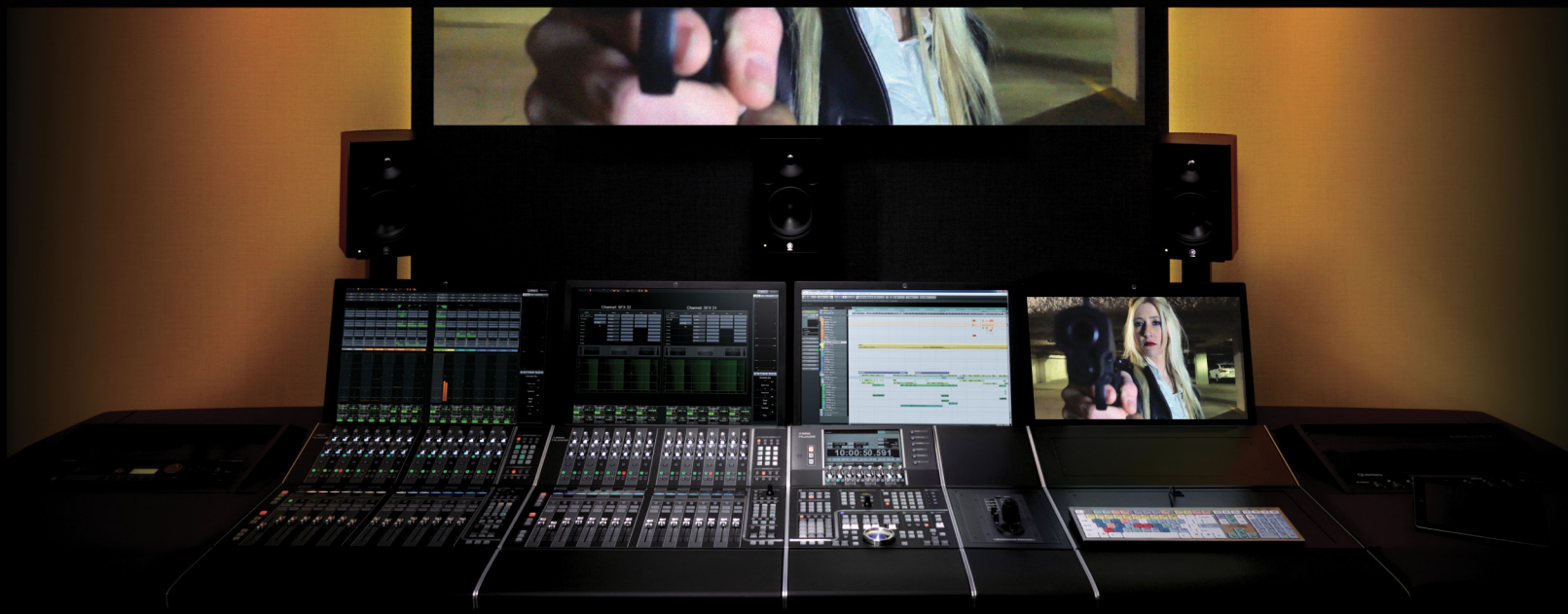
The Cues page is where you can enable the Talkback channel, adjust the click level and pan, and select the monitor source for each Cue independently. Figure 7.24 also shows the level metering for each Cue, which helps avoid any clipping of headphone signals.

BRICKWALL LIMITER PROTECTS HEARING

Using a brickwall limiter on the output of each Cue can help prevent hearing damage due to accidentally overdriven headphones. It can be very painful to receive an unintended burst of loud and distorted audio through headphones. Accidents do happen but a limiter can protect the talent's hearing just in case.

NUAGE

COURSEWARE



PART I: SETTING UP

by Ashley Shepherd

Chapter 8

Extended Layout

NUAGE

Extended Layout

- ❖ Channel Settings
- ❖ The Pool
- ❖ The Sample Editor
- ❖ MediaBay
- ❖ Workspaces

In addition to the three basic windows described in the previous chapters—Project, Transport, and Mixer—there are several other windows that are central to the operation of Nuendo:

- ❖ **Channel Settings** – Consolidates all settings from the Inspector into one single window for a selected channel.
- ❖ **The Pool** – Organizes all audio and video media used in a project.
- ❖ **The Sample Editor** – Facilitates editing of audio clips, offline processing, and warping functions such as pitch correction and time stretching.
- ❖ **MediaBay** – Gives you access to all media files on your computer and connected network drives. Categorization of all your media allows for quick searching and auditioning of audio, video, and MIDI.

In this chapter, we will take a look at these windows and discuss their basic function and operation.

Channel Settings

The Channel Settings window consolidates settings found in the Inspector section of the project window and from the mixer's expanded views into one place. Only the selected channel will have its settings displayed here.

As with so many windows in Nuendo, the Channel settings window is configurable. Various sections of the window may be turned on or off using the familiar setup window.

TRACK TYPES WITHOUT CHANNEL SETTINGS

If you select a track type in the project window that has no equivalent channel in the mixer, the Channel Settings window will display the last channel selected (e.g., if you select a Folder track in the project window, the Channel Settings window will remain on the previously selected channel).

To access the Channel Settings window, click the “e” symbol found in several places in the GUI:

- ❖ Main Tab of the Inspector
- ❖ Track List in Project window
- ❖ Fader section of the Mixer

Once the Channel Settings window is open, it will display settings for whatever channel is currently selected. For multiple selected channels, it will display the last channel selected or clicked. Only one Channel Settings window can be open at a time.

Audio Channel Settings

Audio Channel Settings will be similar among all channels types that have actual audio passing through them.

- ❖ Audio Channels
- ❖ Group Channels
- ❖ FX Channels
- ❖ Input Channels
- ❖ Output Channels
- ❖ VST Instrument Channels

Looking at Figure 8.1, there is a toolbar at the top of the window and various sections and panes below. By default, four sections are displayed for an audio track:

1. Inserts/Strip
2. Channel Strip/Equalizer
3. Sends/Cue Sends
4. Channel Faders

The only optional section available is Direct Routing, shown in Figure 8.2. To display Direct Routing, click on the Setup Window layout button in the upper right and check the box for Direct Routing.

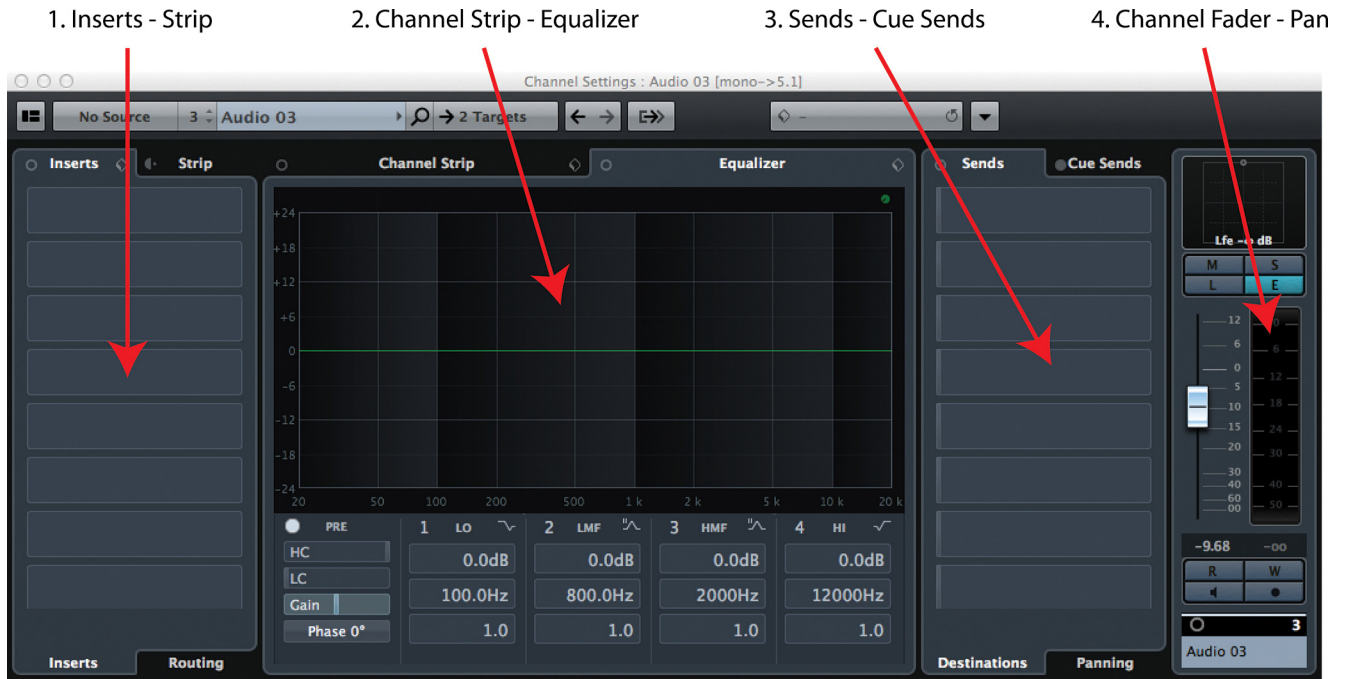


Figure 8.1 Channel Settings for an Audio track



Figure 8.2 Channel Settings with Direct Routing

Inserts/Strip

The first section can display either the eight Inserts or the dynamics Strip. On the left side of the Strip tab, there is an icon to represent pre or post Inserts. Clicking on this icon will rearrange the signal flow order of the Inserts and the Strip. If the Strip is moved to pre-inserts, then the tabs will switch positions to indicate this new signal flow, as seen in Figure 8.3.

Clicking on the Strip tab will switch the section to the Strip where you can change the position of the EQ within the Strip signal flow just like the MixConsole.



Figure 8.3 Strip in pre-inserts position

Channel Strip/Equalizer

The next section displays the equalizer controls by default. Clicking the Channel Strip tab will open the controls for the dynamics processors, as seen in Figure 8.4. Also, note that the equalizer curve is now displayed below in the Inserts/Strip section and can be modified graphically. The EQ, input gain, phase, and filter parameters also move to the lower section in the Channel Strip display, giving you control over most of the channel parameters in one view, hence the Channel Strip name.

Sends/Cue Sends

As the name implies, the next section can display either the eight Sends or the four Cue Sends. In the Sends view, there are two tabs at the bottom, one for the routing destination and level of the send and the other for the panning of the send.

Here's where multi-channel routing can be addressed with Sends. Either a surround panner or MixConvert plug-in will be visible here if multi-channel audio being used. Figure 8.5 shows a surround panner for the first aux send.



Fig 8.4 Channel Strip view



Fig 8.5 Sends Panning view with a surround panner

Direct Routing

In the Direct Routing section, you can create eight different routing destinations and switch between them by clicking each routing. If you right-click at the bottom of this section, you access the Summing Mode option to enable more than one routing at a time, as shown in Figure 8.6.

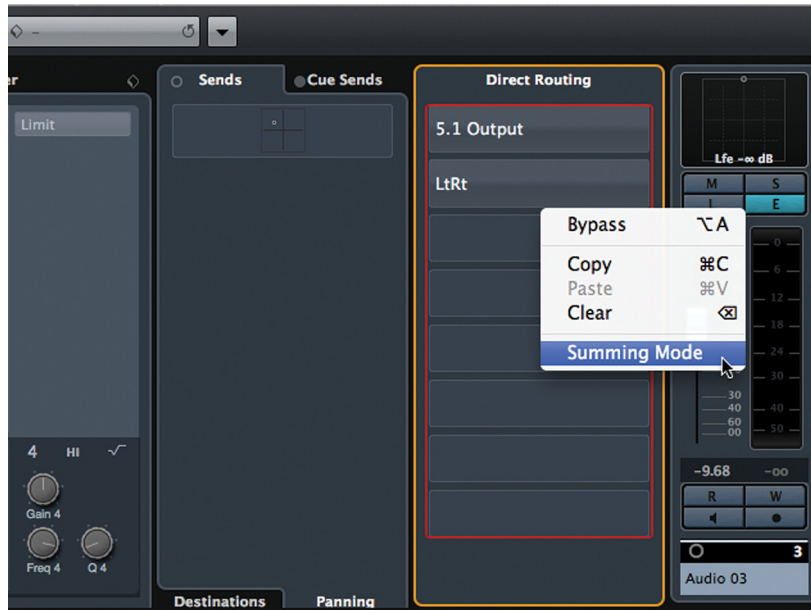


Fig 8.6
Summing
Mode Option
menu

Channel Faders

The Channel Faders section shows the channel fader by default. However, if you enable the Show Output Chain option from the Toolbar, the channel fader for the routing destination will also be displayed, as seen in Figure 8.7.

Toolbar

The Channel Settings Toolbar has several buttons and a functions menu. The buttons do the following:

- ❖ Select the input routing
- ❖ Switch to the Input Channel's settings
- ❖ Select tracks by number
- ❖ Select tracks by name
- ❖ Search tracks by name
- ❖ Switch the Channel Settings to one of multiple targets



Fig 8.7 Channel Fader with Output Fader

- ❖ Select the primary Output destination
- ❖ Go to previous channel
- ❖ Go to next channel
- ❖ Show Output Chain

MIDI Channel Settings

The MIDI Channel Settings window is fairly simple. The Toolbar remains the same. There are two sections; MIDI Inserts and MIDI Sends.



Fig 8.8
MIDI Channel Settings

Nuage Channel Settings Mode



(tutorial video: “Channel Settings Block Mode”)

On the Nuage Fader Unit, there is a mode whereby all the settings for one channel occupy the entire screen and all 32 encoders. This makes it very easy to address many parameters of a channel at once with the control surface.

Press any channel’s “e” button on the fader unit and the display will switch to Channel Settings mode, showing the entire channel on one screen. The knobset will now control settings for just one channel. This is block mode. For more details, please refer to Chapter 7.

Most hardware control surfaces offer access to only one channel at a time. With the Nuage Fader, each unit can access two channels at once while the Master unit can address yet another.

The ability to view several channels at once gives you added creative control by letting you manage the relationship between two different channels at the same time. And mixing is all about relationships between things in the mix.

The Pool

The Pool is the place where you can manage all the audio and video files that are part of a project file. It is here that you can see every audio file that has been recorded or directly imported into the project. Even audio files that have been deleted or “undone” after recording will still remain in the trash folder of the pool. Nuendo makes it difficult to truly erase an audio file by accident. Several steps must be taken to erase a file from disk. I appreciate this as a fail-safe way to handle recorded audio files.

Audio and video files that are in the pool might not actually be used in the project window but remain a part of the project file. For example, you could import 24 audio files into the pool at one time. They do not immediately have to be placed on audio tracks in the project window. They can remain happily in the pool until they are needed.

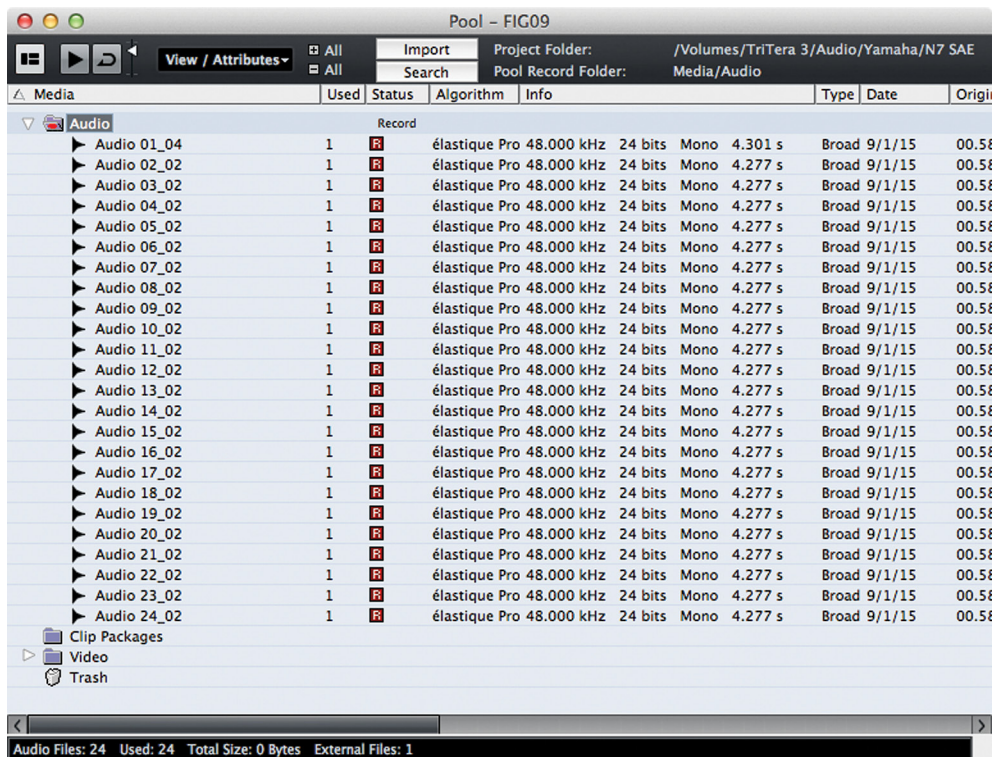


Figure 8.9
The Pool with
24 imported
audio files

PRO TOOLS TIP

For Pro Tools users, the pool is the equivalent of the region list, just in a separate window and with a great deal more options and organizing ability.

Audio File Location

Files in the pool do not have to be located in the active project folder! This is very important. Files located anywhere on your system, from local hard drives to networked storage, can be added to the pool. Very often, video files reside on another physical hard drive due to the size and bandwidth needs of HD video.

This complicates things when it comes to backup, archiving, and transfer of projects from one system to another. Fortunately, the pool lists the directories of every file in its display and offers the option to copy those files into the current project folder if needed.

CAREFUL FILE MANAGEMENT

Since audio files from outside the project folder can be used in the pool and in the project in general, care must be taken not to muddle the file structure. This occurs when saving copies of just the project file and not all the media files to another directory, assuming that all the media will follow to the new location. I have had many clients with issues concerning missing files as a result of this type of misunderstanding, not just with Nuendo but with Cubase, Pro Tools, Digital Performer, you name it. Keeping all the audio files for a particular project in the project folder itself is the best way to avoid problems later when transferring or backing up projects.

For this same reason, be cautious when erasing audio files. If you are simply removing files from the pool that are unique to the project, that is one thing. However, if you are using audio files from a sample library or a series of loops, the audio file might exist in another location and could be used in another project. If you choose to erase this file permanently, it will be removed from that location, perhaps destroying parts of your sound FX library or loop collection.

The pool offers ways of sorting and organizing audio files using attributes such as name, size, creation date, format, etc. You can even create custom attributes to fit your particular needs. Additional folders can be created within the main Audio folder to group related audio files. In film work, the sheer number of files generated requires some amount of compartmentalizing just to make sense of it all: dialog, Foley, ambience, etc.

Many functions of the Pool are accessed from the contextual menu. Right-click (Win) or control-click (Mac) to view these options, as shown in Figure 8.10.

The Pool During Recording

Since recording is the first activity discussed in this book, let's look at how the pool can be used during recording. When you first create a new project, the pool will be completely empty. Once you have recorded on one or more audio tracks, the pool will list the files that were created as a result. As an example, let's set Nuendo to record on 14 audio tracks, 12 of which are mono and two that are stereo. These are the basic tracks for a 5 piece rock band.

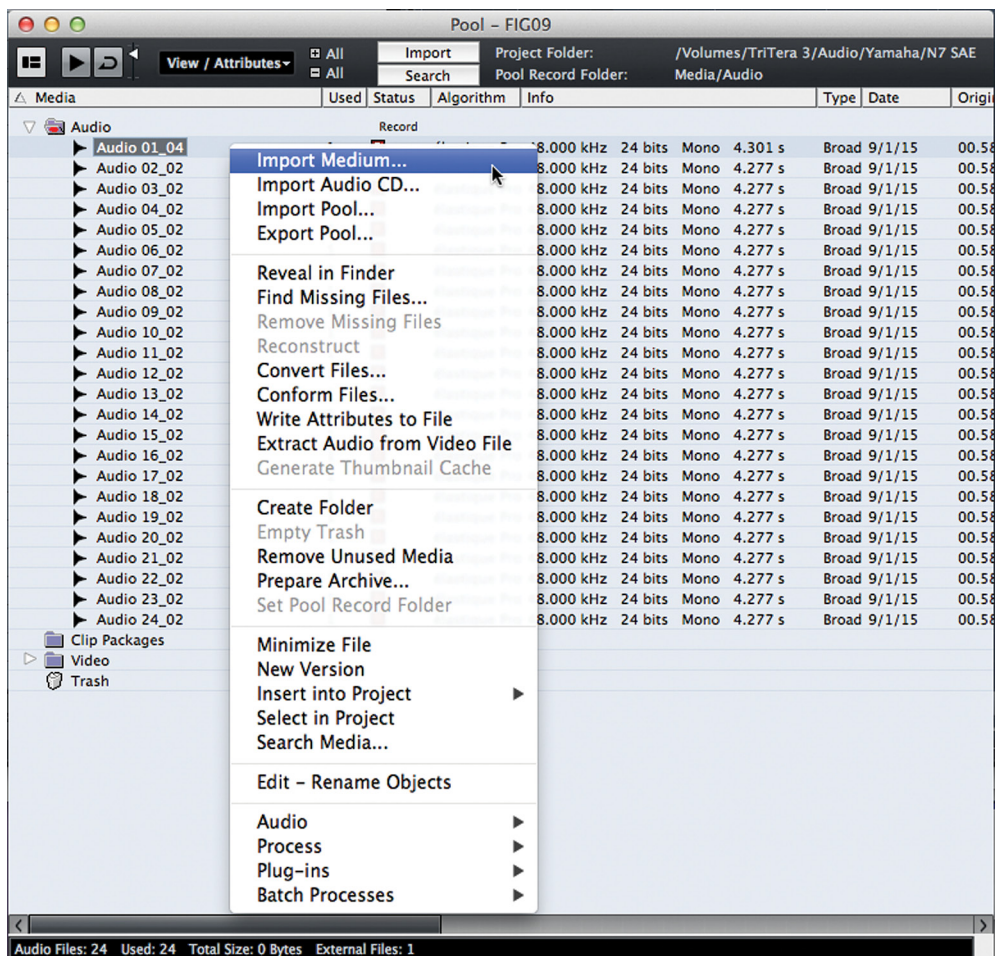


Figure 8.10
The Pool's contextual menu

The tracks break down like this:

- | | |
|-----------------------|---------------------|
| 1. Kick drum | 8. Bass DI |
| 2. Snare drum | 9. Bass Amp |
| 3. Hi-hat | 10. Guitar Amp |
| 4. Rack Tom | 11. Keyboard DI |
| 5. Floor tom | 12. Acoustic guitar |
| 6. Overheads (stereo) | 13. Harmony vocal |
| 7. Room mics (stereo) | 14. Lead vocal |

Let's say we record the first take but it's a false start, only about 20 seconds into the tune. Figure 8.11 shows what the Pool would look like after the first take.



Figure 8.11
The Pool after
the first take

We have 14 files inside the Audio Files folder. Audio files are named according to the name of the track in Nuendo followed by a number indicating the order in which it was recorded (_01, _02 etc.). They are arranged in alphabetical order by default but can be reordered using any of the attributes shown in the pool. The info column lists all the files as being of the same format except for the two stereo tracks having two channels instead of one.

PRO TOOLS TIP

Nuendo records interleaved files for multi-channel audio tracks, unlike Pro Tools, which records multiple mono files, one for each channel of a multi-channel track. If you are sharing files with Pro Tools systems, interleaved files will have to be converted to multiple mono files in order to be directly transferred to Pro Tools systems. Nuendo provides a special function that can convert multi-channel tracks directly into multiple mono tracks or vice versa. This is covered in Part III: Editing and Part V: Tools and Accessories.

Since this was a false start and no one is interested in keeping the take, we can simply use the undo function ([Cntrl]/[Cmd]+Z) and the files will be removed from the project window, gone. But not so fast... In the pool, these files have simply been moved to the trash folder, as seen in Figure 8.12. They have not yet been erased from the hard disk. If, all of a sudden, the bass player thinks there was something interesting about that take, the files are retrievable. You can simply use the redo function from the edit menu ([Cntrl]/[Cmd]+[Shift]+Y) to restore the files back into the project window and into the audio files folder of the pool. It is also possible to drag the files from the trash folder and into the audio files folder by hand and then place them into the project window.



Figure 8.12
The Pool after undoing the first take

BACK INTO THE POOL

Audio files in the pool's trash folder cannot be directly placed into the project window. They must first be placed into the audio files folder within the Pool.

If everyone is sure that the first take was junk and should be thrown away forever, you can choose to empty the trash from the contextual menu. Up pops the empty trash dialog giving you an important choice: erase the actual audio files from the disk or remove the "clips" from the pool, as shown in Figure 8.13. Clips are Nuendo's references to actual audio files and will be discussed in the next section, the Sample Editor window.

- ❖ **Remove from Pool.** The audio files will no longer be a part of the project but they will still exist in the Audio folder inside the project folder. You can still re-import them back into the project. They are not gone for good.
- ❖ **Erase.** The actual audio files will be permanently erased off the hard disk. There is NO UNDO for this action!

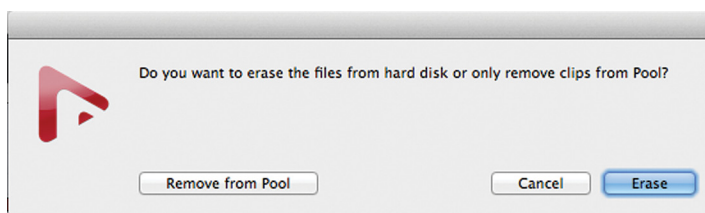


Figure 8.13
The Empty Trash dialog

Now, let's continue and record takes two, three, and four. Take two was just as bad as one and was erased. Take three was pretty good until the second chorus. Take four was a punch-in for the second chorus. Now we have two takes that we are keeping. The pool now has audio files _03 and _04 listed, as shown in Figure 8.14.

Even though takes one and two were erased from the hard disk, Nuendo will increment the audio file numbering regardless of which files have been removed or erased. This way, you always can tell the distinct order in which audio files have been recorded.

CAUTION

Be aware that if you decide to change the name of a track at any point, Nuendo will start naming the audio files recorded onto that track using the new name and a reset count of “_01.” It is always best practice to name your audio tracks appropriately before you start recording.

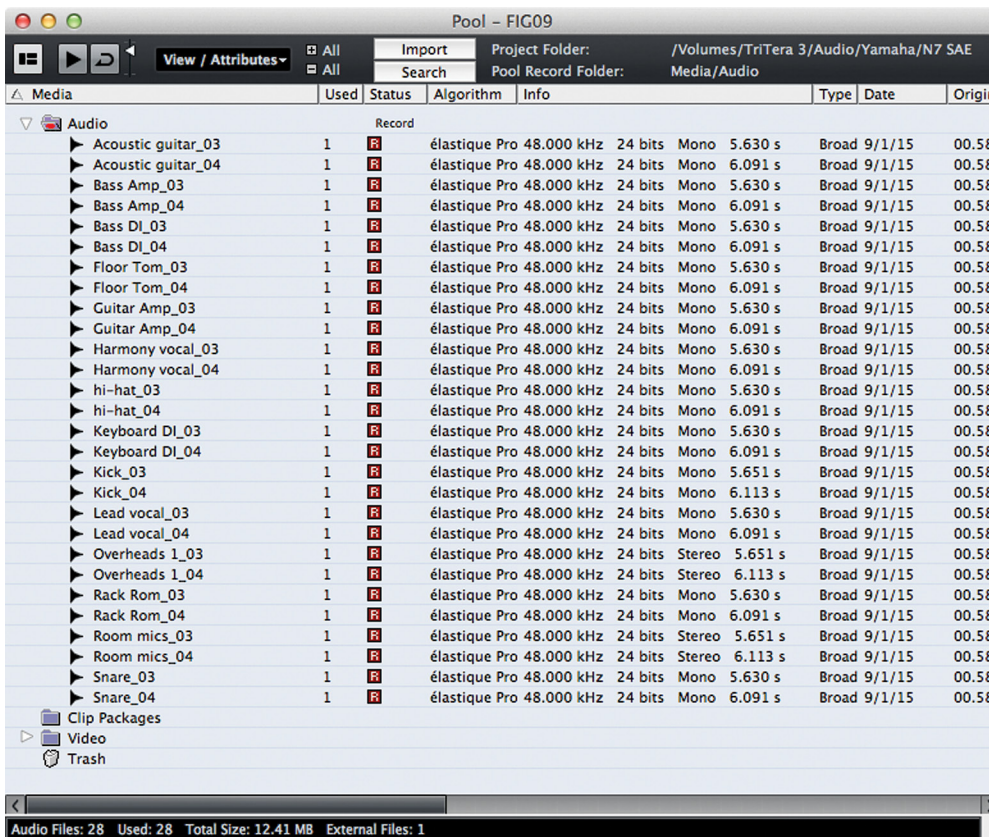


Figure 8.14
Takes 3 and 4

File Naming in the Pool

You may rename files within the pool. Renaming files here will change the actual name of the file on the hard disk. To rename a file in the pool, first select one file by clicking on it. Then click a second time but hold it for a second. When you let go, the name will be highlighted and you can enter new text. Once you press enter or return, the changes are made to the file on disk and in the pool. This will update the modified date of the disk file. So beware that sorting by modified date will be different when altering the name in the pool.

Pool Status Column

The status column in the pool provides instant feedback on which files have been recorded in this version of the project or if they are located in the project folder, missing from the pool, or have had processing applied to them. The status of each audio file is represented by an icon in the status column, as shown in Figure 8.15. Understanding the condition and location of audio files is made easy using this visual representation of status.



Not located in Audio folder



Missing from Pool



Recorded in current version of project



Processing applied

Figure 8.15
Status Icons

The Pool Record Folder

As discussed earlier, it is possible to create multiple folders within the audio files folder of the pool. Each of these subfolders can be used as the pool's record folder. That is, all newly recorded audio files will be placed within the selected folder. By default, the main Audio Files folder is the pool record folder.

In order to change the pool's record folder, simply click in the status column of the folder you choose and the "Record" status indicator will move to that line. Also, a red dot will appear inside the folder icon, indicating that is where any newly recorded audio files will be placed.

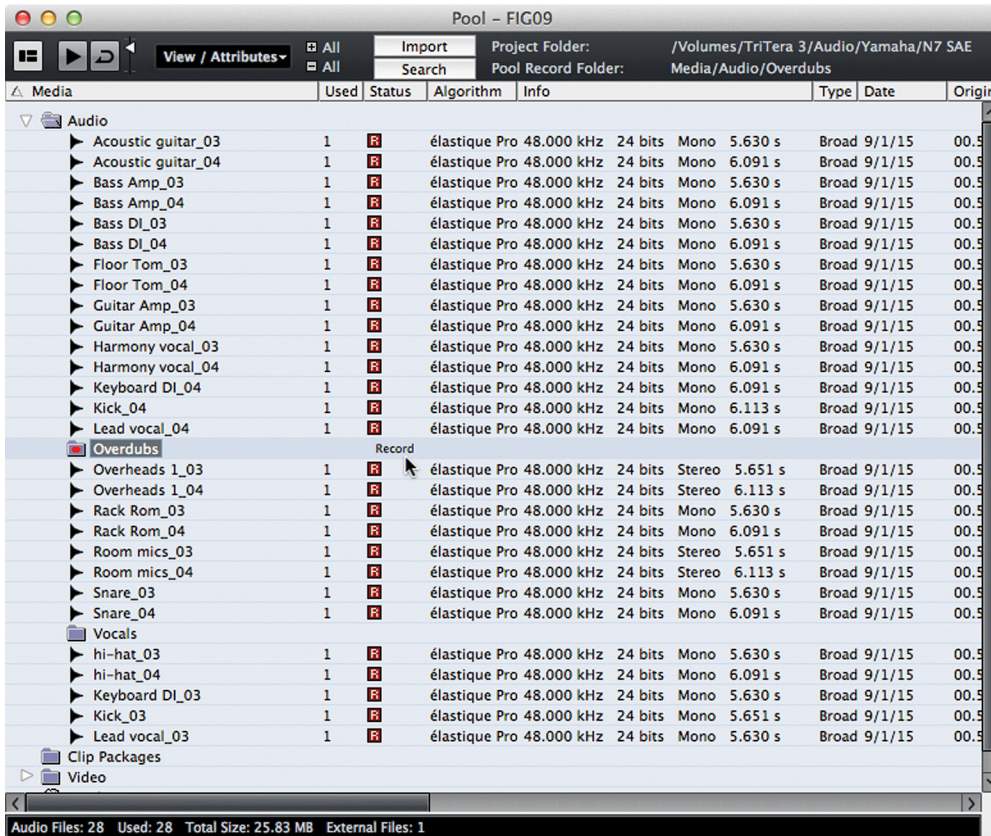


Figure 8.16
Setting the
pool record
folder

THE POOL'S VIRTUAL FOLDER STRUCTURE

Note that these folders only exist in Nuendo's Pool. They are not created on the hard disk. All audio files on disk are contained within the Audio folder inside the project folder. The folder designations are for organizational purposes inside the pool only.

It is possible to have each track record audio files to unique folders in your computer system, even on separate drives, as this may be required for high sample rate sessions with many tracks. Setting the record folder for individual audio tracks will be covered in Part II: Recording.

By creating multiple folders, you can be organizing your project as you record and import files. For example, a feature film has at least five basic types of sounds:

- ❖ Dialog
- ❖ Foley
- ❖ Ambience
- ❖ Sound Effects
- ❖ Music

We could begin by creating five folders to hold these sound categories. During recording, we can set the pool's record folder to the category of sounds we are working with so that all audio files of that type are placed within the proper folder.

It is also possible to create nested folders to further categorize audio files. Figure 8.17 is an example of a feature film audio file organization scheme. With thousands upon thousands of audio files possible, having a deep organization system will improve workflow and help you to focus on the more creative aspects of the project.

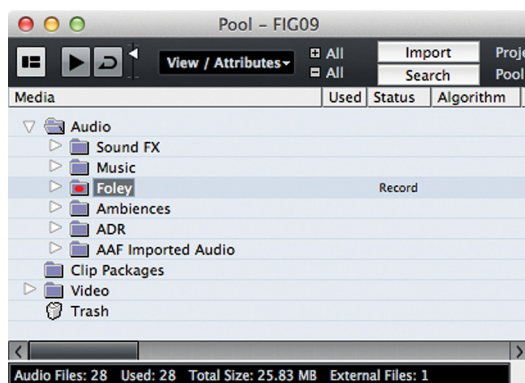


Figure 8.17
Feature film
example pool
structure

MOVING FILES BETWEEN FOLDERS

Note that audio files may be freely moved between folders at any time. Even if an audio file was recorded in the “dialog” folder, you may drag it into the “sound effects” folder later.

The Sample Editor

The sample editor is used to isolate single audio files for editing and processing. Think of it as a mini project window for one audio file only. But before we can discuss the sample editor, we must explore how Nuendo refers to audio files and processed audio files.

The Audio File, Clip, and Event Relationship

Nuendo uses a special method of addressing audio files on the disk that allows you to endlessly process, edit, and manipulate them without altering the original audio file at all through the use of audio “clips.” The relationship between the audio files and audio clips can be confusing, since they are usually identical and only changes once we begin to process the audio files. Processed audio is saved in separate audio files on disk, preserving the original recording. These processed files are then assimilated into the clip and heard as a part of the original audio. This structure is hidden from the user and is meant to maintain the processing history of each audio recording so that changes can be made seamlessly without altering the original audio file.

Audio Clips

An audio clip is a container for one or more audio files that are related to each other in that they are all derived from the same original audio file. Everything in a clip is derived from one single audio file on disk. Portions of that file may have been processed in one way or another and those processed portions will be contained in the clip. This appears seamless to the user, as if there is only one audio file in the Sample editor.

For example, let’s say you record a vocal and, during the take, the singer pops the mic on the word “please,” creating unwanted low-frequency noise (plosives are caused by air bursts hitting the microphone diaphragm). In order to correct this you want to process just that syllable using a high-pass filter to remove the “pop” from the recording.

To begin with, the original audio file is contained in a clip. When you process just that one syllable, the new processed audio is written to disk in another audio file. Inside the clip, this new audio file is placed at the same location as the original pop sound. The clip plays the original audio file until it reaches the point where the processing starts, switches to the newly processed audio file and then returns to the original after that section.

To you, this is invisible. You do not see any indication that this has occurred. It still appears as if you have destructively altered the original audio file by processing that one section. However this is not the case. The clip container keeps track of any and all the various changes you make to an audio file so that at any point in time you can revert all the way back to the original unprocessed file as it has remained on the disk, untouched.

NOTHING IS LOST

Even when the entire audio file is subjected to processing, the clip keeps references to both the original and newly processed files. The clip may only play the fully processed version, but if you should decide to revert back to the original, you can easily do so, as the original file is untouched. This is what is meant by non-destructive processing. In many other DAWs, such as Pro Tools, file processing (Pro Tools Audiosuite) actually replaces the audio file on disk, thus destroying the original recording.

Think about this for a second. You could process a file in various ways, perhaps 50 or 60 different times, and still be able to return to the untouched original at any time. It is even possible to remove intermediate processing from the clip while retaining all other processes (with certain limitations, including time-stretching and non-linear processes). This is unprecedented flexibility, allowing you to try out any editing or processing steps without fear of altering the original sound file. Nuendo keeps track of all of this in the offline process history discussed in detail in Part III: Editing.

Audio Events

An audio event is some portion or all of an audio clip that is played back as part of the project. The chunks of audio you see in the project window are all “events.” The audio file on disk is part of an audio clip, which is then used to create an audio event in the project window. Figure 8.18 illustrates this by showing how three audio files are used to make one audio clip, which then can be used to create an audio event in the project.

PRO TOOLS TIP

In Pro Tools, this kind of processing (offline) is known as Audiosuite processing. The difference between the two is mainly in how files are handled. In Pro Tools, each processing step creates a new audio file that is used directly in the session as a region. In Nuendo, processed audio files are merely referenced by the clip, which is then used in the project as an event. This difference allows for Nuendo to have the offline process history with complete historical undo functionality for each processing step applied to the audio file.

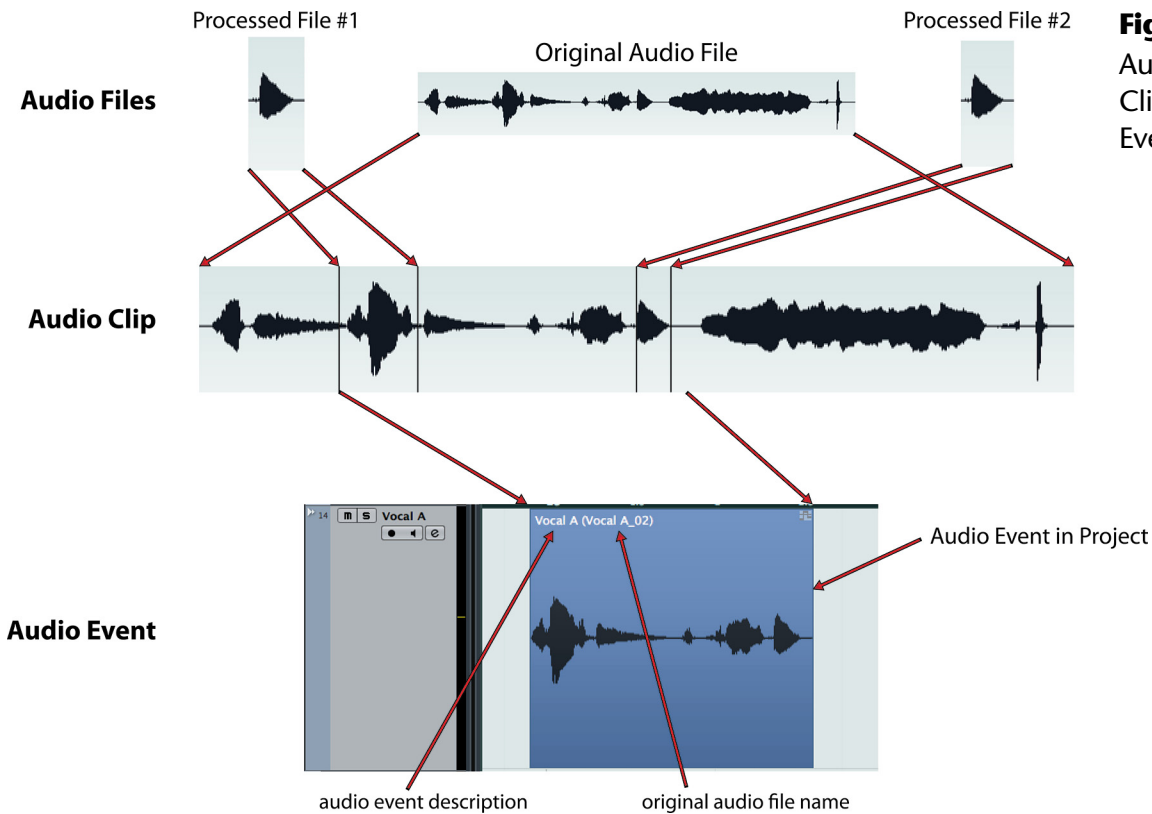


Figure 8.18
Audio Files,
Clips and
Events

Sample Editor Layout

The sample editor, shown in Figure 8.19, could be called the “Clip Editor” for all intents and purposes. It is the tool that is used to edit the audio clip, process various parts of the audio file, and even define boundaries of the audio event.



Figure 8.19 The Sample Editor

The layout of the sample editor is similar to the project window with several tabs on the left side, overview, info, and tools on top and the waveform display in the middle. A single Sample Editor can display only one audio clip at a time. However, you can have multiple sample editors open at the same time, allowing you to edit more than one clip at a time.

VARIAUDIO AND MULTIPLE CLIPS

One exception is that multiple clips can be edited together when using VariAudio to tune vocals for example. You will be able to see the pitches for multiple clips together in one Sample Editor for easier editing.

Regions

Audio clips may also contain regions, which are basically defined portions of the clip. These regions are defined and then contained within the sample editor and can be used to create events, mark certain areas for processing, or simply to note things within a clip.

For example, loop CDs (audio) often contain a complete drum loop and then component parts such as kick, snare, hats, and crashes all within one ID marker on the CD. After importing tracks from such a CD, you can use the sample editor to define the drum loop and individual sounds as regions within the clip. These regions can then be dragged into the project window to create events that are prepared and ready to use.

In order to access regions, you must set the sample editor layout to display the region list. Once open, the region tools are available at the top of the list. Click the add region button (+) to create a region from the selection made in the sample editor. Figure 8.20 shows the

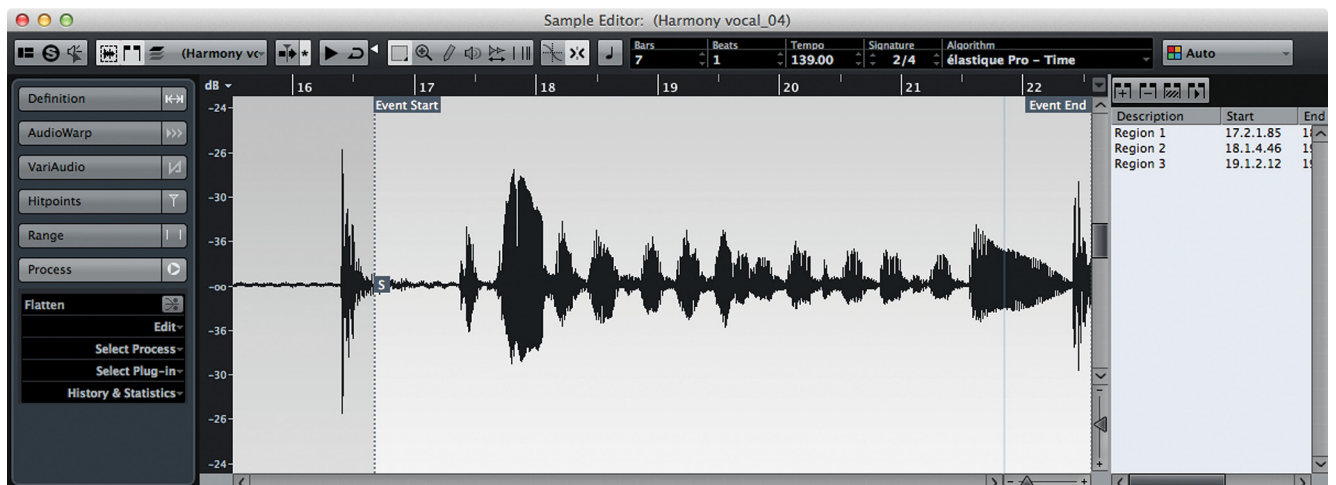


Figure 8.20 Region list and tools

sample editor with three “loop” regions defined for this clip. These regions can be used to create events in the project window later.

The second method of creating regions involves the cycle record mode. Using this mode described in Part II: Recording, each recorded pass during a cycle record will automatically create a region in the resulting clip. This facilitates easier editing of takes afterwards.

Sample Editor Inspector Tabs

Down the left side of the sample editor are the tabs that give you access to many of the processing possibilities. I will go through a brief description of each tab as an overview in this section. The specific uses and details will be covered in Part III – Editing.

Definition

The definition tab, shown in Figure 8.21, provides tools to edit the musical time aspects of an audio file. For example, drum loops can have relevant musical time intervals defined so they may be matched to the tempo of the project.

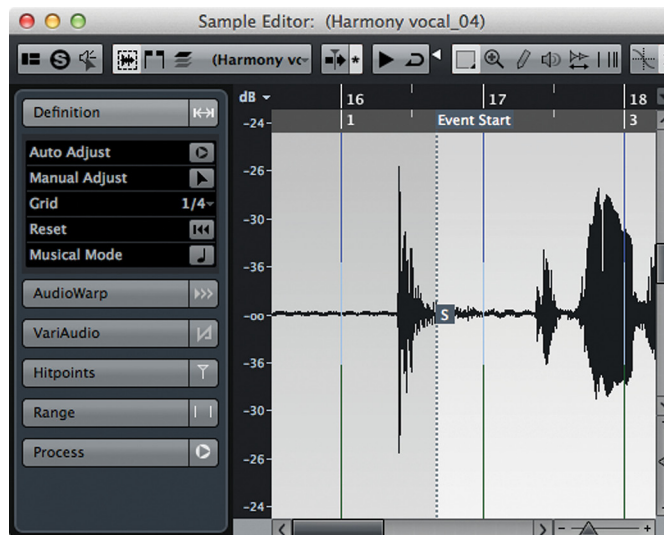


Figure 8.21
Definition Tab

AudioWarp

Audio warping is time stretching that is used to actually do the tempo matching of an audio clip. The tools in this tab shown in Figure 8.22, determine how time stretching is applied to the clip. Audio Warp and the Definition tabs work together.

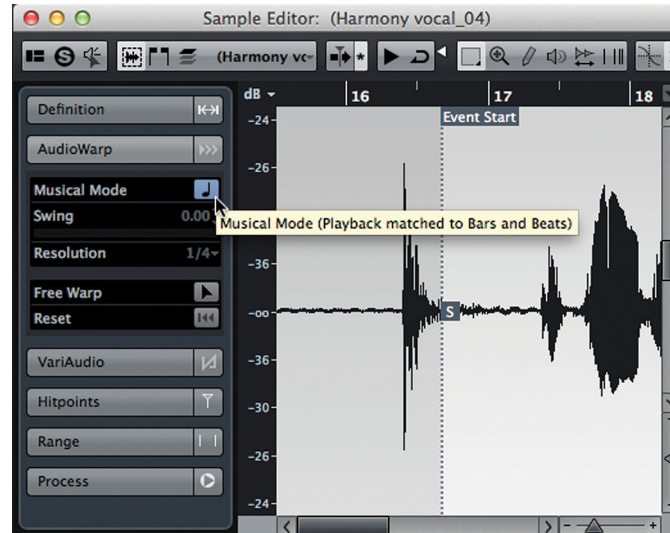


Figure 8.22
AudioWarp Tab

VariAudio

The powerful set of tools shown in Figure 8.23, gives you pitch and envelope control over audio clips. VariAudio functions similar to Celemony's Melodyne™ software. The pitch of each note can be modified in order to “tune” vocals, for example. You may also change the length of individual notes and control the transition from one note to the next.

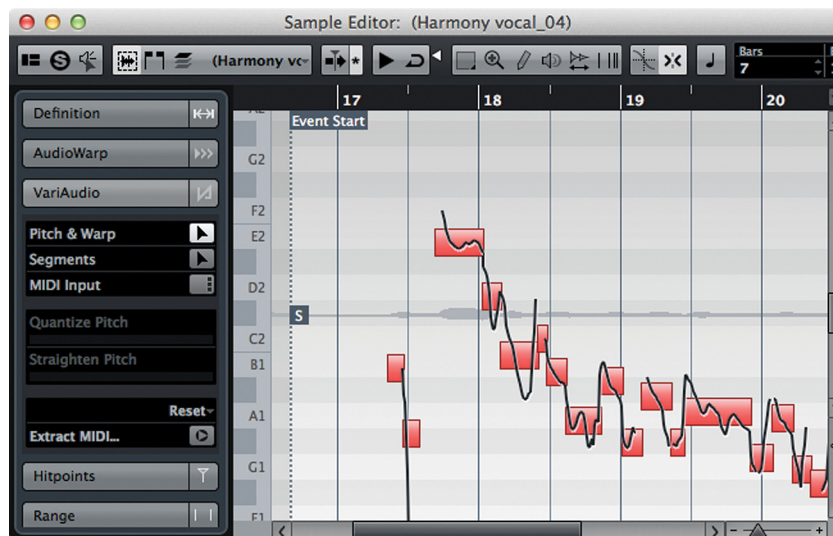


Figure 8.23
VariAudio Tab

Hitpoints

The Hitpoints tab, shown in Figure 8.24, is related to audio warping in that it allows you to detect and edit percussive and transient sections in an audio clip. Once these sections have been determined, you can do such things as reorder the sections, process individual sections and apply time stretching in order to match tempos similar to the Audio Warp features.

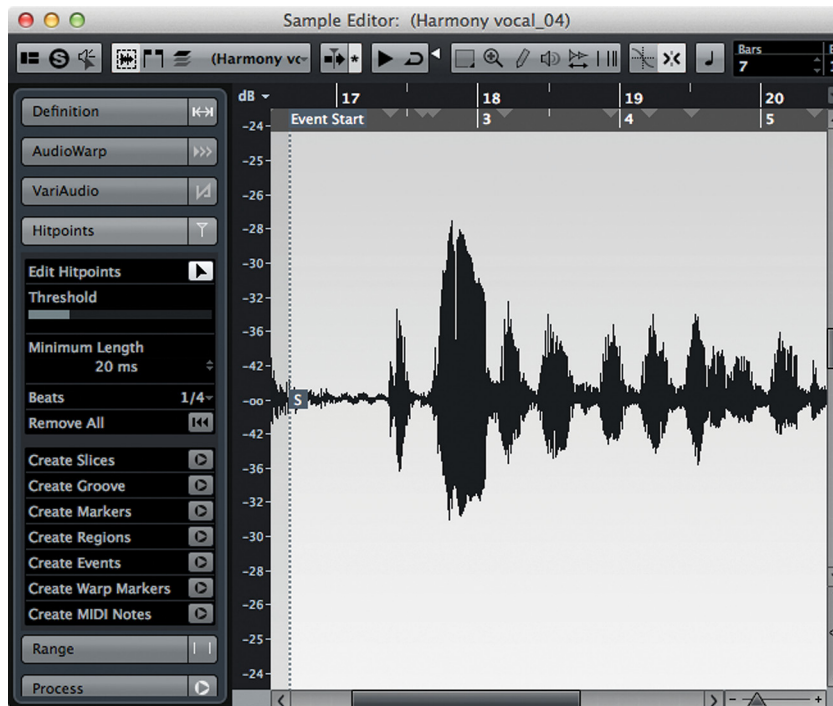


Figure 8.24
Hitpoints Tab

Range

The range tab shown in Figure 8.25, provides a display for the currently selected range in the Sample editor. There are also two menus for zooming and selecting. You can also manually enter values for start, end, and length to create a selection.

Process

The Process tab, shown in Figure 8.26, gives you access to the processing history of a clip, plus functions such as “flattening” of any realtime processes (time-stretching, pitch shifting/tuning) into a new audio file in order to conserve CPU resources. The process history allows you to alter or remove any processing that has been applied to the clip, returning to the original recorded audio file.

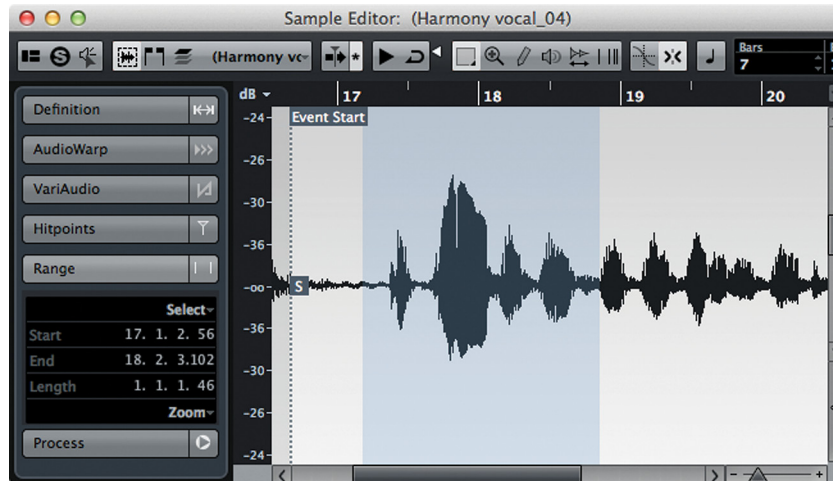


Figure 8.25
Range Tab

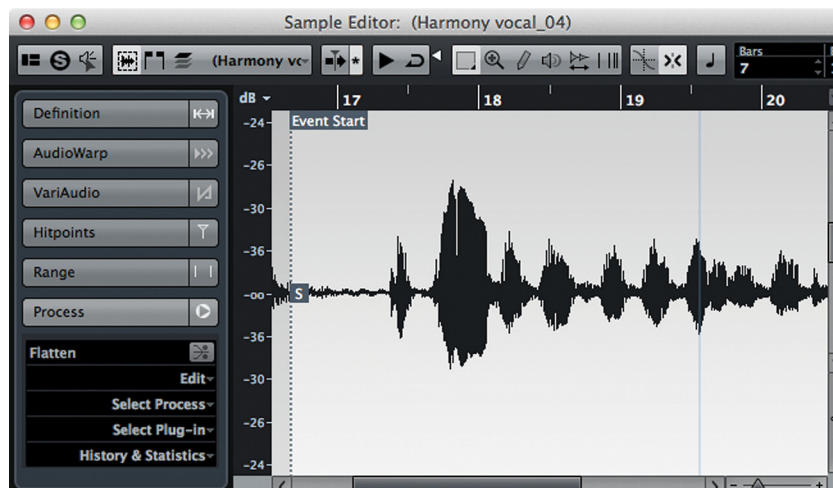


Figure 8.26
The Process Tab

MediaBay

The MediaBay is similar to the Pool in that it gives you access to various media files you can use in Nuendo. However, the MediaBay scans all of your hard disks for any type of media file, keeping track of their location and allowing you to search this database for just the file you need. Queries can be made for name, file type, meta-data, length, format—you name it, and you can search for it in the MediaBay. These files include preset files for anything in Nuendo: channels, VSTi's, plug-ins, groups of audio files, sound FX libraries, MIDI files, the list goes on.

Basically, the MediaBay provides one-stop shopping for all the files on your system. Once you find a potential file, the tools are there for you to audition that file before bringing it in to your project. With extensive Boolean and attribute search tools, even gargantuan libraries can be managed and utilized quickly with the MediaBay, shown in Figure 8.27.

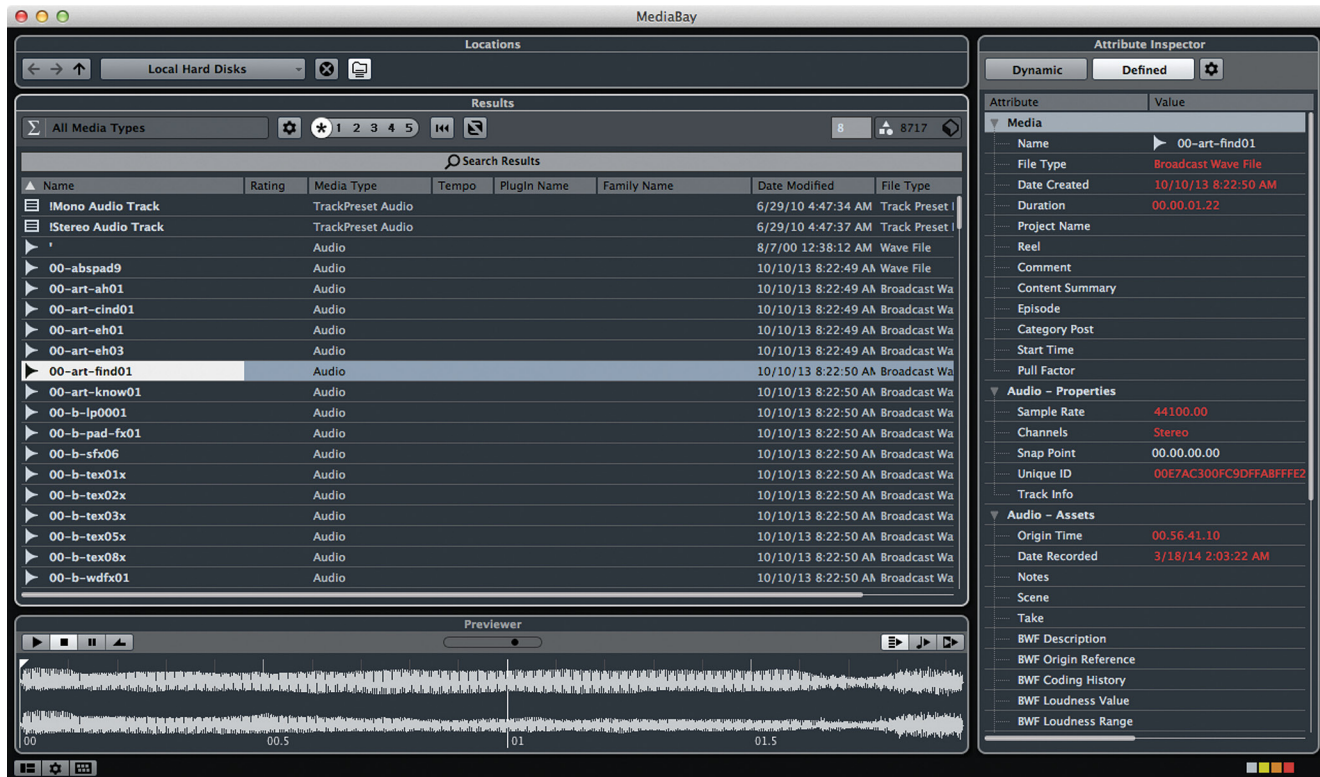


Figure 8.27 The MediaBay

As the specific documentation for the MediaBay is quite good in Nuendo’s Operation Manual, this book will concentrate on actually using the MediaBay in various situations. Specifics related to those items will be discussed as they come up in each chapter.

Workspaces

Nuendo has a lot of windows. Many appreciate this wonderful flexibility, but for others it can be a burden. For everyone, there are Workspaces. A Workspace is a set of windows in Nuendo including their position, size, and configuration. Defining several workspaces, you can quickly switch between different workflow setups.

For example, you could create a specific workspace for ADR recording, with the timecode, project, video, and mixer windows all placed and configured as you would need them. Then you could switch to another workspace setup for SFX creation using the MediaBay, project, video, and pool windows all placed as you prefer. These switches can be performed with key commands or Nuage User Defined Keys, making the changes instantaneous. No more

mousing around to move your windows, trying to get them set up *just right*. Simply hit a key command and one step sets everything in position.

Workspaces are stored by using the Workspaces menu shown in Figure 8.28. Here you can add new workspaces or recall stored ones. Each workspace can have its own key command for easy recall. Set up your favorite window layout and save it.

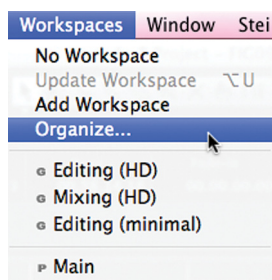


Figure 8.28
The Workspaces menu

You can manage all the workspaces you create in the Organize Workspaces dialog shown in Figure 8.29. Since workspaces can be global or specific to the project, this dialog helps you work with the various ones, deciding which are global and which are local to the project.

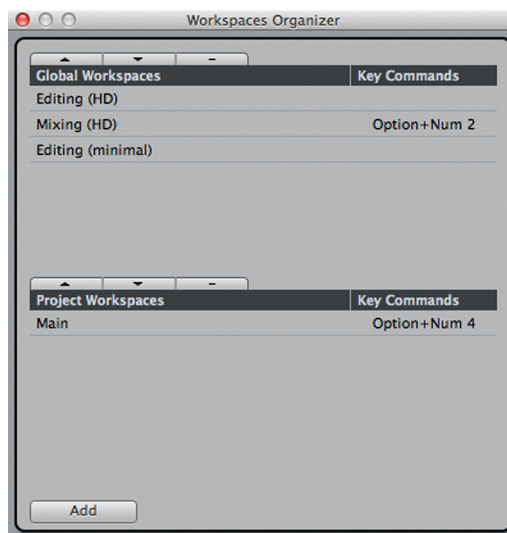
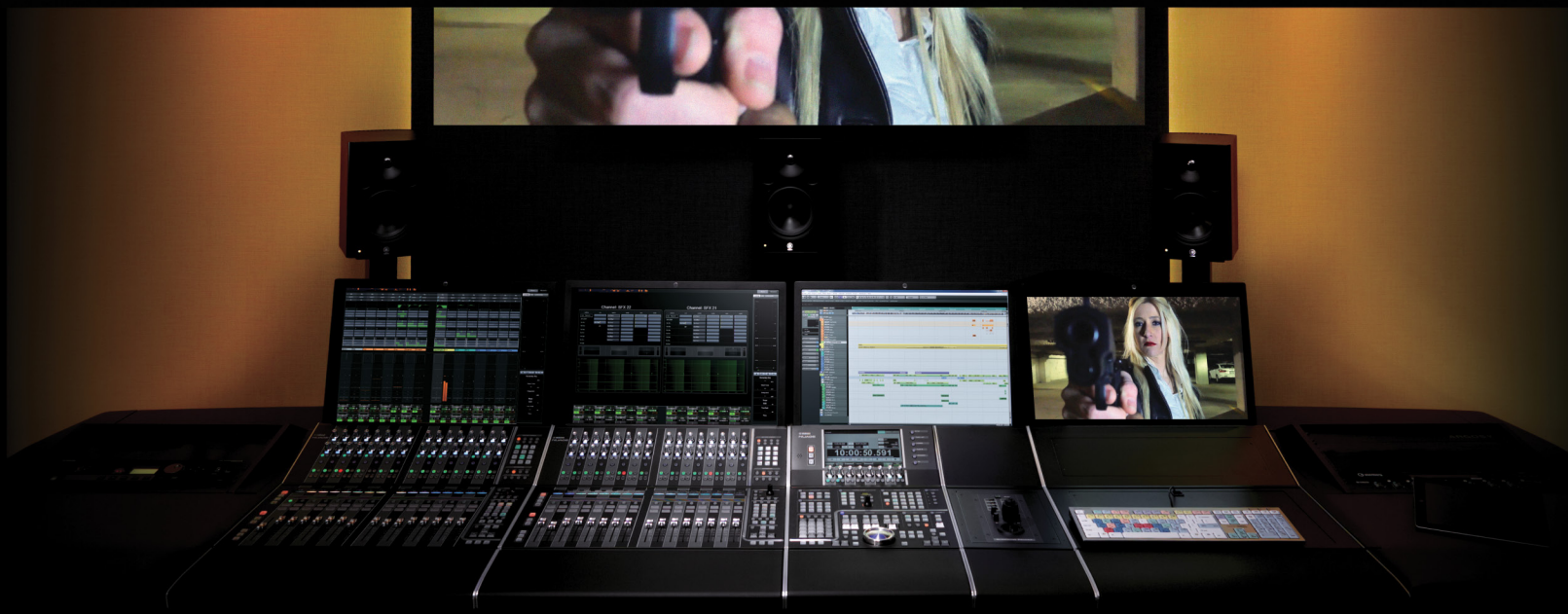


Figure 8.29
The Workspaces Organization dialog

NUAGE

COURSEWARE



PART I: SETTING UP

by Ashley Shepherd

Chapter 9 Navigation



NUAGE

Navigation

- ❖ Timeline Navigation
- ❖ Timeline Navigating with Nuage
- ❖ Channel/Track Navigation
- ❖ Nuage Channel/Track Navigation
- ❖ Master Unit Track Navigation

The ability to navigate efficiently around a project in any DAW software is key to working fast and effectively. I find that most of my day ends up being spent just moving around the project in order to edit and mix. Nobody wants to wait around while you rewind back to the first verse to redo a vocal take. While I miss the forced break working with 2" tape during winding, I'd rather spend that time doing something productive or coming up with creative ideas.

To that end I have put together some tips on how I navigate Nuendo projects quickly and without too much setup time. Some users may find that using a large list of markers can help them move around. I like having a roadmap of the project too, but my technique involves just a few key commands and a preference setting or two. These will get me flying around a project with ease.

PRO TOOLS NAVIGATION VS. NUENDO NAVIGATION

Here's one area that differs a good bit from the way Pro Tools normally operates. If you are migrating from Pro Tools into Nuendo, take a bit of time here to really get the hang of locating and moving around, as this is such an important skill when working with any DAW.

The most obvious difference is that in Nuendo, the selection of events or range is not tied to the cursor position. In Pro Tools, by default, the cursor's position is locked to the current timeline selection. When you make a selection and start playback, playback will start right at the beginning of the selection (perhaps with pre-roll).

In Nuendo, the cursor's position is independent and can start anywhere you'd like regardless of your current selection. I find this to be much more convenient for my workflow, as playback is more independent of editing tasks.

Of course Pro Tools can be configured to have the selection separate from the cursor position but then locating becomes a bit more difficult. Nuendo can also be configured to have the selection determine the cursor position in the special "Edit Mode" (designed for video post-production) as discussed in Part III: Editing.

Timeline Navigation

Let's start by importing a song from a CD into a blank project for practice and demonstration purposes.

1. Create a new, empty project.
2. From the file menu, choose Import>Import from Audio CD.
3. Make sure the CD is in the drive.
4. Up pops the Audio CD Import dialog (Figure 9.1). Select the track you wish to import.

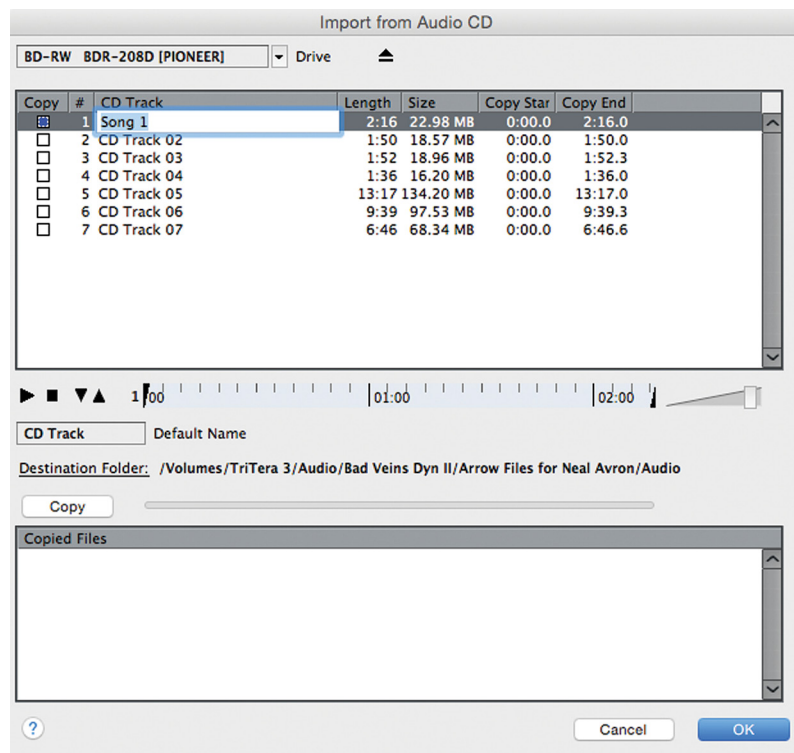


Figure 9.1
The Audio CD Import dialog

5. By double-clicking the name, you can change it, making it more relevant than "Track 01."
6. Click "Copy" in order to extract the audio file and put it in the project's Audio folder.
7. Click OK and the audio file will be placed on a newly created stereo audio track for you as seen in Figure 9.2.



Figure 9.2
Newly created audio track with CD audio on it

BEFORE YOU HIT OK

Make sure not to skip step 6 as it is tempting to just hit “OK” once you have selected a track to import. Multiple tracks may be selected but they must be copied into the project folder before being used in the project window as an audio event.

Hit the spacebar to start playback. You should see the cursor moving across the project window and hearing your favorite tune-of-the-moment. Now hit the spacebar again to stop playback.

Zooming Horizontally

After importing the CD track into the project, you might not be able to see the entire sound file in the project window. You may need to zoom out to see the entire thing. Nuendo’s default key commands for zooming are:

- ❖ G = Zoom Out
- ❖ H = Zoom In
- ❖ Shift+F = Zoom to Entire Project (I think of this as zoom to “[F]ull”)

SINGLE KEY COMMANDS

One of the really nice things about Nuendo key commands is that they can be simple single keystroke commands that do not require a modifier key (such as Alt or Control) to function, making their use much quicker and easier.

So, repeatedly hit G to zoom out until you can see the entire CD track. Or you can use the Shift+F command to instantly zoom out to see the entire contents of the project. This is especially handy in larger projects such as feature films, where the entire project could be an hour long or longer.

Note that this function zooms out to see every event in a project including automation events, tempo, MIDI, and audio—any type of event that can be present in a project is included. Zoom to full will include *every* event in the project, so long as it is visible in the project window. If an event is on a track that is not displayed in the project window (such as a hidden automation track) and you use the zoom to full command, that event will not be taken into consideration when determining how far out to zoom.

WHY G AND F?

Why G and F? These keys are located in the center of any standard QWERTY keyboard so they are easiest to get to for either hand. You will find that the default key command layout has many of these ergonomic considerations factored into the choice of keys.

The zoom commands usually center around the cursor. So as you zoom in on a project, you will be zooming in around the cursor position. If the cursor is not visible in the project window, then zooming will be focused on the center of the current display area. As soon as you zoom out far enough to see the cursor, it will then become the center focus for zooming. Mess around with this to get a feel for how the zooming works with the imported CD track.

There are a number of other possible zoom commands that may be programmed as key commands. As you develop your workflow style in Nuendo, these commands can be added as you find a need for them. For example, there is a command to zoom to selected, whereby the project window will zoom horizontally to all the currently selected events.

QuickZoom

QuickZoom is a command that has a dedicated button on the Nuage Master Unit. It will zoom in at a 5:1 ratio for fine editing. When the button or command is executed again, the zoom level will return to the previous setting.

Project Ruler Zooming

You can click anywhere on the project ruler to reposition the cursor to that location. Also, if you click and hold within the ruler, you may zoom in and out by dragging up and down from there. The combination of dragging up, down, left, and right on the ruler will move the cursor around and zoom in or out all in one motion. While this technique is quick, it might not be precise enough for certain situations. It's just another method of getting around in Nuendo.

Zooming Vertically (Track Height)

For precise editing of audio waveforms, it can be necessary to zoom vertically in order to see more low-level detail in the waveform. Nuendo's track height can be increased from very small to the height of the entire screen, as shown in Figure 9.3.

You can grab the bottom border of a track in the track list and drag it up or down to resize the height of a single track. This can also be done with more than one track at a time. Select several tracks and drag one border up or down to resize all selected tracks at once.

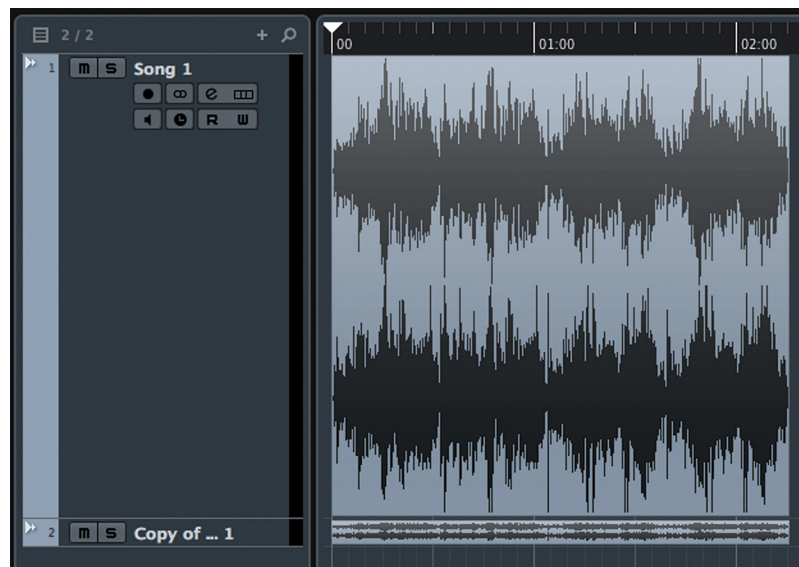


Figure 9.3

Large and small track heights

Zoom Selected Tracks (Z)

One zoom command I find very helpful is Zoom Tracks Exclusive (Z). What this command does is enlarge the selected track or tracks while also reducing the height of all other visible tracks to small, as shown in Figure 9.4. Pressing Z again will reduce the height of the selected tracks to small. You can go back and forth with the key command to toggle the height of the selected tracks.

Where I find this most useful is when editing a particular track, I'll hit "Z" to enlarge that selected track while reducing the clutter of other tracks in the Project window in one step. This allows me to visually focus on this one track for editing. Since it is just one key command, it saves time.

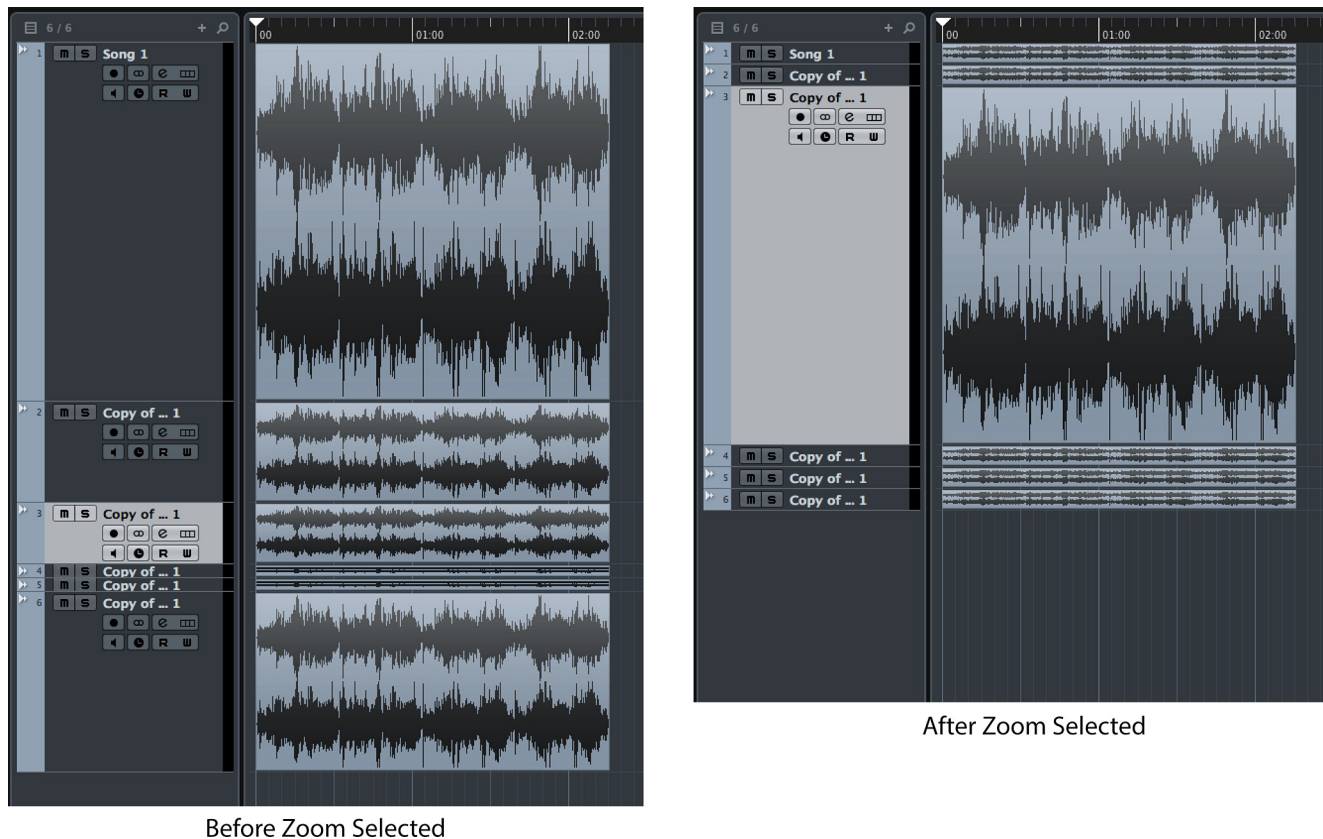


Figure 9.4 Various heights before and after “Z” Zoom selected

Basic Transport Commands

The most obvious way to move the cursor around in the project is to use the Transport panel controls just like those on a traditional tape deck. These controls work just as you’d imagine and also have default key commands that can be customized. The default values are very handy and will work for most folks just fine. While the spacebar for play/stop is standard on most DAWs, the other commands can be found on the keypad area of your keyboard.

- ❖ Play/Stop = Spacebar
- ❖ Rewind = Minus (-) key on the keypad
- ❖ Fast Forward = Plus (+) key on the keypad
- ❖ Record = Star (*) key on the keypad

NOTE

Open the Key Commands window from the File menu and look at the Zoom category for a complete list of possible zoom commands, as seen in Figure 9.5. There are 40!

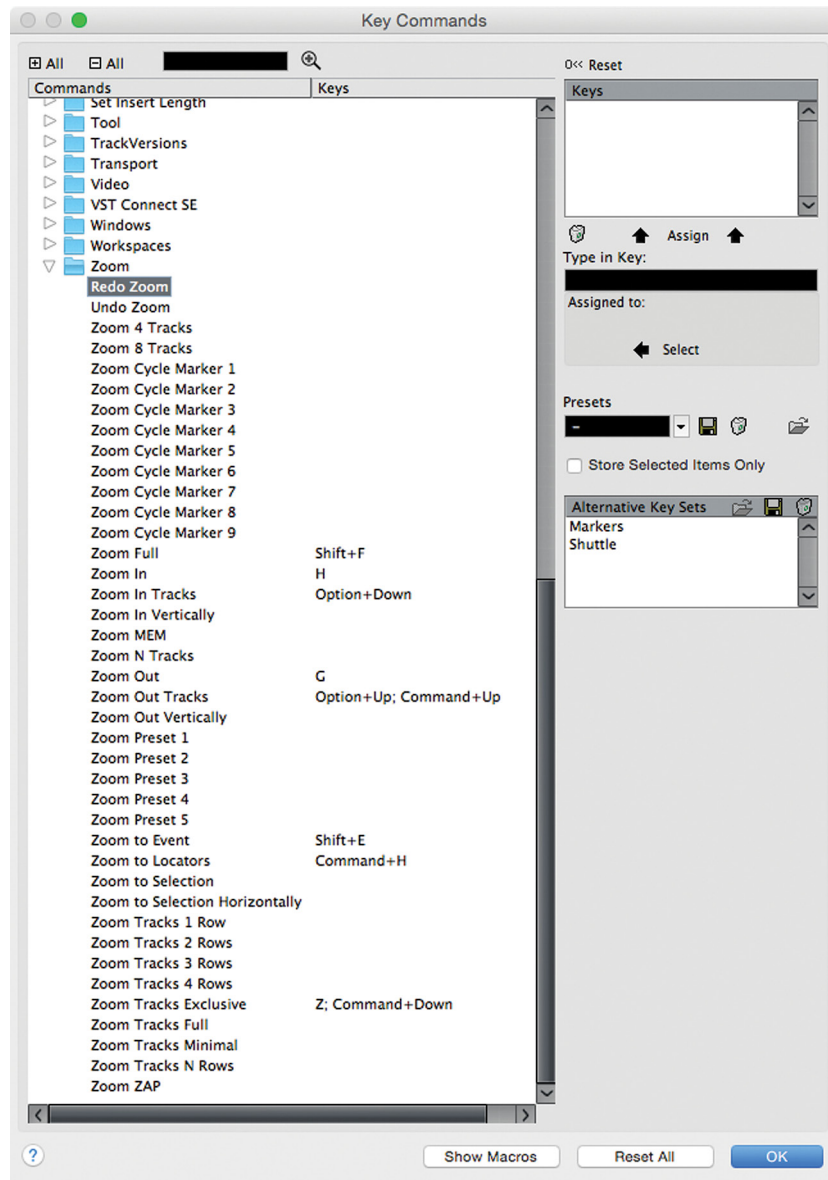


Figure 9.5
Zoom Category
in Key
Commands

By using these key commands, you can freely move the cursor around the project and start playback from any point in the timeline. Additionally, if the jog/scrub controls are visible (Figure 9.6), they may be used to audibly move the playback cursor around as if you were rocking the reels of an analog tape machine.

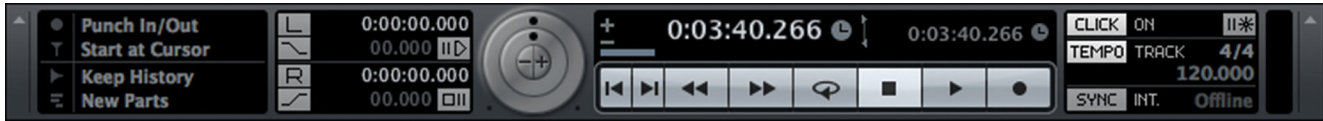


Figure 9.6 The transport panel with jog and shuttle controls

Return to Start Position

One of the first options for navigation and playback is whether or not Nuendo returns to the starting position after stopping. This is handled by a preference choice. Open Nuendo's preferences by choosing File>Preferences in Windows or Nuendo>Preferences... in OS X. In the Transport pane shown in Figure 9.7, you will find the checkbox for Return to Start Position on Stop. When checked, Nuendo's cursor will jump back to the position it was in when playback began.

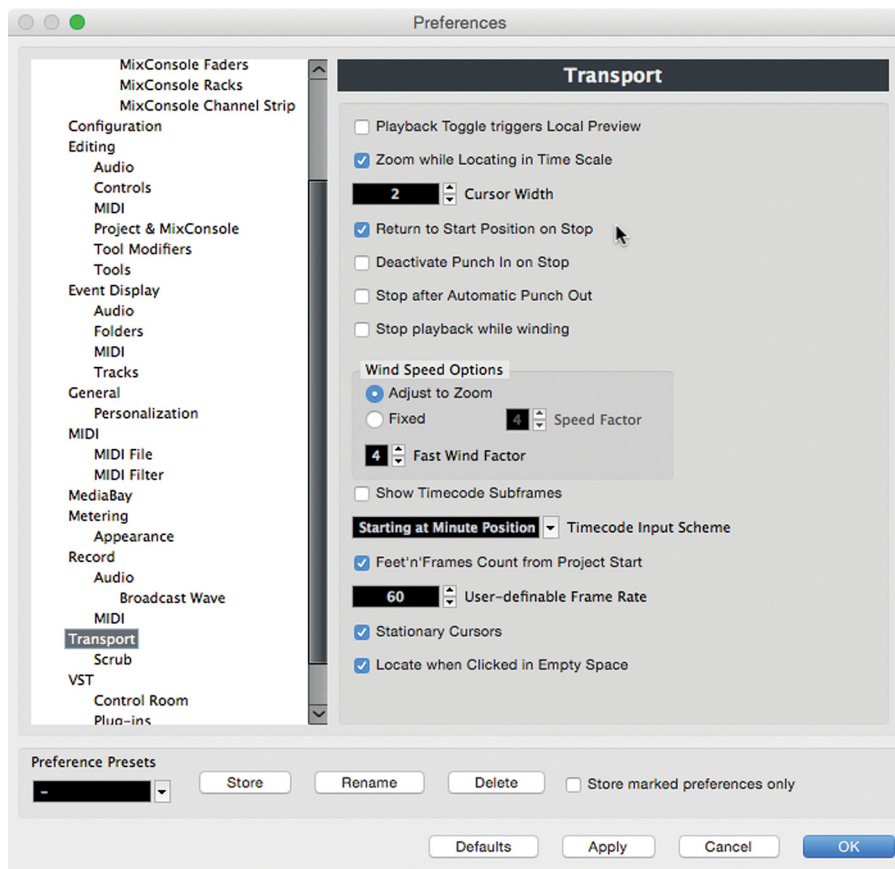


Figure 9.7 Nuendo's Transport Preference pane

During recording, for example, it is convenient to return to the start to hear what was just recorded. However, in post-production workflows, this behavior could be counterproductive. In order to switch quickly between these modes, you can create a custom key command to switch this preference on or off.

Figure 9.8 shows the Key Commands dialog setting up the command Control+R to switch this preference on or off. Now you can have both behaviors available at any time without opening up the Preferences.

NUAGE USER DEFINED KEYS

The Nuage Master unit user defined keys can also be assigned to specific Preferences. This possibility expands workflow variations at the touch of a button.

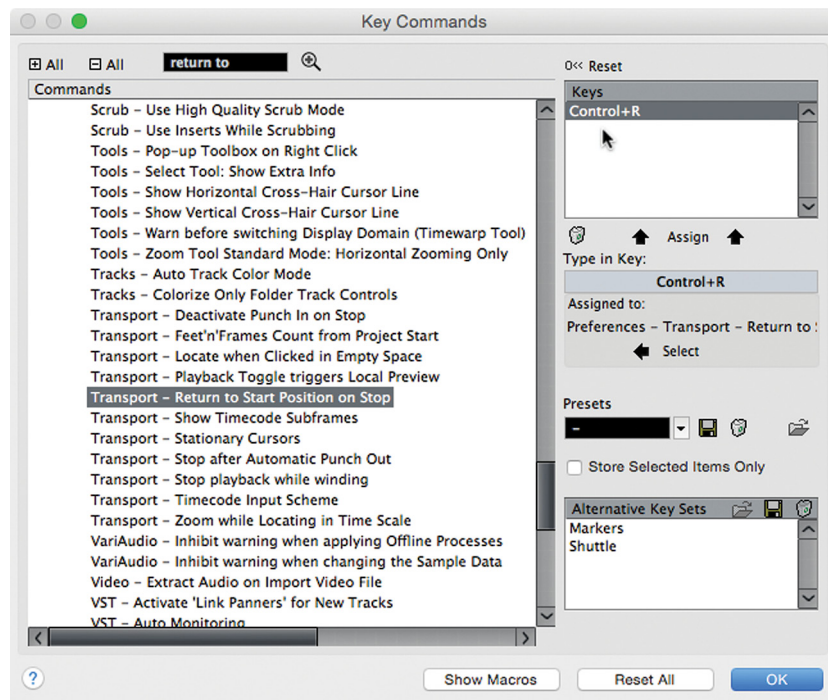


Figure 9.8
Key Command being assigned to “Return to Start Position on Stop”

Click in Empty Space

Another option is the ability to locate the cursor when clicking in empty space in the project window. This option is found in Preferences>Transport>Locate when Clicked in Empty Space. When checked, clicking anywhere in the event display area that is empty will cause the cursor to snap to that position. This prevents you from moving the mouse up to the ruler to move the cursor to a nearby location. You can create a blank track just below where you are editing to provide some “empty space” to use this feature.

Auto-Scroll



(tutorial video: “Navigation Auto Scroll”)

During playback, the cursor will often disappear off the right-hand side of the event display. Nuendo can automatically move the display in order to follow the cursor as it continues down the time line. This is called Auto-Scroll and is easily turned on or off using the key command “F” or by clicking the Auto-Scroll button in the project window toolbar.

FOLLOW THE CURSOR

I think of this key command as “F” for “[F]ollow the cursor,” where the display will actually follow the playback cursor as it moves through the project. This is a simple way for me to remember key commands although this one gets used about a million times a day and is more than memorized!

Since the F key is found just to the left of the G key, its choice as the key command for Auto-Scroll is no accident. The idea is that as you are zooming in and out, you can also quickly move the event display to where the cursor is currently located without taking your fingers off the G and H zoom commands.

Stationary Cursors

A feature that works in conjunction with Auto-Scroll is called stationary cursors. This preference is found again in the Transport pane of the preferences window. When checked, the playback cursor will remain in the center of the event display during playback while Auto-Scroll is enabled. The event display itself will then move behind the cursor smoothly, as if the audio was being drawn across the cursor. I find this display to be the most helpful.

When “stationary cursors” is not checked, Auto-Scroll causes the event display to page over as the cursor moves down the timeline. I find that the paging over of the display is more disruptive as I am less aware if Auto-Scroll is active or not.

In conjunction, stationary cursors and Auto-Scroll provide an extremely fast and easy way to navigate a project while editing. Let’s try some examples of how this can work using the imported CD track from the earlier example. First, ensure that “stationary cursors” is checked and “return to start” is checked in preferences and Auto-Scroll is off.

1. Start playback (spacebar).
2. Press H to zoom in. Notice that you will zoom in around the cursor.
3. When the cursor has left the event display, press F to start Auto-Scroll. The event display will jump to the cursor’s position, keeping the cursor in the center.
4. Press G to zoom out. Notice you will zoom out while staying centered on the cursor while it is still moving.
5. Press F again to stop Auto-Scroll. The event display stops moving and the cursor continues on.
6. Hit the spacebar to stop. The cursor will return to the start position, which might not be visible right now.
7. Press F. Even in stop, Auto-Scroll will snap the display back to the cursor’s location.

The above example outlines some basic navigation techniques you can start with in order to develop your own style of working in Nuendo. This style of navigating will be used throughout the book, especially in Part III: Editing.

Suspend Auto-Scroll when Editing

For the next example, there is one more option that will come in handy: suspend Auto-Scroll when Editing. This option is enabled by clicking the tab just next to the Auto-Scroll button in the project window’s toolbar, as seen in Figure 9.9.

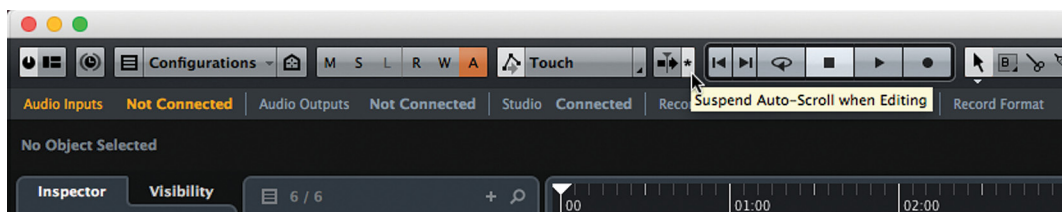


Figure 9.9
Suspend Auto-Scroll when Editing

If you are using Auto-Scroll and you wish to edit something in the event display, this option temporarily disables Auto-Scroll once you click on an event. Using stationary cursors, this becomes necessary, as editing an event while it is moving across the screen is quite difficult. Auto-Scroll is enabled upon the next playback.

Now let's put all these tools together into another example. We will perform an edit to the imported CD track while audio is playing.

1. Choose the selection tool in the project toolbar. (Figure 9.10)

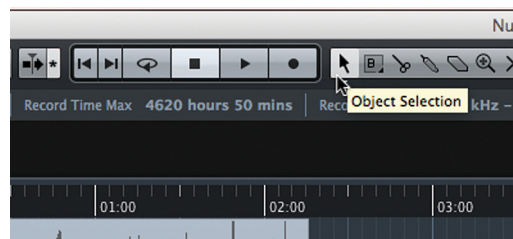


Figure 9.10
Object
Selection Tool

2. Start playback (spacebar).
3. Enable Auto-Scroll (F). The audio waveform will start moving behind the cursor.
4. Click the Suspend Auto-Scroll button.
5. While positioning the mouse over the audio event, hold the Alt key. The mouse pointer will change to a pair of scissors, the cutting tool, as seen in Figure 9.11.



Figure 9.11
Holding Alt
changes the
selection tool to
the scissors tool

6. Click anywhere on the audio event. The event will be cut at that point and Auto-Scrolling will stop since you have initiated an edit by cutting the event. Notice that playback does not have to stop.
7. Press F again to enable Auto-Scroll and the waveform will start to move again.

8. Holding Alt, click again to create another cut and Auto-Scroll will stop.
9. Now without stopping playback, click on the event created by the two cuts as seen in Figure 9.12.



Figure 9.12
New event
created by
two cuts

10. Press the Delete key to remove this event.
11. Now click in the empty space left by the event and the playback cursor will appear at that point and continue playing.
12. Press F to start Auto-Scroll and you are back to moving along through the project.

The interesting thing about this example is that the editing you just performed happened without stopping playback once. You can endlessly edit and move around the project without ever stopping playback, using Auto-Scroll to reposition the event display to what you are currently hearing and then hold that position while you perform various editing tasks. Of course playback must be stopped once in a while or we'd all go nuts.

It is especially nice to perform little editing bits while others in the studio are listening to playback. You do not have to disturb the listening flow while tidying up edits along the way. Also, all of this navigation is not using the mouse, so the strain of repeated mousing does not stress your mouse hand.

The Left and Right Locators

The left and right locators are fundamental in Nuendo. They have prominent icons in the project window and are used for many editing and navigation tasks. The area in between the locators is shaded in the event display and further illustrates their location.



Figure 9.13
Left and right
locators with
shaded area in
between

There are several ways to change the location of the locators. By default, they are both located at the beginning of the project. Here are some of the most common ways to change their position:

- ❖ Drag their tabs in the ruler display.
- ❖ Input values into the transport panel for each locator, as shown in Figure 9.14.
- ❖ Control/Command+Keypad 1 to set the left locator to the cursor's position.
- ❖ Control/Command+Keypad 2 to set the right locator to the cursor's position.
- ❖ Press P to set the locators to the start and end of the current selection.

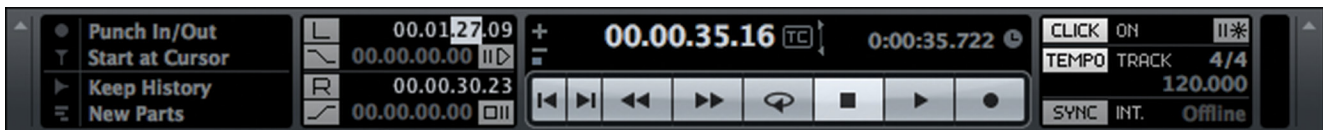


Figure 9.14 Entering values into the left locator position of the transport panel

Any of these commands can be performed on the fly while Nuendo is playing. Once the locators are set, it is possible to snap the cursor to either locator's position by pressing the keypad 1 or 2 to move to the left or right locator position respectively. This gives you yet another quick way to move about relevant points in the project quickly and with a minimum of key-strokes or mouse movement.

The locators are used to define an area on the timeline that will be used for exporting mix-down files, looping sections, and performing project-wide editing such as inserting or deleting time across all tracks.

CYCLE PLAYBACK

The left and right locators define the area that will loop during cycle playback. Enable cycle playback from the Transport panel and the project will play till it reaches the right locator and then it will jump back to the left locator and continue playing in a loop.

Locate to Selection

By default, the L key command moves the cursor to the start of the current selection. If you have an event selected, pressing L will move the cursor to the start of that event. During editing, this becomes extremely handy as you can always get the cursor back to the spot you are working on with just one keystroke.

Locate to Next/Previous Event

The next little gem in navigation is locating using events. When you have many events on one track, you can move the cursor back and forth to each event boundary by using the B and N keys. Notice that these are just beneath the G and H keys for zooming. Here's how it works.

Let's take the CD track example and cut up the event into several pieces and move them apart from one another so it looks something like Figure 9.15. To move an event, use the Object selection tool to click and drag it to a new position.



Figure 9.15
CD track cut up
into smaller
events

1. Make sure the track is selected. This only works for the selected track.
2. Select the first event.
3. Press L to locate to the start of that selection.
4. Press N to move the cursor to the next event boundary, as shown in Figure 9.16.

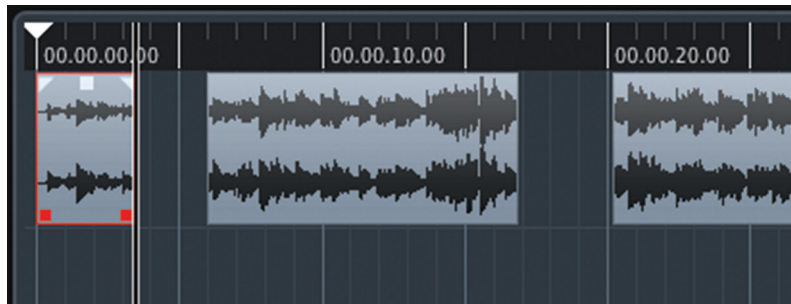


Figure 9.16
Cursor has moved to the end of the first event

5. Press N repeatedly to move the cursor to all the event boundaries in the track. When you come to the end, pressing N will no longer do anything.
6. Now press B to step backwards through the same points. If Auto-Scroll is on, each time you move the cursor, just the audio will move underneath.

I use this to step through the edits made to tom-tom tracks in a live drum recording. Being able to jump quickly to the edited toms makes tweaking them much faster even if they are few and far between. ADR tracks in film work might have a sparse amount of events on each track. Using B and N to step through these events can speed up locating them over long stretches of time without zooming out.

Markers

Nuendo supports a rich set of marker tools, with multiple marker lists and meta-data for each marker. There are two types of markers:

- ❖ Single Markers, which only mark a point in time.
- ❖ Cycle Markers, which have a start point, duration and end point.

Adding a Marker

There are several ways to add a marker. It is not necessary to have a marker track in the project in order to create a marker. Once created, markers can be used to aid in navigation.

- ❖ Use a custom key command to add a marker.
- ❖ Add a marker track to the project and press the “Add Marker” button.
- ❖ Open the Markers window (Control/Command+M) and choose “Insert Marker” from the functions menu.

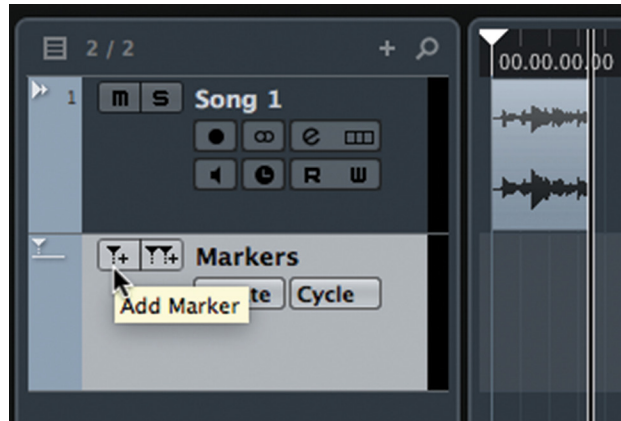


Figure 9.17
The Add
Marker button

PRO TOOLS AND NUENDO MARKER CREATION

With Pro Tools, creating markers (Memory Locations in Pro Tools) during playback is done by pressing Enter, which opens the naming dialog so you can quickly enter a name for the marker. In Nuendo, this is also possible but requires the creation of a custom key.

In the Key Commands setup, there is a Marker folder that contains commands for marker functions. Create a key command for “Insert and name Marker.” When you use this key command, Nuendo will create a Marker and also open the Marker window and place the cursor in the description field, ready for you to type the name. This makes Marker creation quick and easy, much like the Pro Tools workflow. Note that the Pro Tools key command preset that comes with Nuendo assigns the Enter key to create a Marker without the ability to also name it at the same time. Switch this to “Create and name Marker” to get the same functionality.

Create several markers. For songs, I usually create a marker for each section: Verse 1, Chorus 1, Solo, etc. When working, I can simply click the marker in the track and hit L to locate the cursor to that selection. There are key commands to move to the next marker (Shift+N) or move to the previous one (Shift+B). Or you can click on the “Go To” icon (>) of the marker in either the marker window or the inspector of the marker track to move the cursor to that marker, as shown in Figure 9.18.

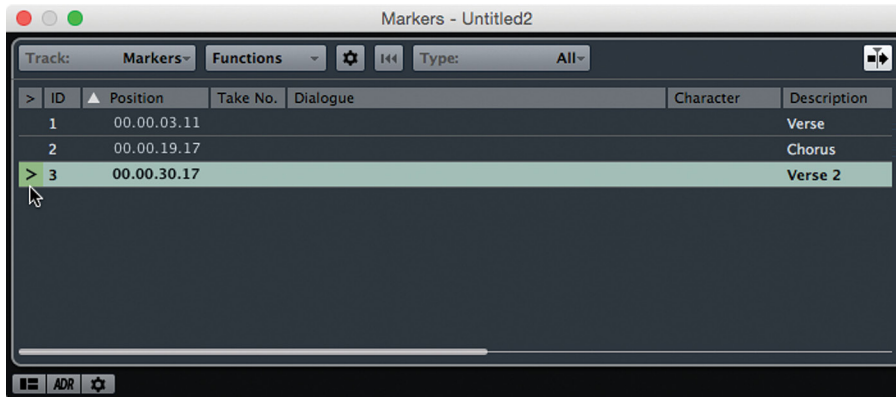


Figure 9.18
The go to icon
in the marker
window

Navigation Package for Keyboard and Mouse

So let's put it all together:

- ❖ G and H to zoom out and in.
- ❖ Shift+F to zoom out to the entire project.
- ❖ [F] for "Follow the Cursor" Auto-Scroll.
- ❖ Stationary Cursors to have the waveforms scroll past the cursor.
- ❖ Return to Start after stop.
- ❖ Suspend Auto-Scroll for editing.
- ❖ [L] to locate to selection.
- ❖ [P] to set left and right locators to selection.
- ❖ Control/Command+(Keypad 1 or 2) to set left and right locators.
- ❖ Keypad 1 and 2 to move cursor to the left or right locator.
- ❖ Markers.
- ❖ [N] to move to next event boundary, [B] to move to previous.

That might seem like a bit much to start with, but after using this set of tools for a while, moving around a project will become fast, accurate, and easy, giving you a more streamlined workflow.

There are many other tools in the bag for navigation in Nuendo that are more specific and can be integrated as you develop your own way of working. For an idea of the possibilities, open Nuendo's key command window, found under the file menu, and go to the transport section. Have a look at the 127 possible operations that can be mapped to a key command in Figure 9.19.

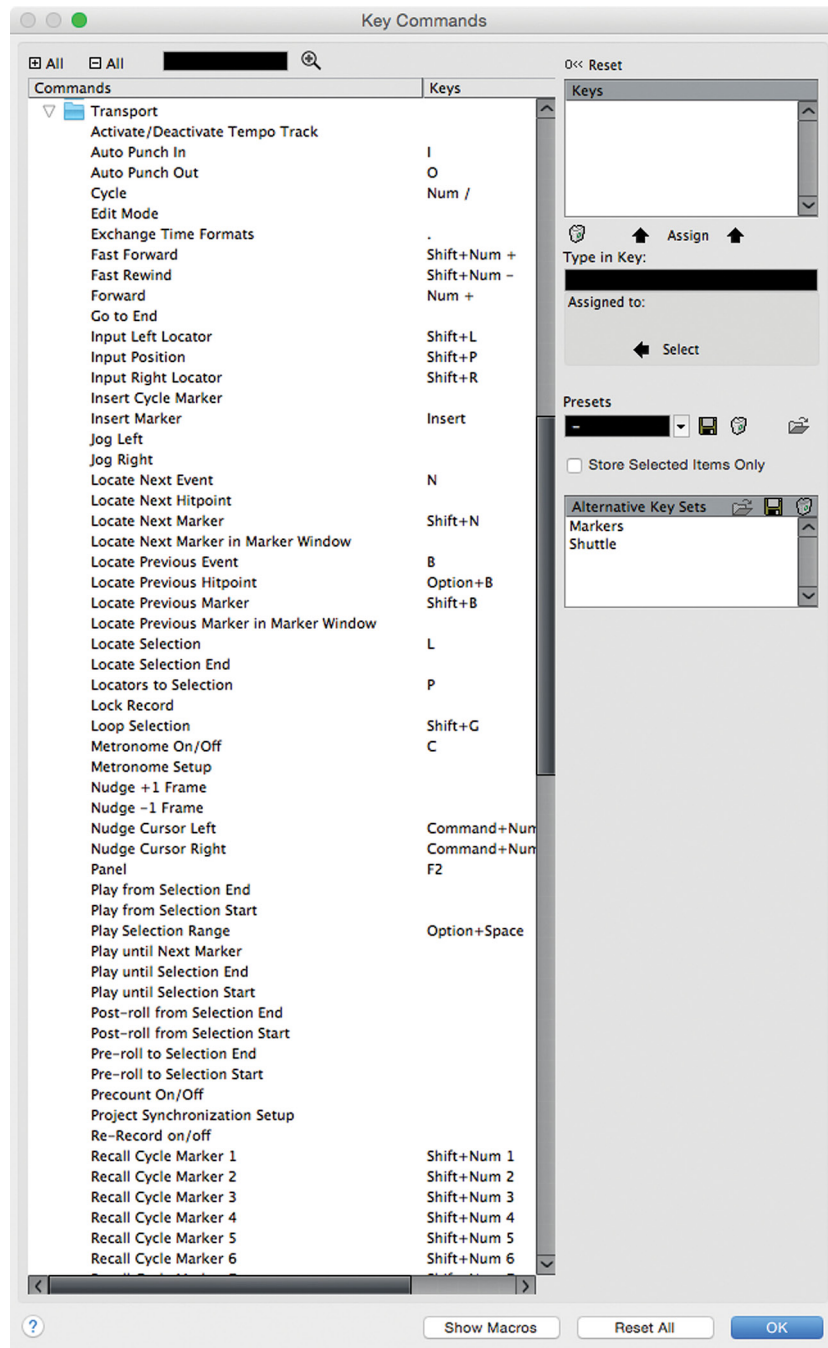


Figure 9.19
Transport Key
Commands

Timeline Navigating with Nuage

With the Nuage Master Unit, navigation takes on a whole new feeling of immediacy and quickness. Many of the key commands discussed previously are mapped to buttons on the control surface, making operation even faster.

The Scroll Wheel



(tutorial video: “Navigation Scroll Wheel”)



(video tutorial: “Navigation Scrub and Shuttle”)

The scroll wheel is central to the Nuage Master unit, centered at the bottom of the controls in the best place for your hands to reach it. It is made from a solid piece of aluminum to provide a solid feel and accurate motion. The sensor has a very fine resolution so that minute movements of the scroll wheel translate to fine adjustments in Nuendo. While it is used for much more than navigation, this section is focused on using the scroll wheel to move around the timeline zooming in and out of the Project window.

Moving the Project Cursor

The scroll wheel is tied to the Project cursor. Turning the scroll wheel will move the cursor back and forth along the timeline. This is fast and intuitive. The speed of movement is proportional to the size and zoom level of the Project window: the further out you are zoomed, the faster the cursor moves through a minute of time. If you are zoomed in close, the scroll wheel moves the cursor in smaller increments.

Zooming Horizontally

By pressing and holding the zoom button on the Master unit while turning the scroll wheel, the Project window will zoom horizontally in and out. This is a very quick motion, going from a large view of many minutes down to the sample level in just a couple of wheel turns.

Zooming Vertically (track height)

By holding both the Zoom and Alt buttons together on the Master unit, the scroll wheel adjusts the height of the tracks in the Project window, giving you a more detailed view of the audio or other data displayed on each track.

Zoom and Alt together increase or decrease the height of all tracks in the project together. By adding the Control button, this same function can be applied only to the selected tracks in a project. Holding Zoom+Alt+Control and turning the scroll wheel will increase or decrease the height of only the selected tracks in the project.

Adjusting the Waveform Display

When the signal level of an audio file is rather low, the detail in the waveform display will be shorter in height. This can make editing more difficult at times. You can increase the waveform height using the scroll wheel while holding Zoom+Alt+Shift together and turning the scroll wheel. This will increase or decrease the height of the audio waveform.

Scrolling the Project Window

The Scroll button on the Master unit is used to look through the Project window vertically and horizontally. By holding the Scroll button, the scroll wheel will slide the contents of the project left or right within the Project window. By holding Alt+Scroll together, the wheel will move the contents up or down within the Project window.

Momentary and Latch Modes

By default, if you press and hold any of the function keys for navigation on the Master unit, they operate in momentary mode, meaning that once you let go, the scroll wheel returns to normal operation, moving the project cursor left or right in the timeline.

If you tap either Scroll or Zoom, the function will become latched, locked in, and the button will remain lit until latch mode is disengaged, as seen in Figure 9.20.



Figure 9.20
The Zoom button latched on

WINDOW FOCUS FOR SCROLL WHEEL

Nuendo uses a system called window focus, which allows key commands to be directed at the active or focused window. When using Nuage, window focus can sometimes cause the scroll wheel to stop functioning. If the Project window is not active (selected), then the scroll wheel will not zoom or navigate correctly. To remedy this, simply click on the Project window with the mouse to make it the active window. You can also program a user-defined key to do this in order to avoid using the mouse.

Left and Right Locators



(tutorial video: “Navigation: Locators and Events”)

On the Master unit, the left and right locator buttons are placed just above the transport controls, as seen in Figure 9.21. These buttons are used to set each locator and also to move the playback cursor to their position.



Figure 9.21
Locator buttons
on the Master
unit

Setting Locator Positions

To set either of the locators, follow these steps:

1. Move the playback cursor to the desired position.
2. Press the “Set” button on the Master unit keypad, as shown in Figure 9.22.
3. Press either the Left or Right locator button to set its position.

This procedure can be performed while stopped or during playback. During playback, press the Set button to prepare, and then when the locator button is pressed, the current playback location will be used to set the locator position. This method allows you to set the locator position by sound rather than sight.

Using Locators

Simply pressing either locator button will move the playback cursor to that position. That is the most basic use of the locators, to move the cursor position. If both are pressed at the same time, the cursor will locate to the beginning of the current object or range selection.

The locators also define a portion of the timeline for cycle playback. Enable Cycle by pressing the Cycle button on the Master unit, as shown in Figure 9.23. Start playback from any point ahead of the right locator and when the right locator position is reached, playback will jump to the left locator's position and continue looping between the two points until you stop.

The locators are also used to define Cycle Markers, as discussed later in this chapter.

Prev Event – Next Event

The Prev Event and Next Event buttons, also shown in Figure 9.23, help you navigate by using event boundaries as location points. Pressing the Next Event button will move the project cursor to the next event boundary on the selected track.

If more than one track is selected, the cursor will move to the next event boundary on any of the selected tracks, allowing you to tab through a set of tracks, quickly seeing each and every event along the way.



Figure 9.22 The keypad “Set” button

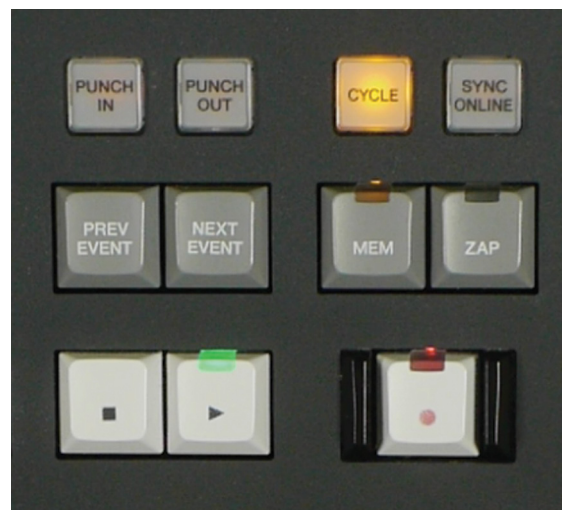


Figure 9.23 The cycle playback button

LOCATING WITH STATIONARY CURSORS

With the Stationary Cursors preference turned on and Auto-Scroll enabled, moving between event boundaries will bring the most important parts of each event into the center of the project window for easy editing even at high zoom levels.

Mem Zap



(tutorial video: “Mem Zap and Quick Zoom”)

There are two special zoom commands that work together. These also have dedicated buttons on the Nuage Master Unit, shown in Figure 9.23.

- ❖ MEM
- ❖ ZAP

As an example, let’s say you are taking a raw recording of a voice-over and need to assemble the best parts into a finished take. This might require copying portions of the recording from one location in the Project and putting them together in another. Using the test project with the CD song, follow these steps to see how the Mem Zap function works.

1. Move the cursor towards the end of the song.
2. Zoom in horizontally very close so you can see details in the waveform.
3. Press and hold the MEM button. The button will light up for a moment and the ZAP button will stay lit. This indicates the current position and zoom level have been memorized.
4. Zoom back out and move the cursor to another position in the project.
5. Press the ZAP button and the project window will return to the memorized location and zoom level.
6. Press ZAP again and you will go back to the other position and zoom.

You can continue to use the ZAP button to toggle between the two positions and zoom levels instantly. This is especially helpful for editing material between two different locations or using a 4-point editing model.

Markers with Nuage



(tutorial video: “Master Unit: Markers”)

The keypad on the Master unit can be used to enter and navigate with markers. The keypad must be in marker mode in order to do this. Press the Markers button above the keypad to switch it into markers mode, as shown in Figure 9.24.



Figure 9.24
The keypad in
Markers mode

Setting a Marker with Nuage

1. Position the cursor at the desired marker location.
2. Press the Set button.
3. Press Enter on the keypad.

You will see the marker as it is being created on the touchscreen. This can also be done during playback. You may enter multiple markers during playback without stopping.

Setting a Cycle Marker with Nuage

1. Set the left and right locators to their desired locations.
2. Enable the Cycle button on the keypad, as shown in Figure 9.25.
3. Press the Set button.
4. Press Enter.

You will see the cycle marker on the touchscreen as it is entered.



Figure 9.25
Nuage Master
Cycle Marker
button

Locating to a Marker with Nuage

If the Nuage Master keypad is in marker mode, simply typing in a number will call up the marker list showing which numbered marker you are recalling. Pressing Enter will locate to that marker position.

If the cycle button is enabled, typing in a number will call up the list of cycle markers to choose from. Pressing enter will locate to that cycle marker.

Nuage Keypad Locating

 (tutorial video: “Keypad Locating”)

If the keypad is in locate mode, as shown in Figure 9.26, you can enter location values directly into the transport using the keypad. Simply start typing the desired location (usually in time-code) and press Enter to locate.



Figure 9.26
The keypad in locate mode

There is a setup option to change the direction of the numeric entry depending on your preference. Go to the Setup page of the touchscreen, as shown in Figure 9.27.

The third tab has the option “Numeric Pad Input.” It can be set to either left or right, which changes the direction in which the numbers are entered. When the direction is set to right, numbers entered will fill places starting from the right side. This makes for quicker entering of lower values on the timeline. The left entry is more useful for higher timecode values, such as those beyond 01:00:00:00.



Figure 9.27 The third Setup tab on the touchscreen

Channel/Track Navigation

Now that you are familiar with timeline navigation or moving around horizontally in the project, let's examine how to navigate vertically in the project in order to find and select specific tracks.

Track List Selection

The first place to look for tracks is right in the Project window's track list.

Scrolling in the Project Window

It is possible to scroll up and down this list if there are more tracks than can be displayed on the screen at once. You can use the scroll bar on the right side of the project window, as seen in Figure 9.28, or if your mouse has a scroll function, this will also move the track list up and down.

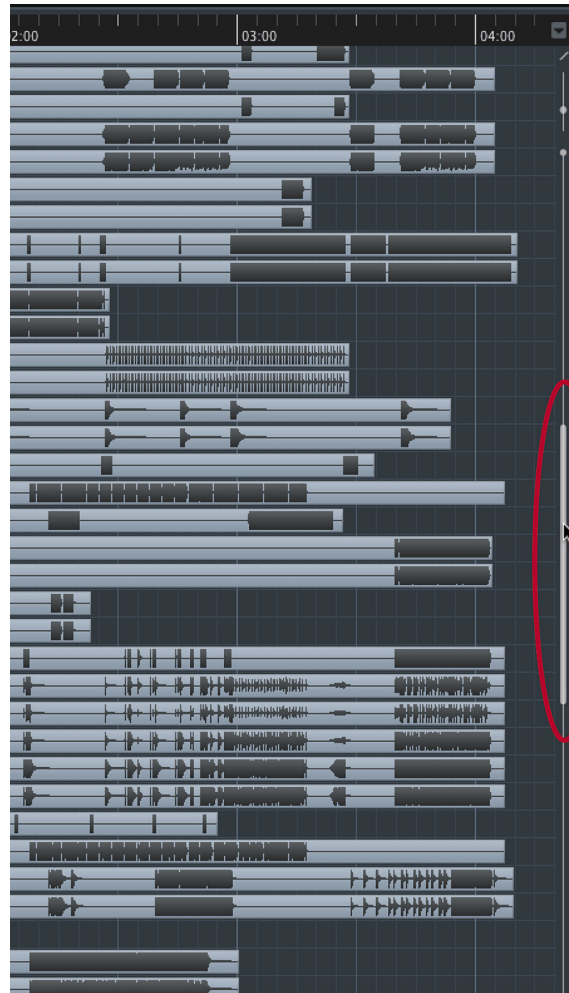


Figure 9.28
Scroll bar in
Project window

Visibility Pane

Clicking on a track name in the Visibility pane of the Project window will select that track, as seen in Figure 9.29. Once you have clicked inside the Visibility pane, using the up and down arrow keys will select adjacent tracks either above or below. Using the shift modifier with the arrow keys you can select multiple tracks at once.

Of course you can use the visibility buttons to the left of the track name to hide or reveal each track in the project window. Hiding unnecessary tracks can help navigation by bringing all relevant tracks closer to each other.



Figure 9.29
Multiple tracks selected in the Visibility pane

Find Track (Project window)

In a large project with perhaps hundreds of tracks, scrolling through the list might not be the fastest option for locating a specific track. The search icon at the top of the track list shown in Figure 9.30, gives you a text search for the track list. If you know the name of the track you are looking for, this makes it a snap to find it quickly.

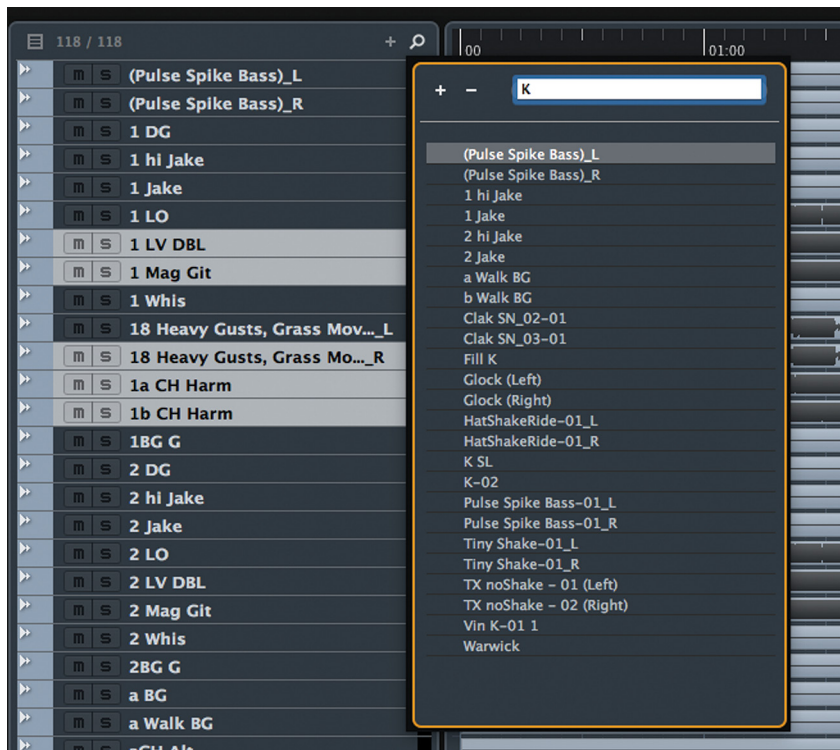


Figure 9.30
Find Track text search in the Track List

Simply start typing and Nuendo will conduct a search of the track list to find matches for the string of characters you are entering while you type. Even if you only have a portion of the name, it will be easy to find this way.

Find Track/Channel (MixConsole)

The MixConsole has a similar function to find channels in the mixer. It is found at the left side of the toolbar shown in Figure 9.31.

The main difference is that this text search will only find tracks that have a corresponding channel in the MixConsole. For example, you will not find a Marker track in this search dialog.

When you find the channel in the MixConsole and select it, the same track in the Project window will also be selected. This is the default preference: the selection is synchronized between the MixConsole and Project window, as shown in Figure 9.32.



Figure 9.31
MixConsole
Find Track/
Channel Button

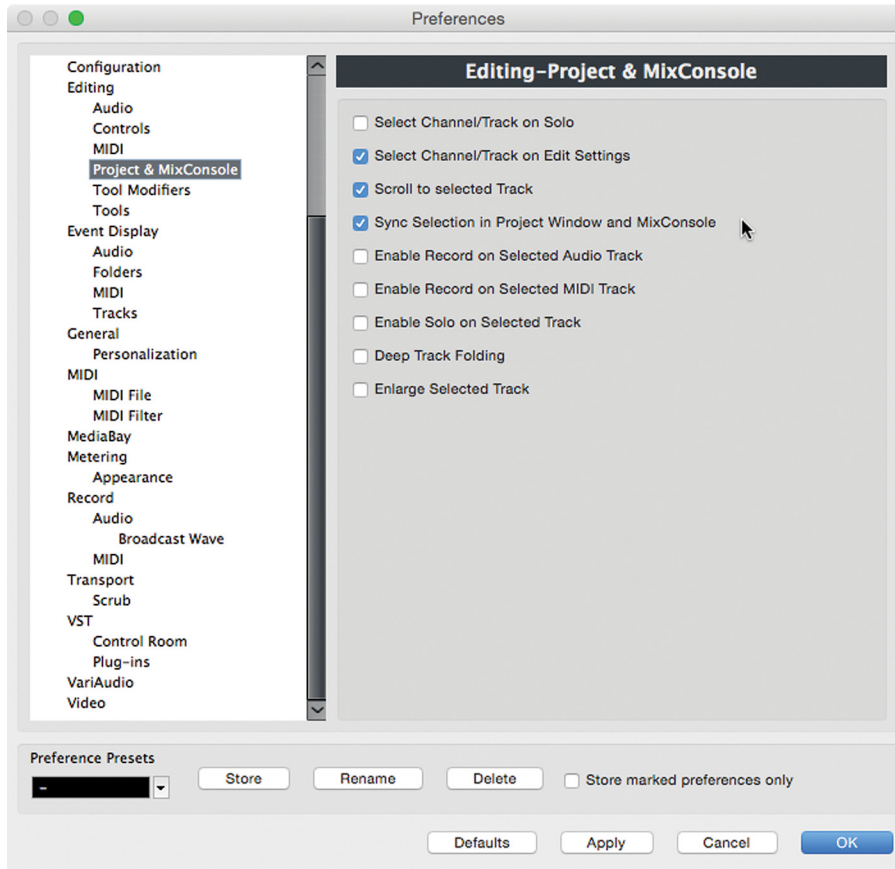


Figure 9.32
Project and
MixConsole
Preferences

If you find a channel in the Project window and select it, that channel in the MixConsole will become selected as well and the MixConsole will automatically scroll to that channel so it is visible in the window. This is the default preference: “Scroll to selected Track.”

Together, these two preferences help to coordinate track and channel selection together. Finding tracks can be done in either window for flexibility.

Channel Visibility Agents

We can use the power of the computer to do some intelligent locating of channels through the use of the Channel Visibility Agents. These are logical routines that will find certain channels and make them the only visible channels in the MixConsole. Of course, this makes them easier to select.

Playing Channel

For example, in a feature film production there might be hundreds of tracks in the project. Many of these will contain events only during certain scenes or when certain characters are onscreen. This can make for a project that has a lot of empty space in it. A track might have only a few events on it during the entire film. Finding specific tracks in this environment can be difficult using normal means.

One Channel Agent is referred to as “Playing Channel” or “Show Channels for Tracks with Data at the Cursor Position,” or in plain English, “Show me what’s playing right now.” Nuendo examines every track in the Project and will show only those tracks that have events where the cursor is currently located. Figure 9.33 shows the channel agent list in the MixConsole.

Now we could go from 200 tracks visible in the project to only 10 channels in the MixConsole for the tracks that are playing at one moment in the Project. This is very powerful and can be done while the Project is playing. For film work, this gives you the ability to scroll to a particular frame of video and view only the tracks that are playing at that moment, even if they are from very different locations in the Track List.



Figure 9.33
Channel
Visibility Agents

If the Channel/Track Visibility is synchronized between the MixConsole and the Project window, there will only be ten tracks in the Project window after using this Channel Agent. Think of this as using artificial intelligence to do the searching for you. There are more Channel Agents that perform other intelligent operations that will be covered during workflow examples.

TRACK AGENTS: PROJECT WINDOW

This same functionality is also in the Project window in the form of Track Visibility Agents. The difference being that Track Agents can search for tracks that do not appear in the MixConsole, such as Markers, Folders, etc.

Filter Channel Types

Another method of sorting through the MixConsole is by the type of channel. Using Channel Filters shown in Figure 9.34, the MixConsole can display only certain channel types that you choose. For example, you could choose to see only Group Channels and nothing else. No matter where in the Project the Group channels are located, if all other channel types are hidden, the Group channels will be shown all together and nothing else.

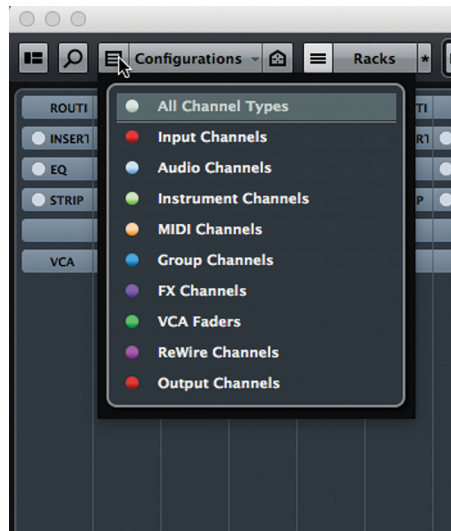


Figure 9.34
Filter Channel
Types Menu

For example, in a film mix, Group channels may be used to subgroup sounds in the various categories: dialog, Foley, ambience, etc. Filtering the mixer to show only Group channels will hide everything else but these stems, as seen in Figure 9.35. Now you can easily solo, mute, or otherwise mix them together.



Figure 9.35
MixConsole
with only stem
groups visible

INVISIBLE BUT STILL WORKING

When a channel or track is made invisible in the MixConsole or Project window, it still functions and plays as usual. It is only removed visually from the interface.

“Expand” Channel Agent

This is where we can use one of the intelligent channel agents in an interesting way. Let’s use the example of mixing a pop song. The background vocals are ten channels of various voices all singing the chorus, and they have been routed to one Group channel called “BV’s.” Each part is blended together into this Group channel and EQ, compression and de-essing are applied in the Group channel itself. If the Channel Filter is showing only Group channels, we can select the “BV’s” group and use a Channel Agent to show all the vocal tracks that are routed to that Group in one step.

Select “Show Channels that are Connected to the First Selected Channel” from the visibility menu, as seen in Figure 9.36. This is referred to as the Expand function, since it expands the selected channel to all channels connected by routing.

Now the MixConsole displays the vocal tracks, Group channel and any channel that the Group is routed to as a destination, in this case the mix and a reverb FX channel in Figure 9.37.

This example combines two functions that perform a task that would take significant time manually. If the entire song production takes up one hundred tracks, these two commands filtered that down to thirteen channels instantly. If the MixConsole and Project window visibility are synched, then you now see only these tracks in the Project window, shown in Figure 9.38, ready for editing.

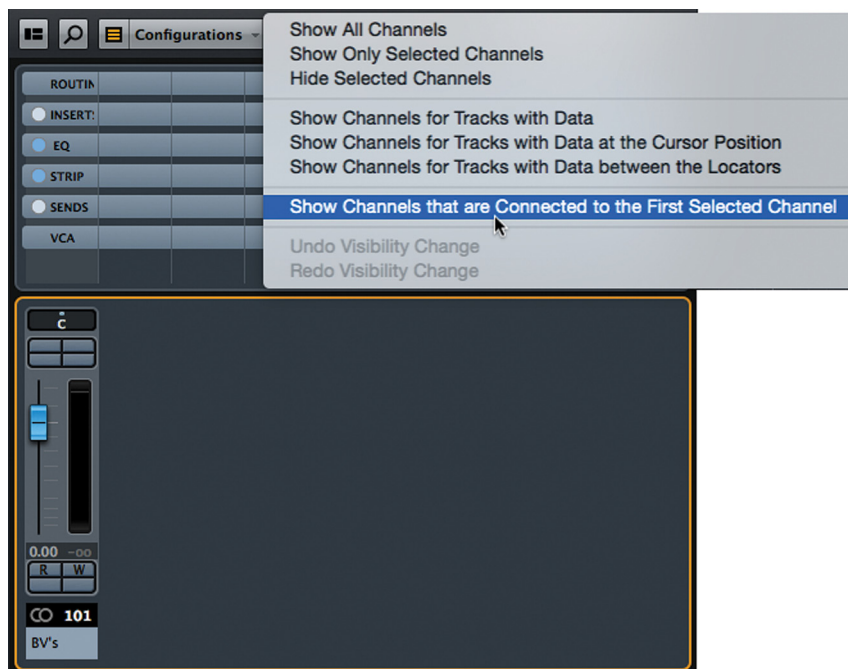


Figure 9.36
Channel
Visibility
Agents: Expand

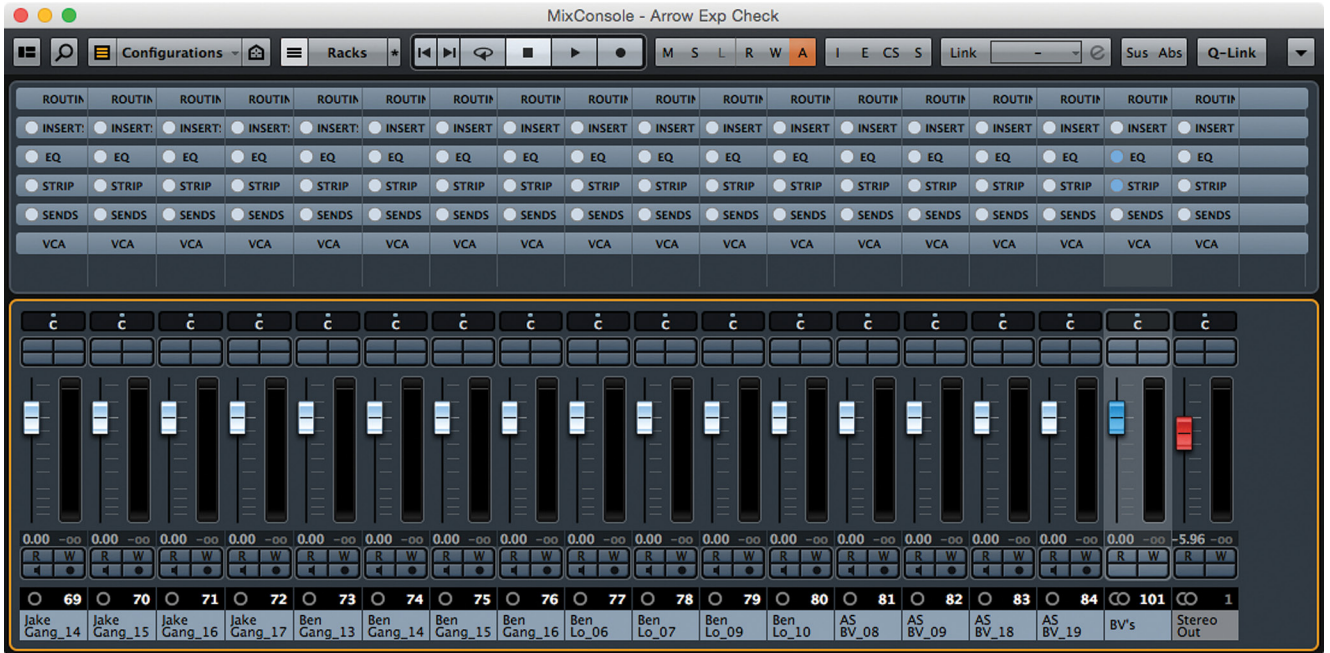


Figure 9.37 MixConsole Expanded BV's Group



Figure 9.38 Project window with BV tracks visible

Locking Channels in the MixConsole (Zones)

We've shown the ability to hide channels quickly in the MixConsole. But there are times when certain channels should never be hidden. For example, the lead vocal in a song is the most important channel in a mix. It is nice to always have that channel available at your fingertips. Using MixConsole Zones, as shown in Figure 9.39, it is possible to lock channels like this to either the left or right side of the mixer.

In the MixConsole's Zones pane, there are two columns of circles on the left side. Clicking on either of these circles will lock that channel to the left or right side of the MixConsole as seen in Figure 9.39.

Once a channel has been locked to either the left or right side of the MixConsole, scrolling will not move it. Only the unlocked channels will scroll and move. Also, Channel Visibility Agents will not be able to hide locked channels. They will remain visible and in their current position. You can lock more than one channel to either side.

The only way to hide a locked channel is to filter that track/channel type. Locked channels still appear in the track list at the same position. Selecting a locked channel will scroll the Project window to its location in the track list, making it easier to get to.



Figure 9.39 MixConsole Zones Pane

Folder Organization

Folder Tracks are great tools for organization. Tracks can be grouped into folders based on whatever criteria you decide. For music, instrument types could be grouped together in folders.

- ❖ Drums
- ❖ Guitars
- ❖ Vocals
- ❖ Percussion
- ❖ Keys
- ❖ Strings

In film sound, folders are indispensable. They can be nested to create subcategories of sounds.

- ❖ Dialog
- ❖ Feet
- ❖ Exterior
- ❖ Principle
- ❖ Moves
- ❖ Music
- ❖ Supporting
- ❖ Specifics
- ❖ Score
- ❖ Walla
- ❖ Ambience
- ❖ Source
- ❖ Foley
- ❖ Interior

Folders help clean up the Project window. Figure 9.40 shows the same Project with the Folders open and then with them closed. Closing a Folder hides the tracks in the Project window but not the MixConsole.

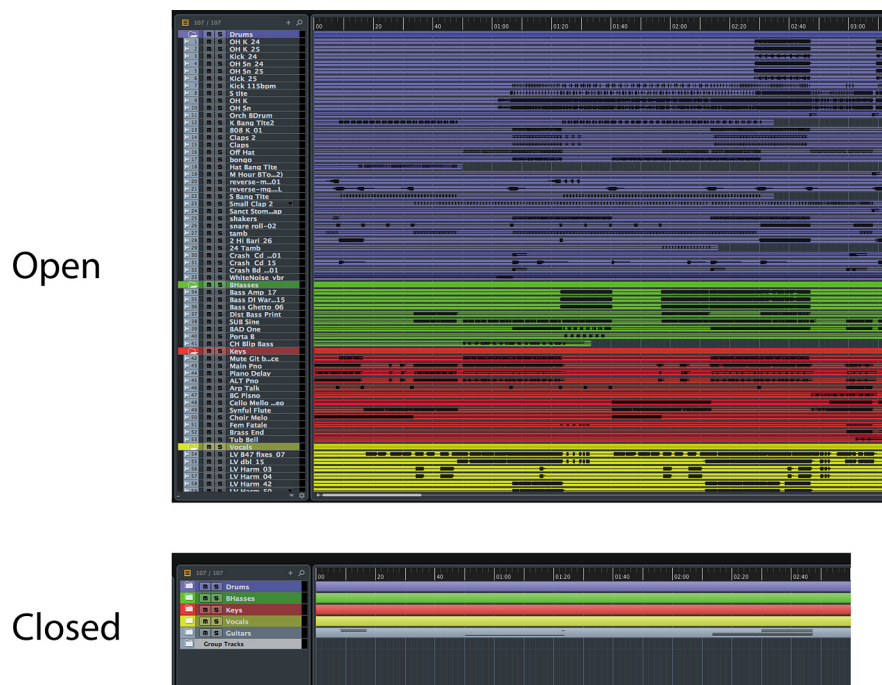


Figure 9.40
Folders open,
Folders closed

Folders are closed and opened in several ways:

- ❖ Clicking on them in the Track List
- ❖ Clicking the tabs in the Visibility Pane (Project window)
- ❖ Clicking the tabs in the Zones Pane (MixConsole)
- ❖ Nuage commands (various)

You can create folder tracks and simply drag other tracks into them one by one or in groups. You can also select multiple tracks and use the command Move Selected Tracks to New Folder, as shown in Figure 9.41.



Figure 9.41
Track List
Context menu

This will create a new folder and place all the selected tracks within it in one step. Organizing large projects in this manner is quick and efficient.

Nuage Channel/Track Navigation

All of the same features from the MixConsole are also available from the Nuage Fader Unit plus a couple unique items.

Touch Slider



(tutorial video: “Navigation – Touch Slider”)

The most obvious and tactile way to navigate channels using the Fader Unit is with the unique Touch Slider. Touching and sliding channels across the Fader unit is a very intuitive action, allowing you to place channels in any desired position on the Fader unit with one stroke of your finger.

Physical Modeling

There is a certain amount of inertia built in to the action of the touch slider. If you whip the slider, channels will continue to slide across the faders, slowly coming to a stop as if coasting across a smooth surface. This has the reassuring effect of letting your eye follow the names and channel numbers on the OLEDs naturally.

Follow Slider Scroll

When sliding channels across the Fader unit, the channel faders will update their position to reflect the channel that is currently in that position. This happens in real-time while sliding. It is possible to change this behavior in the Master unit setup screen, as seen in Figure 9.42.

On the second page of the setup screen, the “Follow Slider Scroll” option can be disabled. Now the faders will update their position only after you release your finger from the touch slider and the channels are no longer moving across the fader unit OLEDs.



Figure 9.42 Follow Slider Scroll option

Locking Channels

 (tutorial video: “Channel Position and Lock”)

As with the MixConsole, channels in the Fader unit can be locked to one side of the control surface. Simply press the left or right lock buttons to fix selected channels to either the left or right side of the control surface, as seen in Figure 9.43.



Figure 9.43
Channel Lock buttons

When more than one Fader unit is present in a Nuage system, locked channels will appear at the far left or right of all linked Fader units. When the Fader units are not linked, channel locking is independent for each Fader unit.

Channel Position



(tutorial video: “Channel Position and Lock”)

When there are fewer than sixteen channels visible on the Fader unit, their position depends on the channel position setting. Channel position has two modes:

- ❖ Locked
- ❖ Free

In order to switch between mode, hold the Fader unit Alt button and press the left channel bank arrow key (<) to enter fixed mode. Holding Alt+Right bank arrow will switch to free mode.

The other option available is choosing the left or right side for fixed mode. Hold the Fader unit SHIFT key and press the right channel bank arrow key to place channels on the right side in fixed mode, or the left arrow key to place them on the left side.

When two or more Fader units are linked together, channels will appear at the very far left or right of all combined faders (32 or 48).

Track Type Filters



(tutorial video: “Channel Type Filters”)

The Fader unit provides direct access to the channel type filter found in the MixConsole. Located in the Channel View control section, there are six channel type filter buttons, as seen in Figure 9.44.

Since there are more than six types of channels in the mixer, these buttons can be customized to fit your needs using the NUAGE Fader Setup window found under the Devices menu, as shown in Figure 9.45.



Figure 9.44 Six channel type filters

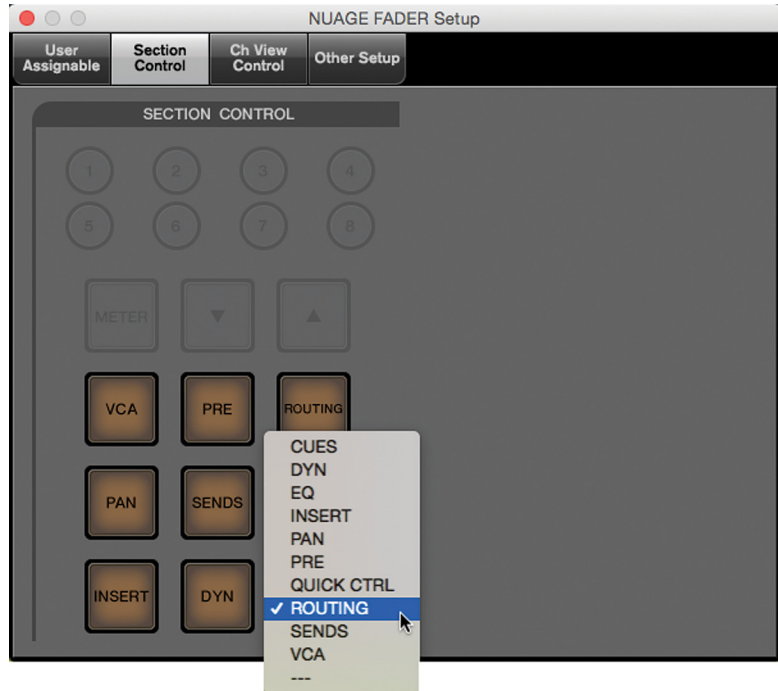


Figure 9.45 The NUAGE Fader Setup window

You can group the various channel types into each of the six buttons using the pull-down menus for each channel type. Choose the number of the button you wish to associate with each channel type. For example, the VCA channels could be grouped together with Group channels as they both related to controlling sets of channels together. Your workflow will dictate how best to assign these filters.

Channel View Memory



(tutorial video: “Channel View Memory”)

Now that you have various ways to organize how channels appear on the Fader unit, it becomes extremely useful to be able to memorize each layout and switch between them. The Fader unit provides eight memory locations to store channel layouts.

For example, you could create a layout that has all of the most important channels locked in position for mixing. A second layout could contain just the dialog channels and nothing else. A third could show just the group channels and stems. A fourth could be all channels visible and unlocked. You can switch between these four presets with one button press.

Setting a memory view is as simple as pressing and holding one of the Channel View Memory buttons until it flashes, as shown in Figure 9.46. Once it is stored, recalling the channel view takes only a single press of that button.

In order to access memory locations 5-8, hold the Shift button on the Fader unit and use the same four buttons again to set and recall the additional channel views.



Figure 9.46
Channel View
Memory
buttons

NUAGE Channel View Agents



(tutorial video: “Channel View Agents”)

The Fader unit gives you access to six channel agents, as seen in Figure 9.47.

- ❖ Events on Track
- ❖ Events on Track within Cycle
- ❖ Playing Channels
- ❖ Selected Channels
- ❖ Expand
- ❖ All Channels

Since you have direct access to these agents right on the Fader unit, you can take advantage of their intelligent power to change the configuration of the mixer instantly like no other control surface.



Figure 9.47
The Channel
View Agent
buttons

For example, you can use the Playing Channel agent to filter all the channels out that do not have audio or other event data present at the current playback position. Instantly, the Fader unit(s) will only have the relevant channels for that moment in the project visible on the control surface. You could then quickly save the channel view to a memory location to recall later. The possibilities are endless.

The expand channel agent could be used to show all the dialog channels that have been routed to the dialog stem group channel in an instant, something that would take much more time to do manually.

Sync Project and Nuage Fader



(tutorial video: “Sync Project and Nuage View”)

This next feature takes channel and track organization and navigation to a whole new level. You can synchronize the channel view on the Fader unit with the track view in the project window. In other words, what you see on the Fader unit will also be what you see in the Project window.

For example, if we use the channel type filter to show only the group channel on the Fader unit, and synchronize that with the Project window, then all we will see in the Project window is the group channels, and any other track type that does not have a corresponding channel in the mixer, such as markers, video, folders, etc.

This opens up a whole new way of organizing the project view: using the Fader unit. If you want to edit a particular sound effect in a scene, instead of searching through tracks and tracks of sound effects to find the right one, you can now use the Playing Channel agent to find it for you. Move the cursor to the frame of video that has the sound effect and press the Playing Channel agent button to filter both the Fader unit and project window to just the tracks that have audio data at that frame and you will be much closer to finding the exact track you are looking for.

This is possibly one of the most useful combinations of features in the Nuage system especially for film post-production where channel counts easily exceed 100-200. You can use the Fader unit’s channel navigation to organize the project window and vice versa.

Master Unit Track Navigation



(tutorial video: “Master Unit Track Navigation”)

The Master unit can also navigate through the track list.

Touchscreen Track List

The touchscreen’s tracks list, shown in Figure 9.48, has several ways to access all the tracks in your project. There are three tabs used to view the track list in different ways.

Overview

The Overview groups tracks in blocks of 32 shown in Figure 9.48. Tapping a block will open that group of tracks into the touchscreen for selection.



Figure 9.48 Track List Overview

Folder View

The Folder view maintains the hierarchy of folders in the project, allowing you to open each folder and access its contents, including nested folders, as shown in Figure 9.49.

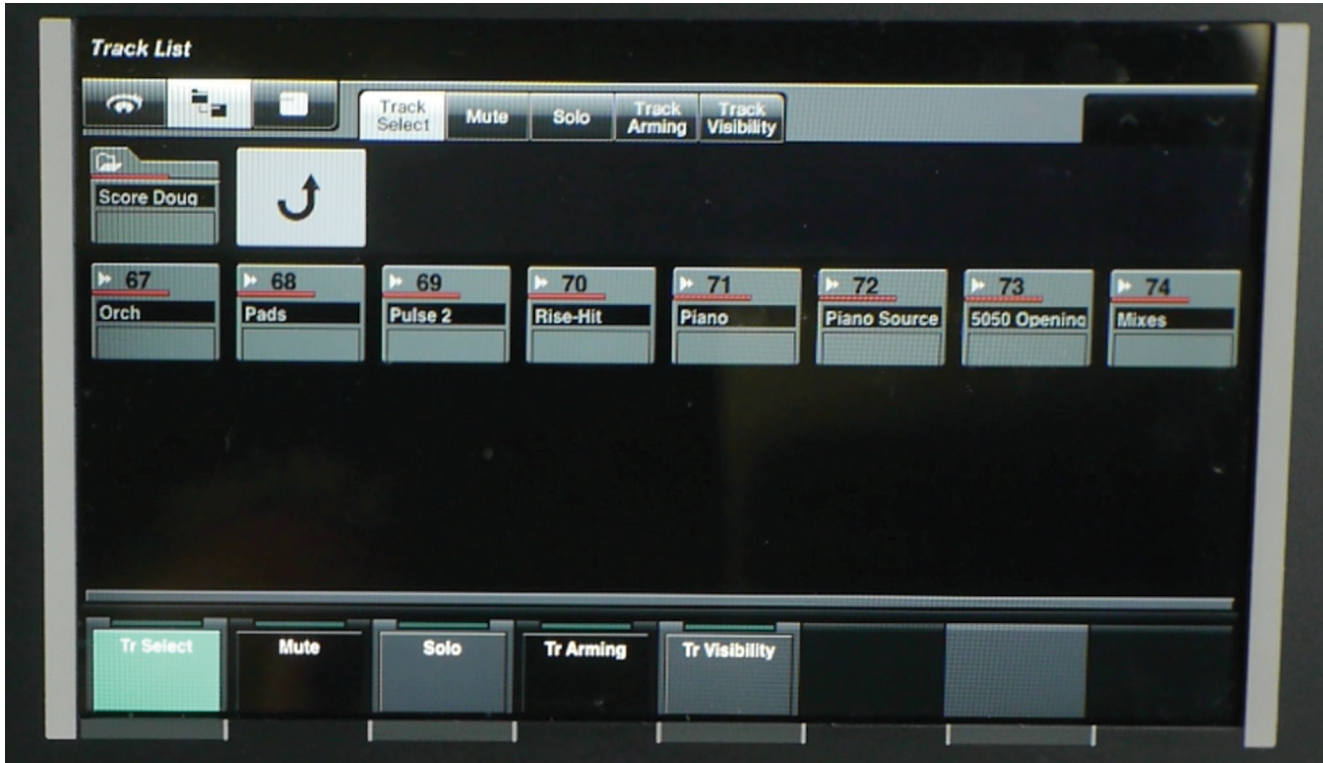


Figure 9.49 Track List Folder View

Track List

The track list places all tracks together with scrolling arrows to move up or down to the rest of the tracks, as shown in Figure 9.50.

In any of these track list views, each individual track can be addressed in the following ways:

- ❖ Selected
- ❖ Muted
- ❖ Soloed
- ❖ Record-enabled
- ❖ Hidden

The touchscreen provides another method of interacting with tracks, one that might be more useful in different workflows. Again, Nuage has flexibility at its core.



Figure 9.50 Track List View

Master Unit Arrow Keys

The arrow keys found in the lower right hand side of the Master unit, shown in Figure 9.51, can also be used to navigate through the tracks list.



Figure 9.51
Master Unit
Arrow Keys

Up and Down for Selection

The up and down arrow keys will change which track is selected by moving up or down. This in conjunction with the scroll wheel forms the basis for audio editing on the Master unit, covered in Part III: Editing.

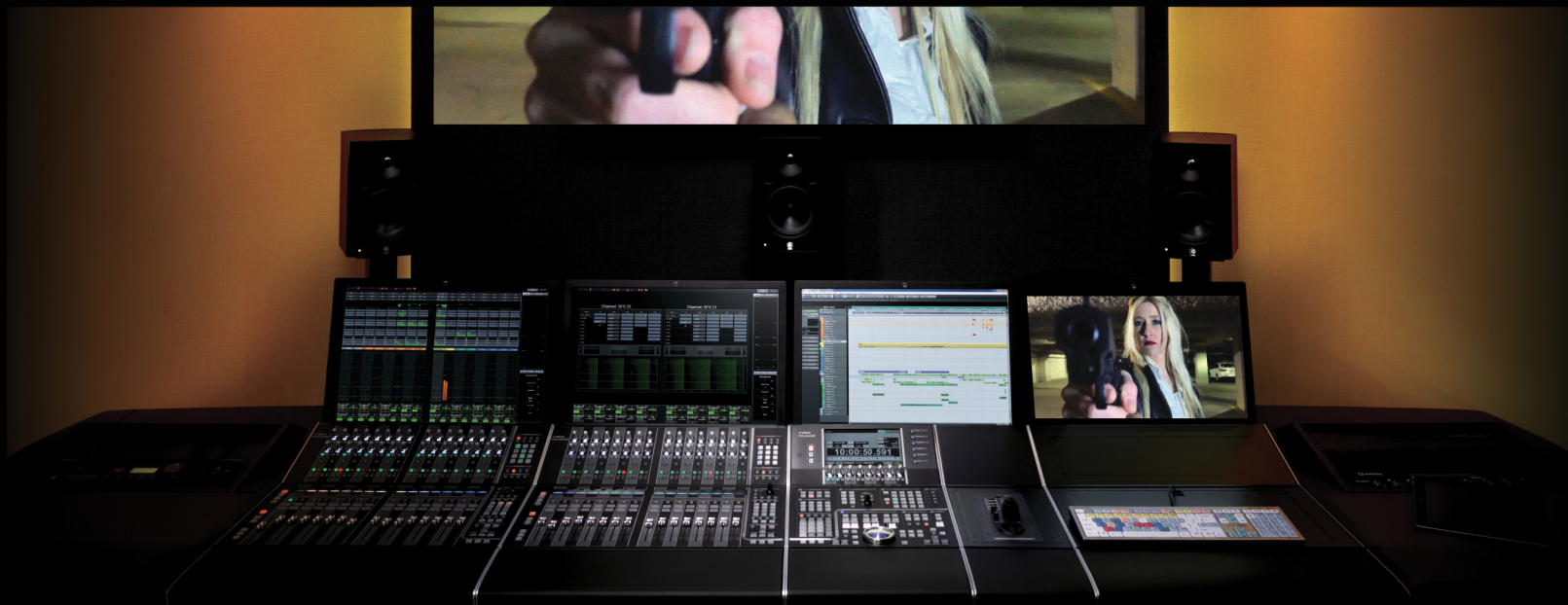
Double Arrow Folder Actions

By pressing both the left and right arrows together, you can open and close the selected folder track. Use the up and down arrows to move to a folder track and then press both left and right arrows to open or close the folder.

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PART II: RECORDING

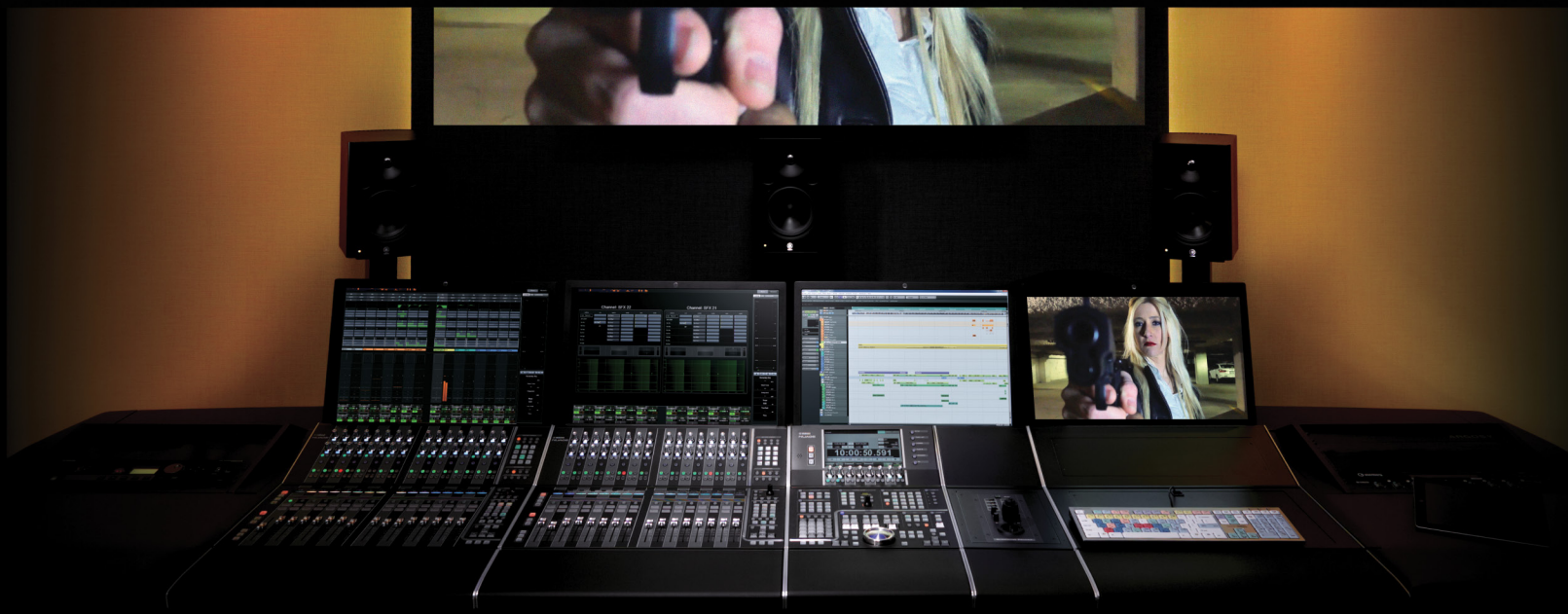


by Ashley Shepherd

In the second part of this material we will cover all types of recording, from simple voice recording to recording an entire band. We will also cover the process of importing audio from other sources such as video editing software, field recorders, and other DAWs. This part covers the many ways to get audio into Nuendo .

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PART II: RECORDING

by Ashley Shepherd

Chapter 10

Recording the Voice



NUAGE

Recording the Voice

- ❖ Setting up First Take
- ❖ Overlaps
- ❖ Cycle Recording
- ❖ Punching In

To begin, let's start with a voice-over recording. Using this simple example, the various recording modes of Nuendo can be explained clearly. The concept of overlaps and multi-lane recording will be explained. These are some of the most powerful features in Nuendo and can aid in quick editing during post-production.

Setting up First Take

Since voice-over recording usually requires only one recording channel and simple headphone monitoring, setting up should be easy.

1. Configure the VST Inputs so that there is at least one mono input bus to record from.

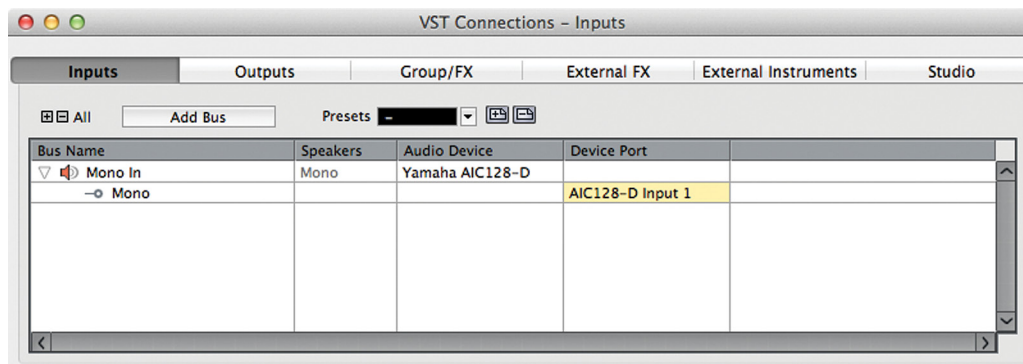


Figure 10.1
VST Inputs,
Mono Input

2. Configure the Control Room to have at least one Studio channel to feed the headphones for the voice talent.

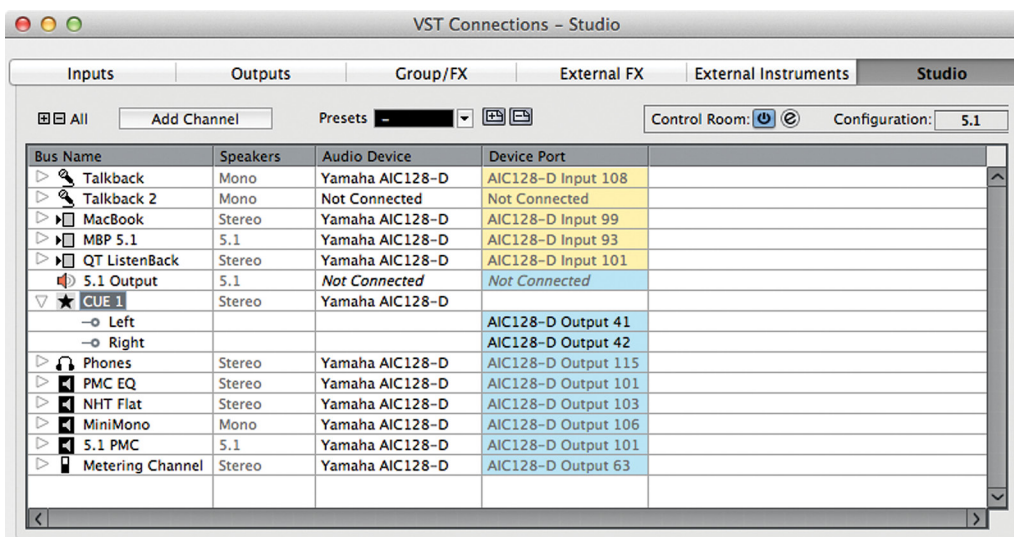


Figure 10.2
Studio Tab with
one studio send

3. Create one mono audio track.
4. Select the desired VST Input for the track.
5. Enable input monitoring on the track and adjust your recording level.

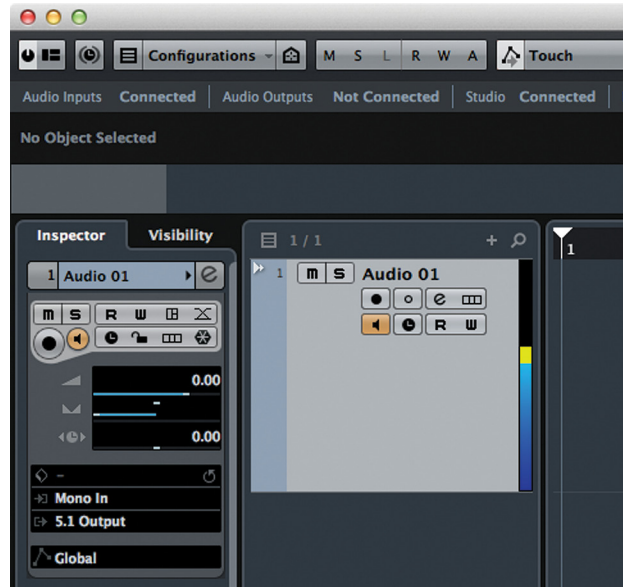


Figure 10.3
Input monitor
enabled on
track

6. Record-enable the track. (See section on Auto Input Monitoring in this chapter.)
7. Set the Cue 1 output in the Control Room mixer to “Mix.” This feeds the headphones the exact same mix that you are hearing, the Main Mix bus.
8. Press Record and record a take.

If all goes well, you should have a first take that looks something like Figure 10.4:

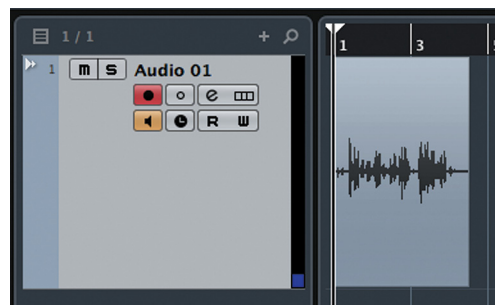


Figure 10.4
First voice-over
take

RECORDING LEVELS:

Most professional recording equipment including AD converters, mic preamps, compressors, etc. are designed to operate at a nominal level. This ensures that the devices is not over-driven or pushed beyond its designed capacity. For most A to D converters, this nominal level translates to around -18dBFS on the meters in Nuendo. Notice that this point on the meters is only about a third of the way up from the very bottom. Bear in mind that recording signals above this level is not necessary for quality sound. The idea is that there is “headroom” above the nominal level for sounds that are unexpected. Signals that exceed -6dBFS are very close to digital distortion and should be avoided. Be conservative in setting recording levels so that the average signal level is around -18dBFS as a best practice.

Now unless you have the perfect voice-over talent in the studio, you’ll probably need to record another take. Nuendo gives you a couple options for recording multiple takes.

- ❖ **Linear:** One take after another in succession, just as with analog tape.
- ❖ **Stacked:** Each take is recorded at the same place in time, stacked on top of one another in one audio track.

The linear method is straightforward, recording each new take after the last. In Nuendo, you can just keep recording on the same track till you run out of hard drive space. You might want to turn off the preference “Return to Start on Stop” so that you can easily continue recording from the end of the previous take.

After several takes, the project window could look like Figure 10.5:

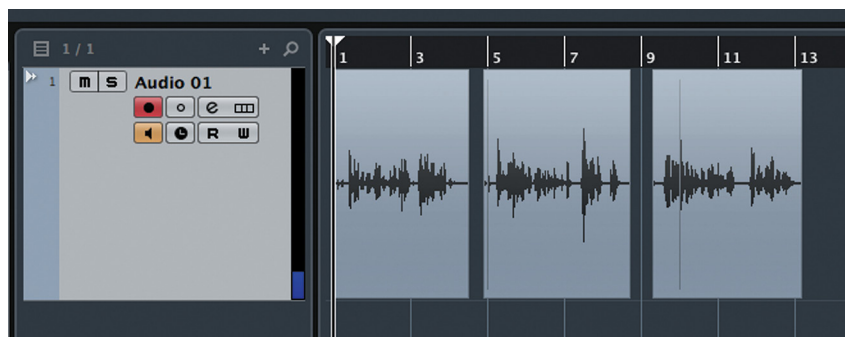


Figure 10.5
Multiple takes recorded in linear fashion

Overlaps

With stacked takes, each take occupies the same place in time, stacked up in a sort of pile. For example, if you are recording vocals for a song, you would want to record the first verse in the same place with the music every time. Each new take of the verse would be stacked, overlapping the last take.

So what happens when you record something right on top of something else? It creates an overlap and it looks like Figure 10.6:



Figure 10.6
Two takes overlapped

Since Nuendo can play only one event at a time on a single audio track, the one “on top” will be the one that is heard. Notice in the above example how there are diagonal lines indicating where the events are overlapped. The second event is not as long as the first and ends early, leaving the earlier event (take 1) exposed at the end. You would hear take 2 up until take 1 is exposed and then take 1 till the end. You can keep doing this over and over, creating many overlapped takes on one track.

What’s the point if we can only hear the latest take? Well, all the previous takes can be “brought to the front” and heard later on during editing. You never have to throw away any old takes. They are all kept right there stacked on the audio track.

If you record another four takes on this audio track, it will still look much the same, giving no visual indication of how many takes are stacked, as seen in Figure 10.7. This could get a bit confusing.



Figure 10.7
Five overlapped takes

Figure 10.7 looks remarkably like the two overlapped takes in Figure 10.6. Have no fear! There is a special display mode that allows you to see all the stacked takes clearly, each in its own lane.

Lane Display

Let's take the above example and turn on lane display to see all five takes. Press the "Show Lanes" button found in the track list and the lanes will be displayed beneath the compiled track shown in Figure 10.8.

Now each take is displayed on its own lane beneath the audio track. Each new take will create another lane. The lanes are numbered earliest to latest, with higher lane numbers for the latest takes. Areas of each lane that have greyed out events will not be heard. Only one lane can have an active event at any point in time. This display allows you to see the composite of what is heard during playback. The bottom lane is always empty, prepared to accept the next recording.

If you were to "punch in" on this track, in other words record a portion in the middle of the voice-over, Nuendo will show an active event on the next lane (6) and create another empty lane for the next recording, as shown in Figure 10.9.

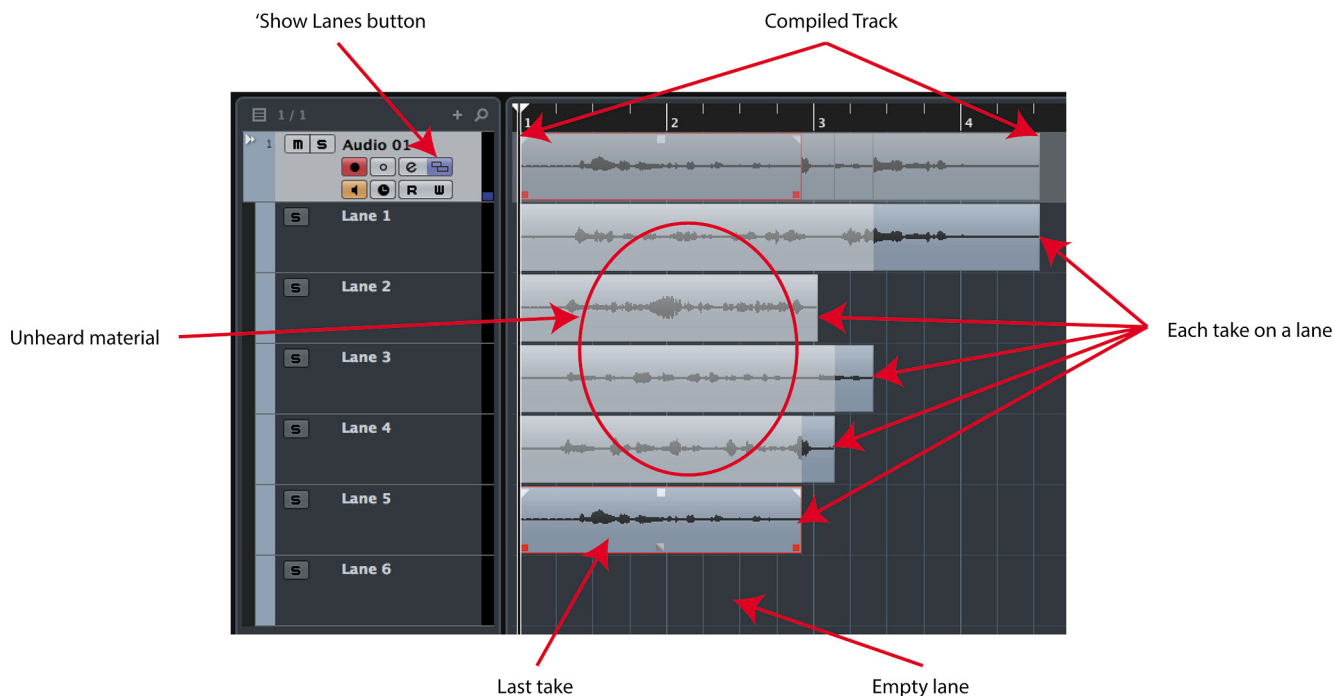


Figure 10.8 Five overlapped takes shown in lane display mode

Lanes are only created when audio events overlap. Nuendo will always try to use the lowest numbered lane possible so long as no other event occupies that lane after the cursor position.

For example, if you record something after the end of the events on lanes 2 through 5, the new event will be placed on lane 2. If there is another event already on that lane to the right of the cursor, a new take will be placed on the lane beneath, as shown in Figure 10.10.

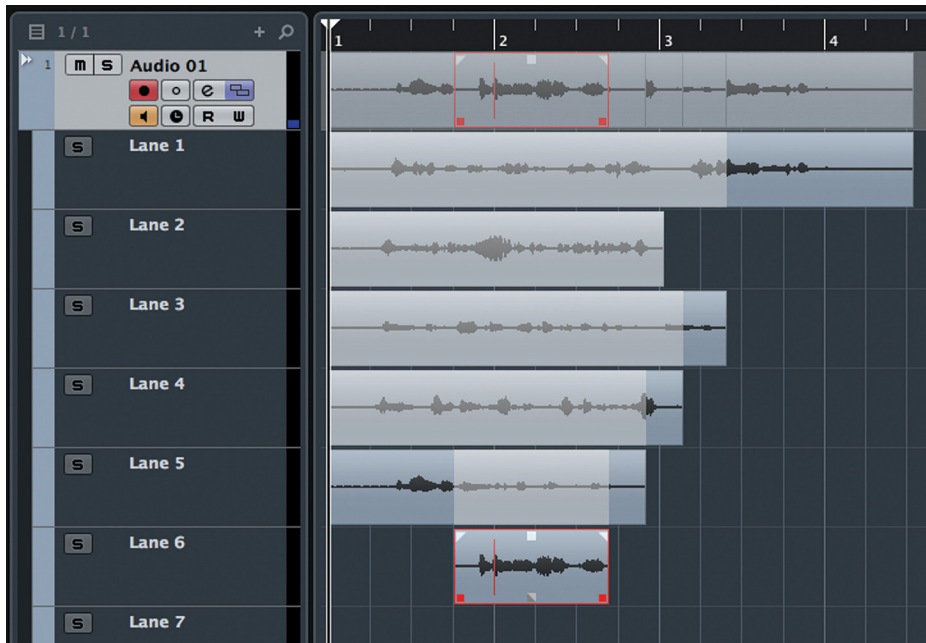


Figure 10.9
A punch-in on lane 6

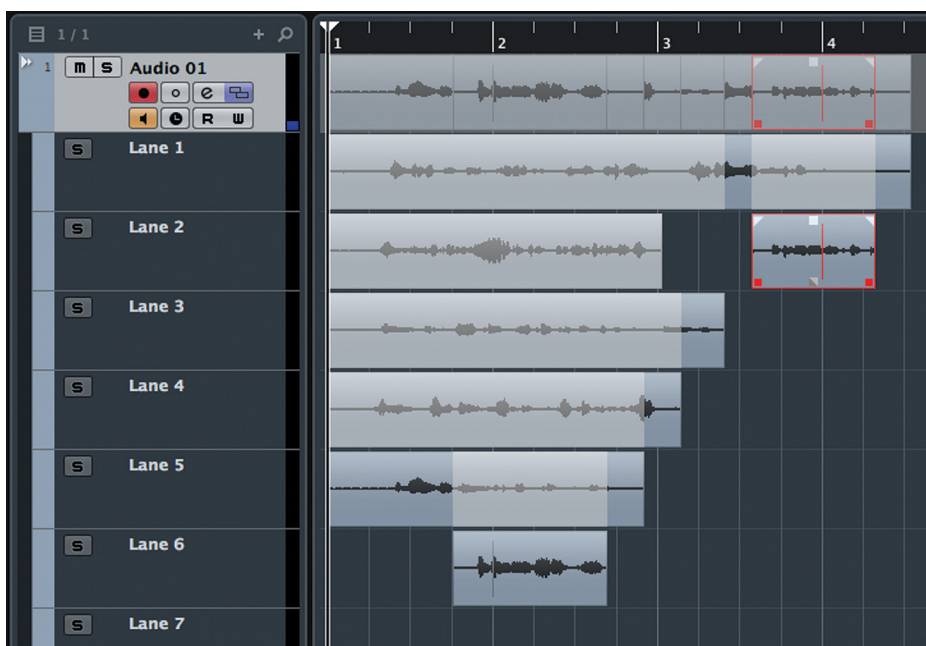


Figure 10.10
Next take using lowest numbered lane possible

The Comp Tool

In order to listen to earlier takes that are now greyed out, you must switch to the Comp tool. The Comp tool is for creating composite edits between multiple takes on different lanes. This process will be covered in Part III: Editing. But for now, this tool shown in Figure 10.11 can be used to activate an event that is greyed out in order to hear it during playback.

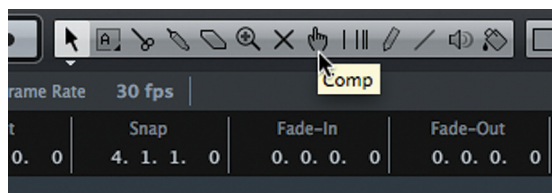


Figure 10.11
The Comp tool
in the toolbar

Clicking on an event with the Comp tool will immediately make it the active “on top” take. In this fashion, you can audition the various takes in order to pick the best. If the event on Lane 2 is clicked with the Comp tool, it becomes active and will be heard during playback. Notice how the audio track waveform display updates to reflect this change in Figure 10.12.

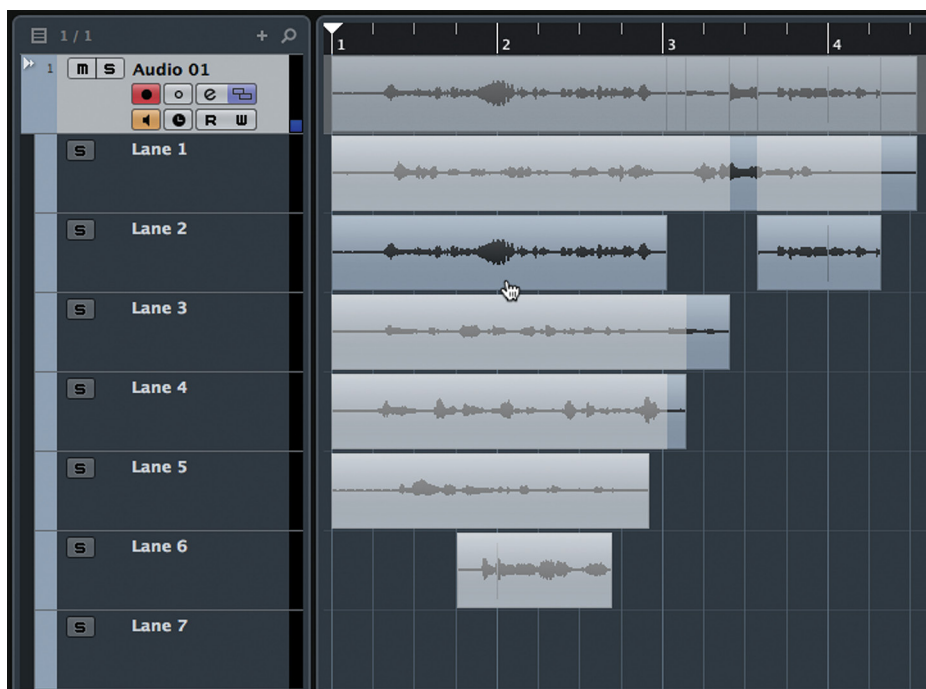


Figure 10.12
Event on Lane 2
is now active,
audio track display
updates

Audio Record Mode

Nuendo has three audio record modes that determine how overlaps are handled.

- ❖ **Keep History (default):** Creates a new lane for each overlapping event as shown above.
- ❖ **Cycle History + Replace:** This mode is used with cycle recording in which you continuously loop a section and keep recording takes until you stop. Only the last take recorded during the cycle pass will be retained on the track. Other previous takes will be removed.
- ❖ **Replace:** Newly recorded events take the place of existing ones. No lanes are created. This is more like a tape machine, where each new recording replaces the last.

These modes are set via a menu found on the Transport panel shown in Figure 10.13. Recording modes are separate for audio and MIDI.

When set to “Keep History,” the audio recording mode functions as described in the previous section, creating new lanes for each overlap.

Replace mode functions like a tape machine, erasing anything you record over. Of course, the actual audio files are not erased from the hard disk or removed from the pool. Recordings made in replace mode can be undone to bring back the previous recordings.

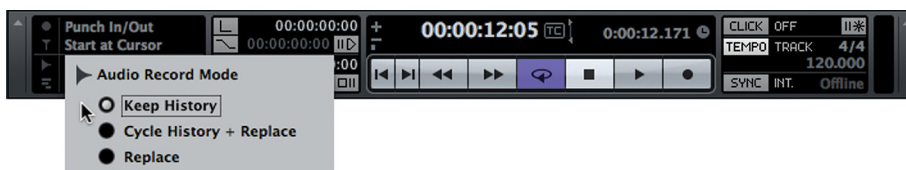


Figure 10.13
Audio recording modes in the Transport panel

PRO TOOLS NOTE

Replace mode is how Pro Tools records, always replacing the existing audio on a track with the new take. Pro Tools uses playlists as a way to record multiple takes and then compile them to yet another playlist.

Cycle Recording

You can re-record a section over and over again using the Cycle mode of the transport. Cycle mode uses the left and right locators to determine the beginning and end of the cycle.

1. Set the audio record mode to “Keep History.”
2. Set the left and right locators to the start and end of the cycle you wish to record, as in Figure 10.14.

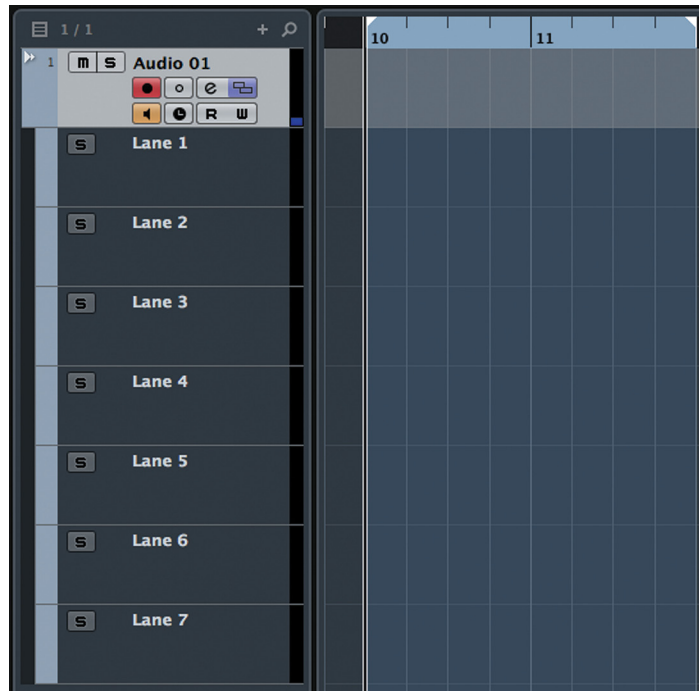


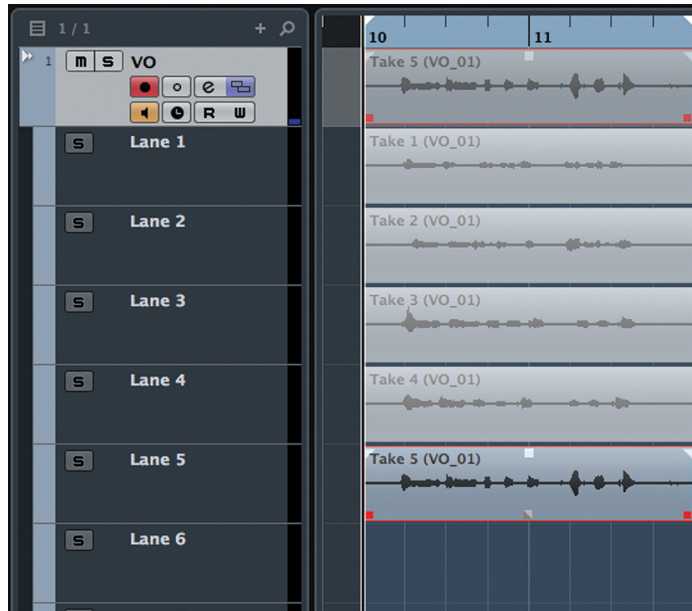
Figure 10.14
Left and right locators set

3. Enable cycle playback on the transport panel, as in Figure 10.15, or on the Nuage Master unit.



Figure 10.15
Cycle enabled on the transport

4. Start recording from the left locator. Once the right locator has been reached, the cursor will jump back to the left locator and continue recording.
5. After recording five takes, you will have each take in a lane with the last complete one active, as seen in Figure 10.16.

**Figure 10.16**

Five takes recorded in cycle mode

Notice how each event is named Take 1 (VO_01), Take 2 (VO_01), etc. What has happened is that one audio file (VO_01) has been recorded with five Regions within that audio file, each creating an event in a lane (Take 1, Take 2, etc.). This helps identify takes and speeds up the editing process afterwards.

PRO TOOLS NOTE – PLAYLISTS VS. LANES

Pro Tools uses a system of playlists to record multiple takes for editing. Playlists differ in that they are essentially alternate versions of a track. They can contain differing audio regions and (as with Nuendo) only one playlist can be heard at a time. Playlists must be created manually or by loop recording in a special mode. The playlists can be arranged in an editing mode later.

Lanes in Nuendo are a bit more fluid since they are created automatically during cycle recording and “Keep History” mode. Merely punching in on a Nuendo audio track will create lanes from overlapping audio events. With Pro Tools, you would have to manually create a new or duplicate playlist to record new material without removing previous takes.

The similarities and differences between Pro Tools playlists and Nuendo’s lanes will be discussed further in Part III: Editing.

The audio record modes affect the way cycle record deals with overlaps and lanes. The above example applies when the audio record mode is 'Keep History'. When the mode is set to 'Cycle History + Replace', Nuendo will remove any previously recorded events and replace them with all the new lanes created by the current recording cycle. In replace mode, only the last complete 'take' will remain in the lane.

Punching In

Sometimes a take is almost perfect except for one line or one phrase. Re-recording just that phrase or section is called "punching in." The talent listens to their performance as it approaches the location where you want to re-record. You can enter record manually (punch-in), record the section to be replaced, and then stop recording manually (punch-out) or you can set the in and out points and let Nuendo do the punch automatically.

Auto Input Monitoring

As mentioned above, the talent needs to hear their performance leading up to the punch in. In order to do that, input monitoring must be off for that track. Then when the punch in has happened, the talent needs to hear the input signal in order to perform properly. Input monitoring needs to be on during the punch. If you have to do this manually, it can be exhausting and difficult.

Analog tape machines have this same issue when overdubbing. They need to switch to input monitoring while in record. Nuendo has a preference that deals with this issue in Preferences>VST>Auto Monitoring. There are four choices:

- ❖ Manual (default)
- ❖ While Record Enabled
- ❖ While Record Running
- ❖ Tapemachine Style

The most common setting is Tapemachine Style. With this preference set, the input monitoring for an audio track will be turned on automatically in two states:

- ❖ Record-enabled, stopped
- ❖ Record-enabled, record running

Input monitoring will be off when the track is not in record, or during playback. This way you can record-enable a track and instantly hear the input signal. During a punch, the talent will hear playback until you punch in, at which point input monitoring will switch on so they can hear their performance. When the punch out happens, input monitoring will be turned off to hear playback again.

Manual Punching

Manual punching is performed just like a tape machine, hitting the record button at just the right time to start recording and then pressing record again to stop recording and continue playing. This method is very quick as it does not require any preparation time and can be done on-the-fly at any moment. Nuendo does not need to prepare to record. It's always ready when you are.

Depending on which record mode you are using, the punch in can create an overlap adding another lane, or it can replace a portion of the original audio event. Either way, new audio events will be created automatically as a result of punching in and out.

There are three phrases shown in Figure 10.17. The middle phrase needs to be re-recorded. So, start playback until the cursor gets just ahead of the second phrase and then punch-in by pressing the record button on the Nuage transport or using the "*" key on the keypad. Once the phrase has been recorded, press the record button or "*" key to punch-out. If the record mode is set to replace, the result will be a new event in the middle along with the resulting two events on either side automatically created by Nuendo, as seen in Figure 10.18.



Figure 10.17
Single audio event before punch in



Figure 10.18
Three audio events after punching in the second phrase

If the record mode was set to “Keep History,” an overlap would be created, as seen in Figure 10.19.



Figure 10.19
New event overlapping the original

Automatic Punching

The left and right locators can be used to define punch-in and punch-out locations for automatic punching. Auto-punching is especially helpful when you are recording by yourself as you no longer need a free hand to punch-in. It is also useful for extremely precise punches or punches that need to be repeated many times in a row.

1. Define the area you wish to re-record by setting the left locator at the start and the right locator at the end of the section.
2. On the transport panel, press the Auto Punch In and Auto Punch Out buttons. Alternatively, you can use the key commands “I” and “O” respectively. On the Nuage Master unit, enable PUNCH IN and PUNCH OUT above the transport.
3. Locate the cursor some time before the left locator. Alternately, you can use the pre-roll function discussed below.
4. Enter play.
5. When the left locator is reached, the transport will go into record.
6. When the right locator is reached, the transport will stop recording.



Figure 10.20
The transport panel with both auto punch in and out enabled

Automatic Punch Preferences

There are two preferences that affect how the transport operates in auto-punch. These can be found in Preferences>Transport. The default settings are shown in Figure 10.21.

- ❖ **Deactivate Punch In on Stop** – This preference is helpful in preventing accidental re-recording right after performing a punch. If Auto Punch In is left on, when you try to play back what you just recorded, the transport will enter record again at the left locator. This is for convenience as any recording can be undone if needed.
- ❖ **Stop after Automatic Punch Out** – This preference automatically stops the transport after the punch out, depending on the post-roll settings discussed in the next section.

Auto Punch In and Auto Punch Out do not necessarily need to be used together. You may want to auto-punch in and remain in record until you manually hit stop. Conversely, you may want to enter record manually but always have the transport automatically punch-out at a certain point.

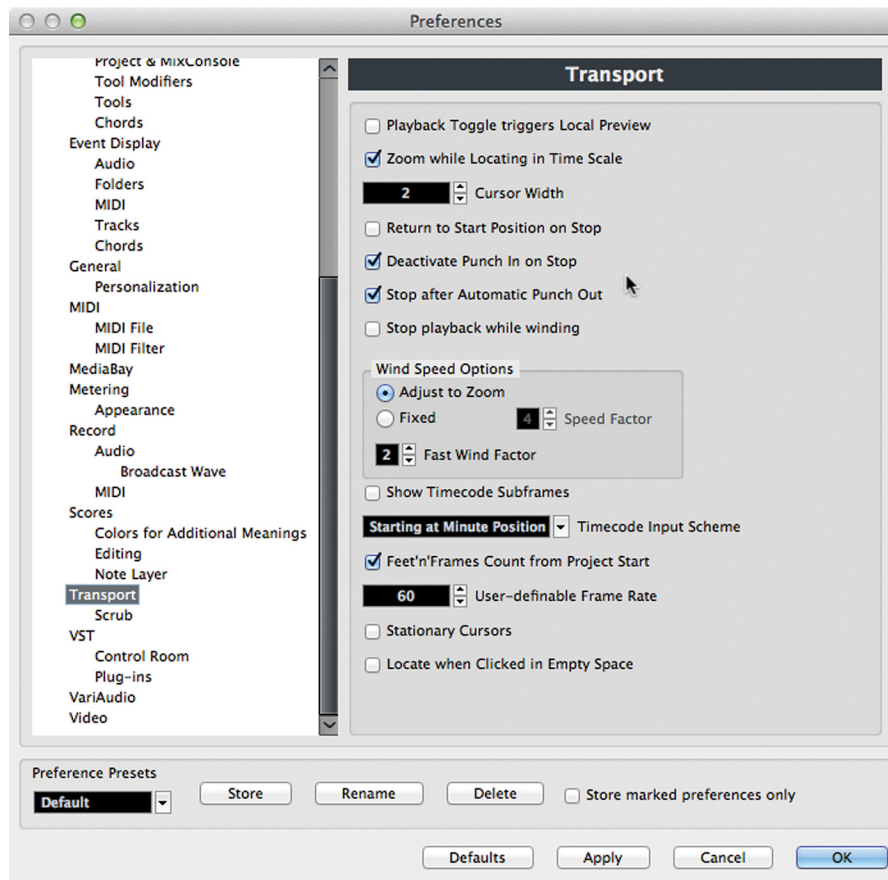


Figure 10.21
Transport preferences with default auto-punch settings

By using the “I” and “O” key commands or buttons on Nuage transport, you can quickly enable or disable the auto-punch functions on-the-fly as you need them.

Pre and Post Roll

The pre-roll function will make the transport start playback ahead of its current cursor position. In other words, when you start playback, the cursor will move back a set amount and then start playing. This is most useful in conjunction with the Auto-punch feature, giving you an automatic lead-in time before Nuendo punches in.

The post-roll function does the same thing for the right locator and the auto-punch out function. Post-roll only works when three things happen:

- ❖ Auto Punch Out is active
- ❖ “Stop After Automatic Punch-out” preference is checked
- ❖ The transport is in record either manually or by auto-punch

Basically, Nuendo has no need of a post-roll until auto-punch has been used and the stop preference is set. Otherwise, the transport should always continue to play unless stopped manually.

You set the amount of pre and post roll in the Transport panel where the left and right locators are defined, as shown in Figure 10.22.



Figure 10.22
Pre and Post
Rolls set to 4
bars each and
enabled

Audio Pre-Record

As we are only human, sometimes a punch-in is a bit late and some material may be cut off. Fortunately in the digital world, you can do some amazing things that were not possible in the past. Nuendo can be set to record a certain amount of audio before you even enter record. This amount (in seconds) is set in Preferences>Record>Audio, as seen in Figure 10.23.

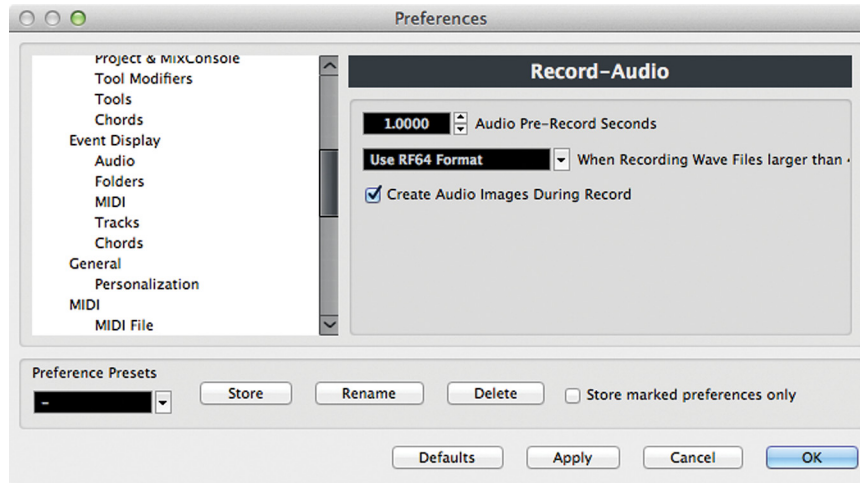


Figure 10.23
Pre-Record preference

If a punch was late (Figure 10.24), but the pre-record preference was set to 1.5 second, then you can actually edit back the missed part of the punch.

During editing, the left side of the event can be expanded to reveal the pre-recorded audio that was missed before the punch, shown in Figure 10.25.

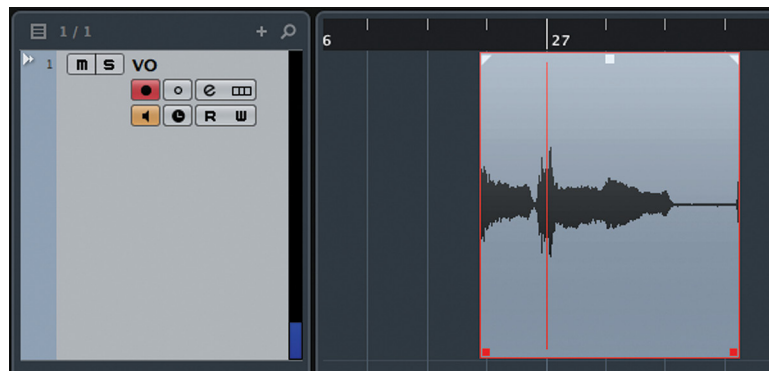


Figure 10.24
Punch in cut off some audio

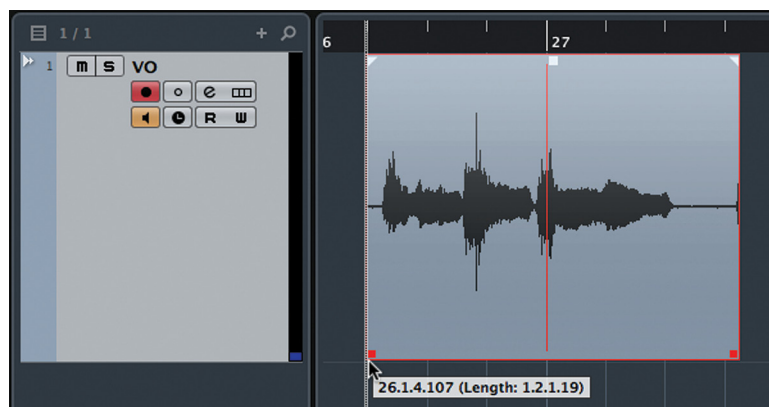


Figure 10.25
Punch in fixed with pre-record buffer

The pre-record buffer is at work any time an audio track is record-enabled. Even if the transport is in stop, the pre-record buffer is still recording 1.5 seconds (or whatever the setting might be) of audio. For example, if you had the pre-record buffer set very high, say 10 seconds or so, and the singer was singing a beautiful idea that you wished to capture, you could press record up to 10 seconds after the singing began and still record the entire idea. This can be indispensable during creative writing sessions.

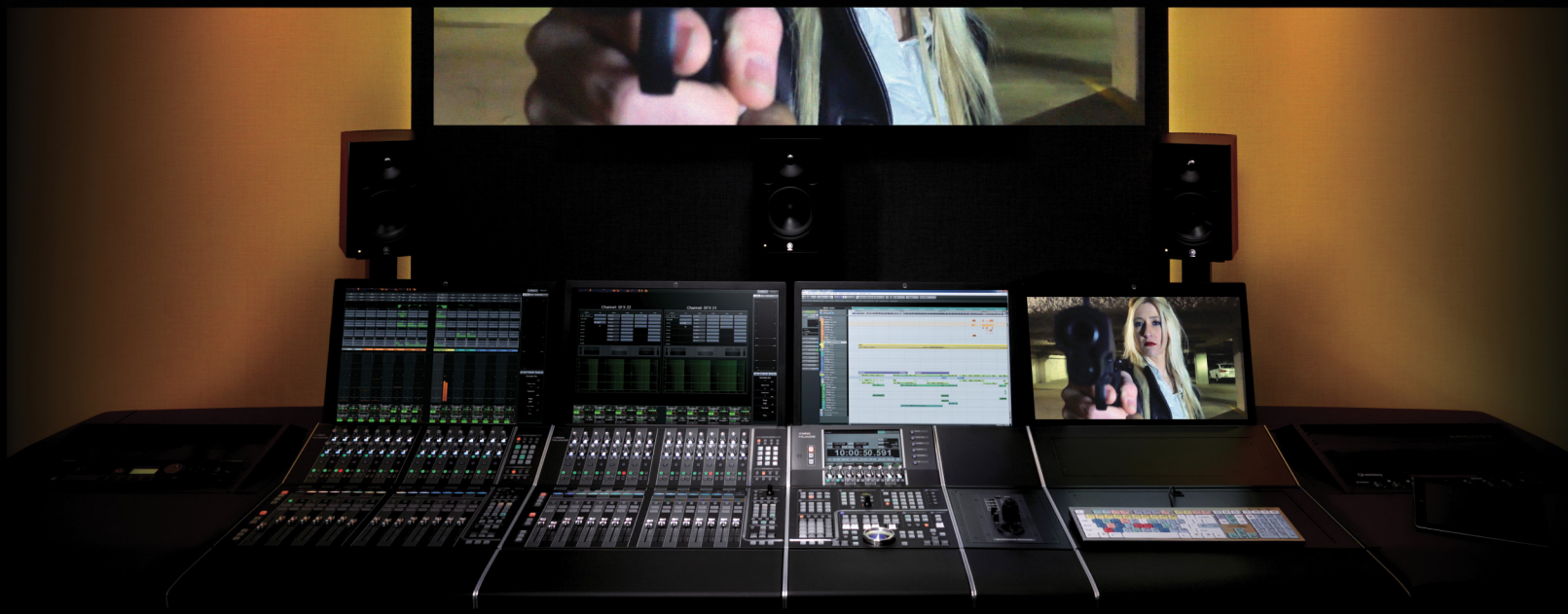
PRO TOOLS NOTE – QUICKPUNCH

Pro Tools also offers manual or automatic punching. However, the manual punch process operates differently than in Nuendo. To manually enter record once playback has started, you must use “QuickPunch.” How it works is Pro Tools starts recording when you enter play on all record-enabled tracks. This records audio files in the background. When you enter record manually, Pro Tools creates the start of a region at that point using the file already being recorded. When you punch out, Pro Tools marks the end of that region but keeps recording the audio file until you stop playback.

The result is the same but with Pro Tools, the recorded audio file is longer since it extends from the start of playback to the stop, using up more disk space in the process. Pro Tools does not have a pre-record buffer that is working in stop mode.

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PART II: RECORDING

by Ashley Shepherd

Chapter 11

Importing Audio



NUAGE

Importing Audio

- ❖ Raw Audio Files
- ❖ Organized Audio Files

While it's not exactly recording audio, importing audio into Nuendo is just as important. There are several ways to import existing audio files into Nuendo and they fall into two categories:

- ❖ Raw – unedited audio files
- ❖ Organized – audio files plus organizational and editorial information

Raw files will be edited and positioned once inside Nuendo. Organized files need to be associated with other information to determine how they are edited and placed after importing.

Raw Audio Files

Raw audio files can be imported from hard disk, CD/DVD-ROM, removable media, and field recorders. Audio can even be extracted from video files.

Hard Disk

Any audio file that is readable by the computer, and supported by Nuendo, can be imported. If conversion is necessary in order to be used in the project, Nuendo will convert the file as part of the import process. Audio files can be imported into the Pool or directly into the project on an audio track.

Importing Audio Directly to Audio Tracks

Let's import an audio file directly to an audio track by following these steps:

1. Select an existing audio track in the project. The imported audio file will be placed on the selected track. If no audio track is selected, a new one will be created at the bottom of the project window during the import process.
2. Position the cursor where you want the imported audio to be placed.
3. Select File>Import>Audio File.
4. A navigation window will open so that you may choose the audio file from any location visible to your system, including network drives, CD/DVD-ROM discs and other removable media such as USB drives and SD cards that are mounted on your computer. Select an audio file.

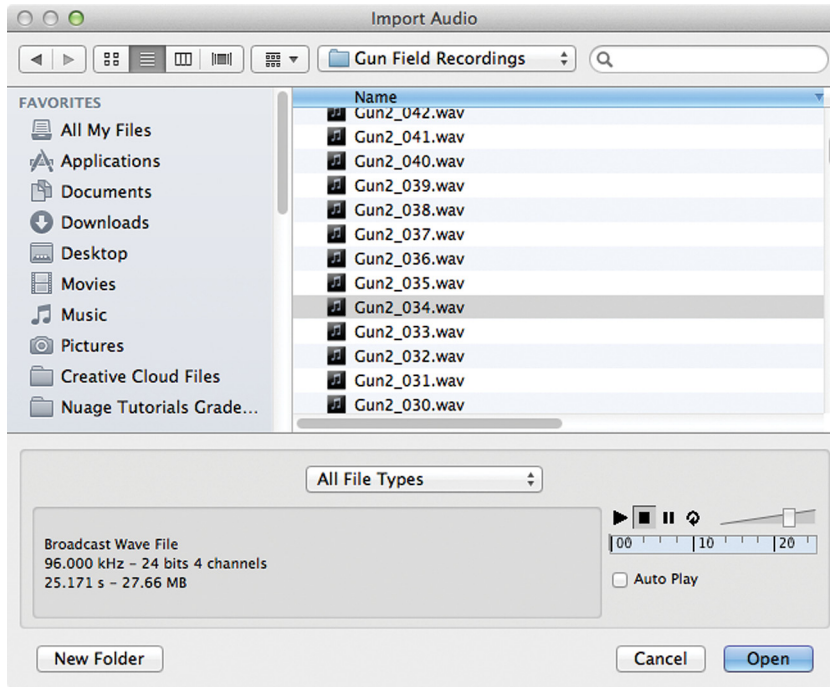


Figure 11.1
The Import Audio dialog showing the file details of a selected audio file

5. Examine the file details and play the file to ensure it is the one you want. By clicking in the duration bar under the transport controls, you can locate to any point within the file to preview that location.

FILE PLAYBACK AUDITION

Any supported file type and sample rate will play back in this window correctly so you can audition it before importing, even if the project is running at another sample rate.

6. Click Open. The “Import Options” dialog will appear, offering you choices for import processing. Once the options have been set, clicking OK will import the file according to the options.

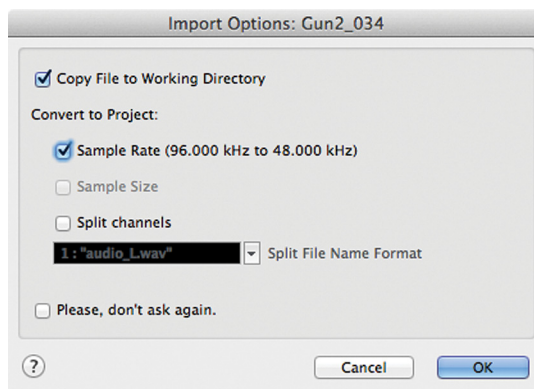


Figure 11.2
Import Options

- The audio file is placed on the selected or new audio track at the cursor position, as seen in Figure 11.3.

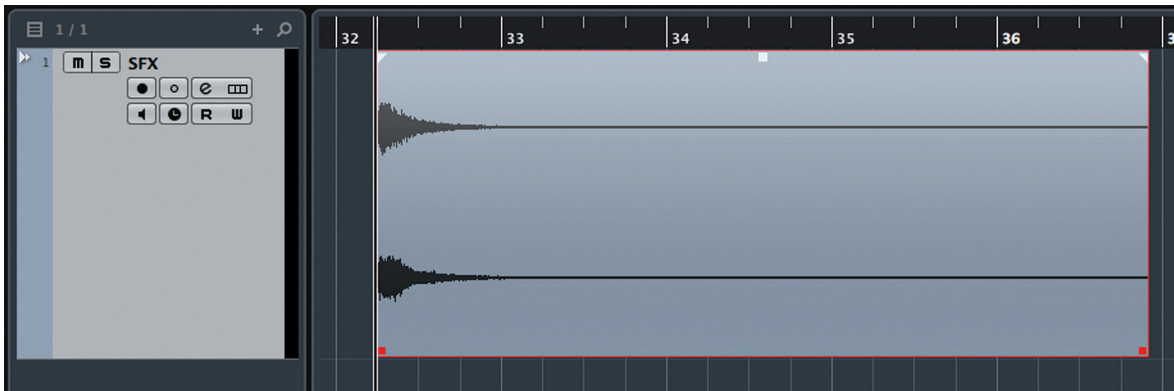


Figure 11.3 Imported audio file at cursor position

Import Options

The Import Options have some critical options. They affect how the project is organized and how the files are played back in some cases.

Copy File to Working Directory

This option is perhaps the most critical, as it determines where the audio file resides on your computer. If this option is checked, the selected file will be copied to the Audio folder within the Project folder. This ensures that all files relevant to the project are also stored within its file structure.

It is possible to leave this unchecked and use the file from its current location, which could be on a networked drive or a removable storage device. In which case, when that drive or media is removed from the system, the project will no longer be able to play that file. Bear this in mind when setting this option.

Convert to Project: Sample Rate, Size and Channels

If the selected file does not match the project sample rate or bit depth, Nuendo can convert it during the import. Additionally, multi-channel files (stereo, 5.1, etc.) can be split into mono files during import. You even have a choice of how those mono files will be named. (See Figure 11.4.)

Choosing any of these three options will also force the “Copy File...” to be selected since Nuendo will create processed copies, leaving the original untouched.

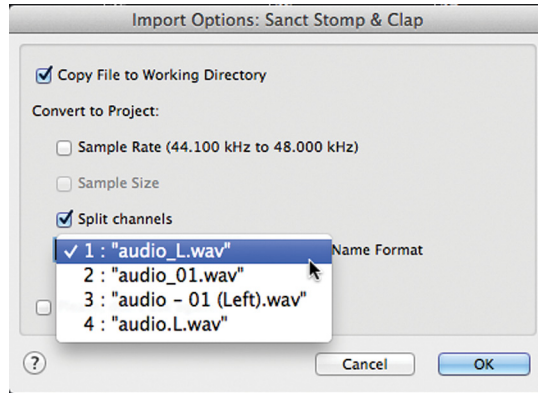


Figure 11.4
Split File Name
Format menu

PLAYBACK AND SAMPLE RATE DIFFERENCES

Nuendo can play audio files of differing sample rates and bit depths together in the same project. However, files that have a sample rate different from the Project sample rate will play back at the incorrect speed. For example, if a 44.1 kHz file is imported into a project running at 48 kHz, it will play back faster than intended and at a higher pitch as a result.

Please, Don't Ask Again

As you might have guessed, this option prevents the Import Options dialog from opening up again. Whatever options are checked this time will remain the same for future imports.

However, it is possible to bring back the Import Options dialog by changing the Preferences. Go to Preferences>Editing>Audio and you will see the same Import Options. Looking at Figure 11.5, choose Open Options Dialog from the first popup menu to bring back the dialog when importing audio.

Multiple Files at Once

If you select more than one file to import, the choices made for the Import Options will apply to all selected files. After clicking OK, you will have the choice of placing all the files on the same track, one after the other, or on separate tracks. If you choose separate tracks, all the files will be lined up at the cursor position.

Nuendo will create as many tracks as is needed for all the files selected. If you selected 100 files, then 100 tracks will be created. If some of those files are mono and some stereo, Nuendo will create tracks with the appropriate channel width for each audio file.

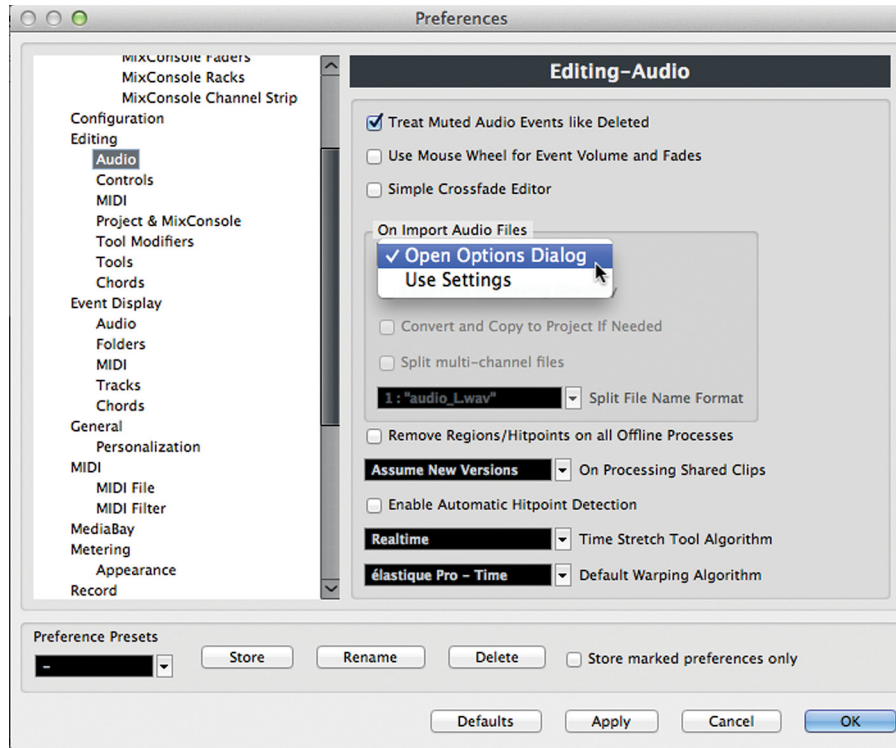


Figure 11.5
Import Audio
Preferences

Import to Pool

You can import files into the Pool without placing them on an audio track. To do this, select Project>Pool. Once the Pool window is open, click the Import button shown in Figure 11.6 and choose all the files you want. These files will be brought into the Pool and are available to drag into an audio track when needed.

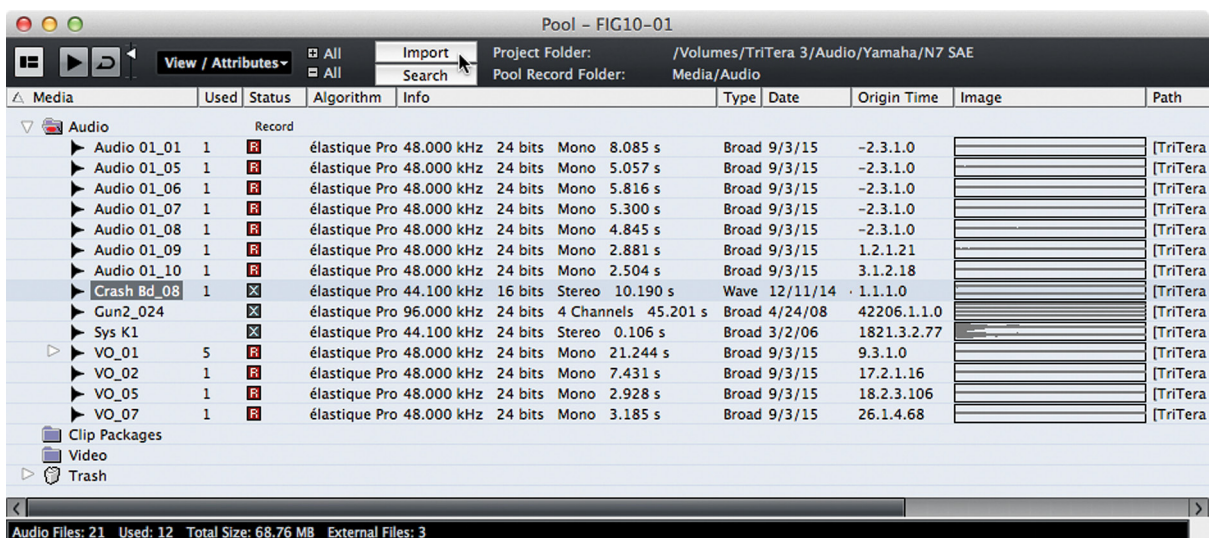


Figure 11.6 The Pool

For example, if you want to import a bunch of gunshot sound effects for editing to picture, import them to the Pool all at once. Then place them one by one into the Project as needed.

Importing from an Audio CD

Importing audio directly from an audio CD is slightly different. Go to File>Import>Audio CD to open the “Import Audio from CD” dialog.

If a CD is inserted into your CD drive, the tracks on the CD will appear here. You can use the eject button to eject a CD and insert a new one. Click on a track and press the play button to audition it. You can use the left and right markers to define a portion of the CD track that you wish to import. You don't have to import the whole track. Ensure the box is checked next to the track and then press Copy to start the import process.

You can continue to import other tracks or portions of them while in this window. Once you have copied them, click OK to insert them into the Project.

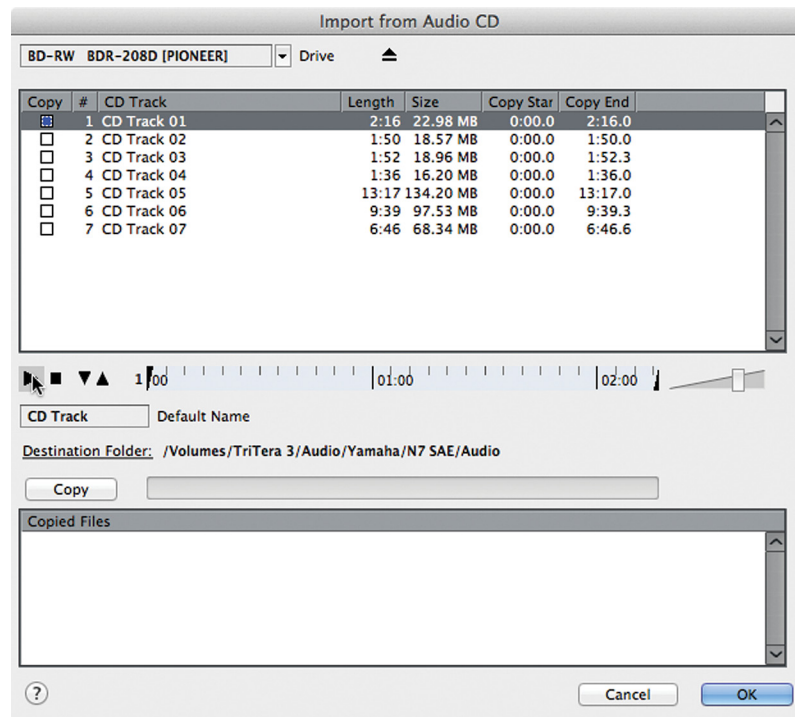


Figure 11.7
Import Audio
from CD dialog

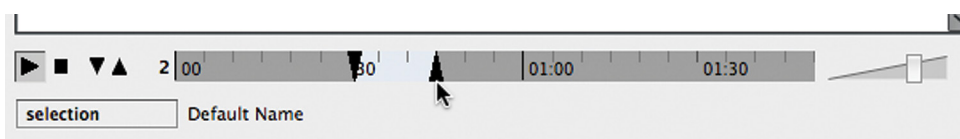


Figure 11.8
Left and Right
markers defin-
ing region to
be imported

Field Recorders

Field recorders such as the top-of-the-line Sound Devices 788T, Zoom H6 or the more modest Yamaha PR7 (Figure 11.9) are the best way to capture sounds on location while filming or for sound design and effects. Portable recorders allow you to go to any location to get just the right sound.

Most field recorders have some form of removable storage that can be read by a card reader, USB port, or external hard drive caddy. Some can be connected directly to the computer via FireWire or USB.

Once the device or its media is connected to your computer, the audio files can be imported just like any other audio file in your system. The files can be mono, stereo, or even multi-channel for larger recorders.



Figure 11.9
Yamaha PR7

Metadata

All audio files have some sort of metadata included in them. For example, they each have a name, creation, and modification dates and attributes such as sample rate and bit depth. All these are metadata examples.

Some audio files contain even more specific metadata, which can include timecode, tempo, key, author, description, and so on. These metadata can help organize files and even position them on the timeline in the project.

The Broadcast WAV file type has specific metadata related to the broadcasting world. This mostly consists of the timecode stamp which identifies at what timecode value the file was recorded. This is known as the “origin time” in Nuendo. You can view this metadata in the Pool as the attributes listed to the right of the file name. Some attributes can even be edited in the Pool, including the origin time. Clicking on the “Info” portion of the Pool entry will pop open a more detailed list of metadata for that file, as seen in Figure 11.10.

With professional field recorders, metadata such as scene, take, microphone channel and camera roll can also be included. These metadata can become indispensable later during post-production when you are looking for a specific file months after the film shoot.

Nuendo creates its own metadata for files recorded in the Project. It is a best practice to use the Broadcast WAV file type to retain the most metadata in a Nuendo project.

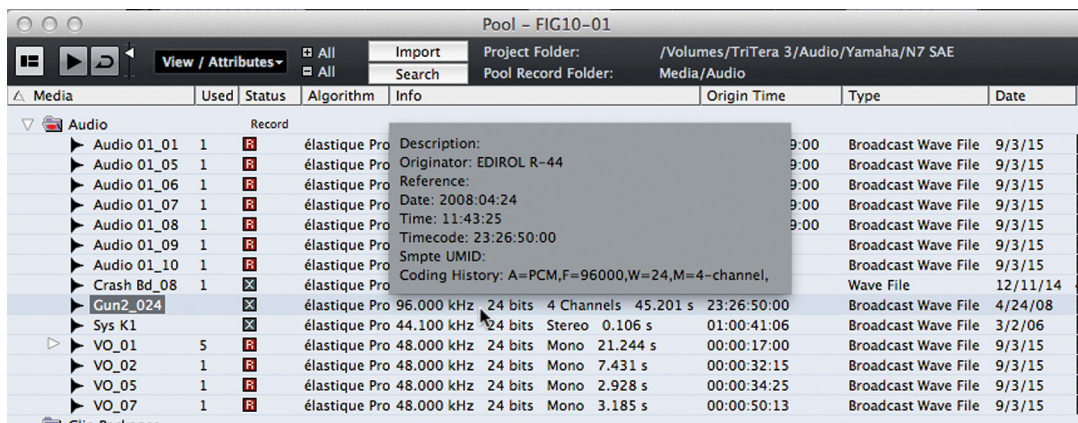


Figure 11.10
Attributes in the Pool, Origin time, etc.

Organized Audio Files

The more complex method of importing audio files involves multiple files that are organized in some fashion. Usually this means that there is additional information about where the audio files should be placed in time and what portions of the files are played. There can even be basic mix information about panning and levels for each file.

Edit Decision Lists

The industry term for this information is the Edit Decision List or EDL. EDLs come in various forms. The Nuendo project file (.npr) is a form of an EDL. It organizes all the audio files on their tracks and plays the correct portions of each file at the correct time. That is the essence of the EDL.

There are other EDL types designed to help transfer projects between different workstations. For example, video editors edit sound at the same time as video. Once that is done, the audio portion of their EDL needs to be transferred to the audio workstation so that the rest of the sounds and music can be added and blended together to create a final mix.

EDLs can also be used to make changes to a project during the post-production process. If the director of a movie wants to change a scene after the audio post-production process has begun, following these changes can make things very difficult for the audio team. The use of EDLs to figure out exactly what the changes are can save huge amounts of time and aggravation. Nuendo's ReConform tool is designed to expedite this process. It will be discussed in Part III: Editing.

AAF (Advanced Authoring Format)

Perhaps the most widely used EDL interchange format in audio is the AAF file. AAF files were designed to allow the interchange of video and audio files along with EDL information between workstations of differing manufacturers and platforms.

AAFs come in two types:

- ❖ Embedded Audio
- ❖ Referenced Audio

AAFs with embedded audio have the EDL and audio file information wrapped together inside one file. This makes it convenient to transport the data without fear of missing any audio files.

AAFs with referenced audio will be contained in a folder. The EDL information will be in the .aaf file and the audio files will be in their own folder. The advantage with this is once audio files have been copied to the receiving workstation, only the small .aaf file needs to be exchanged in order for the EDL information to be applied.

With feature length films, moving large amounts of audio file data between systems can be time consuming and costly. Exchanging small .aaf files over the Internet is quick and easy.

50-50 FILM MATERIAL

In Chapter 12, we will start working on the film project 50-50 by importing an AAF file generated by the video editing workstation. This will give you real-world experience with how a film is put together from the audio perspective.

OMF (Open Media Framework)

The OMF standard was developed by Avid for exchanging audio and video files and editing data between workstations. It is venerable format that, while widely used, has limitations. OMF has the capacity to use referenced files or embedded, just like AAF.

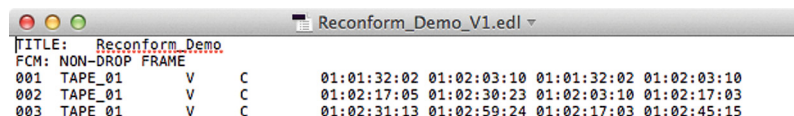
MXF (Material Exchange Format)

This standard is similar to AAF and is actually derived from it. However, it is more focused on the broadcast world. It is always self-contained with audio, video, and metadata wrapped up together in one file to ensure portability and cross-platform compatibility. Nuendo can import the data from within the MXF format.

CMX 3600

The CMX 3600 format is a very old type of EDL that consists of a simple text file that outlines file names, timecode source, and destinations and edit types for both audio and video. Its simplicity has allowed it to continue as a viable format even into today's world. The text file can be easily edited in a word processor and understood by anyone, no computer programming degree required.

Nuendo's ReConform process utilizes the CMX EDL to make changes to existing post-production projects. It provides the simplest fool-proof format to conform projects to picture changes. Figure 11.11 shows a simple 3 step CMX 3600 EDL document used in the ReConform demo.



```

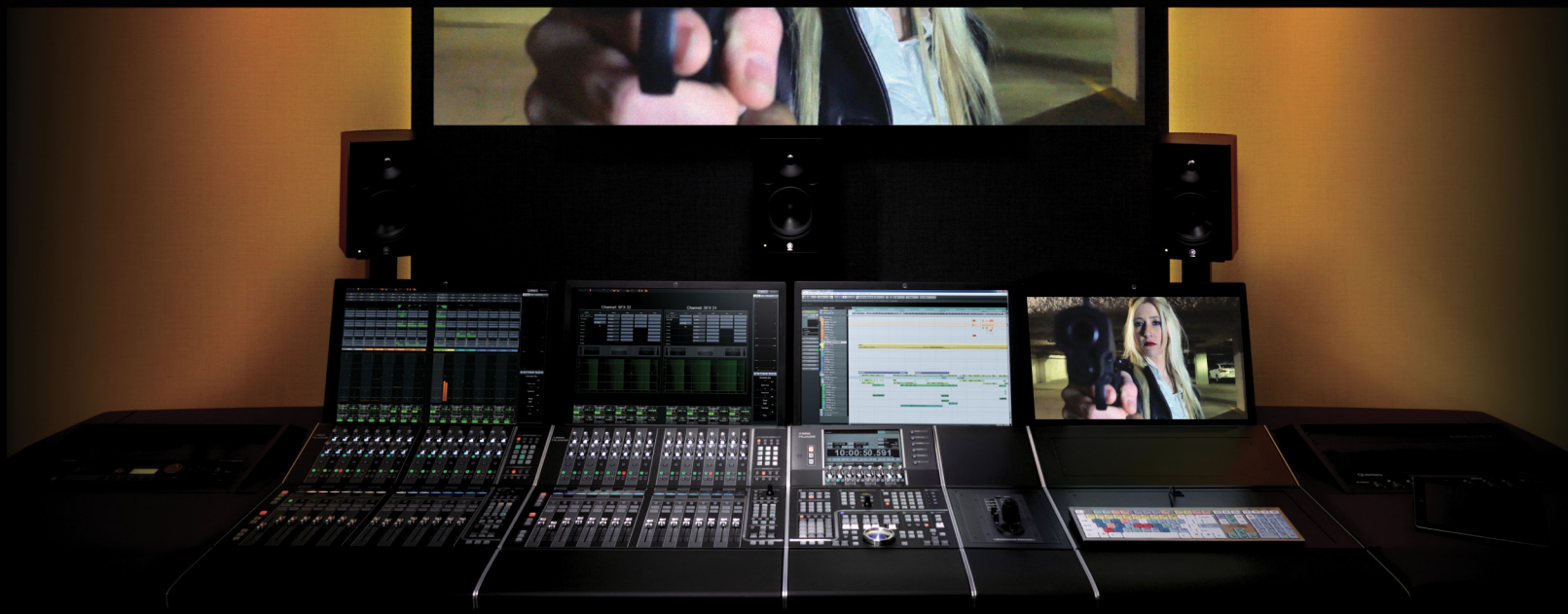
TITLE: Reconform_Demo
FCM: NON-DROP FRAME
001 TAPE_01      V  C      01:01:32:02 01:02:03:10 01:01:32:02 01:02:03:10
002 TAPE_01      V  C      01:02:17:05 01:02:30:23 01:02:03:10 01:02:17:03
003 TAPE_01      V  C      01:02:31:13 01:02:59:24 01:02:17:03 01:02:45:15

```

Figure 11.11
CMX 3600 EDL

NUAGE

COURSEWARE



PART II: RECORDING

by Ashley Shepherd

Chapter 12

"50-50" Dialogue Edit



NUAGE

"50-50" Dialogue Edit

- ❖ Preparing the Project
- ❖ Importing the Reference Video
- ❖ Importing 50/50 Dialog AAF
- ❖ ADR Recording

In this chapter, we will begin working on the short film “50-50” which was produced just for the purpose of testing your skills in film post-production.

The video editing was performed in Adobe Premiere. All of the field recorder audio data was imported into Premiere to be edited along with the video. After the video and audio edits are put together for the movie, the audio needs to be exported so that the sound team can begin work on all the elements that will make up the final sound mix.

To begin with, a movie file of the entire film, including the rough audio mix, is exported from the video workstation, as seen in Figure 12.1. This video file will be used in Nuendo to work with while editing audio.

PROJECT SOURCE MATERIAL

All of the source material for the 50-50 project can be found on the Yamaha Pro Audio website at http://www.yamahaproaudio.com/global/en/products/daw_systems/nuage/selftraining.jsp. Download and copy this material to your workstation before moving on to the next section.



Figure 12.1 One frame from “50-50”

Preparing the Project



(tutorial video: “50/50 Project Setup”)

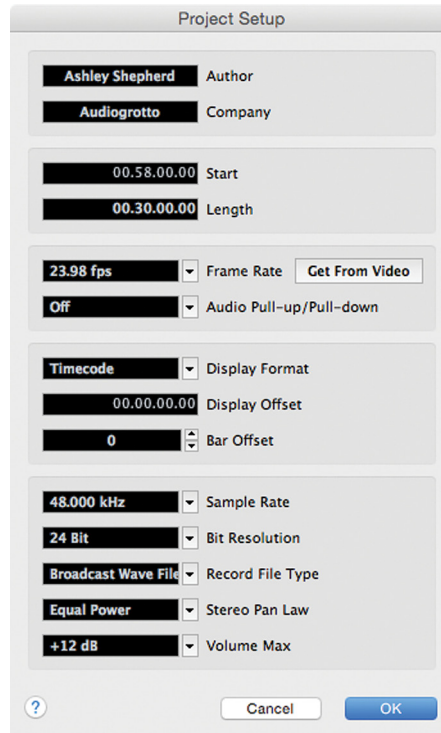
The first step is to import the reference video into an empty project and position it correctly so that everything lines up to timecode. This process requires cooperation between the video editor and audio engineer.

First, the timecode frame rate must be determined. Usually, this parameter is fundamental to the type of camera being used and the speed or frame rate it is set to. Variables include the region of the world where the production originates (PAL 25 fps, NTSC 30 fps), and the style of filming (23.976, also known as 24p, for film style or actual film cameras running at 24 fps). An in-depth discussion of this is beyond the scope of this material. For “50/50,” a filmic look was desired and the cameras ran at 23.976 fps, more commonly known as 24p.

Next, the position of the movie on a timecode ruler must be agreed upon. A common practice is to have the first frame of the video start at the one-hour mark, or 01:00:00:00. This allows for material to appear before the actual start of the film, such as countdowns, sync beeps, etc. Any hour mark will afford the same benefits, 02:00:00:00, 03:00:00:00 or 10:00:00:00. Many times, projects start simply at 00:00:00:00. With modern digital workflows, the need for sync beeps and countdowns has been reduced. “50/50” starts at 01:00:00:00 for the sake of simplicity.

Since this project should be started from scratch, first create an empty project in a directory that also contains the source material folder for the 50-50 project. While there are already project files there for you to examine, the exercise is to build this project from the ground up, starting from nothing.

- ❖ Open the Project Setup window (Shift+S).
- ❖ Set the Frame Rate to 23.98 (same as 23.976 or 24p).
- ❖ Set the Start Time to 00:58:00:00. This leaves some space at the start.
- ❖ Set the length to 30 minutes. 50/50 Runs just under 20 minutes.
- ❖ Set the Sample Rate to 48 kHz. This is the standard for video and film post.
- ❖ Set the Bit Resolution to 24 bit.
- ❖ Set the Record File Type to “Broadcast Wav File” for metadata.
- ❖ Set the Volume Max to +12 for more mixing flexibility, as shown in Figure 12.2.

**Figure 12.2**

The Project Setup configured for film sound

Importing the Reference Video



(tutorial video: “Importing the Reference Video”)

Now the project is ready to import the reference video file. We have been informed that the file is running at 23.98 fps.

1. Position the cursor exactly at 01:00:00:00 or manually type the TC value into the transport panel.
2. Select File>Import>Video File.
3. Find the video file called “5050 720p for Nuendo.mov.” Clicking on it will show its properties at the bottom of the window shown in Figure 12.3 so you can confirm the frame rate and resolution of the file.
4. Check the “Extract Audio From Video” box. This will import the reference audio to an audio track along with the video to a video track.
5. Click OK and wait for the import process to complete. You should now have a video and audio track in the project with events starting at 01:00:00:00, as shown in Figure 12.4. Select both events and group them together to prevent

any loss of sync by selecting both the video and audio events and choosing Edit>Group. Now if you move either the video or audio event, the other will move along with it.

6. Open Devices>Device Setup>Video Player.

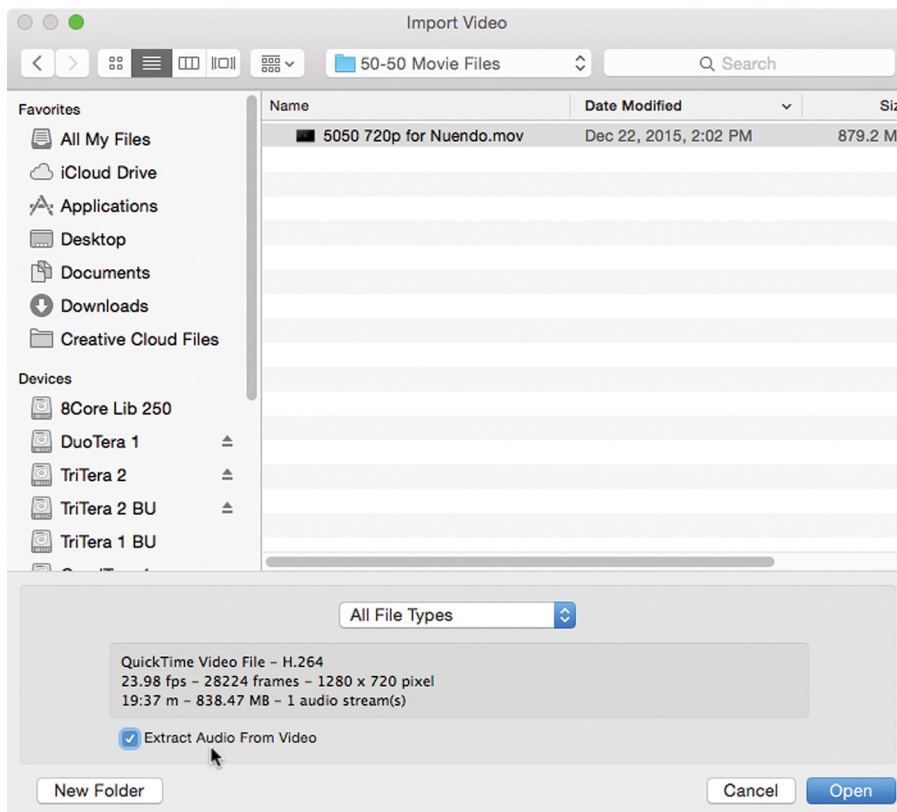


Figure 12.3
Import Video dialog

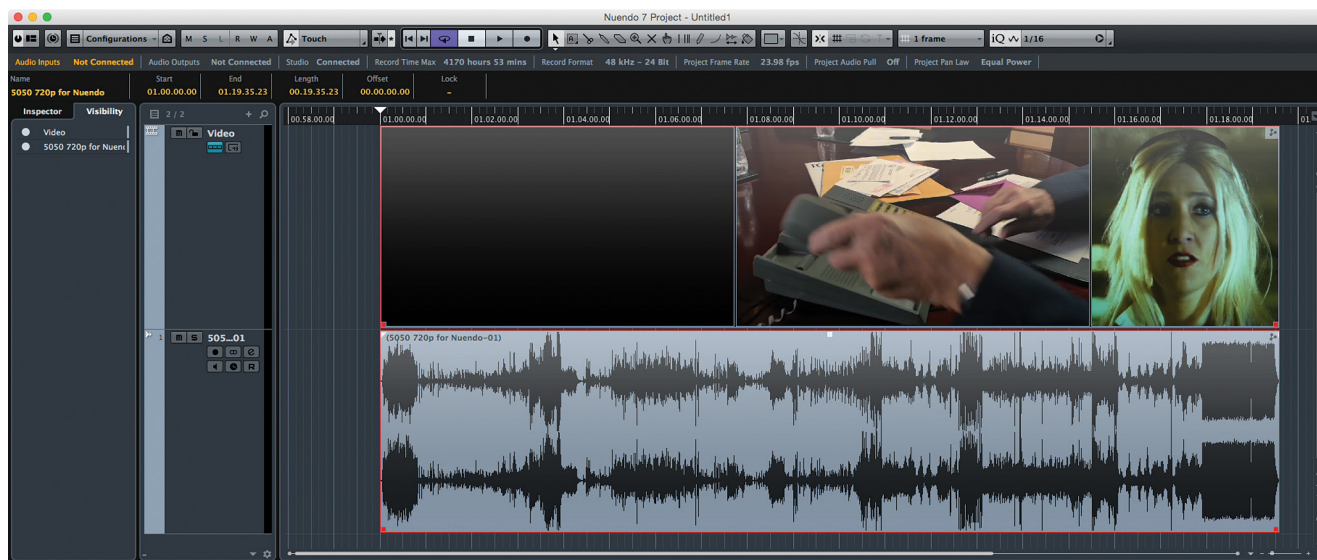


Figure 12.4 Video and Audio tracks with reference material

Check the “Show Timecode” box and choose a position for the timecode display in the video window, as seen in Figure 12.5.

1. Check the appropriate video output for your system. The Onscreen Window is most convenient.
2. Open the Video Window by selecting Devices>Video Player (F8).
3. Press play and watch the video all the way through to ensure sync remains good for the duration.
4. Select both the video and audio events and choose Edit>Lock... to protect the reference material from being moved accidentally.
5. Now the reference material is in place and you are ready to import the AAF file that contains the dialog edit from the video workstation (Adobe Premiere).

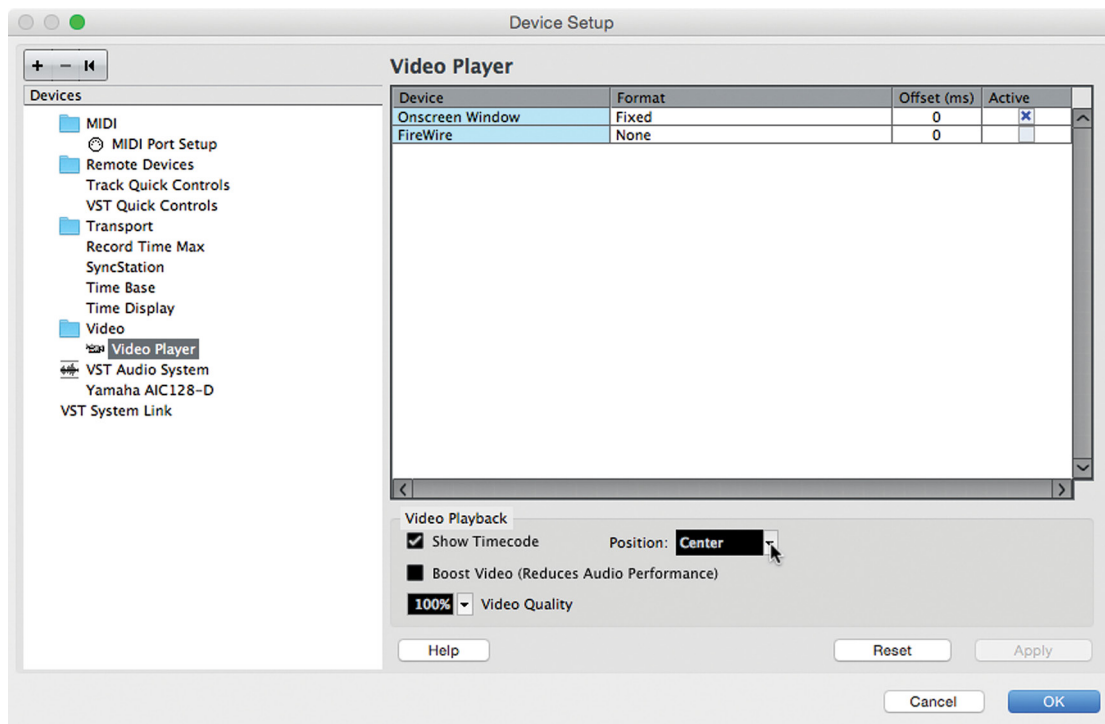


Figure 12.5
Device Setup
for the Video
Player

Importing 50/50 Dialog AAF



(tutorial video: “Importing AAF Files”)

In order to properly edit and augment the dialogue for the movie, you need access to the original recordings that were made on the set during filming. In order to do that, the video editor must give you a transfer of the audio edits that were made while editing the video. There are several transfer formats and methods to do this, and a workflow for this segment of the production should be worked out between the video editor and audio engineer.

On this project, the method chosen was to create an AAF file that referenced all the field recorder data gathered while filming. The field recorder audio files can be copied into the audio workstation (Nuendo) and then the AAF file is used to create the edited version that will match the reference video file that you imported in the previous section.

In the source material for this project, there is a folder that contains the AAF audio files and the AAF file itself (50-50 AAF.aaf). Once you have copied this material to the audio drive in your system, go to File>Import>AAF... to import all the dialog and other edits from the video workstation. Select the AAF file, choose OK. You will be given the choice to create a new project. Select “No” so the AAF will be imported into the current project. You will then see the Import Options window, as shown in Figure 12.6.

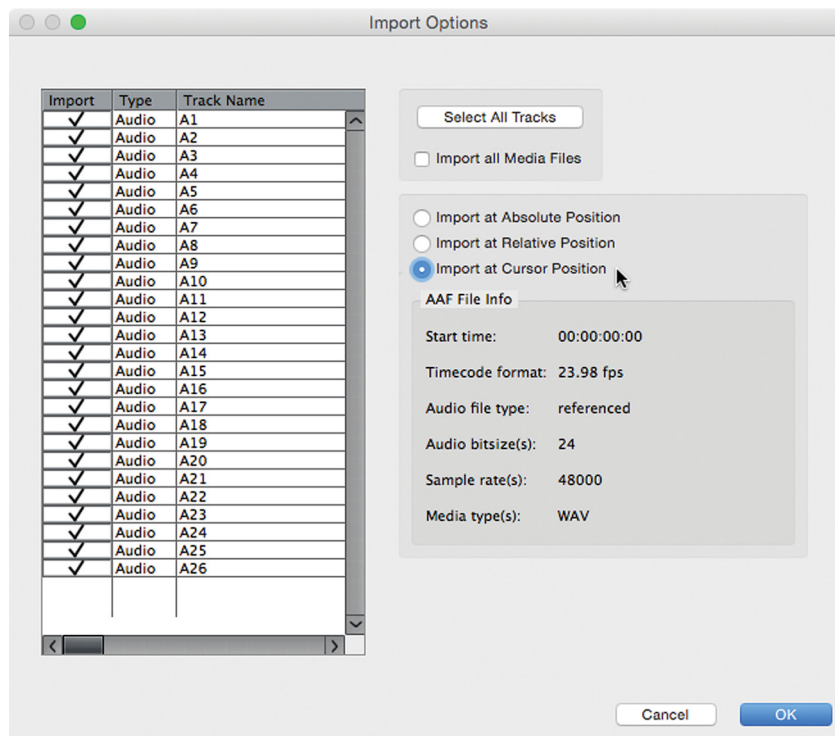


Figure 12.6
AAF Import
Options

Notice that the AAF file begins at 00:00:00:00 but the Nuendo project reference material starts at 01:00:00:00. The AAF material needs to be positioned at 01:00:00:00 in order to be in sync with the reference video. If the video editor was using default settings or had not consulted with the audio team prior, this can be a common issue. To reposition the AAF material, position the cursor at 01:00:00:00 and then choose the option to “Import at Cursor Position,” as shown in Figure 12.6.

There are 26 audio tracks in the AAF file. Without knowing which ones are dialogue and which are not necessary, we will import all of them. In fact, many of the temporary sound effects will end up being used in the final version of the film, so it is always helpful to import everything that was edited in the video workstation.

Click “Select All Tracks” to put checks by each of the 26 tracks at once. Notice the timecode frame rate and audio sample rate are correct and match the current project settings. Click OK and wait for the process to complete. You may see a window asking you to resolve missing files, as seen in Figure 12.7.

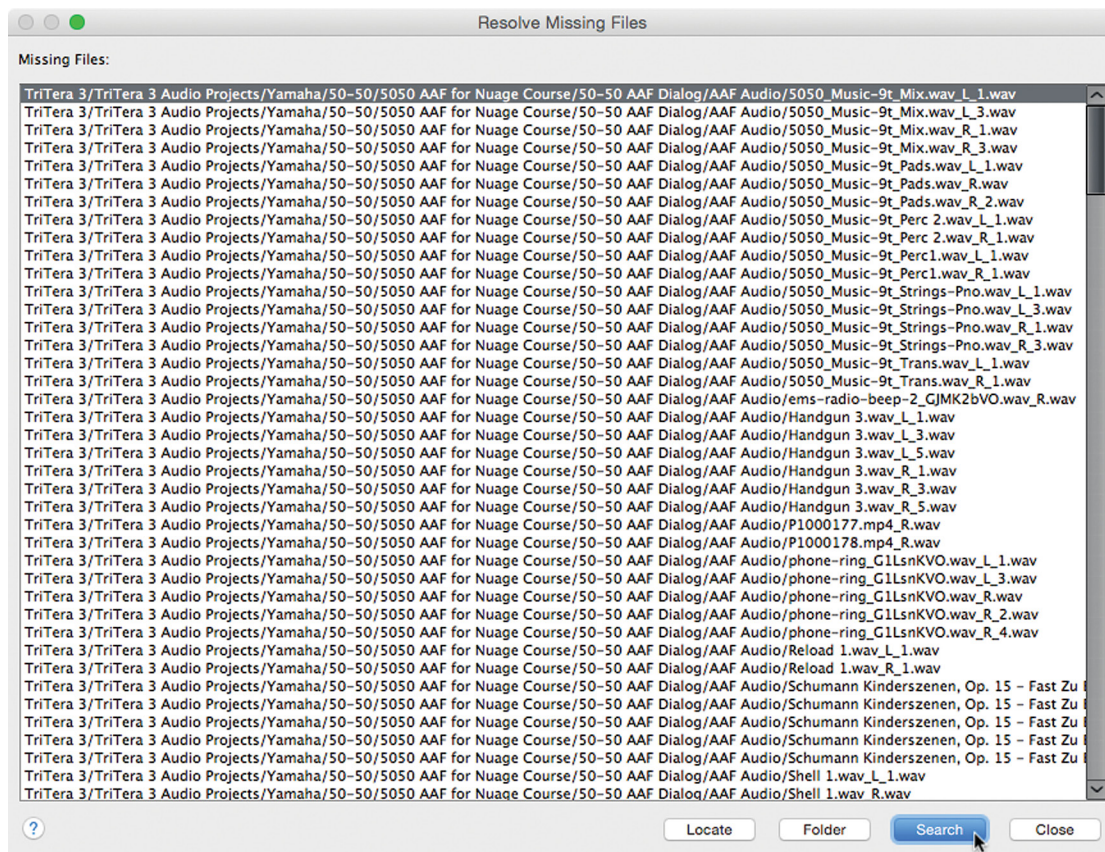


Figure 12.7 Resolve Missing Files dialog

If the list is extremely long, it may be that Nuendo is looking in the wrong place for the AAF audio files. In that case, click the “Search” button and select the correct location for the AAF audio files in your system. Once the first file is found, the remaining files should resolve quickly.

Once the import process is complete, the project will look like Figure 12.8, with a total of 27 audio tracks and one video track. This is the film’s starting point for audio post-production. Once you save this version of the project, it is advisable to save the project with a new name or incremented version number before continuing. This ensures that you can always return to this primary version should the need arise.

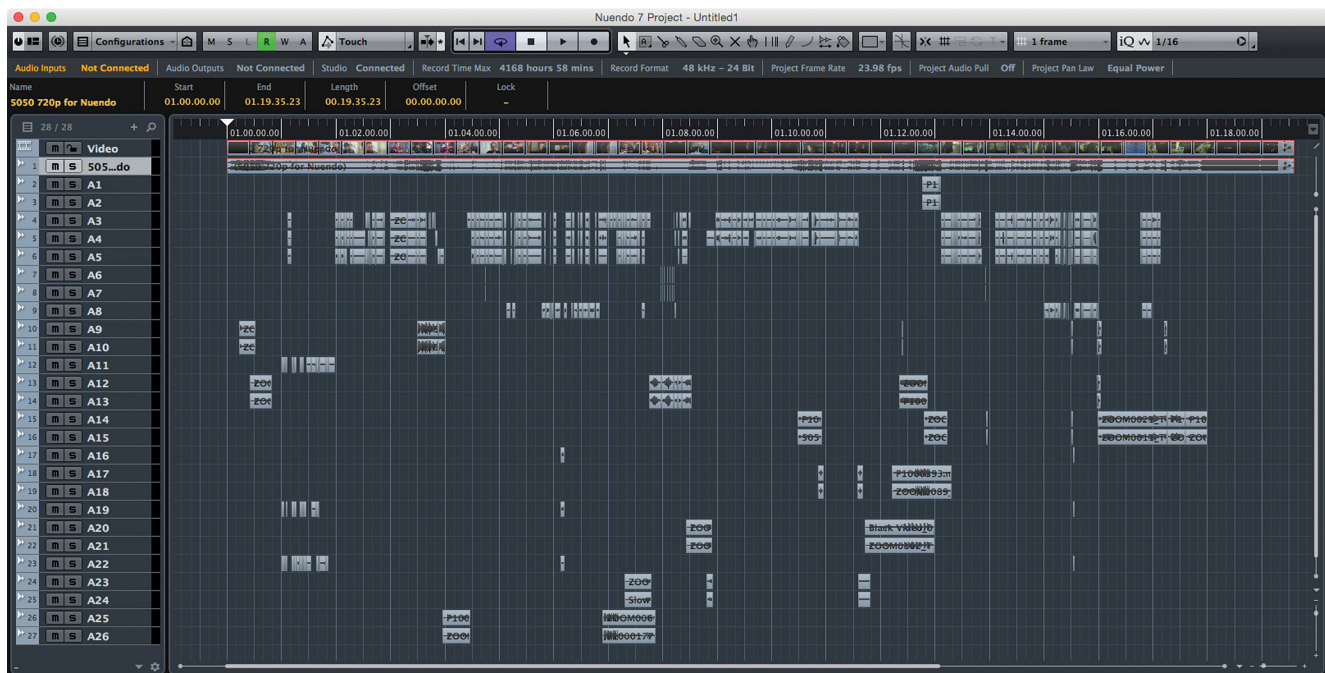


Figure 12.8 50/50 Project after AAF import

PROJECT VERSION SAVING

It is a best practice to save multiple versions of your project as it progresses. As you move through the post-production process, each step should be started with a new version of the project. This helps protect your work from data loss and also acts as a bookmark for the various stages of the workflow. You may end up with 30, 50, or 100 versions of the project by its completion. On a large scale production such as a feature film, this is normal.

Nuendo provides a quick versioning tool from the File menu that will add a version number to the end of the file name when saving. Each time you choose File>Save New Version (Command+Alt+S), the version number will be increased; “50-50 Film -01,” “50-50 Film -02,” “50-50 Film -03,” etc... This makes it fast and easy to increment the project version number. The Nuage Master unit Save button can be programmed to update the version number every time it is used.

ADR Recording



(tutorial video: “ADR Recording: Markers and Video”)

Now that you have all the individual microphone channels recorded during the filming process, you can sort through and listen to them to select the best sounding ones to use in the final mix. During this process, you may find dialogue lines that have problems in the recordings that cannot be fixed or edited. In these cases it will be necessary to re-record the dialogue lines. This is called ADR (Automated Dialogue Replacement).

For example, let’s listen to Jamie’s line at TC 00:15:33:00, “Whaddaya doing?” Track A22 in the AAF file contains the body microphone for his character. Unfortunately, he is standing behind the girl so the sound is muffled. The other channels are clearer but noisy due to their distance from him. This line is a good candidate for ADR. In fact, the following two or three lines have similar problems.

Creating ADR Markers



(tutorial video: “ADR Recording: Markers and Video”)

In order to record using the ADR tool in Nuendo, a marker must be created for each line or group of lines that need to be recorded. This is commonly referred to as a “take.”

Follow these steps to create your first ADR take marker:

1. Create a Marker track in the project. It could be named “ADR.”
2. Place the left and right locators around the line that needs replacing, as seen in Figure 12.9.



Figure 12.9
Left and Right locators placed around dialogue lines.

3. Press the Add Cycle Marker button in the track list for the Marker track, as shown in Figure 12.10. You will see the cycle marker event in the Marker track.
4. Open the Markers window from the Project menu.
5. Open the Set Attribute Columns menu to show all the ADR attributes, as seen in Figure 12.11.



Figure 12.10
Add Cycle
Marker button

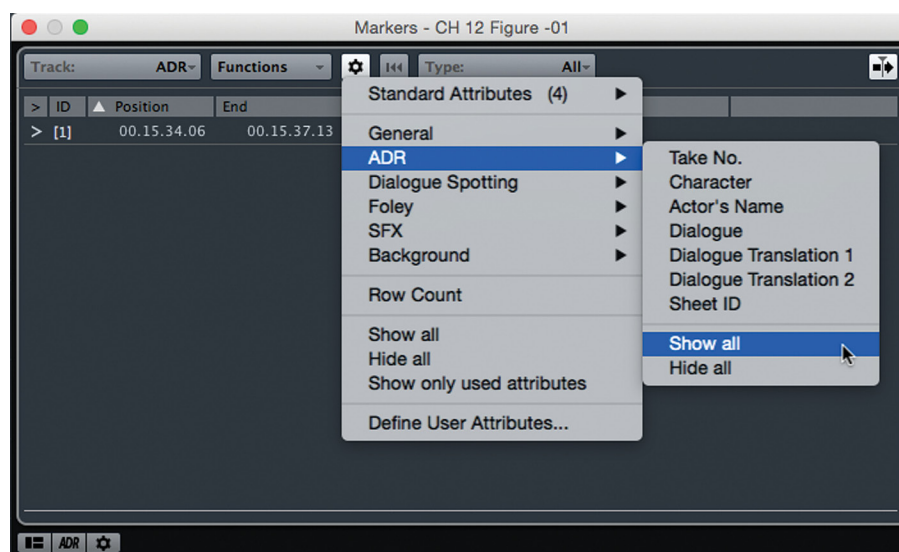


Figure 12.11
Set Attribute
Columns menu

6. Enter the exact dialogue lines into the dialogue field, in this case, “Whaddya doing lady, I will end her.” as seen in Figure 12.12. This is the text that the talent will see on screen when dubbing their dialogue.
7. Enter the take number if needed.

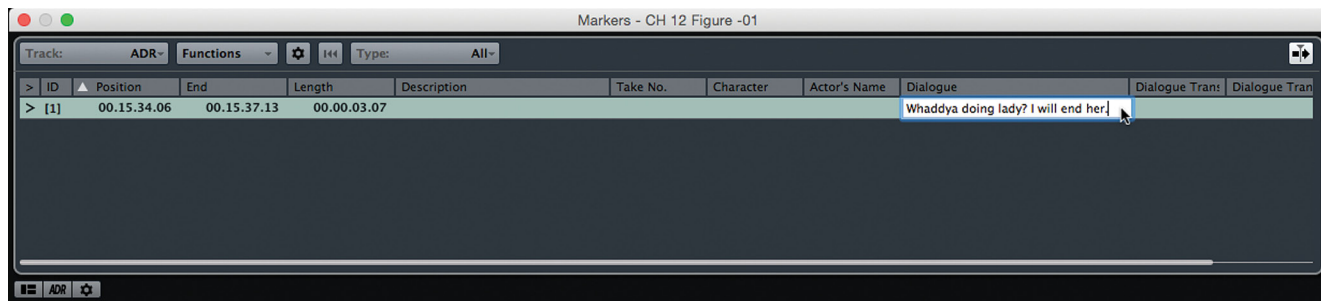


Figure 12.12 Entering dialogue text into the ADR marker

TAKE NUMBERS

Take numbers are a conventional way of identifying individual dialogue lines that need to be replaced. These take numbers are independent of the Marker ID used by Nuendo. They may originate outside of the DAW environment and can be imported into Nuendo using the CSV or database format discussed later in this chapter.

You can also enter more information about the ADR marker, including the character name, actor’s name, translation, etc. These attributes can be used to sort the marker list into a form that is helpful to your workflow. For example, sort the list by actor’s name in order to place all the lines for one actor together when they are in the studio.

Once all the dialogue replacement markers have been entered into Nuendo, you can configure the ADR tool in preparation for recording each take.

The ADR Process

In order to understand how to use the ADR panel in Nuendo, you should have a clear picture of how the ADR process is conventionally done. There are three stages to recording ADR:

Rehearsal

In Rehearse mode, the actor is given the chance to practice their lines while watching themselves on a video monitor. In this mode, the actor might want to hear the original recording of the line made during filming. In the Control Room, the engineer might not want to hear

this original recording, called the “guide” track. This preference depends on the actor and engineer and can even change for each line.

Also, there is a video graphic that helps prepare the actor, clueing them as to the start of the line. This can be in the form of a vertical white line moving across the screen or a “3, 2, 1” countdown.

Record

In Record mode, the dialogue line is actually recorded. What is heard in both the Cue mix and the Control Room mix might change from Rehearse mode. The line may be recorded multiple times, creating lanes for each recording. These can be edited together later.

Review

Review mode is for listening back to each take. Again, monitoring of channels may change for both the Cue and Control Room outputs in this mode.

Video Overlay

To assist in timing of each take, there are video graphic overlays, a countdown swipe or “3, 2, 1”, record indicator and duration counter. Each of these communicates more information to the actor to help them be effective and efficient. Nuendo’s ADR tool handles this automatically according to your preferences.

Audio Monitoring

There are three basic signal sources to be concerned about when recording ADR:

- ❖ The Guide Track: the original recording
- ❖ M&E (Music & Effects): the musical score, Foley, sound effects, ambience, etc.
- ❖ Mic Signal: the actor’s microphone that will be recorded

Since each stage of the ADR process might require different monitoring signals, the task of switching monitoring back and forth manually is complex and time consuming. For that reason alone, many ADR workflows require two people in the studio besides the actor: one to handle monitoring and engineer tasks, the other to listen to each recording and make creative decisions.

Nuendo’s ADR tool is designed to automatically change the monitoring signals based on your preferences (the Signal Switchboard). This frees up the engineer to also make creative decisions since they are freed from many of the mundane tasks described above.

Track Naming

Beyond replacing damaged or unusable audio from the original recordings, ADR may also be used to create foreign language versions of films. With these possibilities arises the difficulty of keeping track of so many recordings.

Nuendo can utilize information from the ADR Markers to help customize the naming of each recording to ensure a high degree of file organization after a recording session.

Configuring the ADR Tool

The ADR functions are located at the bottom of the Marker window shown in Figure 12.13. By clicking on ADR button, you will reveal the ADR panel.

1. Locate to previous marker
2. Locate to next marker
3. Use Pre-Roll

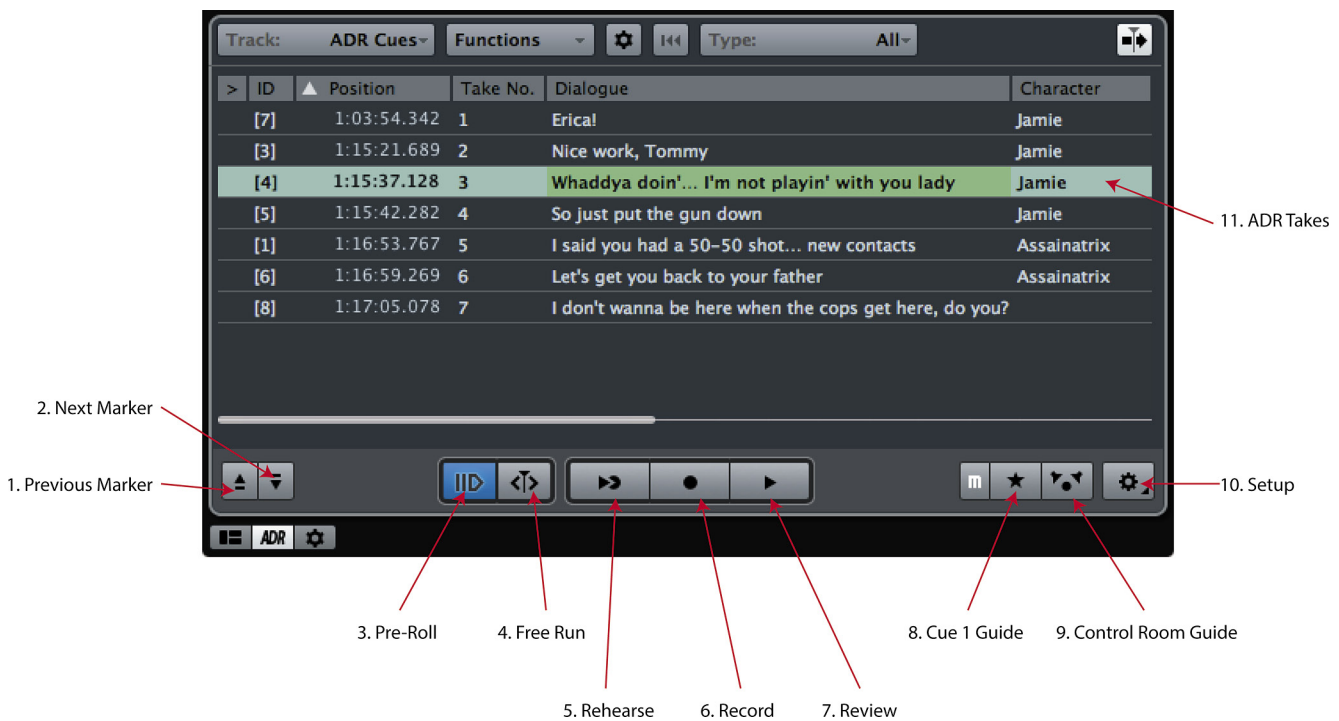


Figure 12.13 Marker window with ADR panel

4. Free Run Mode (to record multiple takes at once)
5. Rehearse
6. Record
7. Review
8. Cue 1 Guide Track mute
9. Control Room Guide Track mute
10. Setup
11. ADR Take Markers

Clicking the Setup button will open the ADR Setup window. Here you can customize how each stage of the ADR process will work and what the video overlays will be.

General

The General tab (Figure 12.14) is where you can define the various audio sources that will be used for monitoring during ADR. The guide track is usually the original microphone recording from the filming location. M&E signals can be routed to a group channel and that group channel can be set as the M&E source for ADR. The Mic Signal should be set to the new track that you are recording the ADR into.

The pre-roll and post-roll for ADR is defined here by clicking on those timecode numbers.

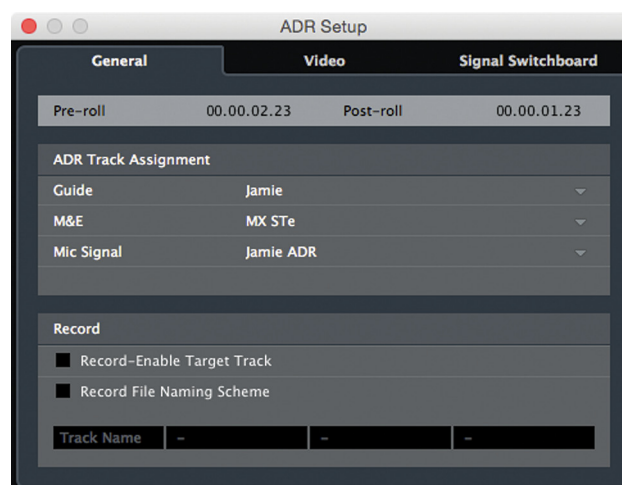


Figure 12.14

The ADR
Settings
General tab

At the bottom, there are some automatic recording features. If you reveal the “target track” attribute in the Marker window, you can set a different recording track for each ADR take in the marker information and have Nuendo automatically record-enable the correct track for each ADR take.

For example, if there are two actors that will record ADR, you could set the first actor’s target track to something named with their character and the second to the other character name. While recording ADR, you merely need to switch takes in the Marker list and the corresponding track will automatically be record-enabled, saving time during the session.

The custom file naming features are also found in this tab.

Signal Switchboard

The signal switchboard is the most labor saving feature of the ADR tool. This is where you can automate the monitor source switching necessary for both the actor and the Control Room. Figure 12.15 shows the matrix of sources for each phase of ADR, including pre- and post-rolls around the take.

The checkboxes indicate when the audio signal will be heard. Now you will no longer need to manually mute and un-mute channels during the process; Nuendo will do this for you.

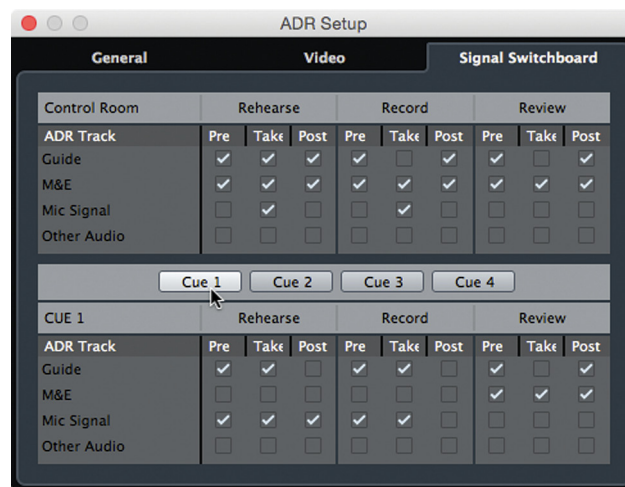


Figure 12.15
The ADR Signal Switchboard

For example, in Figure 12.15 in the Control Room, the guide is heard during the rehearse mode, but not in either record or review. Whereas in the actor's Cue send, the guide is heard during rehearse and record but not review. While the Control Room will hear the M&E through all phases, the Cue send will only hear it during review.

Since everyone's needs are unique, many permutations are available in the switchboard. Plus the ADR Setup window can be left open during recording for any last-second changes.

Video

The Video tab is where you can control Nuendo's video overlay. You can switch between a swipe and numeric countdown, display dialogue text, record status, and a take length indicator. All of these are visual cues to help the actor perfect the new performance with ease.

Multiple Marker options are available when operating in Free-Run mode and recording more than one ADR take at a time.

Exporting and Importing ADR Markers

Since so much of movie making is collaborative, it is necessary to be able to share and integrate information between people and teams. In the case of ADR, the information about each take can be created by one person and then used by another.

For example, the director or sound supervisor of a movie could watch the edited version with just the raw sound and create a cue sheet for every line that needs to be replaced. This usually is done in the form of a spreadsheet. Next, that information needs to be brought into Nuendo so that the ADR recording session can proceed.

Or perhaps you have created a set of ADR markers for the lines that have technical problems and the information needs to be sent to the director for approval.

In both of these cases, the ADR marker information needs to either be imported into or exported out of Nuendo. Fortunately, Nuendo provides the CSV import/export features to do this.

Importing CSV Files

If you have a CSV or database file that contains information about ADR takes, this can be imported directly into a Marker track. Since Nuendo supports multiple marker tracks, it is easy to start with a new, empty marker track.

1. Create a new Marker track.
2. Select File>Import>CSV Marker...
3. Select the CSV file.
4. Arrange the fields so that the data gets placed in the proper attribute of the Marker track, as seen in Figure 12.16.

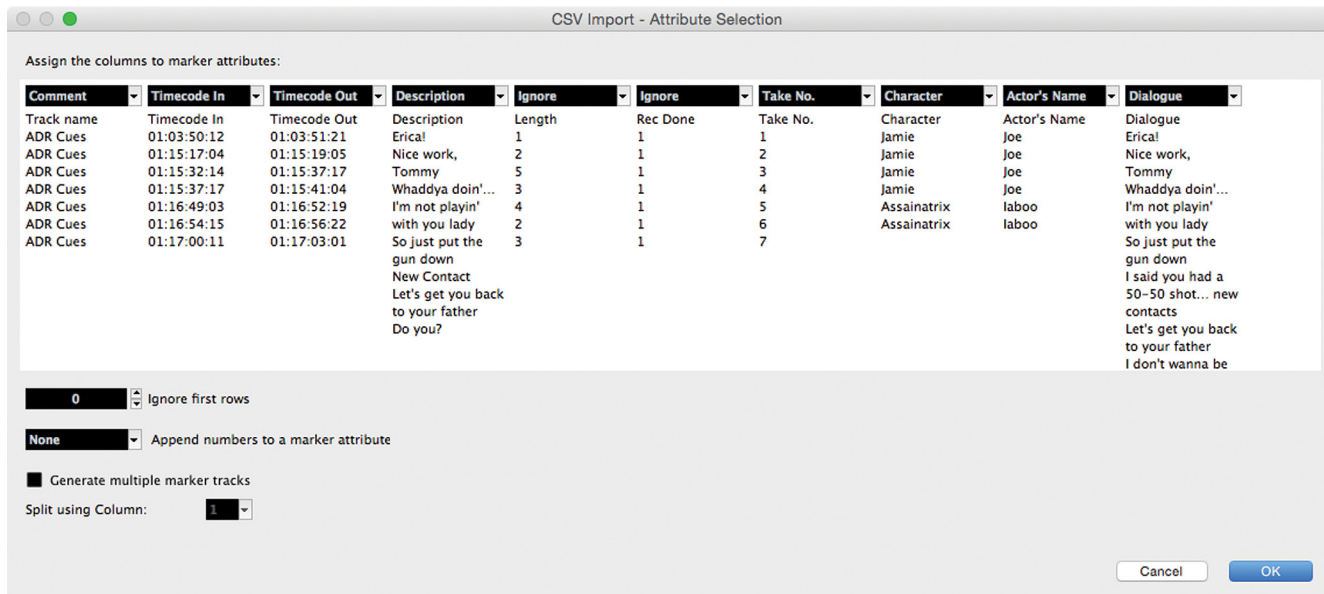


Figure 12.16 CSV Import Field Arrangement

Exporting Markers As a CSV File

Exporting Markers to a CSV file is as easy as selecting the marker track and choosing File>Export>CSV Marker... Options shown in Figure 12.17 afford some choices and allow you to choose the category of attributes that you want to export.

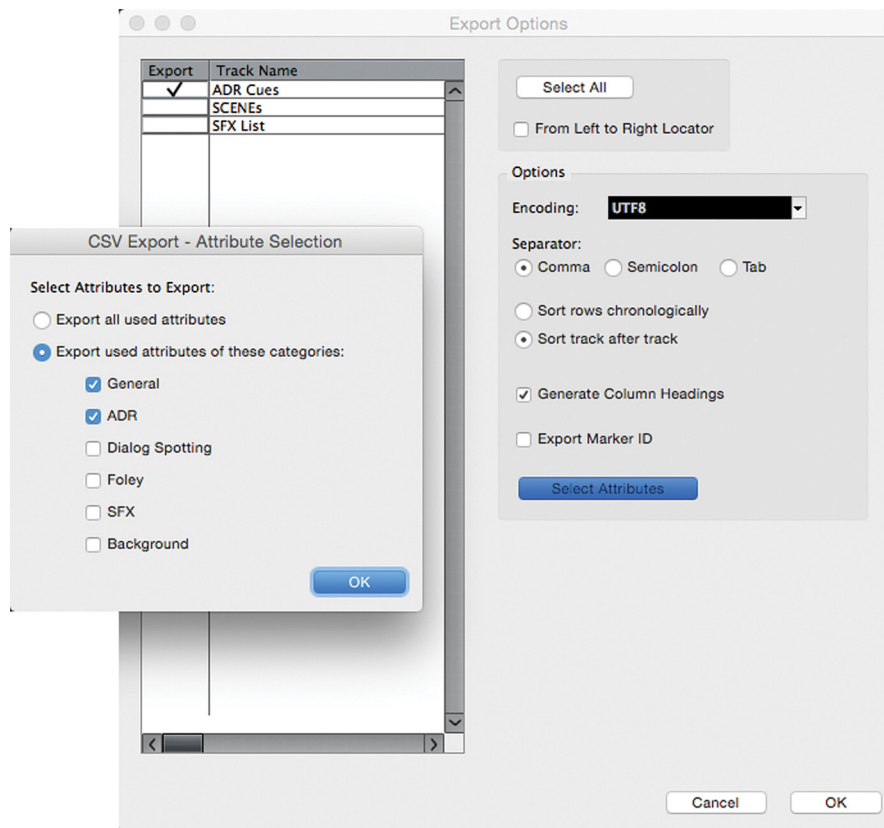


Figure 12.17
Export Markers to CSV options

The resulting file can be opened in Excel or other office database software, as shown in Figure 12.18. It could be edited and then imported back into Nuendo for such purposes as dialogue translation for foreign language versions.

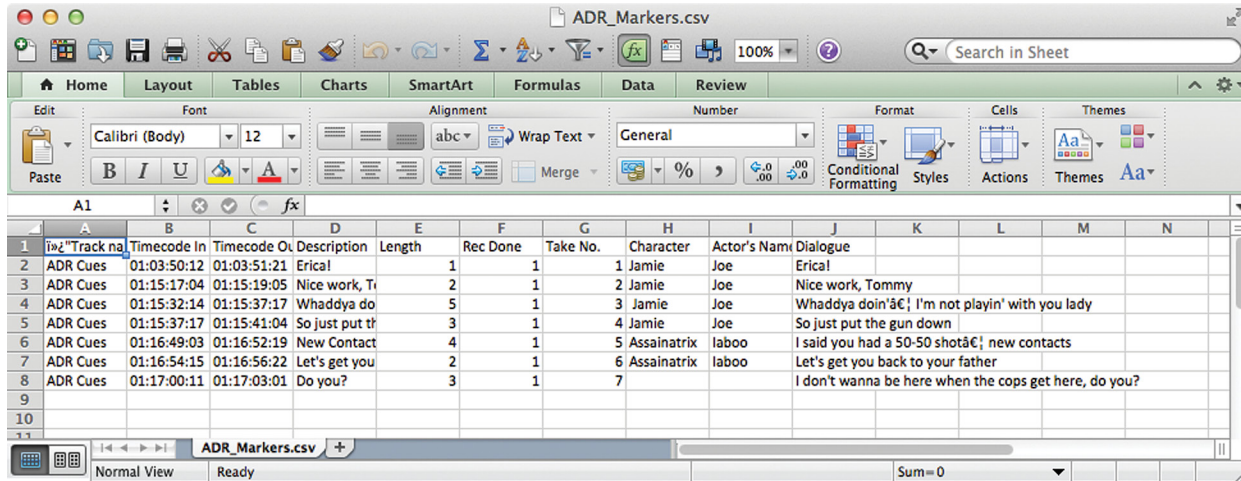


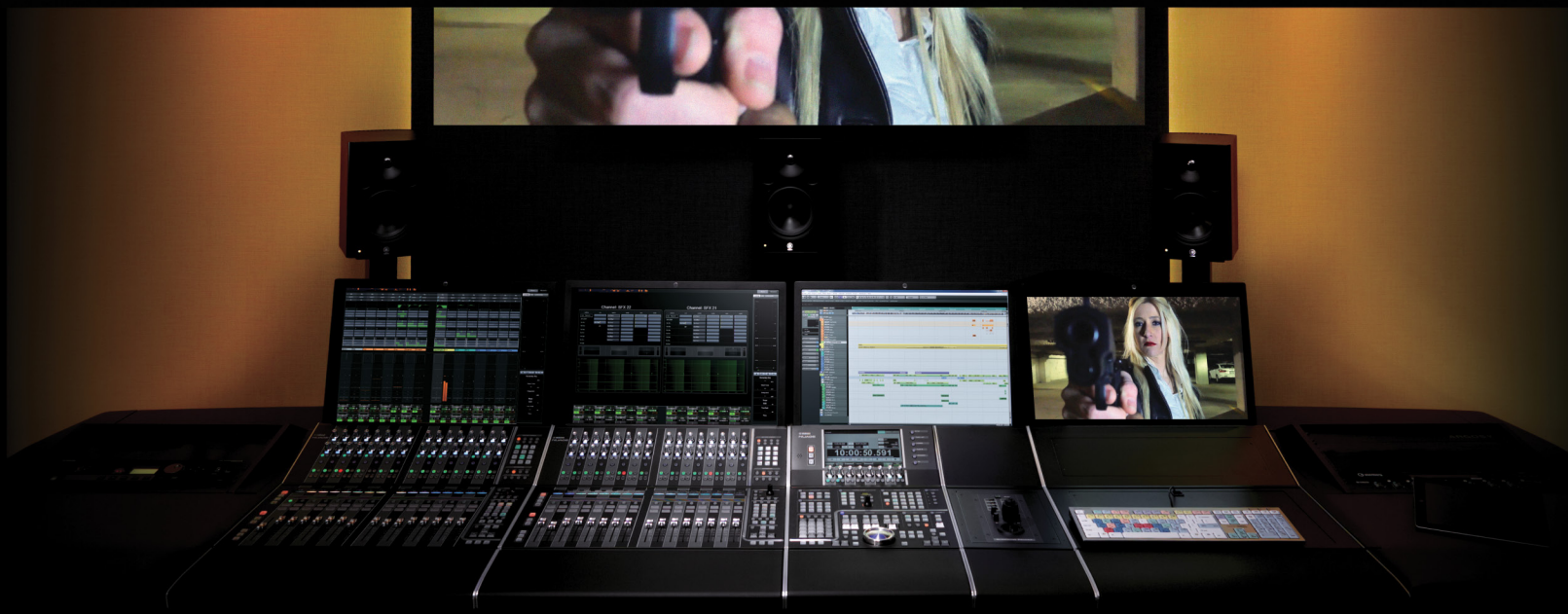
Figure 12.18 Marker CSV File in Excel

NOT JUST FOR ADR

This method can be used for any marker information. Cue sheets for sound effects, Foley, mix notes, or anything else can be exported or imported into the marker tracks of Nuendo.

NUAGE

COURSEWARE



PART II: RECORDING

by Ashley Shepherd

Chapter 13

Recording the Band



NUAGE

Recording the Band

- ❖ Input Routing
- ❖ Input Metering and Levels
- ❖ Track List Organization
- ❖ Click Track and Tempo Map
- ❖ Monitoring and Headphone Mixes
- ❖ Recording Takes



(tutorial video: “Recording the Band Part I”)



(tutorial video: “Recording the Band Part II”)

One of the most demanding tasks for audio engineers is recording a full ensemble, whether that be a jazz trio, rock band, or full scoring orchestra. The art of capturing a complete performance with multiple musicians calls on all the skill and tenacity that a recording engineer and studio can muster. We will use the example of a four-piece rock band to demonstrate how Nuendo can be used to make this task manageable for the engineer.

Here are some issues to consider:

- ❖ **Tempo and Click Track.** Often, drummers will use a click track to help maintain a steady tempo for rock, country, and pop music.
- ❖ **Multiple Headphone Mixes.** With modern digital headphone systems, multiple cue mixes are easily handled by the musicians themselves. Nuendo can provide discrete channels to feed such a system or create up to four stereo headphone mixes.
- ❖ **Input Level Metering.** It is necessary to set proper recording levels using accurate metering in the DAW. This can be a less-than-intuitive process when using peak meters.
- ❖ **Multiple Takes on Multiple Tracks.** In trying to capture the ultimate performance, multiple takes may be recorded and then composited (comped) together to create one master track. Nuendo uses recording lanes to contain multiple takes on multiple tracks of a full ensemble performance.

Most of the work for a session like this is in the preparations. Once we are ready to go, the recording process should be as quick and easy as possible. Creativity does not wait for operator error. The musicians should be able to record quickly so as not to impede the flow and vibe of the session.

Input Routing

Let's start with the input list. Since this will be a real record date, not a demo, a complete input list might go up to 20 channels or so. No compromises will be made here. The drums really eat up the lion's share of inputs, though.

1. Kick – inside the shell
2. Kick – outside the shell
3. Snare top
4. Snare bottom
5. Hi-hat
6. Rack tom
7. Floor tom
8. Stereo overhead (2 ch)
9. Stereo room (2 ch)
10. Mono drum kit (a center room mic)
11. Bass direct box
12. Bass amp Mic
13. Guitar amp
14. Stereo piano (2 ch)
15. Lead vocal
16. Spare 1
17. Spare 2

Now even though there are only 17 tracks listed, there are actually 20 input channels, as three of the tracks are stereo. The VST Inputs tab must have two stereo buses defined in order to record to these stereo audio tracks. I have created two extra mono tracks just in case someone has an idea or is ready for a quick overdub. Figure 13.1 shows what the mixer looks like.

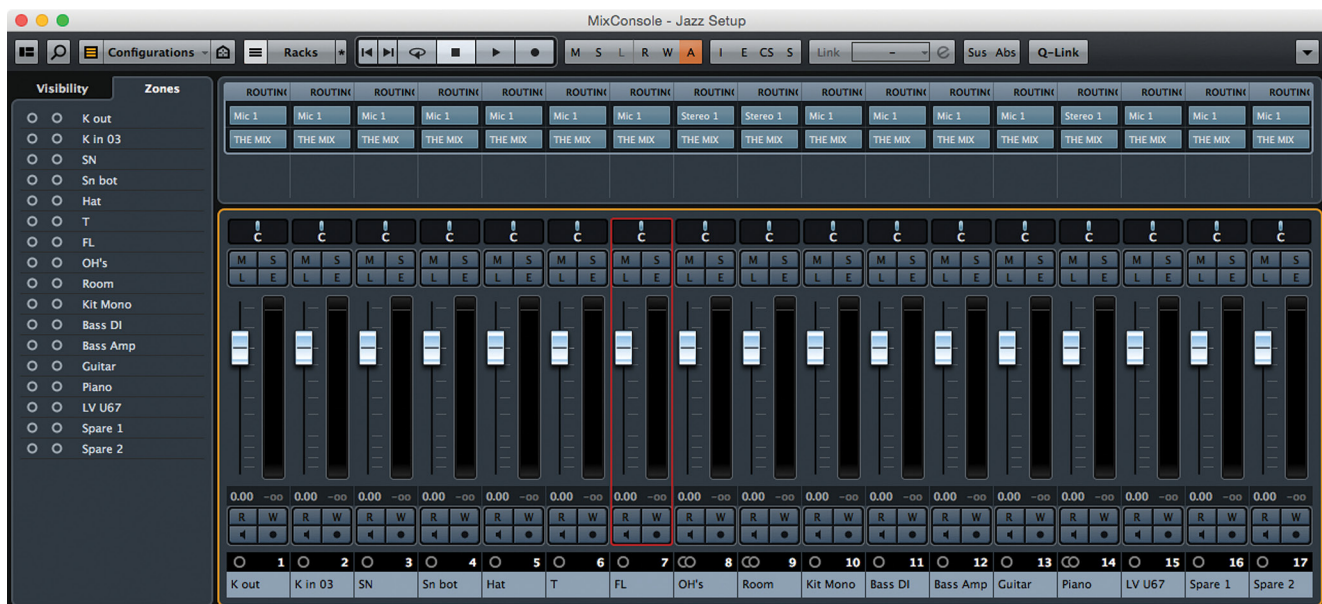


Figure 13.1 Mixer with 14 mono and 3 stereo audio tracks

Notice that all the mono inputs are set to “Mic 1.” This is just the default input setting for first VST Input bus. You can change these inputs quickly if you have all the mic channels coming up in order on the interface: Mic 1 to input 1, 2 to 2, etc., and you have created an equal or larger number of mono VST input buses.

1. Select all the audio tracks from K in to BV.
2. Click on the input bus assignment at the top of the channel strip for the first channel, “K in.”
3. Hold [Shift] while selecting the first input bus, as seen in Figure 13.2.
4. Now all the mono audio tracks should have incrementing input buses. Notice how the two stereo tracks did not get assigned an input bus. They require a stereo input bus.
5. Select the three stereo audio tracks.



Figure 13.2
Selecting the first input bus

6. Click on the input bus assignment for the first stereo track.
7. Hold [Shift] while selecting the first stereo input bus.
8. Now you should have all the inputs assigned and ready to go, as shown in Figure 13.3.

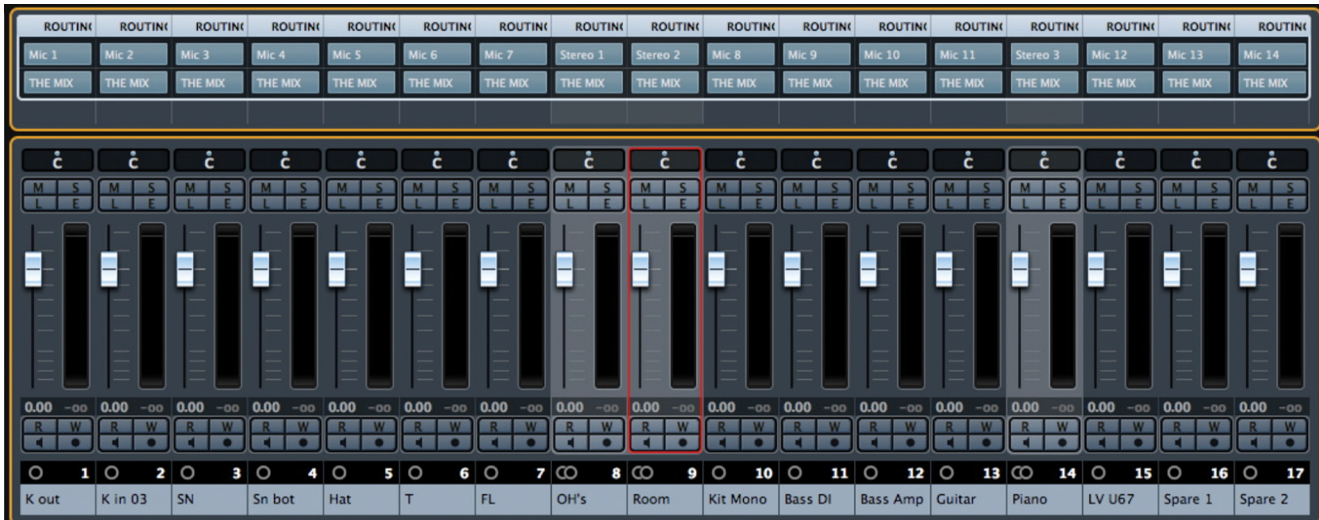


Figure 13.3 Finished input mapping

Input Metering and Levels

Once you have all the inputs routed, you can place each track in record and check the input level while the musicians are practicing and warming up. You can view the input level directly on the audio track meter or by using the meter on the input bus channel in the mixer.

MONITORING AUDIO LEVELS

If you are using direct monitoring via the soundcard's software mixer or an external mixer, make sure to enable Preferences > VST > Metering > Map Input Bus Metering to Audio Track in order to see the levels in the audio track channel. This is already checked by default.

The meters in Nuendo are peak meters. They register the instantaneous level of the signal at all times. This meter reading can be taken at three different points within the signal chain. In order to check or change this setting, access the context menu in the channel fader section or meter bridge of the mixer and go to the Global Meter Settings submenu shown in Figure 13.4.



Figure 13.4
Global Meter
Settings menu

In order to get an accurate input meter reading, you must choose Meter Input. If you choose either post-fader or post-panner, the level reading will reflect any gain changes made by the channel fader. For recording, always set the peak hold to “Forever” so that at the end of a take you can see if there was a clip on any channel. The peak indicator is found next to the gain readout at the bottom of the channel fader, as shown in Figure 13.5.

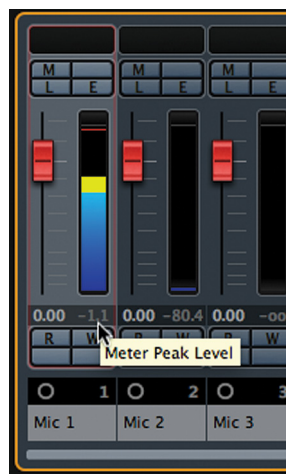


Figure 13.5
Peak Hold
Indicator

If the peak indicator is set to “forever,” you can reset the values by touching the fader, by clicking on the value itself, or by using the “Reset Meters” command from the same contextual menu. Input bus channels also have bright red clip indicators at the bottom of the channel strip, as seen in Figure 13.6.

NUAGE FADER METER RESET

On the Nuage Fader, there is a dedicated button to reset the meters. It is just beneath the Control Room volume knob, as seen in Figure 13.7.



Figure 13.6
Input Bus clip indicator



Figure 13.7
Nuage Fader Meter Reset button

Peak levels will also be displayed in the meter by a hash mark at the highest peak. If levels are set so that no clipping has occurred, a typical reading could look like the one in Figure 13.8.

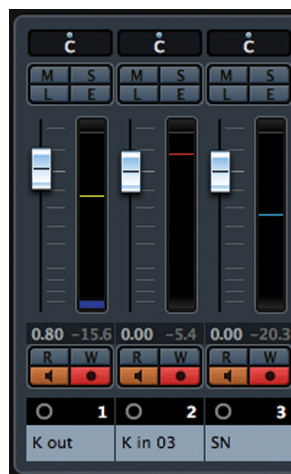


Figure 13.8
Meter readings with peak indicators

Meter Coloring

The meters and their coloring can be customized. I find this a useful feature as digital levels (especially with peak meters) are often too high because the visual meter feedback is misleading. A common reference level for digital is -18 dBFS for nominal levels in music recording. It can be difficult to see this point with the default coloring of the meters, as shown in Figure 13.9. The good news is this can be customized in preferences.

Open Preferences > Appearance > Meters to see the coloring options for the channel meters. Notice the two tabs at the top and bottom of the scale. Each one has a separate color and the meter gradually blends from one color to the next.

The position and coloring of these tabs may be changed. You may also add more tabs by [Alt]+clicking next to the meter display. To remove a tab, [Control]/[Command]+click on a tab. By placing two tabs of differing colors right next to each other, a distinct division can be created, in this case indicating the -18 dBFS reference level shown in Figure 13.10.

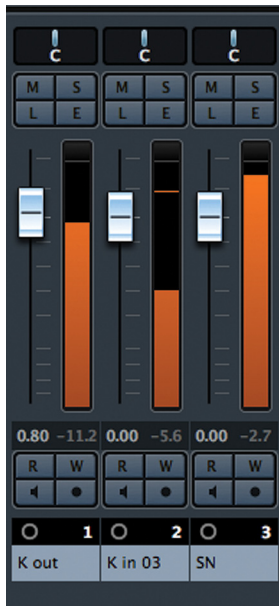


Figure 13.9 Default two-tab meter coloring

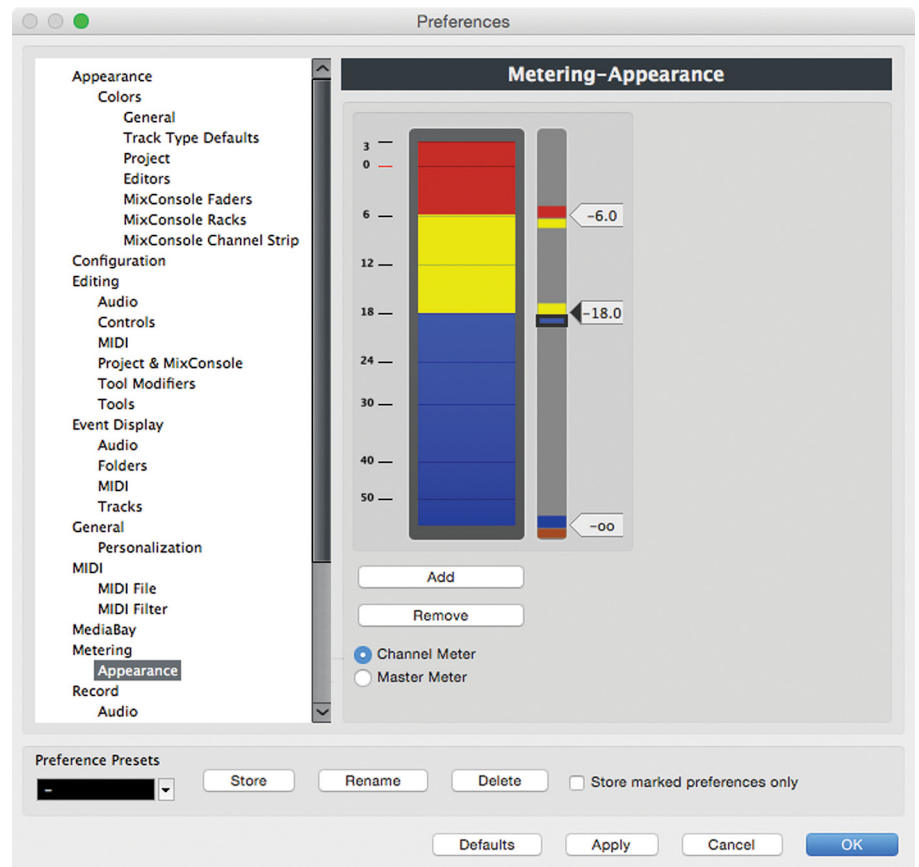


Figure 13.10 Coloring to indicate -18 dBFS reference level with 4 tabs

DIGITAL REFERENCE LEVELS

Digital audio levels are always measured in decibels full-scale (dBFS), that is, decibels relative to the full-scale level possible in the digital system (the highest number possible = 0 dBFS = all 24 bits on). As such, all decibel readings are negative since no level can exceed 0 dBFS in a fixed-point system. Other decibel systems such as dBu and dBm have reference points much lower in the dynamic range such that signals often go above 0 dB. In fact, it is common to have +20 dBu of headroom above the reference level to accommodate peak signals. The reference level is where signals should be *on average*, not instantaneously.

With that in mind, a digital reference level should be -20 dBFS or, as is often the case, -18 dBFS. The film sound and video community has adopted -20 dBFS as their standard reference level. In music recording, there really has been no consensus as people often just record as loud as possible in an attempt to avoid a noisy or “low resolution” recording.

This might have been an issue during the early days of digital when the only available bit depth was 16 bit with a theoretical dynamic range of 96 dB. Modern recording equipment and digital converters run at 24 bit with a theoretical dynamic range of 144 dB, more than enough to accommodate a sensible reference level of -20 dBFS.

The bottom line is this: You do not need to record with levels all the way up the meter. Anything near or around -20 or -18 is plenty loud enough. More percussive sounds such as piano or drums can peak much higher than that with no adverse issues. A synth pad, however, does not need to be recorded at -3 dBFS!

As an example, the synth pad at -3 dBFS would appear on a VU meter as a pinned needle, all the way to the right, registering +17 dBVU! That’s a bit much.

The bottom line is of course, not to clip the A to D converters. However, running them at close to their maximum operating conditions will stress the electronics and might not sound so good. The Nuage I/O has a rated max input of +24 dBu, meeting all professional standards.

Google “decibel scales,” “reference operating level,” and “dBu vs. dBm vs. dBFS” for a plethora of additional information on this subject.

Once this has been set, visualizing the level relative to a fixed reference point is much easier. Any level in the yellow is above reference level, red is close to clipping, and blue is below reference, as shown in Figure 13.11.

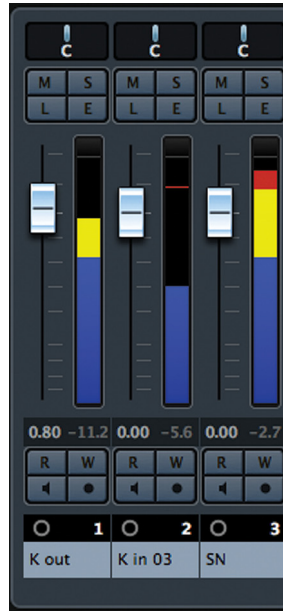


Figure 13.11
New meter coloring in mixer

Track List Organization

You can use folder tracks to start organizing groups of tracks together in the project window. For a session like this, create a folder track just for the drums and then another folder track to contain all the tracks being recorded, the “Basic Tracks.” Folder tracks provide some global functions that come in handy during a tracking session, namely, the ability to record-enable all the tracks within a folder with one button.

Create a folder track named “Drums.” Then select and drag the drum tracks from the track list into the folder to enclose them in the folder track. You will see the arrow indication when you are over the folder track. Let go and the tracks will now appear below the folder track, indented to show that they are enclosed within the folder. Notice that by [Shift]+clicking on more than one track, you can select and then move multiple tracks into the folder at once.

You can also have folders within folders. Select the “DRUMS” folder along with the other tracks in the Project and choose “Move Selected Tracks to New Folder” from the track list context menu, as shown in Figure 13.13. Now, all the tracks are contained in one folder.



Figure 13.12 Dragging audio tracks into a folder track

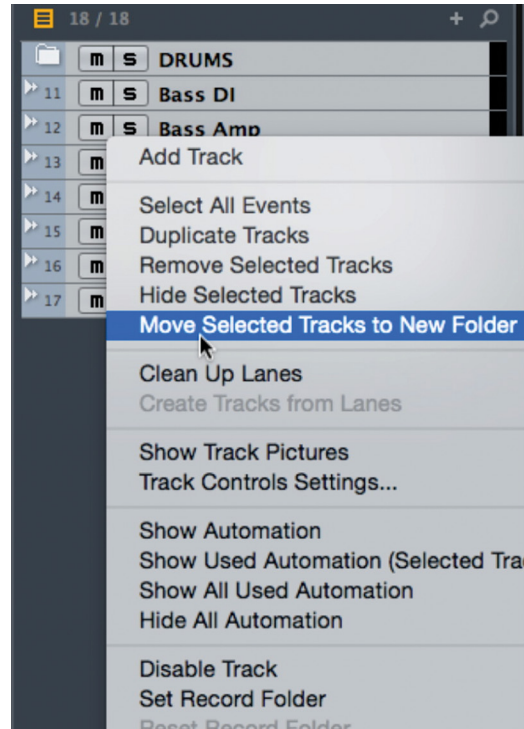


Figure 13.13 Track List context menu

Pressing record-enable on the “BASIC TRACKS” folder track causes all enclosed tracks to become record-enabled, as shown in Figure 13.14.

If you wish to reorder tracks, select one or more tracks in the track list and drag them up or down to move them to a new location. These changes will also be reflected in the order of channels in the mixer.

You may hide tracks within a folder by clicking the folder icon to “close” it. The enclosed tracks will still have their channels visible in the mixer. Just because a folder is closed, it does not mean that the tracks are inactive. They can be record-enabled and will operate as normal. Figure 13.15 shows the “Drums” folder closed. The inspector for a folder track will display the names of the contents of the folder.

The folder track itself will display the contents of the enclosed tracks if something is recorded, as seen in Figure 13.16. This helps you keep a visual handle on everything being recorded.

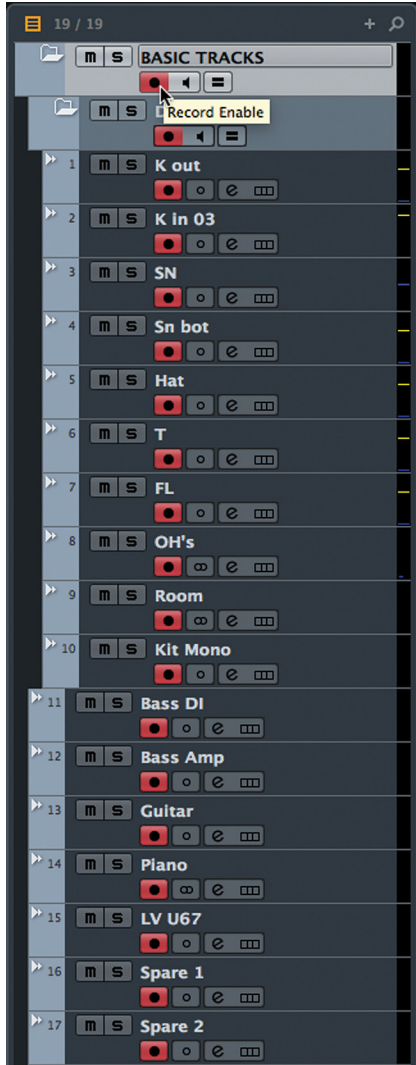


Figure 13.14
Record-enabling a folder track

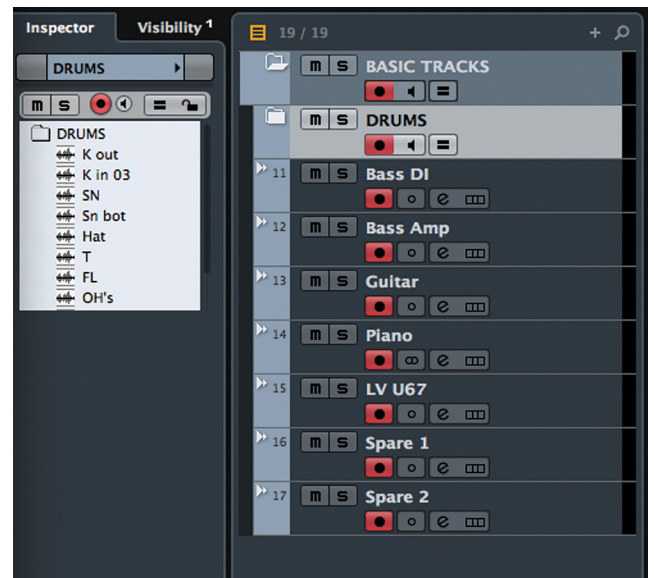


Figure 13.15
"Drums" Folder track closed

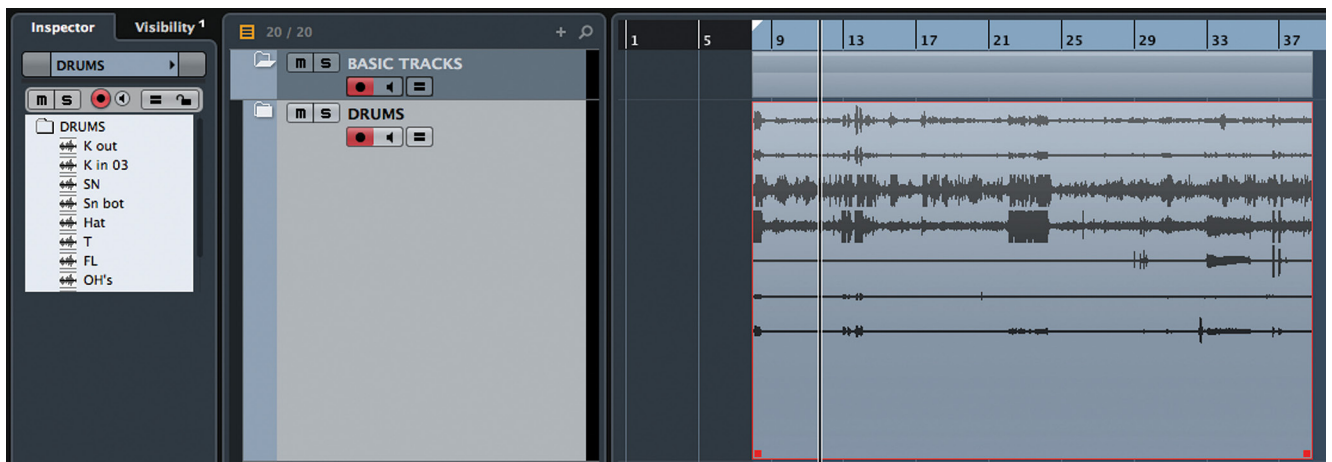


Figure 13.16 Audio within a folder track

Click Track and Tempo Map

Much of modern pop and rock music is recorded to a fixed tempo. In order to remain in time with a fixed tempo, a click track is used to give cues to the drummer for the groove.

If the musicians already know the tempo of the song to be recorded, then the tempo can be set directly. Sometimes, the band might not know exactly at what tempo they have been playing the song, so it might be necessary to figure it out.

Beat Calculator

Nuendo has a “Beat Calculator” that can be used to do this. From the Project menu, choose “Beat Calculator...” to open the tool. Click the Tap Tempo button and up comes the tap tempo tool, shown in Figure 13.17, which lets you tap the spacebar or the mouse button in time with the musicians warming up to get a reading on the tempo they are playing.

Once you have the tempo figured out, click [OK] to return to the Beat Calculator. Here you can choose to insert this tempo at the beginning of the project, the tempo track start. Go ahead and do this, as it can always be changed later if the tempo is not absolutely perfect.



Figure 13.17 Tap Tempo tool

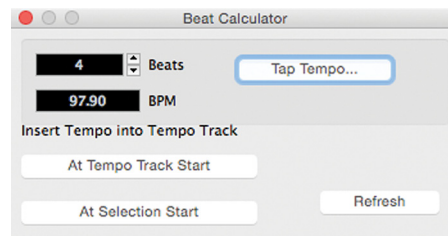


Figure 13.18 Beat Calculator

Alternately you can set the tempo to a fixed value in the Transport Panel. By clicking on the Tempo button in the Transport, the Project will change from using a Tempo Map to a Fixed tempo setting, as seen in Figure 13.19. Then you can enter the bpm value into the tempo indicator.



Figure 13.19 Switching to fixed tempo mode

The Metronome Setup

Inserting the tempo value automatically enables the click in Nuendo. Open the transport and verify that the click indicator is on, as seen in Figure 13.20. Now the click signal will be routed to the outputs of your choice as determined in the Control Room mixer and VST Outputs. You can manually enable or disable the click by pressing “C” as the default key command, “C” for click.



Figure 13.20 The transport showing the enabled click

The metronome (otherwise known as the click) can be set up in a variety of ways:

- ❖ A simple set of beep tones can be used.
- ❖ Samples may be used for click sounds.
- ❖ The click can be sent out as MIDI data to a virtual or external instrument.

To access these options, select Metronome Setup from the Transport menu or [Control]/[Command]+click the CLICK button in the transport window. This opens up the Metronome Setup dialog shown in Figure 13.21.

In the Click Outputs section you can activate the MIDI and the Audio click outputs. The MIDI output must be routed either to an external MIDI port or to a virtual instrument inside Nuendo. From there, that signal must be manually routed to the proper audio outputs in order for the musicians to hear it.

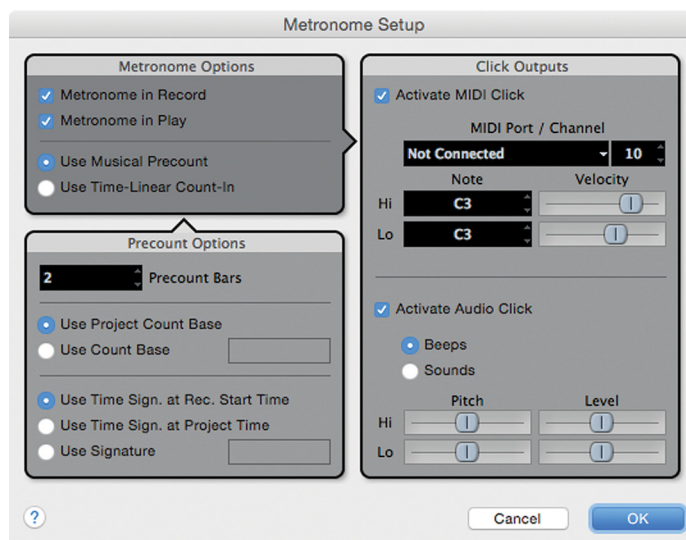


Figure 13.21
Metronome Setup

The audio click has more internal options for routing using the Control Room mixer. In the Control Room mixer, each output has a click enable button on it with controls for volume and panning of the click signal, as shown in Figure 13.22.



Figure 13.22
Control Room
Mixer click
options

Using the Control Room mixer, you can set the click level separately for each headphone mix and the main studio monitors. Often, the drummer's headphone mix will have a great deal more click than anyone else's.

CLICK CHANNEL

Many studios use multi-channel headphone systems that allow each musician to create a personal mix in their own headphones. With this in mind, feed the click signal to just one of those channels so that each person can add just the right amount of click for their needs.

Monitoring and Headphone Mixes



(tutorial video: “Recording the Band: Cue Sends”)

In order for the musicians to play, headphone mixes must be prepared. Nuendo provides some quick and easy ways to create these mixes on the fly using features in the Control Room mixer. When you add Cue channels to the control room setup, special aux sends are added to each channel in the mixer: the Cues sends. While it might be easy to get a quick blend of all the instruments for your main monitor mix, creating unique mixes for four headphone sends can be time consuming. Fortunately, we can use the basic blend of instruments in the mixer as a starting point for each custom headphone mix.

1. Start by creating a rough mix of all the instruments in the mixer using the main channel faders.
2. Select all the channels in the blend by using [Shift]+click to select a range of channels in the mixer.
3. In the Control Room Mixer, open the context menu shown in Figure 13.23.

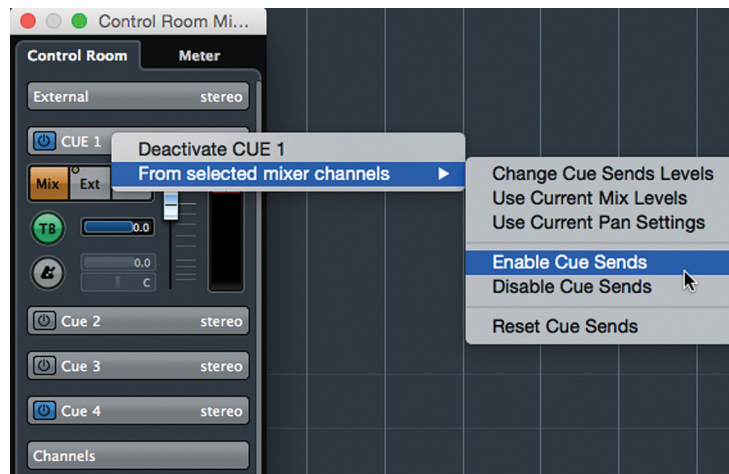


Figure 13.23
Cue Send contextual menu

4. Choose “Enable Cue Sends” to turn these sends all on at once.
5. Open the mixer and view the Cue Sends to see this has happened.
6. From the same contextual menu, choose “Use Current Mix Levels” and watch as the sends are automatically set to the same level as the channel faders and set to pre-fader so the additional changes to the channel faders will not alter the headphone mix, as seen in Figure 13.24.

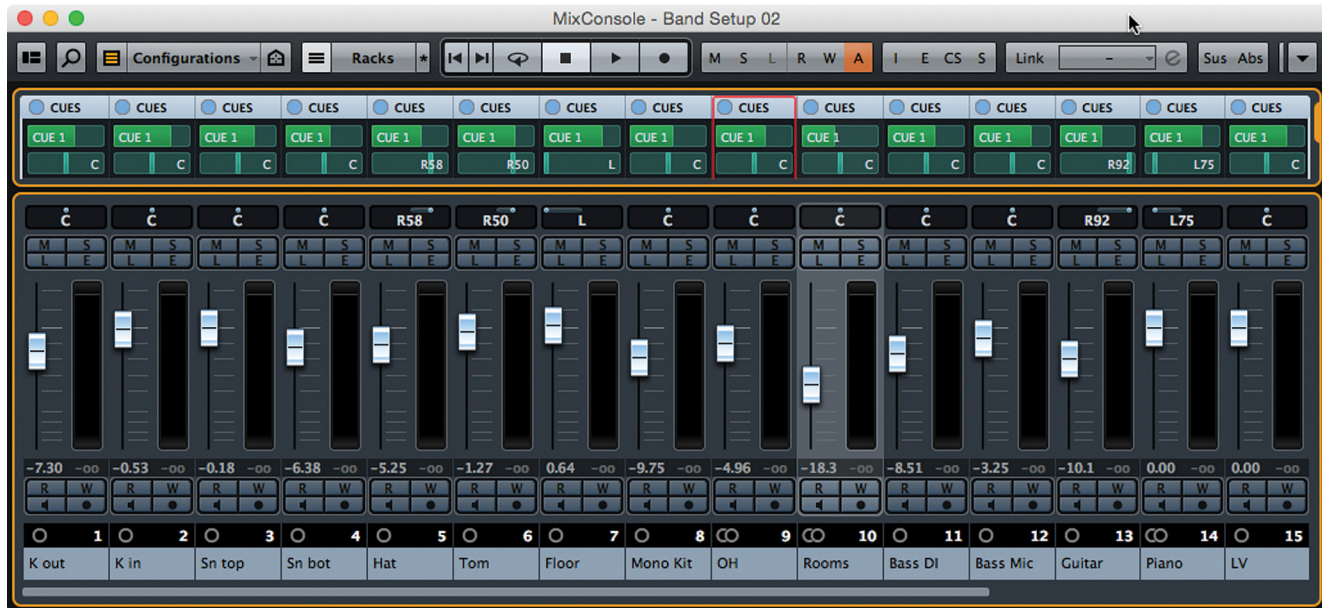


Figure 13.24 Cue 1 with matching mix

7. Now select “Use Current Pan Settings” to adjust all the send panners to the same position as the channel panners.
8. Make any additional changes to the mix as required by the musicians.

You can repeat these steps to rapidly create individual headphone mixes for each Studio Send and customize them to each musician’s needs. This is much quicker than making the mixes manually.

Multi-channel Headphone Systems

In the case of a multi-channel headphone system such as the Hearback system, the four stereo Studio Sends provide a nice match to the eight inputs of the Hearback hub. My approach to this is to create a stereo drum mix on the first Studio Send and then route individual instruments to the remaining 6 inputs so that each musician can create their own custom mix with the click track on channel 8. The result would look something like Figure 13.25.

The bass is going to the left side of the second studio send, which correlates to channel 3 on the headphone system. The guitar goes to the right side, channel 4, and so on. Nothing is sent to the final channel (right side of studio send 4), as the click is routed to that channel in the control room mixer.

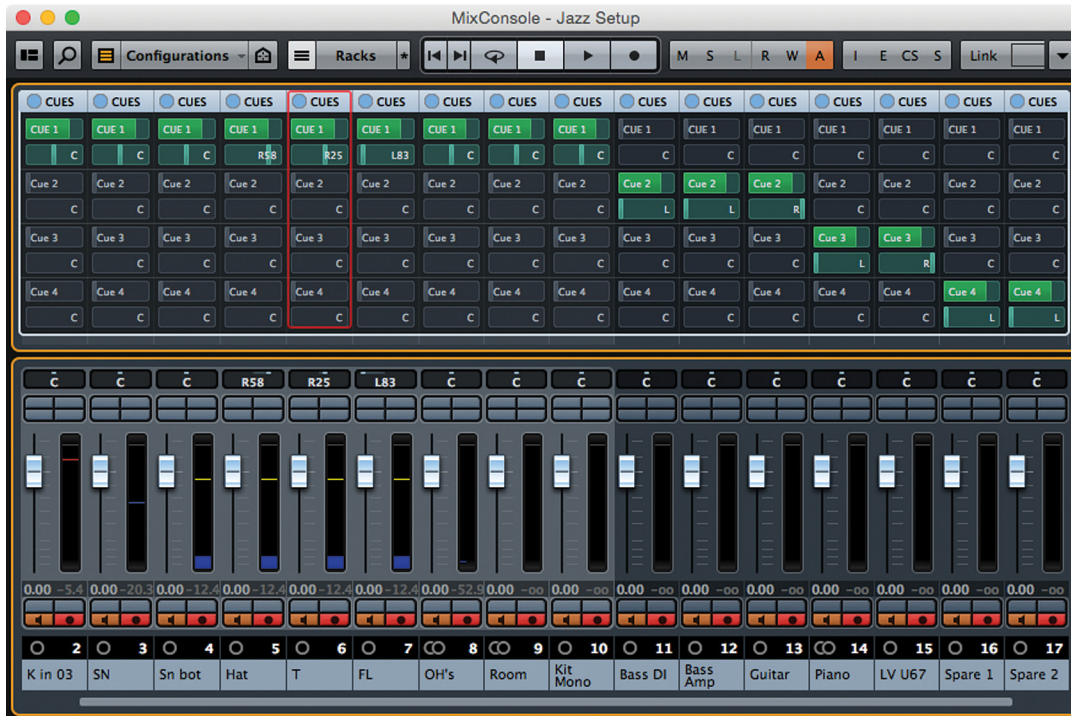


Figure 13.25
Studio Sends
for multi-channel
headphone
system

It is also easy to setup a “More-Me” type of headphone rig by simply setting the first Studio output to “Mix” in the Control Room mixer and routing the “Me” channels to the other outputs. That’s about as fast as it gets for headphones.

With either system, headphone mixes can be handled quickly, and that is so important in recording sessions, keeping the vibe going, not wasting time on mundane tasks like this.

Recording Takes

There are two types of workflow that can be used when recording multiple takes of a song like this.

- ❖ **Linear:** One take after another in a row.
- ❖ **Stacked:** Each take is recorded at the same place in time, stacked on top of one another.

The linear method is straightforward. Simply record each take after the previous one. These takes can be edited together later if necessary. Stacked takes are easier to edit, provided each take is the same arrangement and tempo of the song. With several takes stacked on top of each other, the lane editing mode can be used to compile (or composite) the best of each take into a complete final. Multi-channel and multi-lane editing will be covered in detail in Part III: Editing.

COMPING

The process of editing portions of multiple takes into a complete final version is commonly referred to as “comping.” To “comp” a vocal means to use the best of two or more takes to create an ideal one. This term is an abbreviation of compositing which means to take several visual elements and put them together to create a single “composite” image. In this book, I will use the abbreviated term “comp” and “comping” to mean the same as they apply to audio.

Folder Group Editing

When many tracks are recorded together and then edited together later, such as a drum kit, all the audio events should be edited in the same way to preserve the sonic relationship between them. This could cause some difficulty with large multi-track performances. However, there is a method of using the folder tracks in Nuendo to edit all channels of a performance together. There is a button in the track list for a Folder to enable “Group Editing,” as shown in Figure 13.26.

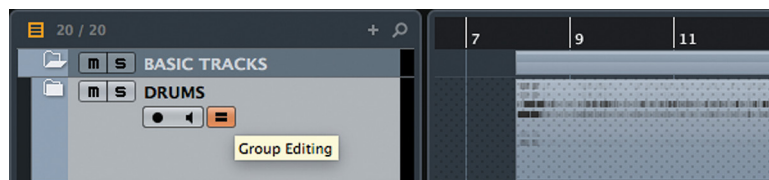


Figure 13.26
Group Editing enabled for a folder track

This will allow you to perform editing on just one track inside the folder and have it affect all other tracks in the folder at the same time, including lanes. When a folder has group editing active, you will see a pattern of dots across the track display. Multi-channel group editing will be discussed in Part III: Editing.

Multi-Channel Punching – Nashville Style

Of course Nuendo can punch in on multiple channels at once. The punch can be performed manually or by using the Auto-punch features of the transport. This can be used to punch in the entire drum kit. If the band is performing to a click, punching in drums becomes as easy as punching in a vocal.

What is a bit more versatile is the ability to punch in and out on different tracks at different times, all in one pass, like a tape machine. The reason I say “Nashville-style” is from the common practice with seasoned session musicians of going back after a basic recording pass with all the instruments, and then punching in specific instruments at different times to fix parts all in one go. It speeds up the recording process, getting multiple overdubs completed in one pass.

For example, let’s say the guitar player felt the second verse could be better on his part and the bass player wants to redo all the choruses to change how the bass line moves, and the piano player has to fix the bridge. You can take all channels out of record-ready and then enter record on the transport from the start of the song. Nothing is being recorded but the record indicator in the transport is on. As each section comes up, simply record-enable the appropriate track as needed to punch in. The record-enable buttons can act like punch-in and out buttons for individual tracks.

MULTI-CHANNEL PUNCHING

Multi-channel punching must be performed manually. The auto-punch features of the transport only affect the record status of the transport, not individual tracks. The transport must be record-running before you record-enable a single track to punch it in. If the auto-punch out takes Nuendo out of record, all punched-in tracks will come out of record at the same time. Ensure that auto-punch is disabled when performing multi-channel punching, Nashville-style.

The bottom line is that Nuendo functions very much like a tape machine with all the added flexibility of non-linear digital recording.

PRO TOOLS NOTE

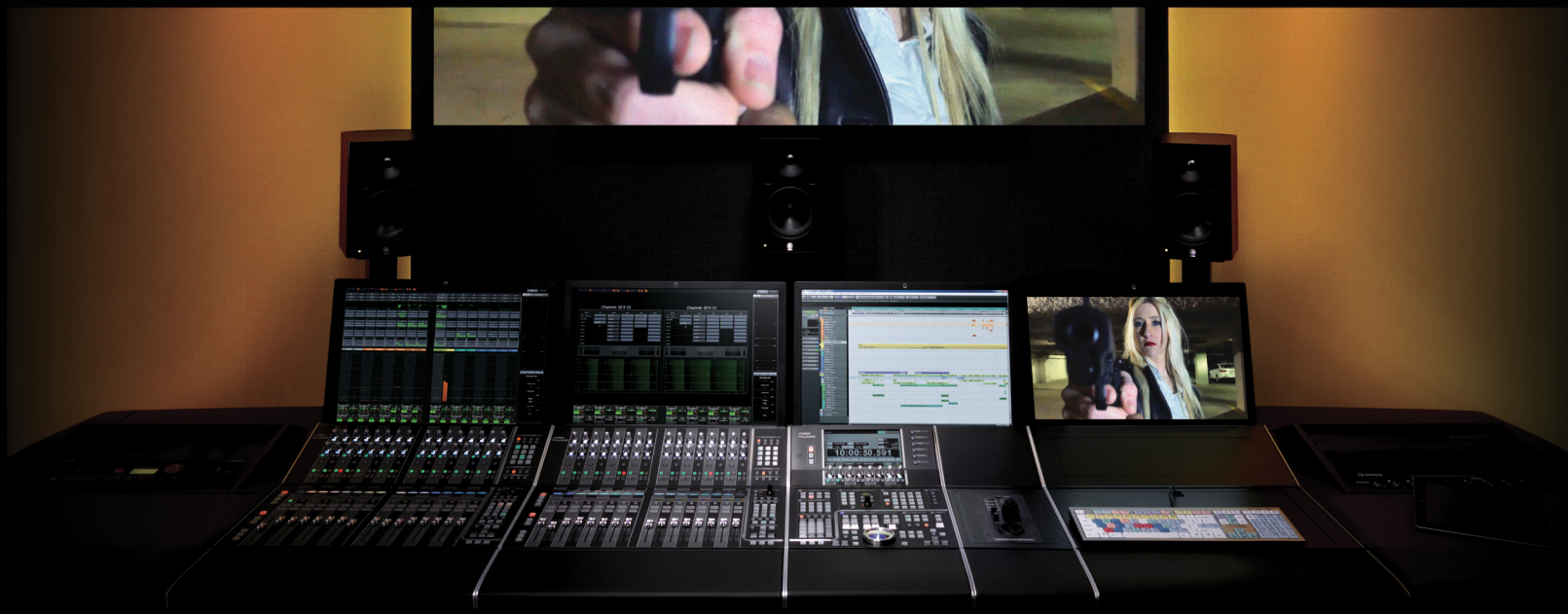
In Pro Tools, multi-channel punching is called TrackPunch. This mode functions in much the same way as QuickPunch, recording continuous audio files in the background. Pro Tools can also use a destructive record mode where each punch-in actually replaces the data within the audio file. There is no undo for this function.

NUAGE FADER

Using the Nuage Fader to punch-in this way is very intuitive since each channel has its own record-enable button. They allow you to operate multiple channels at once while punching-in Nashville style. This works just like a real tape machine would in the same situation.

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PART II: RECORDING

by Ashley Shepherd

Chapter 14

Recording MIDI



NUAGE

Recording MIDI

- ❖ Setup
- ❖ Tempo Mapping and Time Warping
- ❖ MIDI Record Filter
- ❖ Record Some MIDI
- ❖ Recording Multi-Channel MIDI Data

This chapter will focus on basic MIDI recording and how to capture live performances using MIDI controllers.

MIDI recording is similar to audio recording in that we are capturing musical data, just in a different format. This format is much more basic and fundamental to music than the audio itself. MIDI data encodes the raw musical information in terms of notes and articulations into data that can be recorded. This data, in turn, can be manipulated in ways both obvious and subtle to enhance or even reinvent musical and sonic ideas. What can often be overlooked are MIDI's abilities as a sound design tool for creating sound effects for picture.

Combine this with Nuendo's history steeped in the long MIDI tradition of Steinberg, and you have a fabulously efficient and feature-rich MIDI sequencer at the foundation of the DAW.

Setup

Once you have defined all the MIDI ins and outs of your system via the MIDI Port Setup, you need to connect a MIDI controller to generate MIDI data for recording.

The Controller

The most basic MIDI controller is a piano-type keyboard that either has a direct connection to your computer via USB or a MIDI output connected to your MIDI interface. There are also several new and interesting MIDI controllers that create MIDI data in different ways, such as guitar MIDI controllers, breath-type controllers such as the Electronic Wind Instrument (EWI) by AKAI, drum pad and trigger controllers such as the Roland HandSonic line of pads, and even more esoteric devices such as Korg's Kaos pad or the Eigenharp.

It is also possible to program MIDI data without a controller. Nuendo's NEK option comes with a virtual keyboard that temporarily transforms your computer keyboard into a musical piano keyboard so you can create MIDI data without any external device. This can be especially handy when traveling with a laptop.

Once you have your controller set up, you can check to be sure it is actually sending MIDI data into Nuendo by watching the MIDI input activity monitor on the Transport panel. Play some notes on the controller and watch for what looks like audio signal level in this indicator. (See Figure 14.1.)



Figure 14.1
MIDI Input
activity monitor

USING MORE THAN ONE MIDI CONTROLLER

It is possible to connect more than one MIDI controller and record them together in Nuendo (also known as MIDI Merge). For example, when programming drums, use a foot pedal and drum trigger device along with a standard keyboard to program the drum kit. They both can be recorded to one MIDI track.

MIDI Tracks

Now you must determine what MIDI instrument you want to hear while you sequence or program. There are three basic ways an instrument can be connected for MIDI recording.

- ❖ **Instrument Tracks:** Instrument tracks are a combination of a MIDI track and a VSTi plug-in. You get all the MIDI controls plus all the audio controls for sounds coming out of the VSTi.
- ❖ **Rack Instruments:** Virtual instruments within Nuendo can generate sounds that respond to MIDI. These can be inserted in the VST Instruments rack and will be available as MIDI destinations in the Inspector of any MIDI track.
- ❖ **External MIDI Keyboard or Device:** Any MIDI keyboard or sound module capable of creating sounds and responding to MIDI inputs can be connected via a MIDI interface to Nuendo. A MIDI track in Nuendo can record data that will be routed to the external device during playback. Monitoring the sound of the external device can be handled with an external mixer or by using Nuendo's External Instruments feature in VST Connections.

Once you have chosen which type of instrument setup you will use, the various tracks associated with that setup must be created.

Instrument Track

The simplest method is to use an instrument track, which is a combination of a MIDI track and a VSTi all in one. When you create an instrument track, you are asked what instrument should be used. (See Figure 14.2.)

Here you are given the same choices for instruments as in the VST Instruments window. Both internal VSTi and external instruments are available.

REAL INSTRUMENTS VS. VST

Note that external instruments can only be inserted into a project one time because they are physically one device. VSTi's, on the other hand, can be inserted multiple times within one project if more sounds are needed. Each will be individually controlled and can have entirely different sounds and settings.

Once created, an instrument track has controls for both audio and MIDI data because it is a hybrid of the two. The Inspector has tabs from both MIDI and audio track types. (See Figure 14.3.)

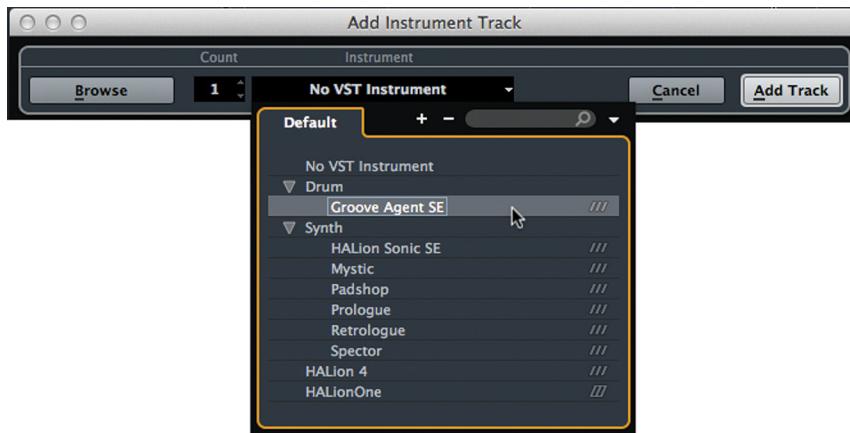


Figure 14.2 Add instrument track dialog box



Figure 14.3 Instrument track Inspector

The top seven tabs have all the MIDI controls, and the rest contain audio controls, including studio sends for headphone monitoring and even direct routing for advanced mixing setups. This track type is used to save space in the mixer when a single instrument needs only one MIDI track to perform its job.

VST Rack Instruments

The VST Rack window is accessed from the Device menu or by the key command F11 or on the right side of the Project window. There are 64 possible instruments in one Nuendo project. You can select either internal VSTi's or External Instruments for each slot. (See Figure 14.4.)

Once you select an instrument, a dialog box will appear asking if you want to create a MIDI track for this instrument. This is just a helpful time saver as you most likely will want to create a new track for the instrument in order to play and record MIDI with it. (See Figure 14.5.)

Now the track list will contain a MIDI track named with the instrument's name and a VST Instruments folder track with another folder track inside it that contains both an audio channel for the actual sound the instrument will make and a MIDI automation track that can be used to automate various parameters of the VSTi. (See Figure 14.6.)

Now you are ready to record MIDI on the top track routed to the VSTi that will make the actual sounds.



Figure 14.4 Choosing a virtual instrument

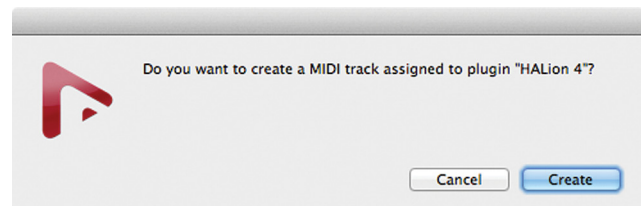


Figure 14.5 Automatic MIDI track add

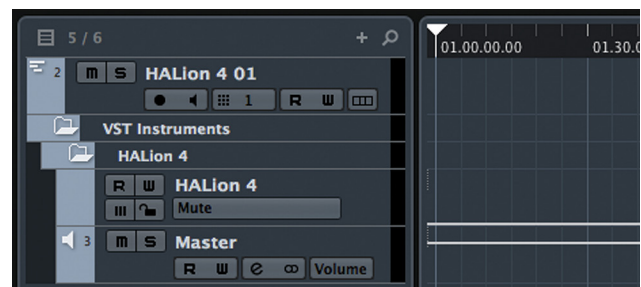


Figure 14.6 Three tracks created by inserting a VSTi

External Instruments

When MIDI was first invented, each hardware device was connected with MIDI cables and then the sound outputs could be mixed together in a console. Multiple MIDI hardware devices could be connected together and communicate using MIDI signals to play musical notes and sounds together.

Eventually, MIDI sequencing came to life after they figured how to store the MIDI data for later playback. Now we have advanced MIDI recording capabilities with software but the basic principle remains the same: capture and store musical data, edit and manipulate it, then play it back.

In order to use external MIDI devices, you must have a MIDI interface installed, such as the classic M-Audio Midisport 4x4, which has four MIDI inputs and 4 MIDI outputs. (See Figure 14.7.)

The inputs may already be connected to one or more MIDI controllers that generate MIDI data. Now, connect the outputs to all of your external MIDI devices so Nuendo can send data to them to generate sounds.

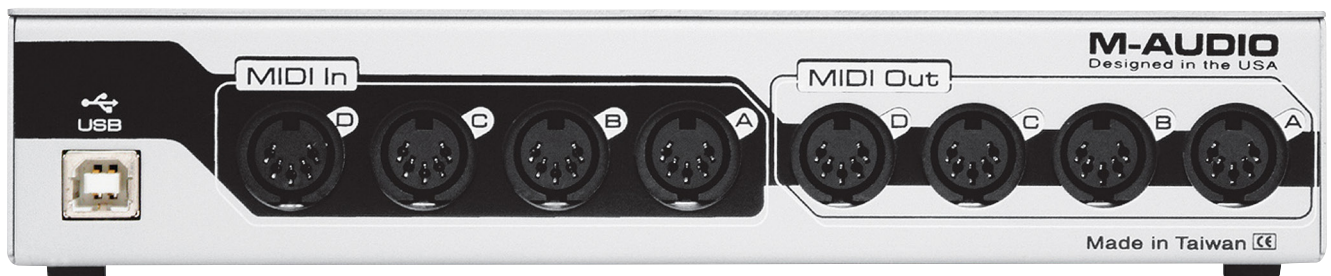


Figure 14.7 M-Audio Midisport 4x4 interface

Monitoring of External Instruments

Each external device needs to be monitored along with other tracks in Nuendo. This can be handled in two ways:

- ❖ **Using an External Mixer:** An external mixer outside of Nuendo can mix the output of your external MIDI devices along with the mix of Nuendo tracks for monitoring.
- ❖ **Internal Monitoring in Nuendo:** Using the External Instruments created in VST Connections, external devices can be monitored directly in the Nuendo mixer.

The internal monitoring option is more convenient for many reasons as it integrates everything into Nuendo's project and will be saved as a part of the project file. Monitoring through Nuendo's mixer will be subject to any latency built up as a function of the ASIO buffer size and any plug-in delay compensation present in the mix engine.

Nuendo has tools to minimize this effect but it also depends on the speed of your computer and its CPU power along with the quality of the ASIO driver you use. If the ASIO driver is designed for low latency operation and your computer is of sufficient speed, internal monitoring is the best option.

Here's how to create an External Instrument:

1. Open VST Connections (F4).
2. Go to the External Instruments tab and click Add External Instrument. (See Figure 14.8.)

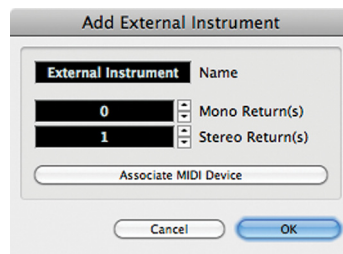


Figure 14.8

Add External Instrument dialog box

3. Enter a proper name for the external device.
4. Enter the amount of mono and stereo outputs the device has that you wish to use. For example, the AKAI MPC5000 has one stereo output and eight mono outputs.
5. Associate a MIDI device for this external instrument. This allows you to easily route MIDI tracks to the proper MIDI port on your system using the name of the device rather than the port name. It also allows the instrument to have its input delay compensated by the mixer. You can create a new MIDI device from inside the dialog box. (See Figure 14.9.)

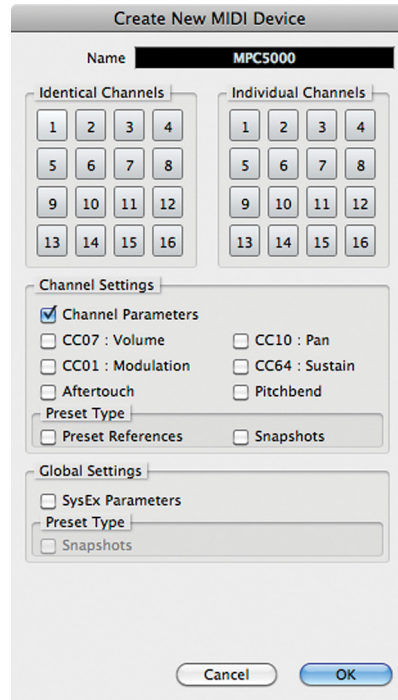


Figure 14.9
Create New
MIDI Device

6. Each of the devices outputs has to be assigned to one of your audio interface's inputs to be monitored in Nuendo's mixer. Assign audio inputs to each of the device's return buses. (See Figure 14.10.)
7. Your new external instrument is now configured and ready to be inserted into the mixer.

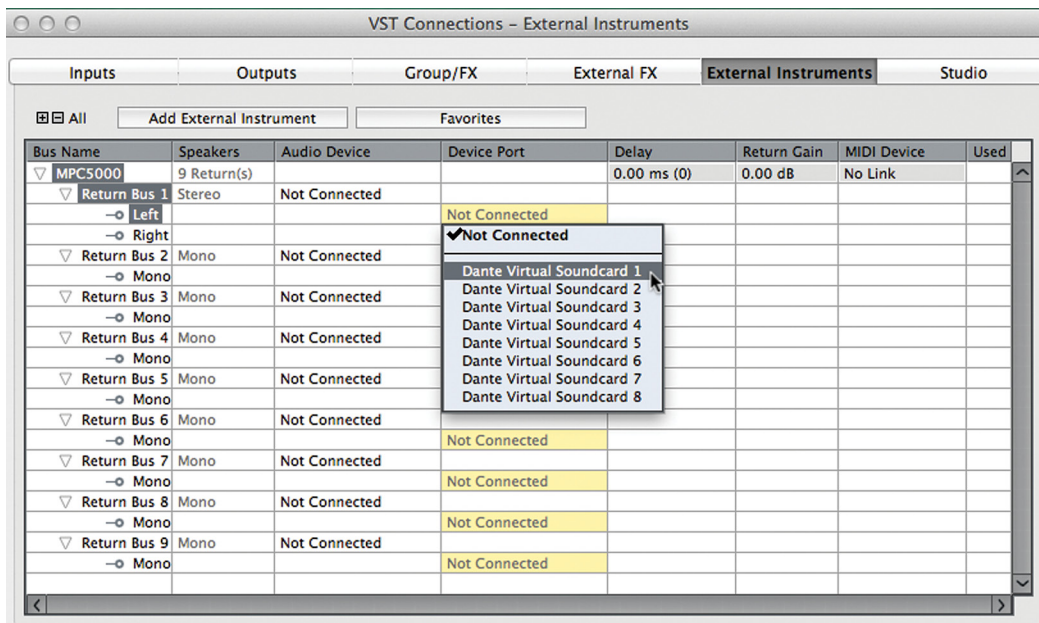


Figure 14.10
MPC5000
External
Instrument
Return
configuration

The external instrument can be inserted into the VST Instruments window or it can be used in an Instrument track. Once inserted, the mixer will contain audio channels for each return bus of the instrument. In the example of the MPC5000, nine faders, one stereo and eight mono, will be created in the mixer so that you can control the blend of all the outputs of the device in the mix plus apply any plug-in processing and route the signals using aux sends to other FX channels.

ASIO Latency Compensation

As a result of the round trip from MIDI out to audio input monitoring, ASIO latency might be an issue for musical timing of the performance. Each MIDI track has a control to compensate for any ASIO latency. By default, this control is not visible in the track list. Go to track control settings and add this control to the MIDI track visible controls, as shown in Figure 14.11.

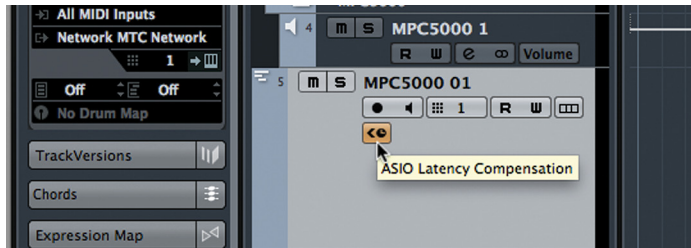


Figure 14.11
ASIO Latency Compensation tool visible in track list

When this control is enabled, MIDI data recorded into this MIDI track will be positioned to compensate for any monitoring delay during recording, which means everything will play back in time the way it was recorded.

Tempo Mapping and Time Warping

In Chapter 13, “Recording the Band,” the click track and tempo map were discussed as they pertained to simple tempos that do not change during the course of the song. While it’s not necessary to have a click or tempo map to record MIDI, its basis as musical data makes it ideal for using in conjunction with a tempo map. For most situations, the single tempo map is sufficient.

However, if you are playing to a pre-recorded live performance, the tempo can fluctuate. It is possible to create a tempo track that follows the performance as its tempo changes. This is called “time warping” and can be performed right in the project window.

Time warping allows you to move and stretch the tempo map directly in the project window using the ruler display at the top with the time warp tool. When you select the time warp tool, the display will automatically change to bars and beats if it was not already that way. The ruler will be colored red to indicate that you are in this powerful mode.

A TIME WARPING DISTINCTION

Time warping of the tempo map should not be confused with time warping of an audio clip, which is possible in the Sample Editor discussed in Part III: Editing. By adjusting the tempo map in Nuendo, we are not directly affecting any audio playback unless it's desired.

Tempo Map from Live Performance Example

As an example, let's say you've imported a live performance of some drums. The drummer was not listening to a click track so the tempo will fluctuate a bit. In order for all the bars and beats to line up in Nuendo, we must match the tempo as it changes during the performance.

To keep this easy to see, I will use one mono audio file as the tempo guide.

1. Import or record the performance first. Here's the example audio in the project window. It does not matter where it is placed since the tempo map will be made to fit its position.
2. A good place to start is using the tap tempo (Project>Beat Calculator...) to figure out a general ball park range for the tempo and insert that at the start of the tempo track. In this case, 101.8 bpm is a reasonable approximation of the tempo. (See Figure 14.12.)
3. Zoom in to where the beat starts (see Figure 14.13) and take a listen.

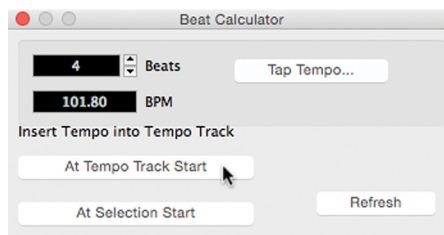


Figure 14.12
Beat calculator
with derived
tempo

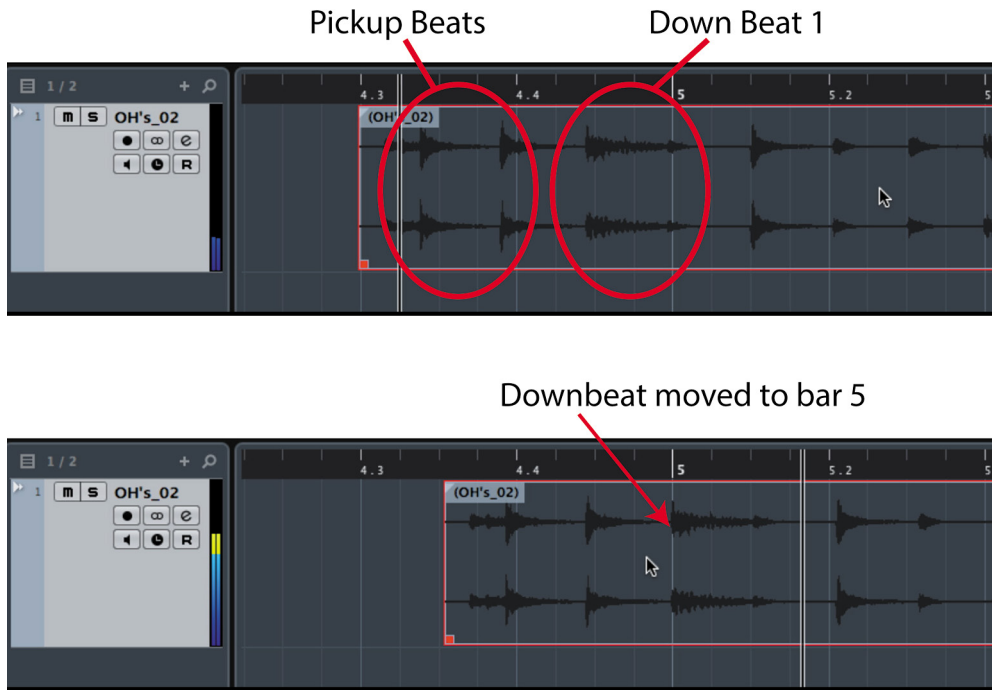


Figure 14.13
Zoomed in to the start of the beat

TRANSPARENT EVENTS

In these images, the Preference>Event Display>Transparent Events has been enabled, revealing the grid markings of the Project window directly behind the waveform. This is a helpful option for detailed editing with grid values that is only available in Nuendo. I have created a user-defined button in Nuage to turn this on or off quickly.

4. Try to figure out where beat one is. It's important that the bars line up musically to the count of the beat. I've assumed that this music is in 4/4 time and the meter does not change. The first two peaks are actually pickups coming in to the downbeat on the third peak. Once you have identified the downbeat, line it up to the bar line of the tempo map. The closest one in this case is bar 5.
5. Enter Time Warp mode by selecting the Time Warp tool. (See Figure 14.14.) The ruler will change to a red color.

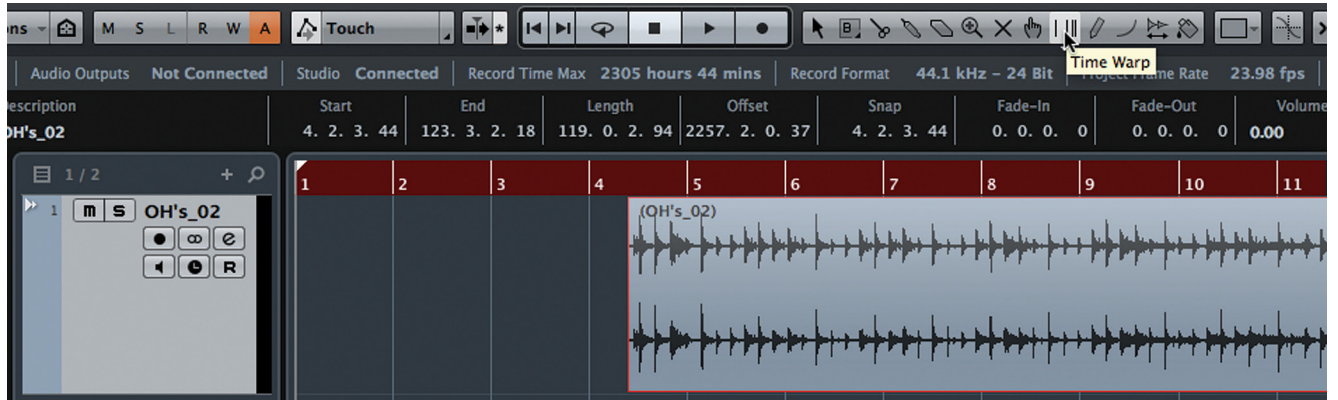


Figure 14.14 Time Warp tool selected

6. You might get a message indicating that the tempo track must be on for tempo editing to be possible. This is true, so turn on the tempo track in the Transport panel and make sure the tempo is set to the tap tempo determined in step 2.
7. Now place the tool over the bar line at bar 5. Notice the dark hash mark indicating you are in the range of bar 5. (See Figure 14.15.)



Figure 14.15 Warp tool hovering over bar 5

8. Click bar 15. Congratulations, you have time warped the tempo track. Notice the yellow tab marked 102 in the ruler. This indicates you have just placed a tempo event at that location. (See Figure 14.16.) The tempo event is locked in place at the downbeat of the drums.



Figure 14.16 Bar 5 has a tempo event, 102 bpm

9. Make sure the click is enabled and you can hear it clearly in the monitors.
10. Listen to see how the click blends with the live playing. When you notice it drifting, take note of the bar number. Right here at bar 9, the performance slows up a bit but before that it was fine, as seen in Figure 14.17.



Figure 14.17 Bar 9 is before the actual beat in the audio file

- I want to move the bar line for 9 a bit later to line up with the drum beat. Click and drag bar 9 to the downbeat of the break. Notice that the tempo at bar 34 has changed to 149 and then back to 142 at bar 35. All remaining bars will stay at 142 until you change them to match a new tempo. (See Figure 14.18.)



Figure 14.18 Moving bar 9 to match tempo change

- More changes were made at bar 11, 12, and 13. The tempo is sped up a bit there, as shown in Figure 14.19.



Figure 14.19 Changes made to bar 11, 12, and 13

- Repeat these steps all the way through the performance to create a complete tempo map that follows the live tempo changes exactly.

It is always possible to add or remove any tempo tabs later just by entering time warp mode again. You can fine-tune the tempo map any time. In order to remove a tempo event in Warp mode, hold the Shift key and click on the yellow tempo event mark.

Time Warp for Scoring

Using these same tools, you can create a tempo map that lines up with specific video frames for scoring music to picture. Bar lines can freely move around to match action sequences in a film or commercial. It becomes an easy task to match hitpoints in a score visually instead of constantly recalculating tempos.

MIDI Record Filter

There are times when you really don't want to record everything coming into your MIDI ports. Often MIDI is used for other tasks, such as mixer automation and remote control, synchronization and patch changing. If any of this data is coming in on the same ports that you use to record, it might be necessary to filter out that data so that it does not get recorded into a MIDI track. Figure 14.20 shows the center controls on a typical MIDI controller. These controls send system exclusive data for transport functions and also various controller data using the knobs. If you use these functions while recording, that data will be recorded along with the musical data. Filtering out the system exclusive messages would be necessary to avoid recording them.

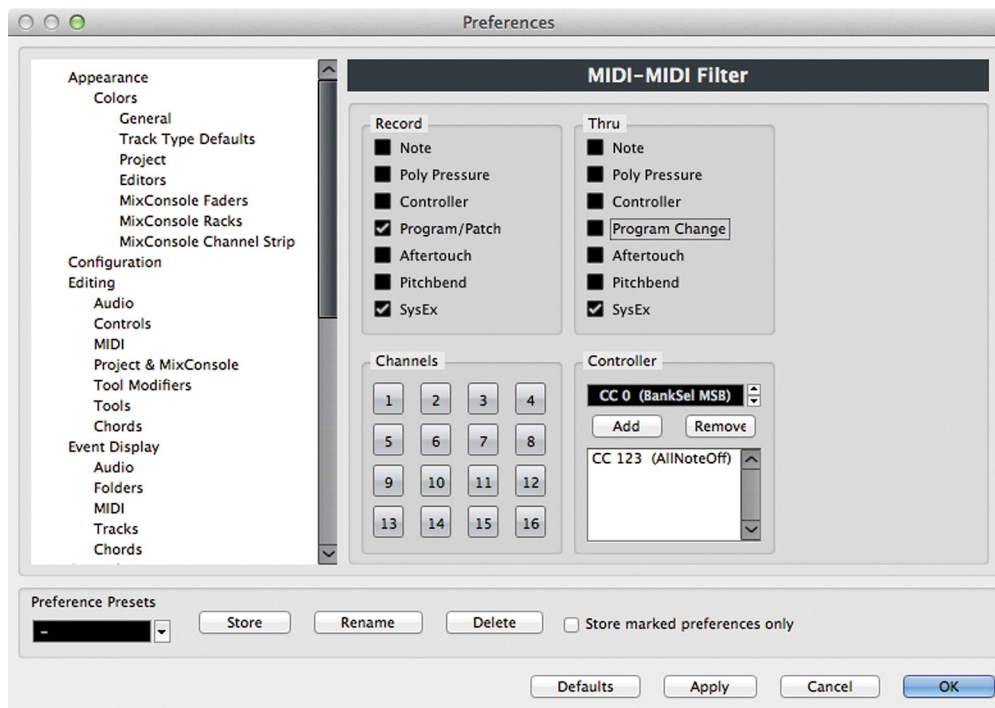


Figure 14.20
Typical MIDI controller with extra functions

The MIDI record filter is found in Preferences > MIDI. (See Figure 14.21.) You have the ability to filter various types of MIDI data from the stream before recording it. Individual controllers can be excluded so that they may be used for other purposes without disrupting the recording process. Often system exclusive messages are not necessary for recording musical performances but can be used to archive settings of external devices for later recall. You may specify a certain MIDI channel for data that should not be recorded and filter that channel out of the stream.

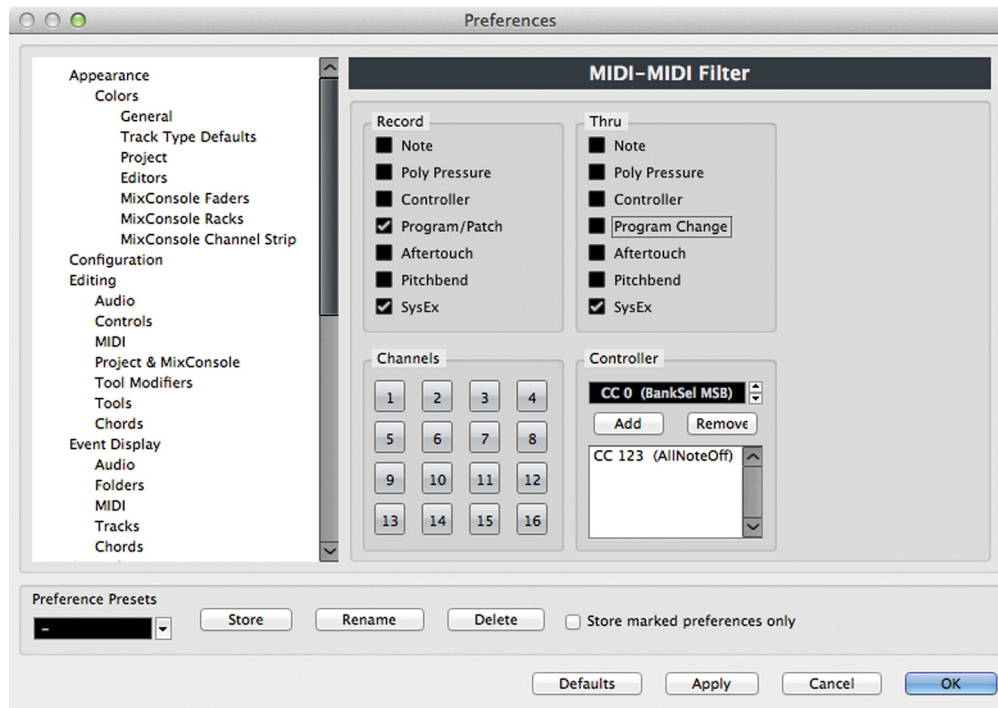


Figure 14.21
MIDI
Preferences,
MIDI Filter

Record Some MIDI

Now that everything has been set up—routing, filtering, tempo map, and instruments—it’s time to actually record something. This is relatively simple and straightforward. After generating the tempo map for the live performance, I have set up the Retrologue VSTi for a bass sound and recorded a part to accompany the live drums. (See Figure 14.22.)

MIDI Parts

The colored block you see after recording on a MIDI track is called a Part. Think of this as a container for multiple MIDI events, the notes recorded. The part is a convenient container for many events that go together, such as all the individual notes that make up the bass line. You can see the MIDI events as small black hash marks inside the part container.

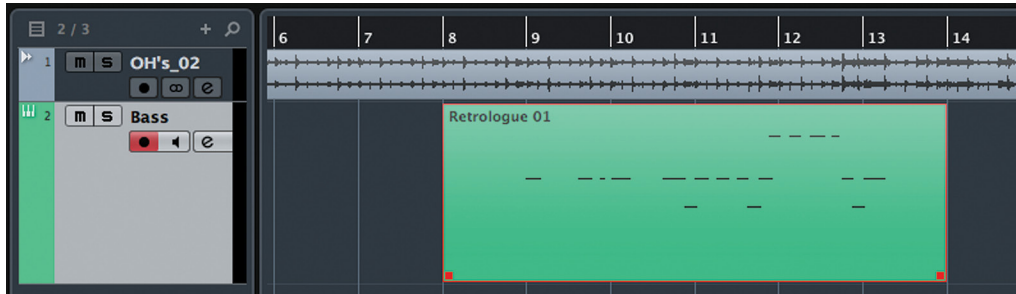


Figure 14.22
Recorded MIDI
part

The part container is helpful for arranging musical ideas because you can move many MIDI events just by moving the part. For example, if you were writing a pop song, the bass part could contain all the bass notes that make up the bass line for the verse. You can even name the parts to make this clearer. When you have a part selected, its information is displayed in the info line at the top of the project window. Click in the name field and enter a new name, as shown in Figure 14.23.



Figure 14.23
Naming the
bass part

Now you can visualize the song arrangement in the project window by looking at the names of parts and how they are organized. Parts may be copied, moved, and otherwise edited just like other events in the project window. They may be trimmed, moved, nudged, and in the case of MIDI parts, quantized, transposed, and more. MIDI parts give you a larger building block to work with while arranging and provide a handy container for multiple events.

MIDI Events

To access the individual MIDI events, you must open the MIDI part. There are several ways to do this.

- ❖ **In-Place Editor:** The in-place editor opens the MIDI part directly in the project window so you can access individual MIDI notes where they are relative to the other tracks. You access the in-place editor by clicking the in-place editor button on the track list, as shown in Figure 14.24.

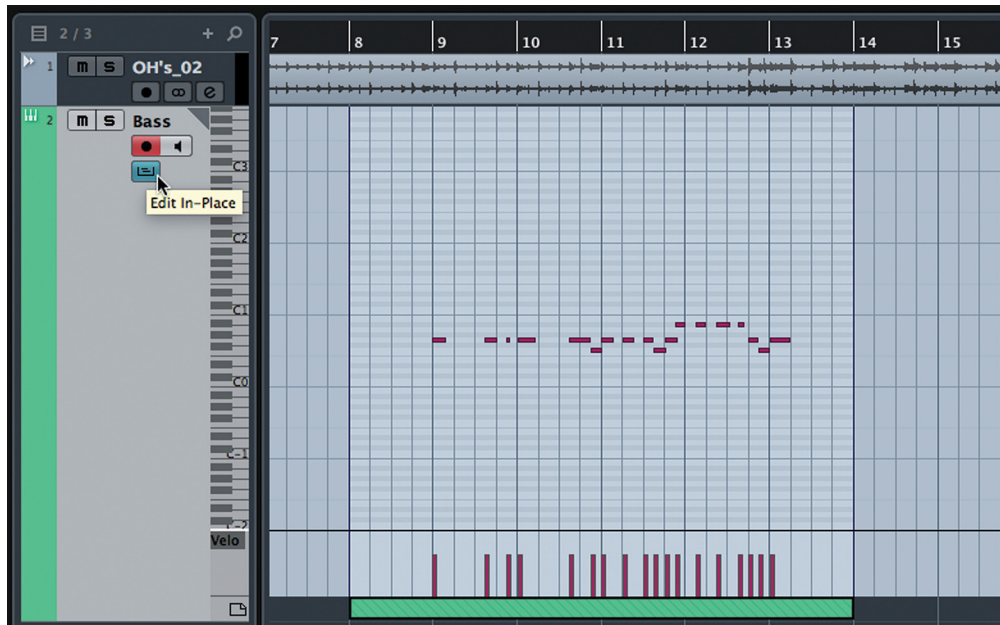


Figure 14.24
In-Place Editor

- ❖ **Key Editor:** The key editor is another window that offers more detailed editing of individual MIDI events using a graphic interface. You access the key editor by double-clicking the MIDI part, which will open the key editor window shown in Figure 14.25.

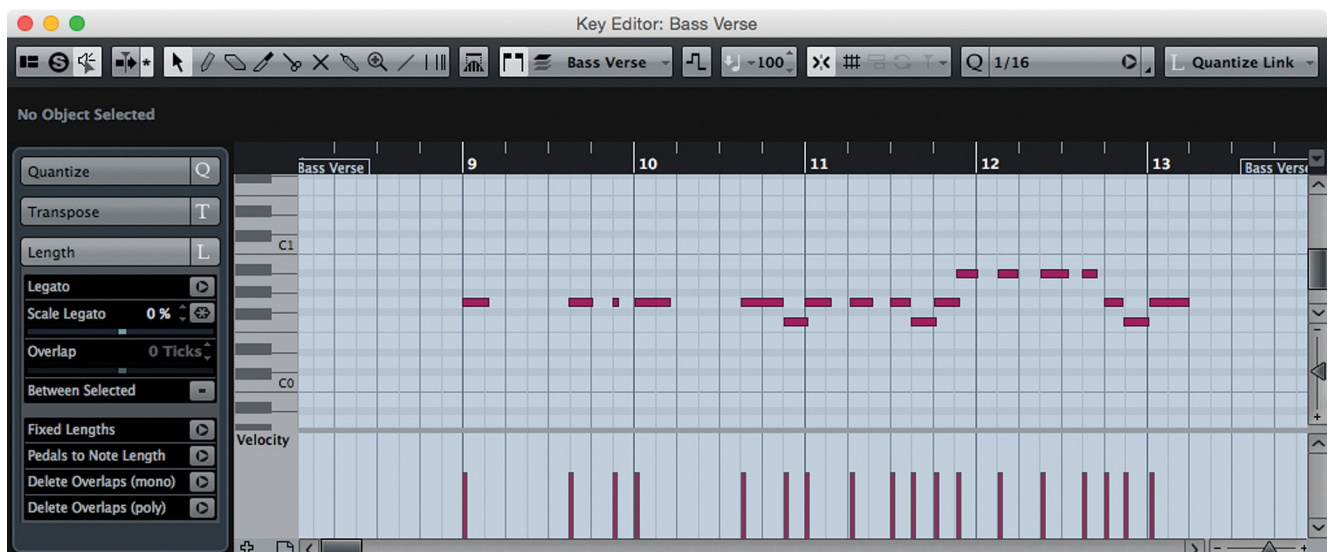


Figure 14.25 The Key Editor

- ❖ **List Editor:** The list editor, shown in Figure 14.26, is another window that displays MIDI events as a list of data that you may edit with direct entry of parameters. The list editor is accessed from the MIDI menu. Select the MIDI part you wish to edit and then choose Open List Editor from the MIDI menu.

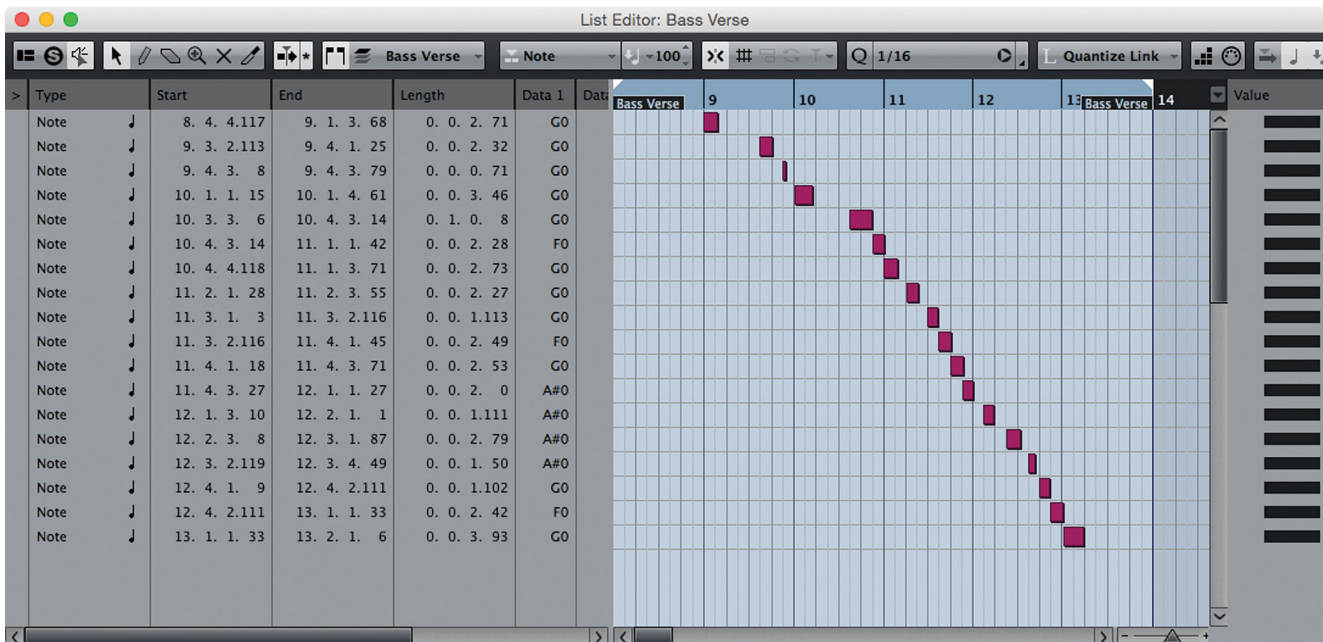


Figure 14.26 The List Editor

The fundamental MIDI event is a note. Each MIDI note has several parameters that define its musical attributes.

1. Start
2. End
3. Length (A function of the end time minus the start time; altering one changes the other.)
4. Pitch (the MIDI note number)
5. Velocity (how hard the note was hit)
6. Channel (The MIDI channel that the note was transmitted on. One MIDI track can contain data from multiple MIDI channels.)
7. Off Velocity (used for some virtual instruments such as VSTi pianos)

Understand that there are many other types of MIDI events, from modulation and pitch-bend to after-touch and poly-pressure, that can be recorded. MIDI notes are just the most basic.

Both the in-place and key editors allow you to graphically edit attributes of MIDI notes by manipulating the note image in the piano roll. In the list editor you must manually enter values to change the MIDI note data.

Recording Multi-Channel MIDI Data

One MIDI track can contain all sorts of data from multiple sources and multiple MIDI channels. Since each MIDI port is capable of receiving data across all 16 MIDI channels and each MIDI track can record data from multiple MIDI inputs, it is quite possible to record MIDI data from several musicians all together on one track.

All MIDI Inputs

In the top inspector tab for any MIDI track you will find the input selection menu. Choosing All MIDI Inputs allows you to record from multiple MIDI ports at the same time and mix the data onto one MIDI track, as shown in Figure 14.27.

The MIDI Port Setup gives you the choice of which MIDI ports will be included from your system in the All MIDI Inputs selection. MIDI ports that contain control data for the mixer and external control surfaces should not be included for recording musical data under normal circumstances. Select any port that has a MIDI controller connected to it that you will use to generate musical data and check its column to add it to “All MIDI Inputs.”



Figure 14.27

Selecting All MIDI Inputs as the input for a MIDI track

As an example, let's say you are tracking a live band and the piano player is using a keyboard to generate the piano sound. You can record the MIDI output of that keyboard along with the audio output during the recording session. The MIDI data can then be used later to generate alternate piano sounds from VSTi's or even other keyboard sounds such as synth pads or a Wurlitzer piano sound.

In addition, the drummer has installed triggers on the drums and has a triggering module set up to generate the resulting MIDI data. You may record this MIDI data as well for use later in replacing drum sounds or augmenting the recorded drums sounds during the mix.

Both of these MIDI data streams can be recorded to one track for the sake of expediency during the tracking session and then later extracted to their own MIDI tracks for use in the mix. Create a MIDI track and set its input to All MIDI Inputs so that data from both devices is recorded together on the track.

Extracting Multi-Channel Data Using the Logical Editor

The wonderful thing about MIDI data is the ability to endlessly manipulate it after it has been recorded. In the case of multi-channel data recorded onto one MIDI track, it is possible to extract the data from each channel and place it on its own MIDI track to allow for further editing and manipulation.

To do this we will use the Logical Editor, which can manipulate MIDI data in a staggering number of ways, and this example is just an introduction to its possible uses. This editor uses functions to extract data and then perform various actions to that data. In this case, we need to extract data from one MIDI channel and paste it into a new MIDI track.

Here's how it works:

1. Record some multi-channel data onto one MIDI track, as shown in Figure 14.28.
2. Open the list editor to identify what MIDI channels are being used, as seen in Figure 14.29.
3. From the MIDI menu, open the Logical Editor. The logical editor has top and bottom panes. The top pane identifies data through use of filters, in this case a filter by MIDI channel. You can set up multiple filters by clicking +. This filter is set up to find data that uses MIDI channel 10 for the drums, as shown in Figure 14.30.

4. The lower pane provides an action list that can process this data. In this case, there is no need to actually process the data because we only want to move it to a new MIDI track.
5. At the bottom of the window is the Function menu. The possibilities are delete, transform, insert, insert exclusive, copy, extract, and select. In this example, extraction is the goal.
6. Click the apply button to execute the filters, actions, and function all at once.

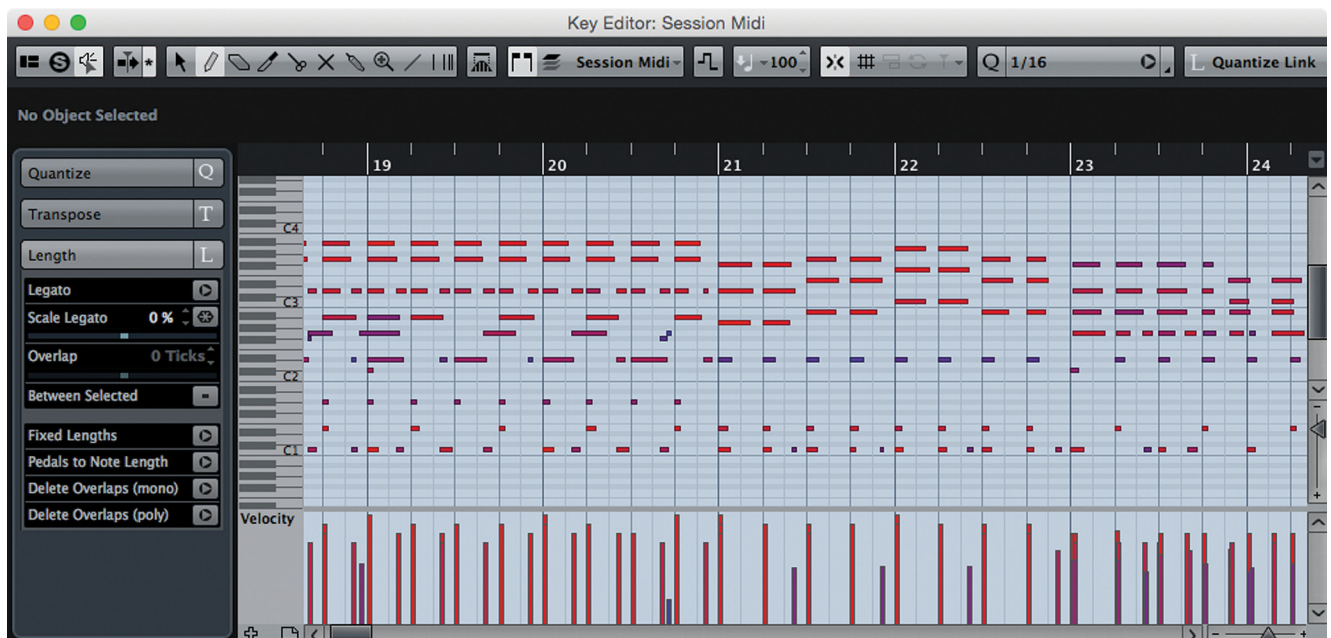


Figure 14.28 The upper MIDI events are a keyboard part while the lower ones are drums

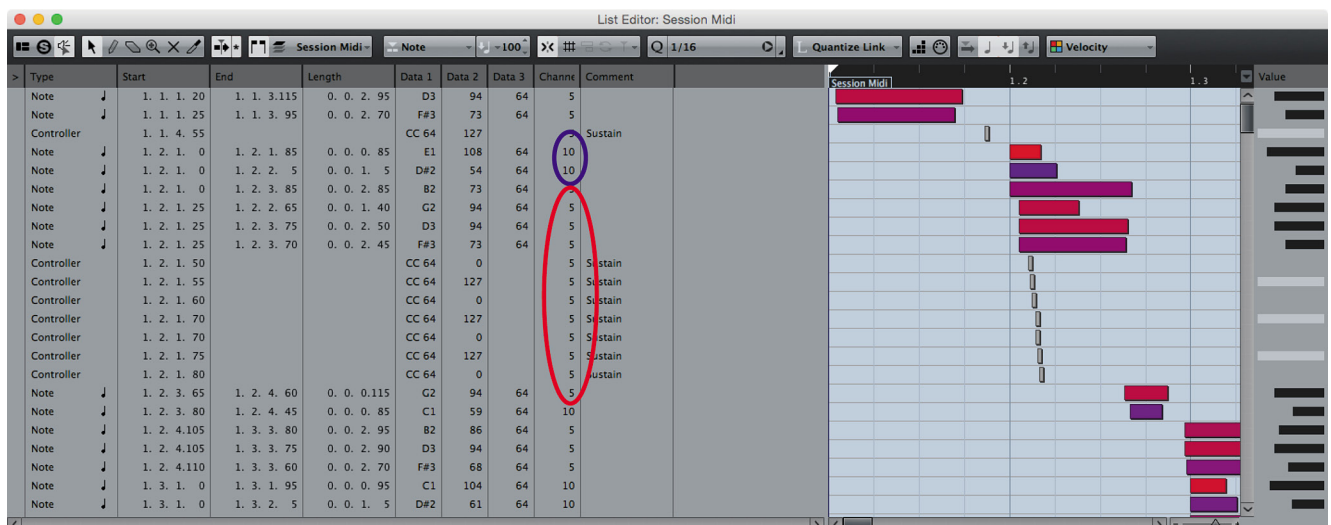


Figure 14.29 The list editor showing data on channels 5 and 10

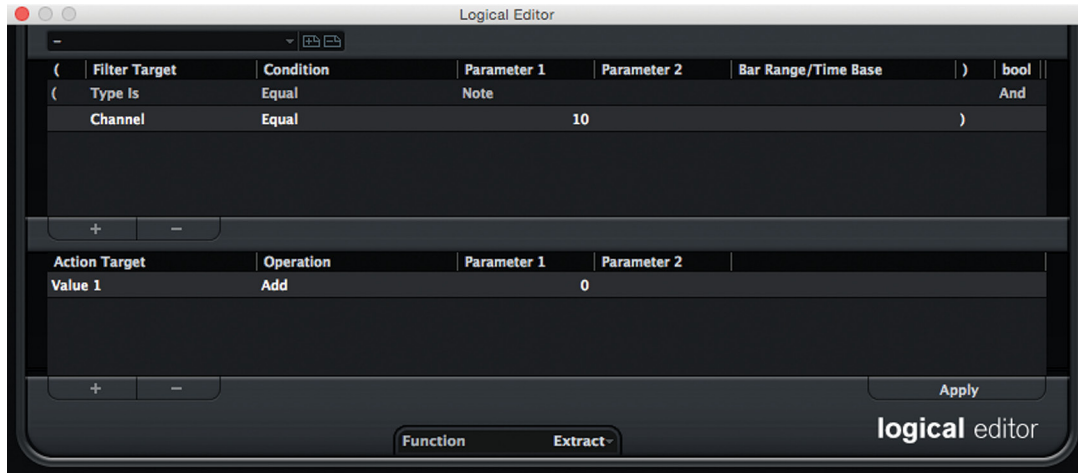


Figure 14.30
Logical editor set up to find data on MIDI channel 10 and extract it

The result is that the filtered data is removed from the first MIDI track and placed on a newly created MIDI track directly beneath the original. Now we have two MIDI tracks, one with piano only and the other with drums only. (See Figure 14.31.)

This is just a simple example of the logical editor’s possibilities. MIDI data provides a unique way of processing musical information that straight audio recording cannot. Experiment and explore its possibilities.

This is just the beginning of all the editing possibilities in Nuendo.

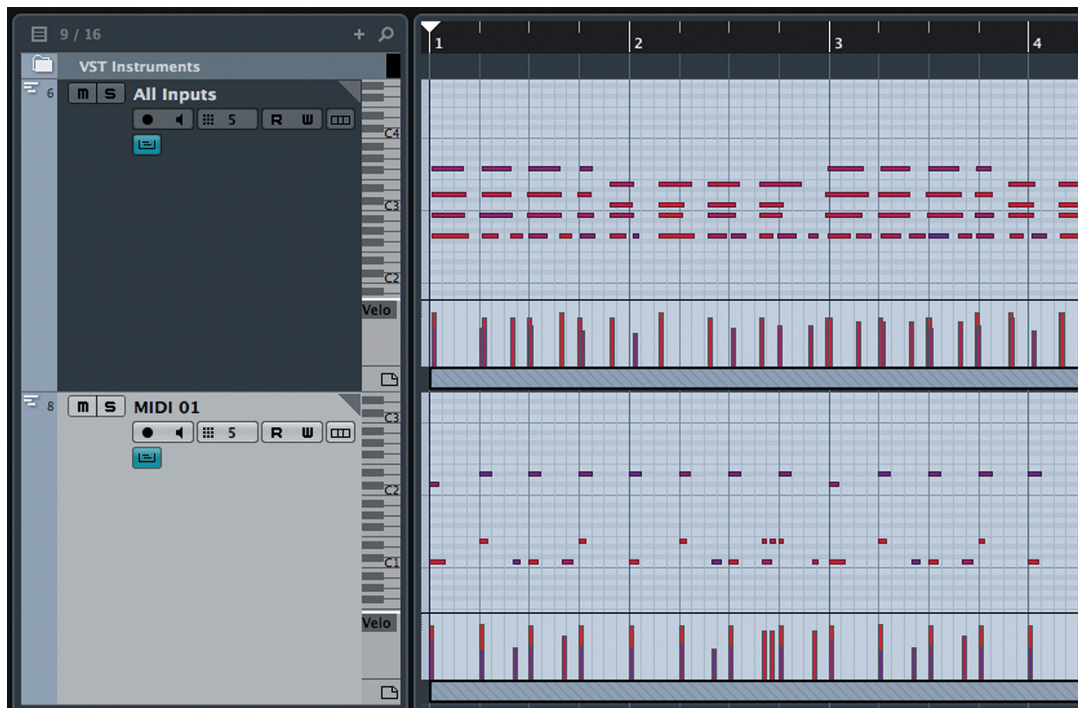
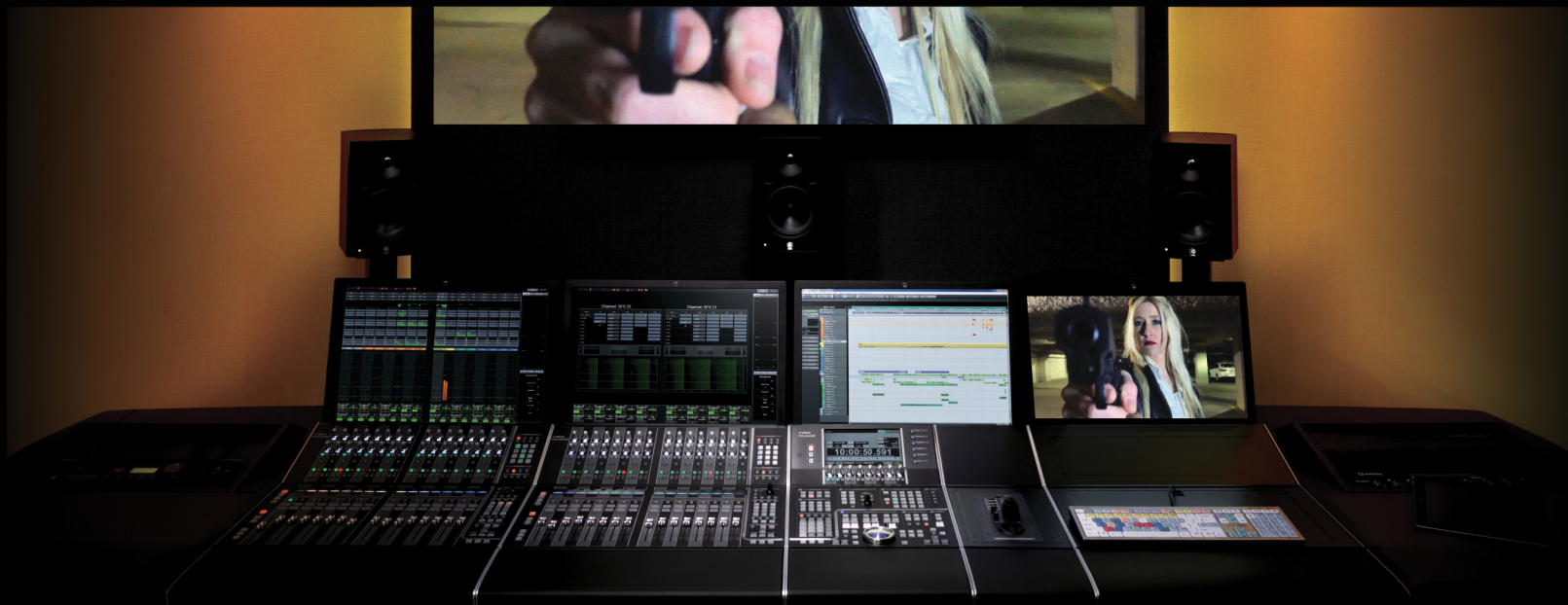


Figure 14.31
The resulting two MIDI tracks

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PART III: EDITING



by Ashley Shepherd

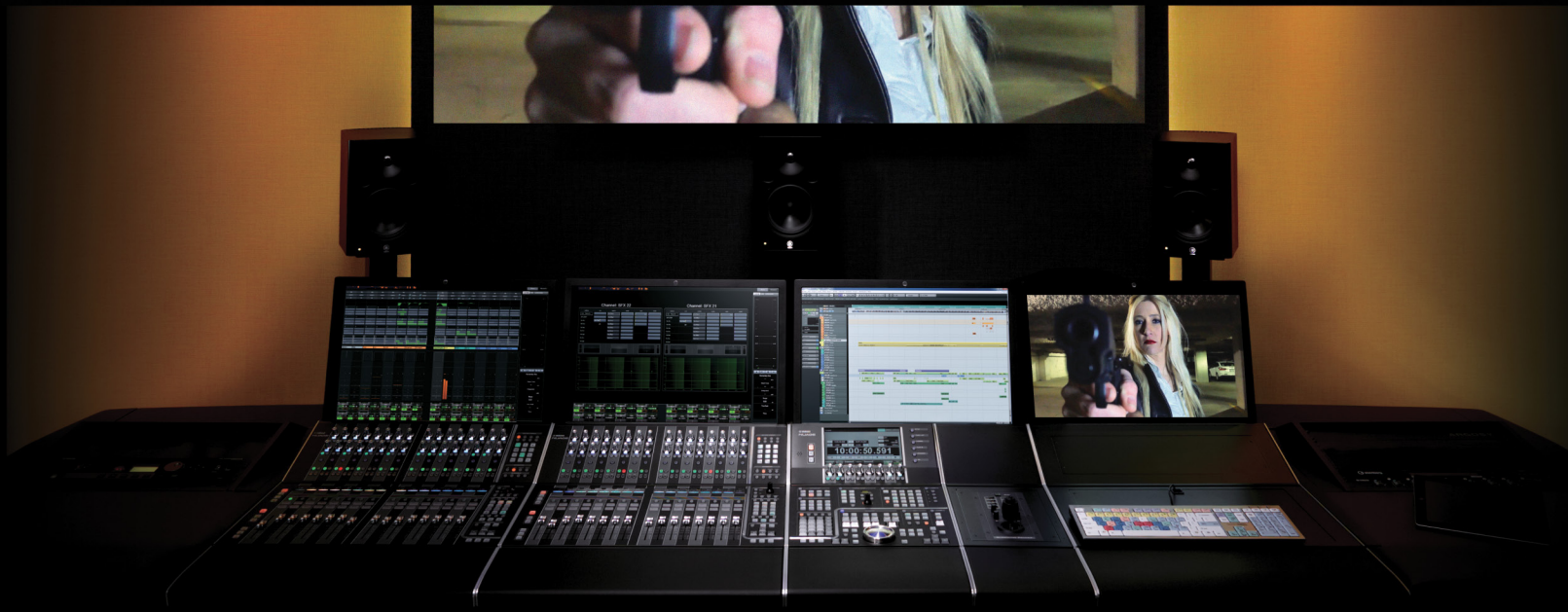
Now that you have recorded some material it is time to start the wonderful process of audio editing. The virtual environment of Nuendo empowers you to manipulate the audio and MIDI data in almost infinite ways. How you use the awesome power is, of course, up to you and the needs of the project.

Often, editing is used to fix problems with the recording, whether that is fixing the timing of a drum performance, tuning a lead vocal, or removing unwanted noise from production audio in a film. The flip side of editing is that it can be used for creative purposes, manipulating sounds to create new sonic textures and musical expressions. In effect, the DAW can become an instrument in its own right, giving the user a powerful canvas to fill with audio art. And then there are times when we just need to get that voice over to fit into a thirty-second spot!

This part of the book will cover many aspects of editing in Nuendo in order to give you the tools and tricks to apply in whatever situations and sessions you find yourself in, from large sessions with many people involved that require speedy solutions to problems encountered to small, creative situations where deeper exploration is possible. Of course not every possible scenario can be covered but we will touch upon nearly all areas of audio in order to show what is possible in Nuendo and how it can help you create compelling sound productions.

NUAGE

COURSEWARE



PART III: EDITING

by Ashley Shepherd

Chapter 15

Basic Editing



NUAGE

Basic Editing

- ❖ Object and Range Selections
- ❖ Cut, Copy, and Paste
- ❖ Audio Event Handles
- ❖ Crossfades
- ❖ Range-Specific Editing Functions

Object and Range Selections

In Nuendo, there are two ways of selecting and editing audio and MIDI data, first by selecting various *objects* (*audio events, MIDI events, etc.*) in the project window, and second by selecting a *range* of time that may include events.

Object Selection

Events can be selected and manipulated using the object selection tool. The object selection tool can select one or more events at a time, as shown in Figure 15.1. These events are then ready to be edited in any number of ways, as discussed later in this chapter.

Object Selection Tool

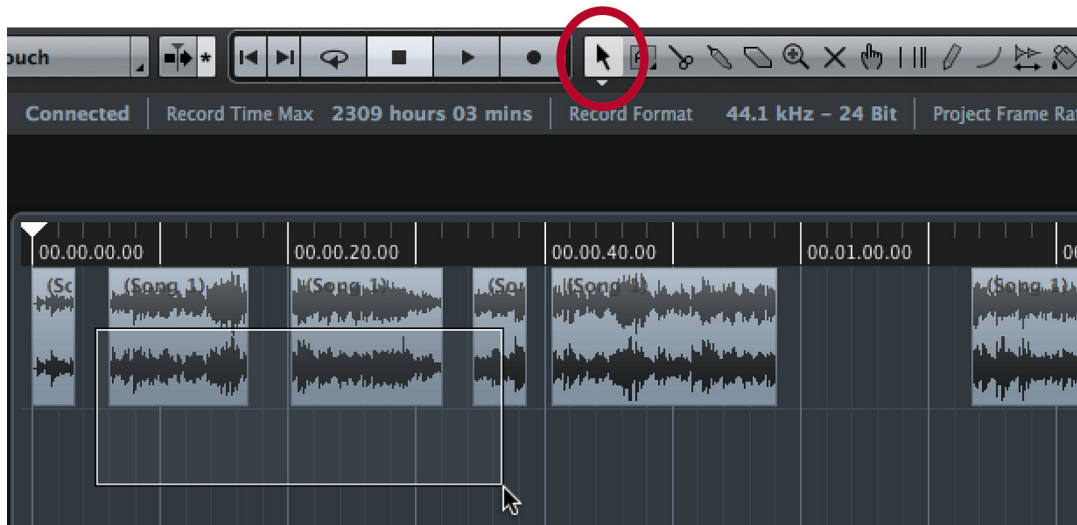


Figure 15.1
Object selection tool dragging across multiple objects in the project window

Selected audio events and MIDI parts are outlined in red and display editing “handles” at the bottom corners, as seen in Figure 15.2. If MIDI “in place” editing is enabled (See Chapter 14) then MIDI notes can be selected individually and will be outlined in black.

Once you have one or more events selected, the info line at the top of the project window will display data for the topmost and leftmost event in the selection. Editing this data will cause all selected events to be altered.

For example, if you increase the start time in the info line, all selected events will move to the right relative to the top left event. In Figure 15.3, I have increased the start time by six seconds. Notice how all the selected events have moved to the right six seconds relative to their original start position in Figure 15.2.

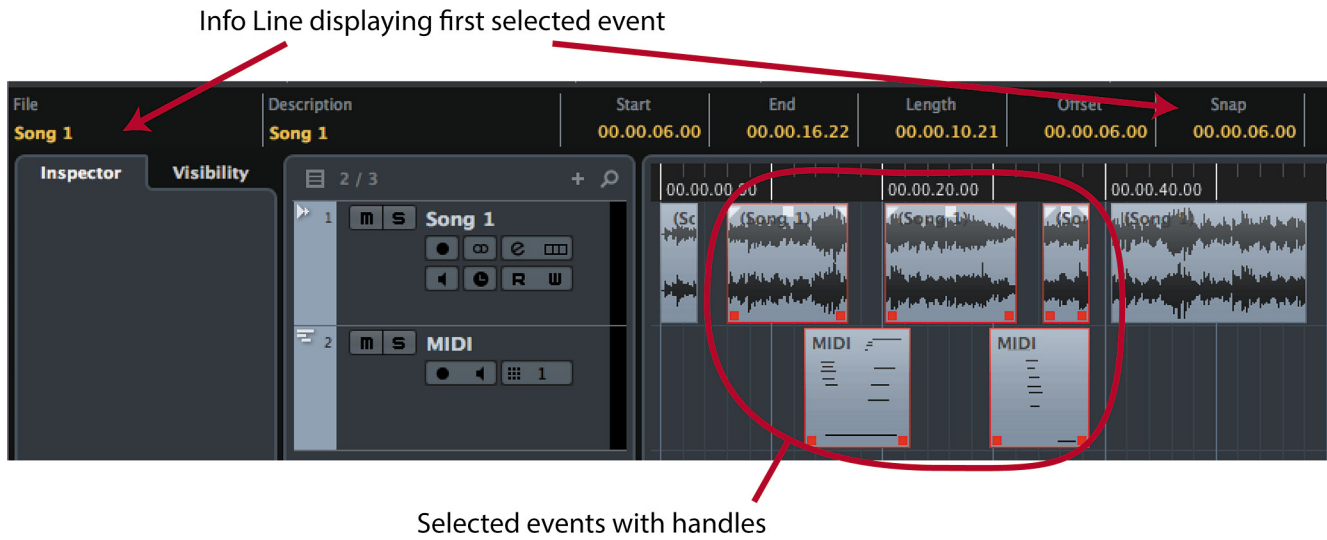


Figure 15.2 Selected audio and MIDI events

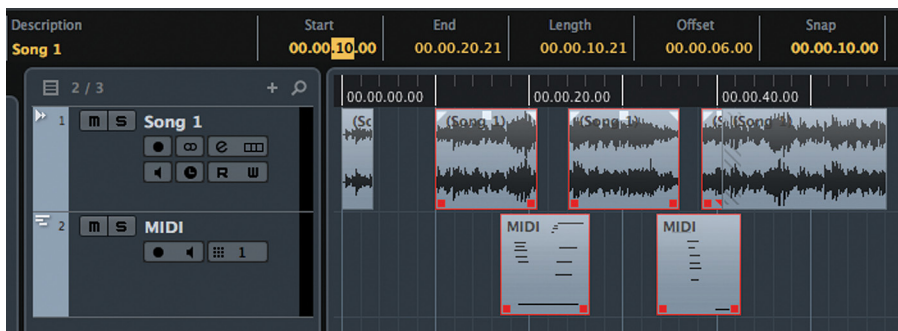


Figure 15.3 Selected events moved six seconds to the right

TAKE CARE WITH MULTIPLE SELECTIONS

The key thing to remember is that when there are multiple objects selected, changing one object changes them all. Always be aware if you have multiple objects selected. The info line will be displayed in a yellow color if more than one object is selected.

Range Selection

Range selection is used to select an area in the project window that encompasses some horizontal (project time) and vertical (track list) amount of space in which events may be located. Various editing tasks may be performed to any and all events or portions of events located within the range selected. This includes empty space, as some editing functions will affect empty space, such as Editing > Range > Cut Time.

The selected range shown in Figure 15.4 encompasses the audio track and MIDI track from 01:34 to 01:36 (highlighted in blue). There are portions of the audio event and some MIDI events within the selection range. Depending on the editing function chosen, only certain events will be affected.

For example, if you press the delete button with this range selection, only some of the events or portions of events will be removed.

Notice how only a portion of the audio event was removed while MIDI events were removed entirely. Range selections affect audio differently than MIDI. For a MIDI note to be deleted as a part of a range, the start of the MIDI note must be part of the range. However, any portion of an audio event can be deleted as a part of a range.



Figure 15.4 A range selection in the project window

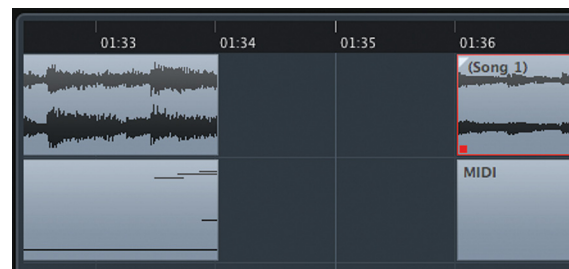


Figure 15.5 After deleting the range selection

Range A and B Selections

Nuendo provides two distinct range selections, A and B. Each selection range is independent of the other, giving you a powerful tool for four-point editing. To access either selection, click on the range tool in the project window to open the popup menu, as shown in Figure 15.6.

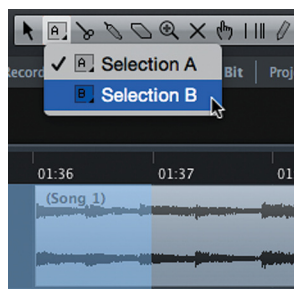


Figure 15.6
A choice of two selection ranges

For example, you can use the A selection for copying events from one area and the B selection for pasting in another area. The A selection is colored blue and the B selection is colored green for easier identification, as shown in Figure 15.7.

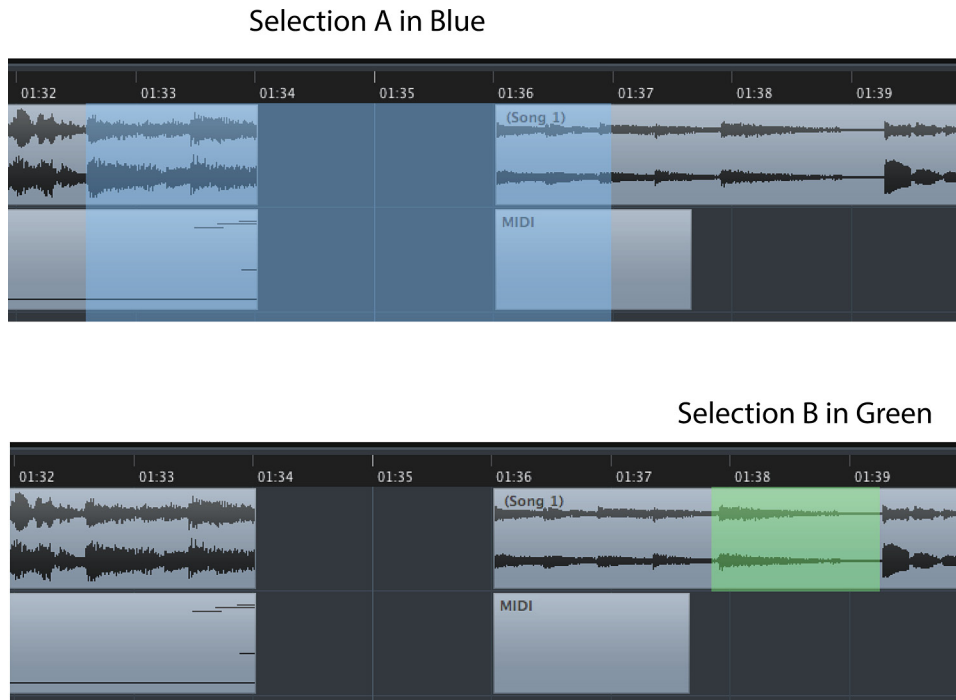


Figure 15.7
Selection A is blue, selection B is green

Cut, Copy, and Paste

The most basic editing functions should be familiar to everyone who has used computers or at least a word processor before. Once you have selected something in the project window, whether by range or event selection, the basic editing functions become available to that material: cut, copy, and paste.

Cut

By using the command `Edit>Cut`, you may remove the selected events or portions of events contained in a range from the project window. The “Delete” key performs the same function as does the key command `Cmd(Ctrl)+X`.

When cutting a range from the project window, only the portions of events within that range will be removed. This function removes the selected range from the project window like the Delete key except that all data that has been cut will be stored in the clipboard (the program’s data buffer) and may be used by pasting the data in another location. This location could be in another project altogether.

DELETING MIDI EVENTS

Note that MIDI events are considered a single point and event though they have a musical length; deleting the start removes the entire note, not just a portion.

Copy

Copying portions of or entire events places them in the clipboard. While they're being held in this buffer, you can go to other sections of the project and place these events in new locations in this or another project. Note that the original events are not altered when copying them.

When copying events across multiple tracks, be aware that pasting them in other locations might cause unexpected results if the destination tracks are not in the same order.

Paste

Pasting involves placing event data from the program buffer or clipboard back into the project. For single track edits, this is pretty straightforward. However, when events have been selected across more than one track, pasting them is a bit more complicated.

Regardless of what tool was being used to copy data, you may paste that data using either the object or range tools. To show how pasting works, let's use the following example to illustrate the various possibilities. Data is copied from three adjacent tracks, two audio and one MIDI, as shown in Figure 15.8. This data will then be pasted using the following scenarios to show how Nuendo deals with the different types of data.

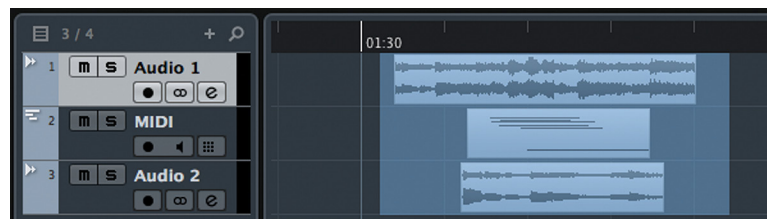


Figure 15.8
Example area of copied data

Pasting with Object Selection Tool

To past data while using the object selection tool, move the cursor to the desired position on the timeline. Depending on what tracks are selected, pasting data will result in one of the following:

- ❖ **No Tracks Selected.** Events will be pasted on the same tracks that they were copied from.
- ❖ **One or More Tracks Selected.** Events will be pasted beginning on the top-most track and going below on adjacent tracks if more than one track was copied. These tracks must be of the same type and order as the source tracks. If not, Nuendo will create new tracks and insert them in the proper order, as seen in Figure 15.10.
- ❖ **Single Track of Other Type.** If one track is selected that is not the same type as the top track of the source data, pasting new data will result in events being placed back on the original tracks from which they were copied, as seen Figure 15.11.

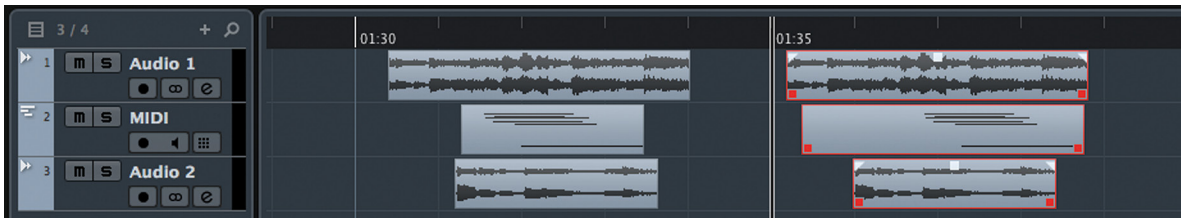


Figure 15.9 Pasted data without a selected track

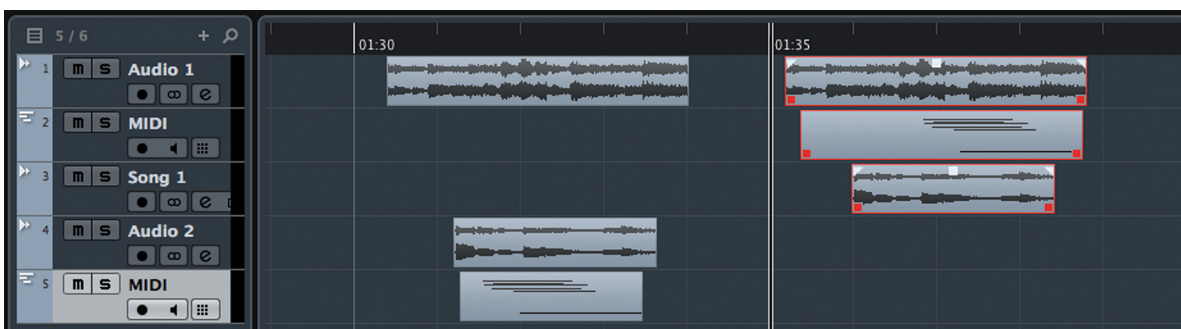


Figure 15.10 Pasted data with multiple selected tracks in differing order

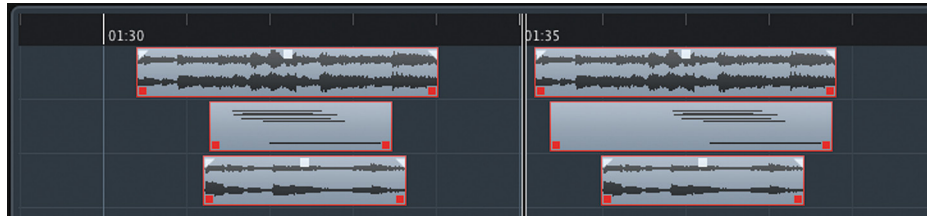


Figure 15.11
Pasted data with single track of differing type selected

Pasting with Range Tool

Pasting data while using the range tool is similar to pasting using the selection tool, with certain exceptions. First, the point at which the data will be pasted is not set by the playback cursor position and track selection, but by the range selection itself.

To paste data using the range tool, click anywhere in the project using the range tool and choose the paste command. The following rules apply:

- ❖ **Range Placed On Topmost Source Track.** Events will be pasted on the same tracks that they were copied from, as shown in Figure 15.12.
- ❖ **Range Starts on Different Track.** If the destination range starts on another track of the same type as the topmost source track, data will be pasted on that track and below with additional tracks inserted as needed, as shown in Figure 15.13.
- ❖ **Range Starts on Different Type Track.** If the destination range starts on a different type of track than the source, data will be pasted back on the original source tracks, as shown in Figure 15.14.

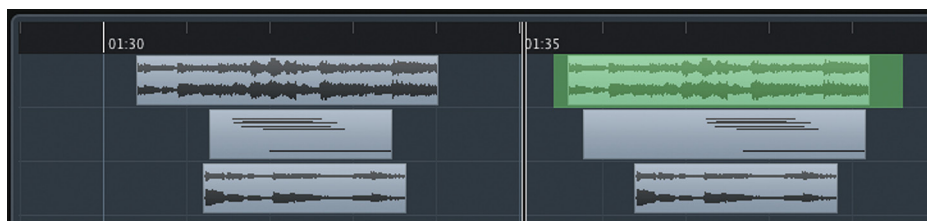


Figure 15.12
Range beam on same top track of source

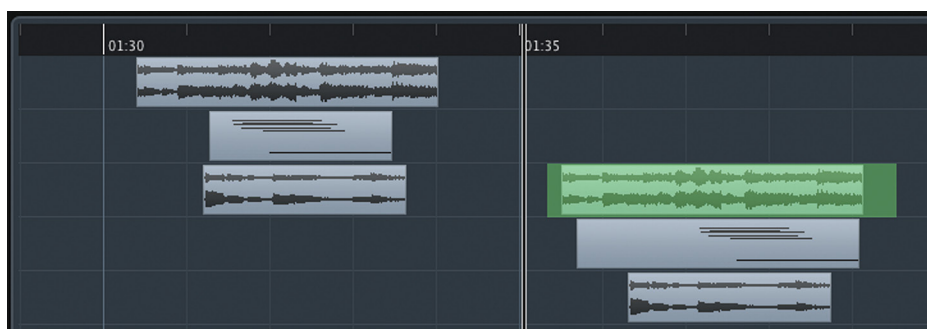


Figure 15.13
Result of paste when range is on a different track of the same type



Figure 15.14
Pasted data with single track of differing type selected

COPYING BETWEEN PROJECTS

Since Nuendo can have multiple projects open at once, data can easily be copied and pasted from one project to another. You will be asked if you wish to copy the audio files into the destination project folder or simply reference the files from their current location.

Audio Event Handles

Various attributes of each audio event can be changed with the Object Selection tool, including the position of the event, fade in and out lengths, event volume, and sizing of the event. Audio events have “handles” that can be manipulated to change these attributes, as seen in Figure 15.15.

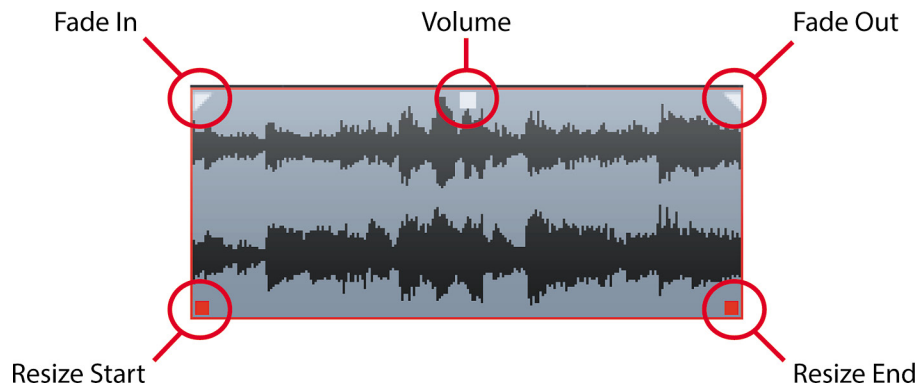


Figure 15.15
Audio event handles

Event Volume Handle

The event volume handle adjusts the gain of just the section of audio within the event boundaries. It is not a destructive process and can be endlessly adjusted as needed. This is quite possibly one of the handiest features in Nuendo, allowing each chunk of audio to be level matched with other events on the same track.

PRO TOOLS

The volume handle is the equivalent of clip-based gain (“Clip Gain”) in Pro Tools since version 10, while Nuendo has utilized volume handles for events since version 1.

For example, say we have a vocal track in which one line was delivered a bit off mic and is therefore softer than the other lines, as seen in Figure 15.16. We can simply edit this line to be a single audio event and using the event volume handle, raise its level to match the other lines in the performance.

1. In order to create a single audio event for the first line, it must be separated from the other lines of the vocal. Select the scissors tool.
2. Make a cut just before the beginning of the second line, as shown in Figure 15.17.
3. Click and drag on the volume handle for the second event. Dragging up increases the gain while dragging down decreases the gain. Adjust the volume of the line to match the others. The waveform will enlarge to reflect the change in volume, as seen in Figure 15.18.
4. Play back the result of your editing to see if the lines match by ear.

Increasing the volume of the event can be done in several ways. The above example uses the mouse dragging up on the handle to raise the level. You can also change the value of the Volume field in the info line to do the same thing, as shown in Figure 15.19. You may enter a desired value down to hundredths of a dB or simply use the mouse wheel to increase or decrease the volume.



Figure 15.16 The second line is softer than the rest

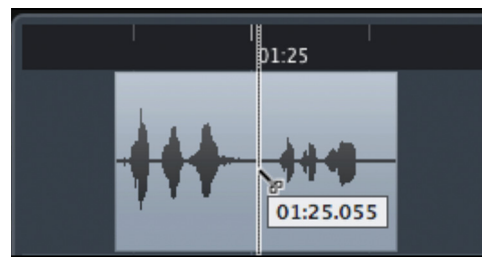


Figure 15.17 Using the scissors tool to create a new event



Figure 15.18 Increasing the level of the audio event using the volume handle by about 4.2 dB

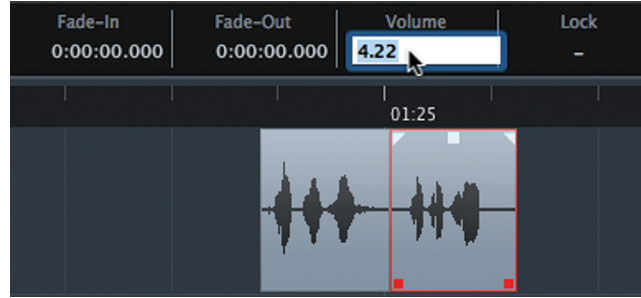


Figure 15.19 Increasing the level of the audio event in the info line

GOOD NEWS FOR DIALOGUE EDITORS

Dialogue editors, rejoice! This simple editing tool allows you to quickly edit dialogue lines to match volume in a scene. The volume handle is non-destructive and the results are instant so that you can edit event volumes on the fly, during playback, to hear the results instantaneously.

Event Envelope

In addition to the volume handle, each event can have its own volume envelope, allowing changes in volume over time. This is similar to volume automation in the mixer, except the gain changes occur prior to the signal entering the mixer channel.

To access the volume envelope, select the pencil tool from the toolbar in the project window and start drawing on any audio event. When you first click with the pencil tool on an audio event, a blue line will appear across the event. Each successive time you click will add another envelope point, resulting in a complex gain curve.



Figure 15.20 Using the pencil tool to create event volume envelopes

There are no gain markings associated with these envelopes. Consider any envelope point at the top of the event as 100% of current volume and the bottom of the event as 0%. The event envelope is independent of the volume handle setting so that even after creating a complex envelope, it may be adjusted up or down as a whole using the volume handle.



Figure 15.21
Complex envelope adjusted down using volume handle

REMOVING THE ENVELOPE

You can remove the envelope by selecting the Remove Volume Curve command from the Audio menu.

Since both the volume handle and event envelope are part of the audio event itself, they move with the event during editing. The volume adjustments stay with the audio regardless of where it is placed in the project timeline.

Both the volume handle and the envelope adjustments are made to audio events prior to the mixer, where processing may be applied including dynamics such as compressors and gates. The ability to adjust incoming audio signals prior to dynamics processors is like having a trim adjustment for every syllable in a vocal performance, allowing you to optimize the compressor for the best tone and response. For film and post work, this is a valuable tool for cleaning up dialog tracks with surgical precision.

Manual De-Essing Example

To illustrate how the volume handle can be used, let's take a look at a technique for de-essing vocals manually. The concept is simple, turn down the "S" sounds in the vocal. We can do this by cutting the "S" out of each phrase and using the volume handle to turn it down. Here's a step-by-step guide for doing this:

1. Locate the offending "S" sound.
2. Using the selection tool, press the Alt/Option key to turn it into the scissors tool.
3. Cut the audio event at the start of the "S" sound.



Figure 15.22
Cutting the audio event at the start of the "S" sound

- Cut the event at the end of the "S" sound.

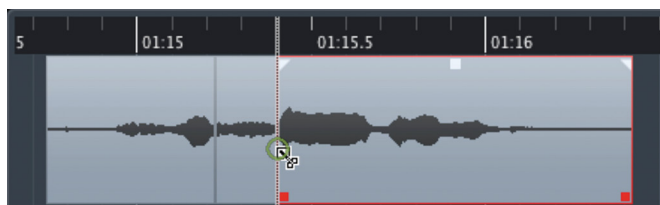


Figure 15.23
Cutting the end of the "S"

- Adjust the volume handle to lower the "S."



Figure 15.24
Lower the volume of the event using the volume handle

- Select all three events in a row.



Figure 15.25
All three events selected ready to crossfade

- Hit the X key command to create crossfades between the events.

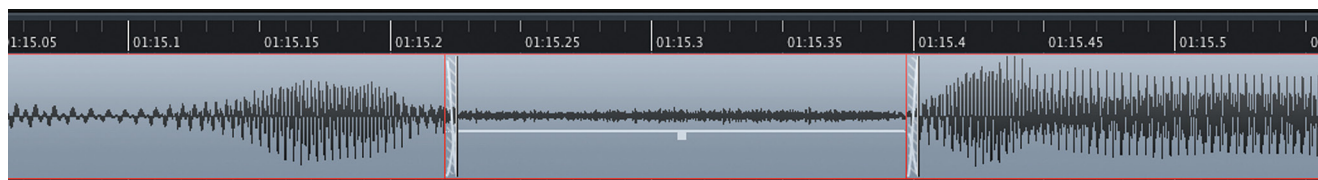


Figure 15.26 Crossfades between events

- Listen to the result and adjust if needed.

Now that you have the "S" isolated, the event volume handle can be adjusted in order to get the correct amount of "S" for the material. Since the event volume is rendered in real time, continued adjustments to this event will happen instantly and do not result in more audio files being created for each adjustment of the volume.

Refining the crossfades can help smooth out this type of edit. Advanced crossfade editing will be covered in Chapter 10: Advanced Editing.

Sizing Handles

The sizing handles are found at the bottom left and right corners of each audio event. They are used to shorten or enlarge the event from either the beginning or the end.

Dragging the start sizing handle to the left or right will respectively enlarge or shorten the audio event, exposing more of the audio file in that direction. If there is no additional audio to expose, the handle will not be able to be moved in that direction.

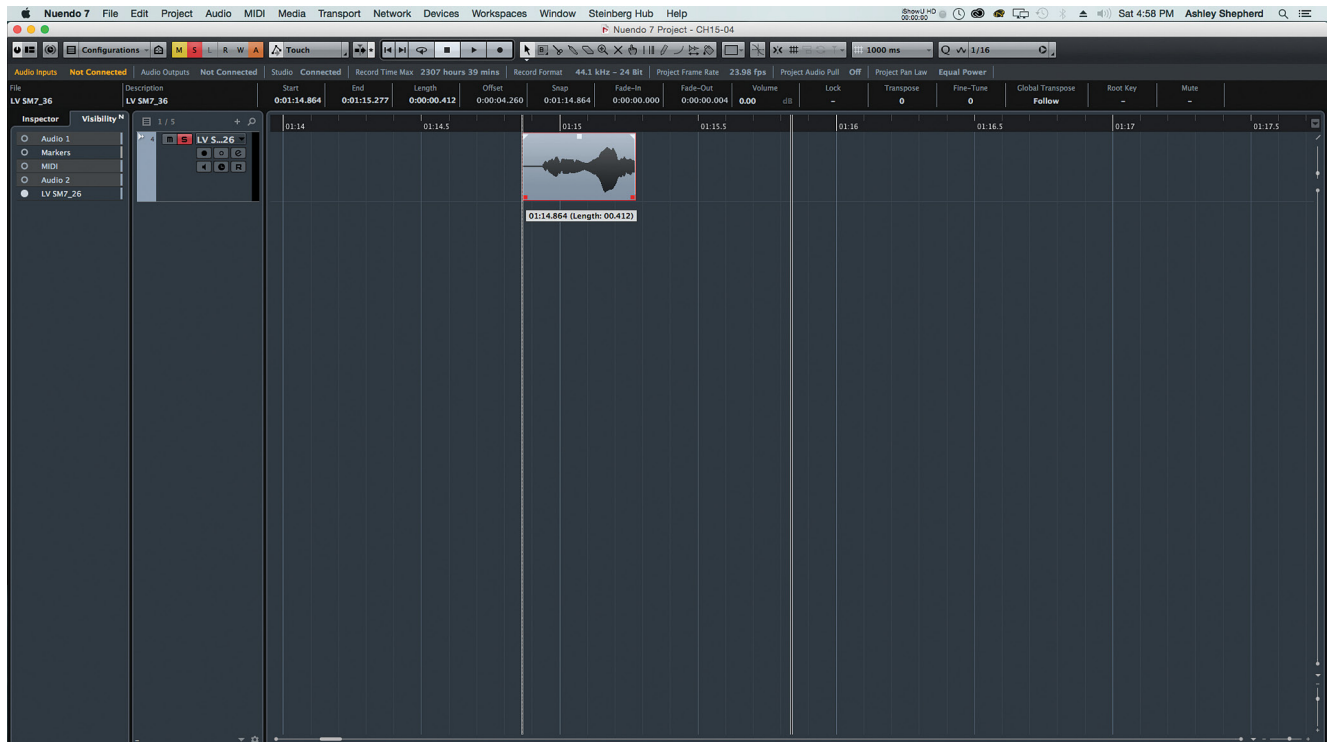


Figure 15.27 Sizing handles

The selection tool has three sizing modes:

- ❖ **Normal Sizing.** Using normal sizing mode, audio events can be enlarged or shortened using the handles.
- ❖ **Sizing Moves Contents.** Using this mode, handles enlarge or shorten the audio event by moving the audio inside relative to the handle being manipulated.
- ❖ **Sizing Applies Time Stretch.** Altering the sizing handles while in this mode causes the audio content to be stretched or compressed to the new length.



Figure 15.28
Normal sizing
before and after



Figure 15.29
Sizing moves
contents

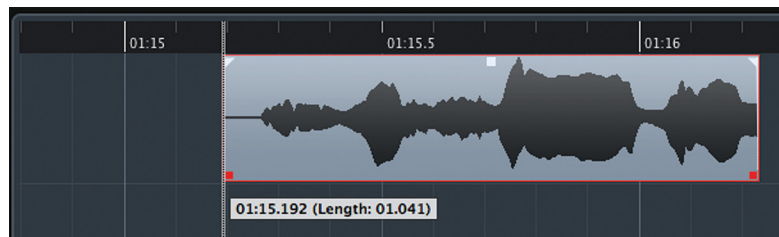


Figure 15.30
Sizing applies
time stretch

Sliding Contents

Another very useful editing feature in Nuendo is the ability to slide the contents of an audio event without resizing. This does not involve the use of the event handles but rather modifier keys and the underlying audio itself.

By pressing [Alt/Option] + [Control/Command] together and dragging on the audio waveform, you can slide the audio inside of the event.

This feature is very useful in correcting musical timing of various parts, including drums. The ability to slide the audio within the event helps avoid generating gaps in continuous audio when moving phrases to be more in time musically.

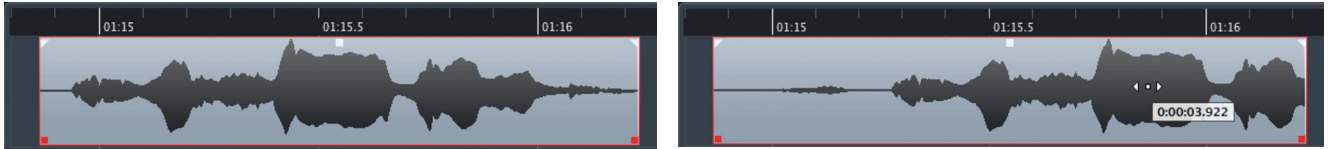


Figure 15.31 Sliding the audio inside the event before and after

Here is an example of how sliding audio can be used to move phrases within a musical performance without generating any gaps. In this example, we have a vocal performance. The second phrase is too early. By slicing out this phrase into its own event and then sliding the audio inside that event, we can correct the timing without creating any gaps in the audio.

1. Identify the offending phrase within the performance.
2. Slice that portion of the audio into its own event.

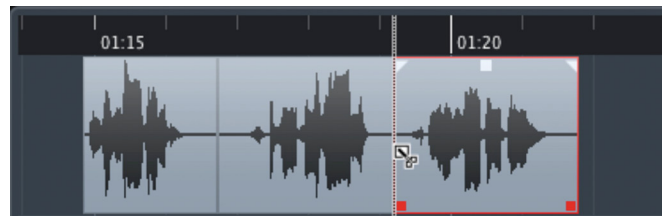


Figure 15.32

Create a new event for the phrase in question

3. Using the [Alt/Option] + Shift modifiers, slide the phrase into better musical time.

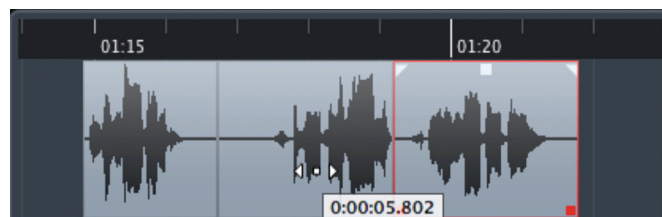


Figure 15.33

Slide the phrase to be in better time with the drums

4. Select all three events and create crossfades between them.

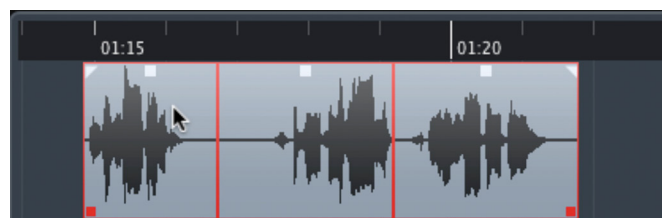


Figure 15.34

Create crossfades

5. Adjust the crossfades if any overlapping audio is present.

PRACTICE MAKES PERFECT

Part of the trick in this example is slicing the offending phrase at points that allow you to slide the audio without creating any overlapped audio. This takes some experience, as each recording is unique. Fine tuning of the crossfades can aid in keeping the edit smooth.

Fade Handles

The fade handles found on all audio events give you control over how the beginning and end of the audio event fade in and out respectively. In order to create a fade in, simply drag the left fade handle to the right, as shown in Figure 15.35. Since the fades are rendered in real time, you can hear the resulting fade in immediately, even while playing back.



Figure 15.35

Creating a fade in using the left fade handle

A VOLUME MANIPULATION CAUTION

Do not confuse the fade handles with the event envelope discussed in the previous section. Both the envelope and fade handles can simultaneously affect the volume of an audio event. When you include the volume handle in this equation, a great deal of volume manipulation is possible just by editing the audio event.

This is one of the most powerful and easy-to-use features of Nuendo. Gain manipulation of the audio prior to the mixer differs so much from fader automation during mixing that it should be noted that this is more like printing volume changes to tape in analog recording.

Fade Duration

The fade duration is controlled by how far you drag the fade handles. As you drag the handle, Nuendo displays the fade duration next to the pointer, as shown in Figure 15.36. The duration is also visible in the info line at the top of the project window.

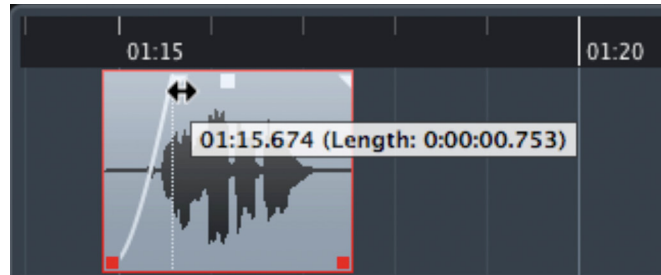


Figure 15.36
The fade duration is displayed next to the pointer while altering the fade time

You may alter the duration in the info line by either using the mouse's scroll wheel or entering data directly. As the fade duration increases, you will see the audio waveform reflect the gain changes that result, increasing the amplitude as the fade moves up, as shown in Figure 15.37.

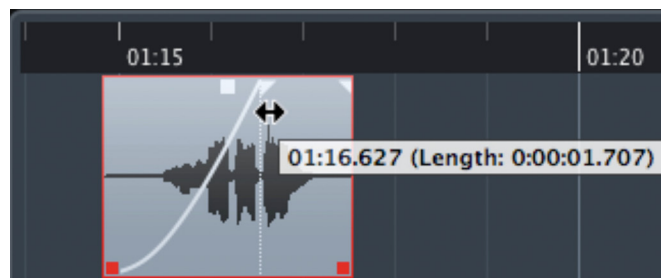


Figure 15.37
Audio waveform reflects gain changes as fade progresses

Fade Shape

In addition to adjusting the fade's duration, you may also alter the shape of the fade curve from something basic, such as a straight line, to a complex curve with parabolic attributes. Custom-designed shapes can be saved in a library to be used later, whether in the current project or in others.

To access a fade's shape, you must double-click on the area above the fade curve, as shown in Figure 15.38.

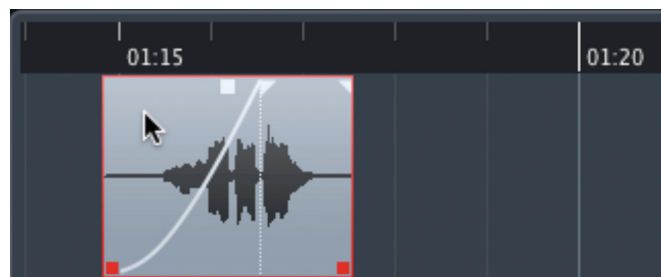


Figure 15.38
Double-click in this area to access the fade curve

NOTE

The examples used in this section are for fade-ins. The same applies for fade outs as well.

This opens the fade curve dialog where you can make adjustments to the shape of the fade and manage preset fade curves.

There are eight preset fade curves to start with, ranging from linear (straight line) to exponential (parabolic shape), as seen in Figure 15.39. These shapes cover most types of fades found in normal editing. However, you may find it necessary to edit these shapes further to create custom curves of your own. Using the preset options, you may store and recall any number of custom fade curves you design.

You can drag the various control points to modify the shape of the fade. If you wish to add additional control points to refine the shape further, [Control/Command] + click on the fade shape line and another control point will be created there.

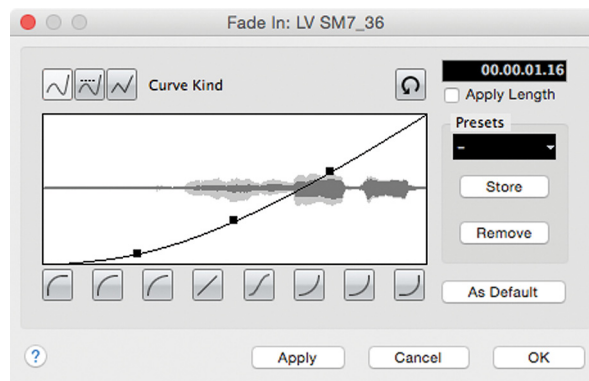


Figure 15.39
Custom fade curve

Above the fade curve display, there are three buttons labelled “Curve Kind.” These buttons control how the shape of the fade is interpolated around each control point. For example, the linear interpolation (the default option) creates simple straight lines between control points.

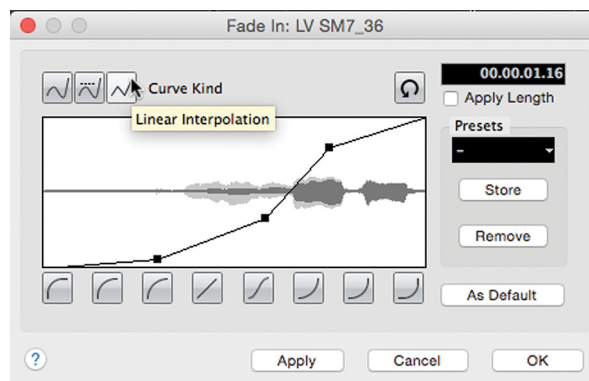


Figure 15.40
Linear interpolation

Spline interpolation, by contrast, creates curved transitions around each control point. As the curve is increased, a reciprocal curve is created on the other side of the control point.

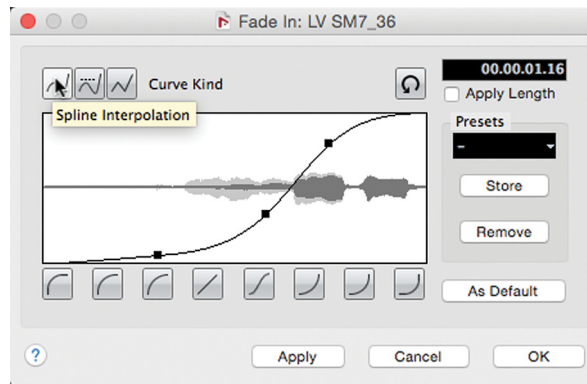


Figure 15.41
Spline
interpolation

In extreme cases, this reciprocal curve may not be desired. In those cases, the damped spline interpolation reduces the amount of reciprocal curving on the other side of the control point.

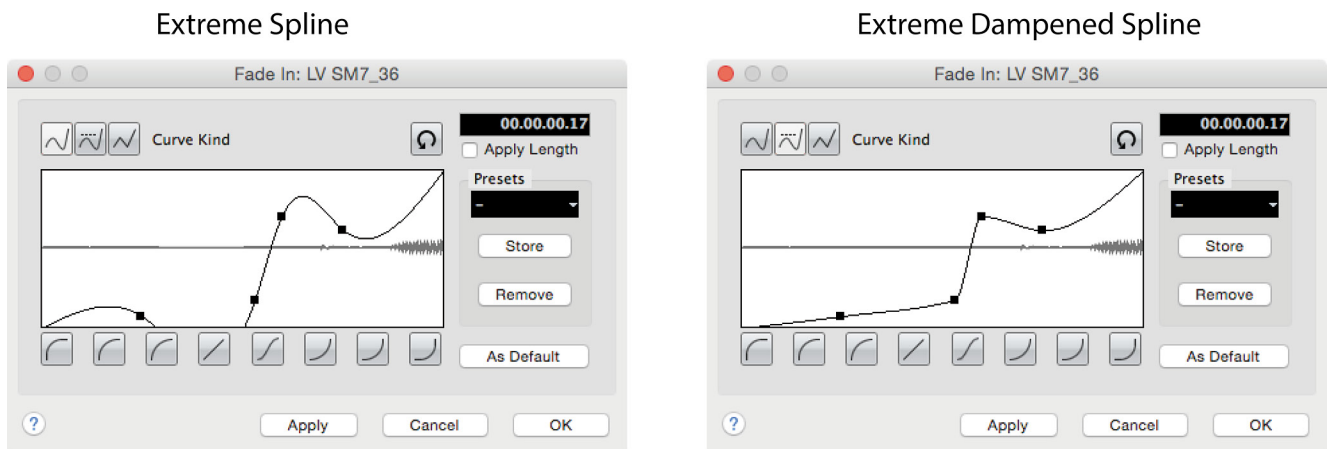


Figure 15.42 Damped spline interpolation

THESE EXAMPLES ARE EXTREME

The control points in this example are placed in extreme positions to illustrate the different interpolation modes. In most normal fade curves, control points are placed in a regular pattern.

Spline and damped spline interpolations result in the most natural-sounding fades in most cases. However, only in more extreme fade shapes will any of these differences become readily apparent.

Default Fade Shape

Once you have settled on a fade shape that works for most of the editing tasks you perform, you can save that shape as the default shape by pressing the “As Default” button in the fade shape dialog. From that point on, when you create a new fade, it will use the default shape to start with. You can then alter that shape if needed.

INDEPENDENT FADE SHAPES

The default fade shape is unique for fade-ins and fade-outs. You must define a default shape for each independently.

Adjusting Multiple Fades

One of the most powerful features in Nuendo is the ability to simultaneously edit multiple events at the same time. This applies to fade handles. If you have more than one audio event selected, adjusting the fade handles on one event will affect all other events at the same time.

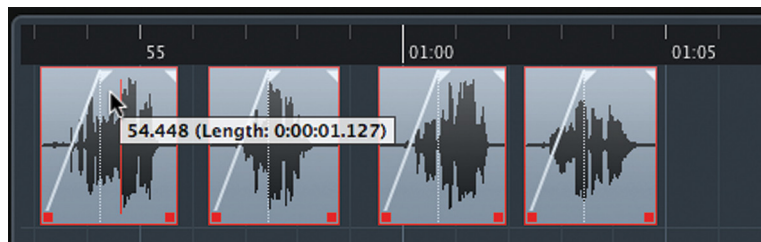


Figure 15.43
Adjusting multiple fade outs at once

This can be a real time saver. Imagine that you have 500 dialogue edits ready for exporting to a game audio engine. Each one of these edits needs a slight fade in and fade out to provide a smooth transition once loaded into the game. It is as simple as selecting all 500 edits and adjusting the fade in and fade out on one of those events to change them all at once.

SHAPING SNARE ENVELOPES

Use this feature to adjust the envelope of snare sounds in a drum kit recording. After using the “detect silence” feature to create individual audio events for each snare hit, I then use the fade out handles to contour the decay of all the snare hits at once. The detect silence feature will be discussed in Chapter 10: Advanced Editing.

Crossfades

Crossfades allow two overlapping audio events to be blended together on one audio track. A fade out is created on the first event while a fade in is created on the second event, both occurring at the same time, which results in a smooth transition from one event to the next.

The easiest way to create a crossfade is to select two audio events that are next to each other and press the X key. This is the default key command for creating crossfades between selected events, which can be found under the Audio menu. The selected events can be overlapped, adjacent, or even separated by a small amount (<100 ms) and a crossfade will be created between them. The length of the crossfade is determined by how far the two events are overlapped. If they are merely adjacent or not touching, the default crossfade settings will be used.

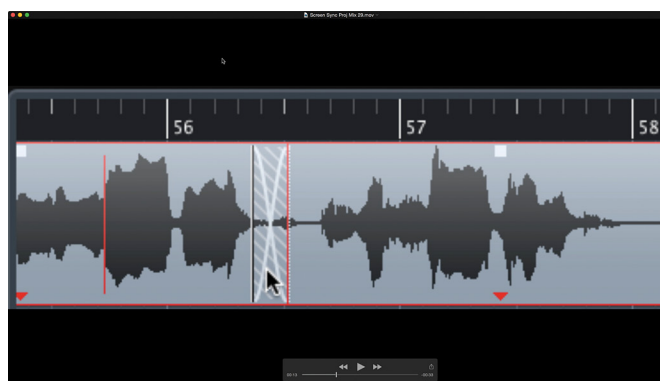


Figure 15.44
Creating crossfades

This crossfade can be altered in a couple of ways. First, the edges may be selected and dragged to change the duration of the fade. This is the most straightforward method of altering the crossfade.

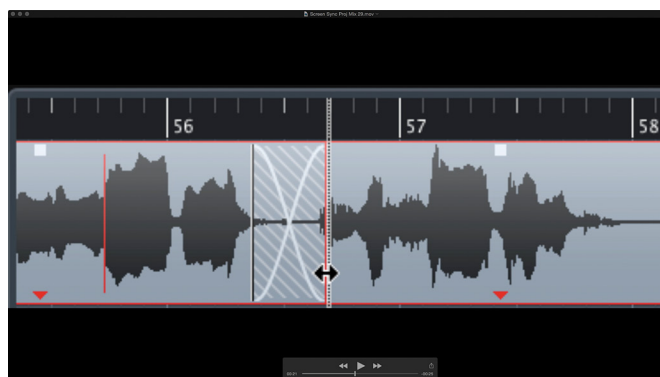


Figure 15.45
Changing the crossfade duration

Clicking in the middle of the crossfade and dragging moves the fade in relation to the audio events. This is very quick and simple editing right in the project window. More advanced control of crossfades is available in the Crossfade Dialog, which will be covered in Chapter 10: Advanced Editing.

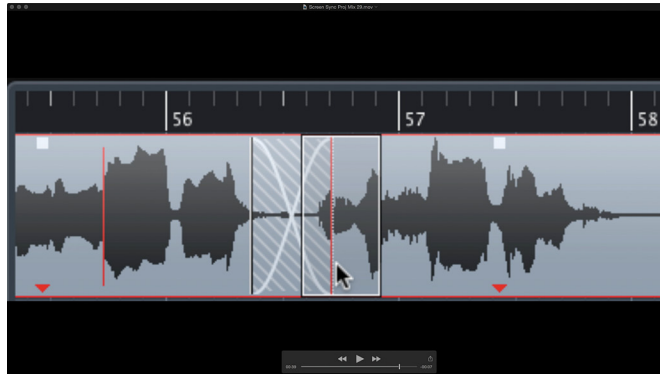


Figure 15.46
Moving the crossfade

These actions can be applied to multiple crossfades simultaneously. Select all the audio events that are part of the crossfades you wish to edit. Then by simply editing one of the crossfades, all of them will change accordingly. If you are editing a lengthy piece and want to alter all crossfades at once, it becomes very easy to do so.

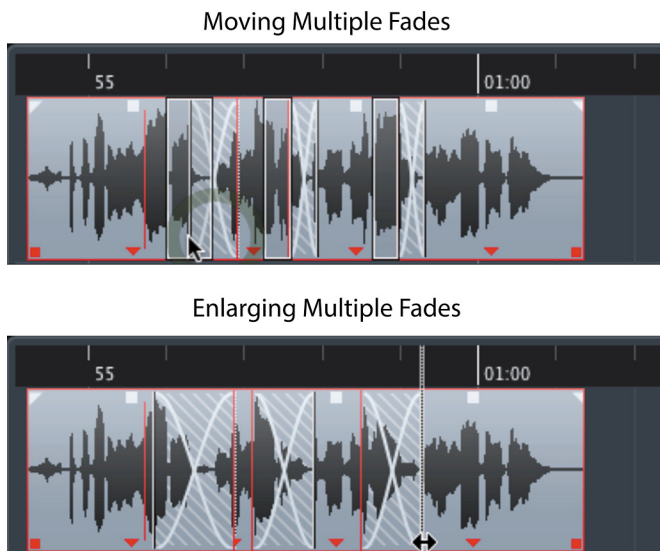


Figure 15.47
Editing multiple crossfades

TAKE CARE WITH SELECTIONS

When editing multiple events in Nuendo, it is quite possible to alter events that are not visible on the screen. If multiple events are selected, the info line will be displayed in color.

Range-Specific Editing Functions

Range editing offers different options for editing, as it relates to a selection of time rather than events. Certain editing functions are only available when using a range selection. They are accessed from the Edit>Range submenu.

Cut Time

The Cut Time function removes the selected portions of any events within the range selection. These can be across multiple tracks and can be of various types: MIDI, audio, automation etc. When the range is removed, any material to the right will be moved up to replace the cut time, a ripple effect.

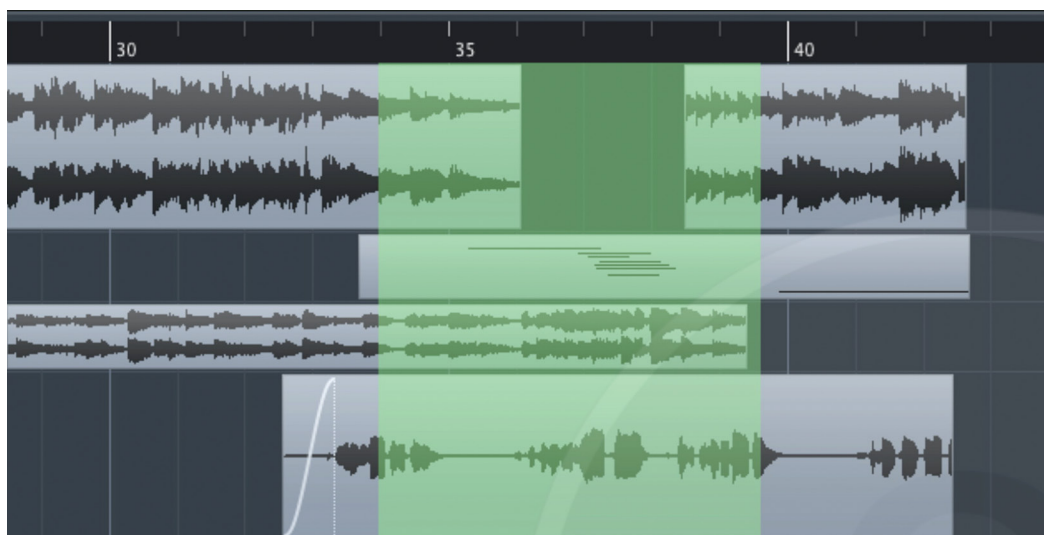


Figure 15.48
Before “Cut
Time”

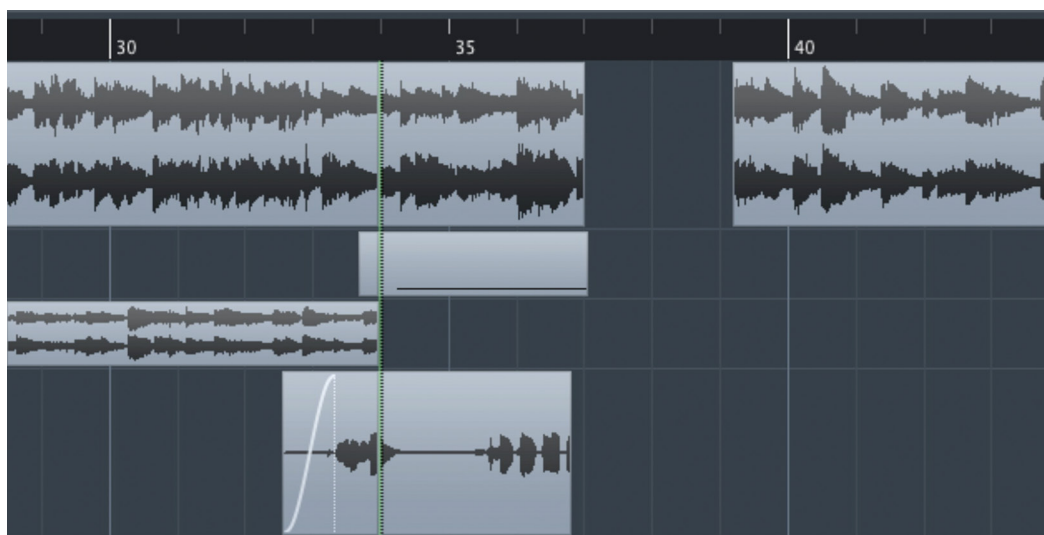


Figure 15.49
After “Cut
Time”

Delete Time

Delete time works in much the same way as Cut Time except that the removed content is not placed in the clipboard.

Paste Time

Paste Time works just like normal paste, placing data from the clipboard at the insertion point set by the current range selection. The difference is that all material to the right of the insertion point will be moved to the right or rippled down the timeline to make room for the inserted material.

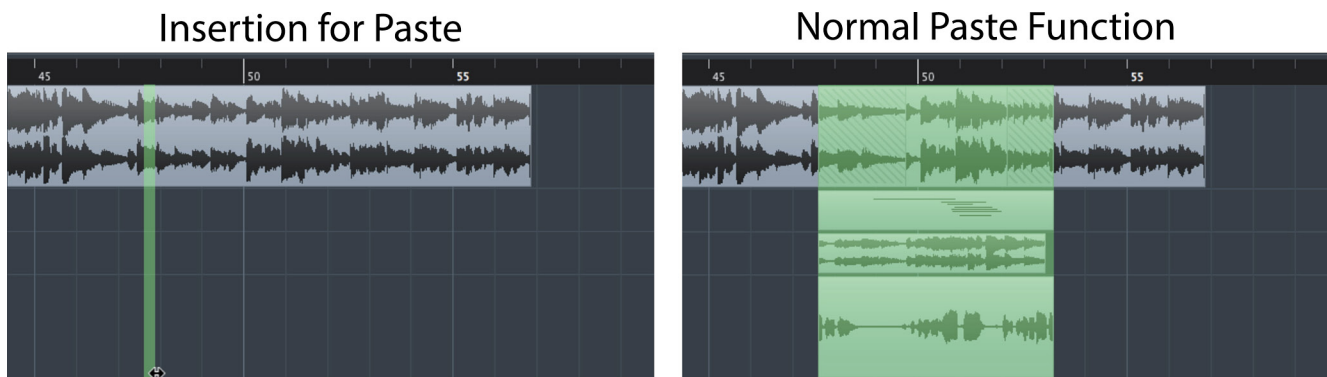


Figure 15.50 Normal “Paste” function

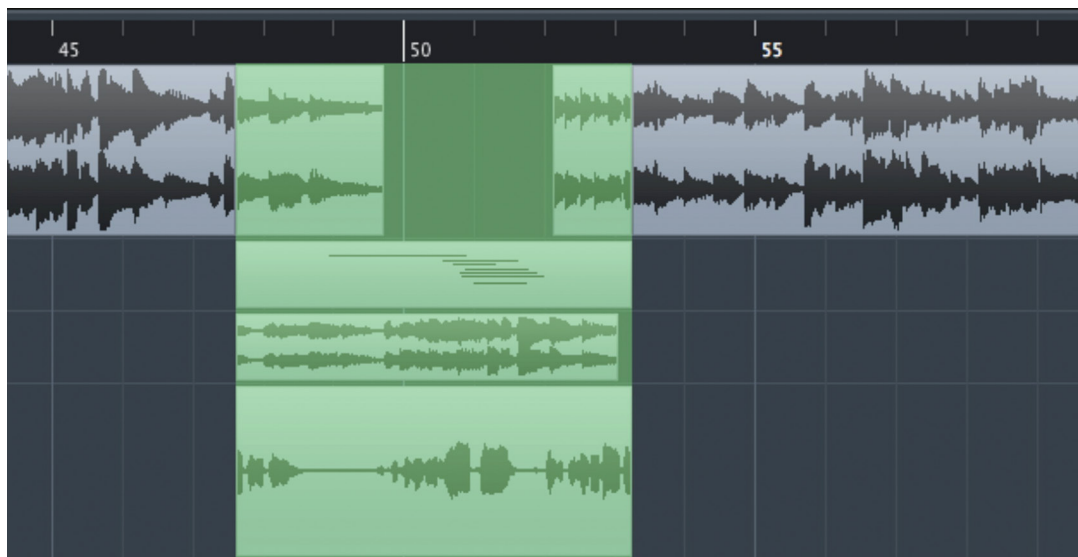


Figure 15.51
After “Paste
Time”

Paste Time at Origin

Pasting time at Origin will place the contents of the clipboard at their timestamped positions. The timestamp could be where the material was originally recorded in Nuendo or could be part of the metadata stored in the audio file as recorded on location in a film shoot.

Split

This command will split the events at the start and end of the range selection.

Crop

Cropping is a more commonly useful function when trimming audio of unwanted noise and other artifacts. Cropping quickly removes any material from both the beginning and the end of a range selection, as shown in Figures 15.52 and 15.53.



Figure 15.52 Before “Crop”

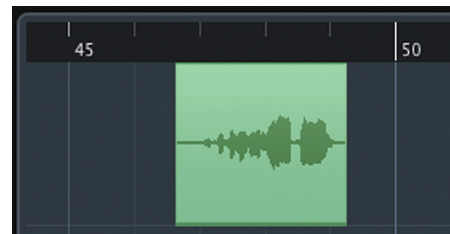


Figure 15.53 After “Crop”

Insert Silence

Insert Silence works in the same fashion as Paste Time, except no material is placed in the range, only blank space. All other material is rippled down the timeline to the right.

Cut Head, Cut Tail

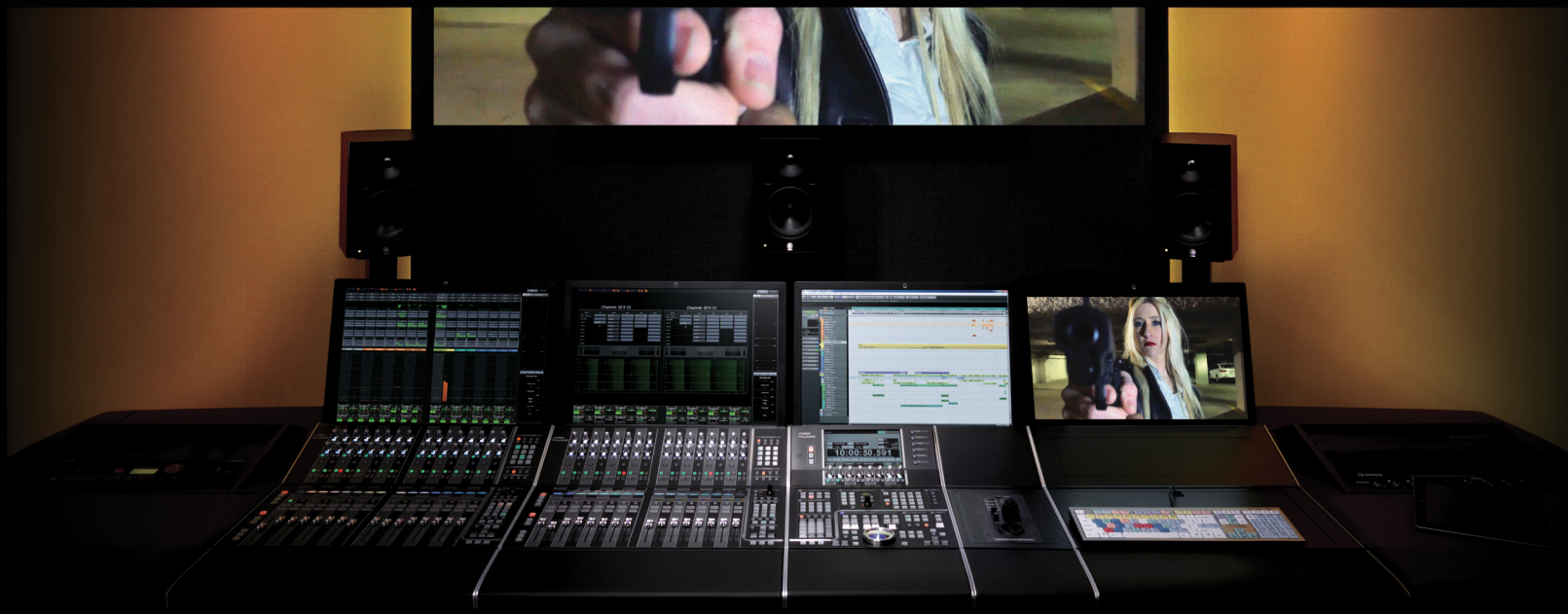
Cut Head and Cut Tail functions are related to the Crop command. Cut Head only removes material to the left of the range selection while Cut Tail removes material to the right.

MAKE LIFE EASIER WITH KEY COMMANDS

Setting up key commands for these or any other specific functions will make them more helpful in day-to-day editing. Many secondary commands do not have key commands assigned to them by default. Your editing style and workflow methods will dictate what functions will best be served with custom key commands.

NUAGE

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PART III: EDITING

by Ashley Shepherd

Chapter 16

Timeline Functions



NUAGE

Timeline Functions

- ❖ Timeline Format
- ❖ Snap
- ❖ Origin Time
- ❖ Pro Tools Editing Modes and Nuendo Equivalents
- ❖ Real World Example:
Flying Background Vocals

In this chapter we will explore timeline functions, ways to use the time ruler in Nuendo to aid in editing. When working with music, often the ruler is in Bars+Beats that are aligned with the musical performances. In film, timecode is used to reference individual video frames. Editing functions in Nuendo can also use these measurements to help editing functions, keeping them aligned with the increments of the ruler or the “grid,” in simple terms.

Timeline Format

Nuendo has seven timeline formats to choose from. However, Bars+Beats, Seconds, and Timecode are the most often used. The others have their specific applications, but this discussion will be limited to these three.

Bars+Beats

The Bars+Beats format is related to the musical tempo that Nuendo is set to. This creates a grid of musically related intervals useful for editing. Each bar is divided into beats. Normally there are four beats per bar but if the meter of the music is changed to $\frac{3}{4}$, for example, there will only be three beats per bar.

Each beat is then divided into musical subdivisions, such as $\frac{1}{8}$ note, $\frac{1}{16}$ note, and so on. The smallest division of the Bars+Beats timeline is the “tick.” A tick is defined by a measure of how many MIDI pulses there are per quarter note (one beat). In Nuendo, 480 PPQ (pulses per quarter note) is the standard. You may alter this in Preferences by changing MIDI Display Resolution, as shown in Figure 16.1. This will change the base PPQ and should only be altered in specific advanced situations.

Seconds

The Seconds ruler format is based on clock time and is measured in minutes, seconds, and milliseconds. The millisecond is the smallest increment available for this ruler.

Timecode

The timecode format relates to video material that you are working with in Nuendo. The only adjustment to the timecode ruler is in the frame rate of the timecode, which is set in the Project setup window, as shown in Figure 16.2.

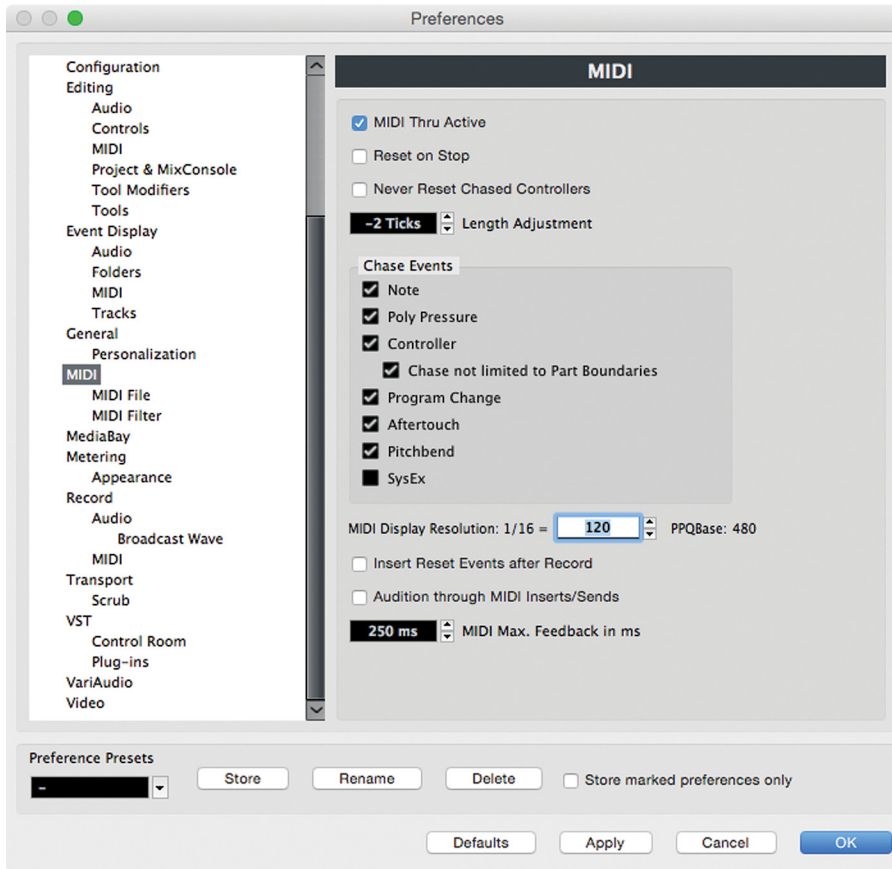


Figure 16.1
MIDI Display Resolution preference

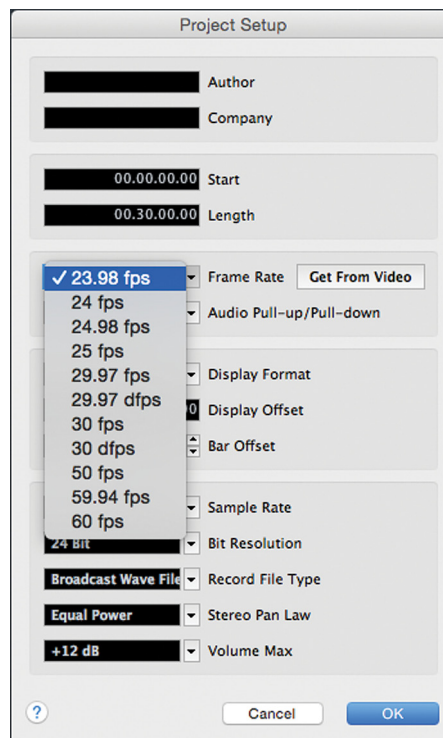


Figure 16.2
Timecode frame rates

MATCH FRAME RATE TO VIDEO

Always ensure that the frame rate set in the Project setup is the same as the video file you are working with in Nuendo. The option to “Get From Video” is a quick way to make this happen.

The fundamental increment for timecode is the frame, correlating to an individual frame of video. However, the frame is also divided into $\frac{1}{2}$ frames, $\frac{1}{4}$ frames, and subframes. There are 80 subframes per single video frame. This allows for a much finer resolution in audio timing when editing to picture.

Snap

The Snap function in Nuendo restricts editing to certain boundaries in the timeline, usually the grid points of the ruler. When Snap is enabled, all of the basic editing functions will be restricted by the snap boundaries. There are four types of Snap boundaries and some variations.

- ❖ Grid
- ❖ Events
- ❖ Shuffle
- ❖ Magnetic Cursor

Grid

The Grid Snap relates to the format of the timeline ruler: Bars+Beats, Timecode, etc. Editing functions will be restricted to increments of the timeline ruler. For example, if the timeline is set to timecode, editing will be restricted to timecode increments, such as 1 frame, $\frac{1}{4}$ frame, one second, etc. This increment is set by the Grid Type menu found in the Project window toolbar, as seen in Figure 16.3.

If the grid type is set to 1 frame, editing will be limited to one-frame increments. This includes moving, trimming, and adjusting fades. If the grid is set to one beat using the Bars+Beats format, then editing functions will be restricted to single beats.

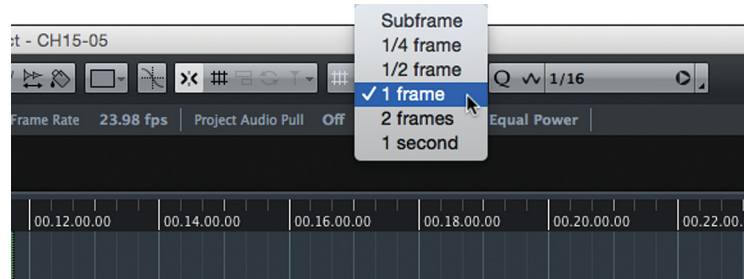


Figure 16.3
Grid Type
menu

Using the grid to assist in editing is a powerful tool that improves accuracy and speed. For example, if you want to move a musical phrase from one section of a song to another, the grid can make this simple.

1. Select the Bars+Beats ruler for the timeline.
2. Enable Snap.
3. Select Bar for the grid type.
4. Trim the phrase to a bar, as shown in Figure 16.4.

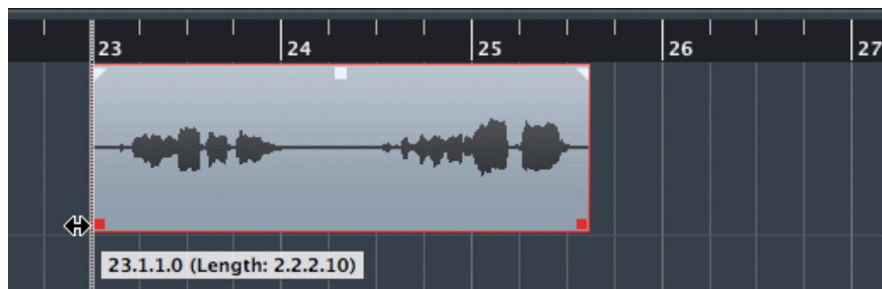


Figure 16.4
Trimming to
the bar

5. Move the phrase to the new location, as shown in Figure 16.5.

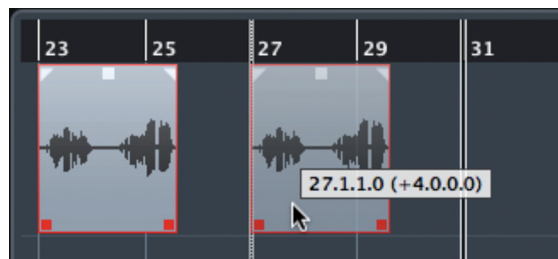


Figure 16.5
Moving with
Snap to grid

Now this phrase has been moved exactly 4 bars to the right.

Relative Grid

Often musical phrases do not line up conveniently on the bar, as shown in Figure 16.6. In these situations, the variation of grid called “Grid Relative” may be used. Grid Relative restricts editing the same way except the points are all relative to the grid value. Figure 16.6 shows an event being moved 4 bars relative to its starting position just ahead of bar 27 to the same position relative to bar 31.



Figure 16.6
Moving a phrase relative to the bar grid

Grid Type

The Grid Type is the size of the increment for the current timeline ruler. For example, if the ruler is set to Bars+Beats, there are three grid types available from the menu as, shown in Figure 16.7.

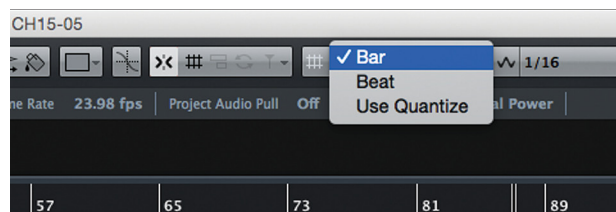


Figure 16.7
Grid Type menu for Bars+Beats

Bar

Editing is restricted to the bar line.

Beat

Editing is restricted to each beat or $\frac{1}{4}$ note.

Use Quantize

When “Use Quantize” is selected, editing functions will be restricted to the value set in the Quantize setup. This could be anything from whole notes down to triplet 32nd notes, with or without swing, etc.

The other grids have their own choices for grid type related to their format. Timecode has various frame choices, Seconds uses milliseconds, Samples has various amounts of samples for grid types, and so on, giving you a variety of choices to assist you in editing.

Events

When Snap to Events is enabled, editing functions will be restricted to the boundaries of other events in the Project. In Figure 16.8, the event on the lower track is being moved using Snap to Events. Moving this event will cause it to snap to the positions described. Notice how both the Start and End points of each event are used as snap points.

Align Start to Start of Upper Event

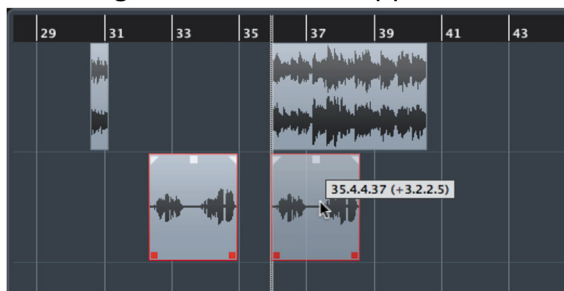
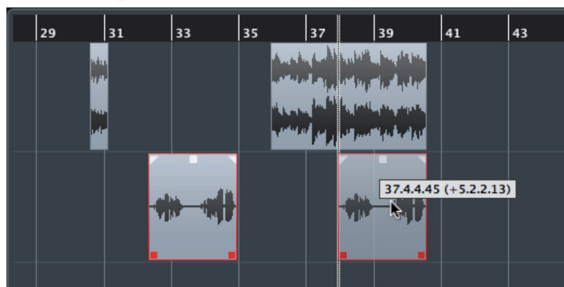


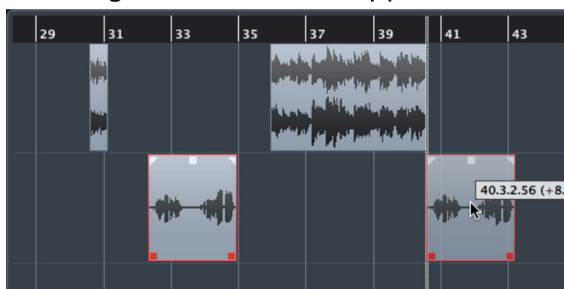
Figure 16.8

Moving an event with Snap to Events enabled

Align End to End of Upper Event



Align Start to Start of Upper Event



Shuffle

The Shuffle Snap mode is a bit different. It restricts editing so that event boundaries are always next to one another on each track. For example, in Figure 16.9, multiple events are selected that are not next to one another. Once they are moved, they will be placed adjacent to each other with no space between them.

Trimming is handled differently in Shuffle mode. When you trim an event, the distances between it and other events will be maintained, as shown in Figure 16.10.

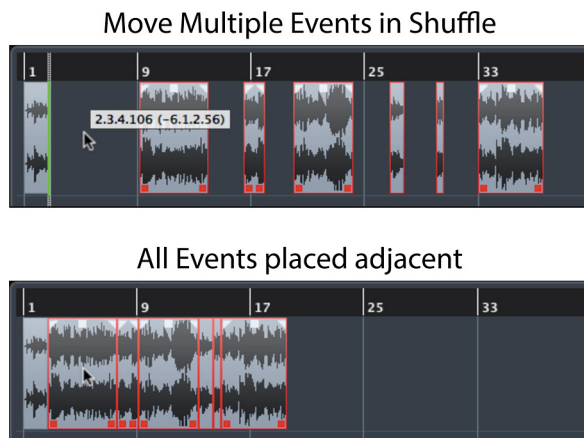
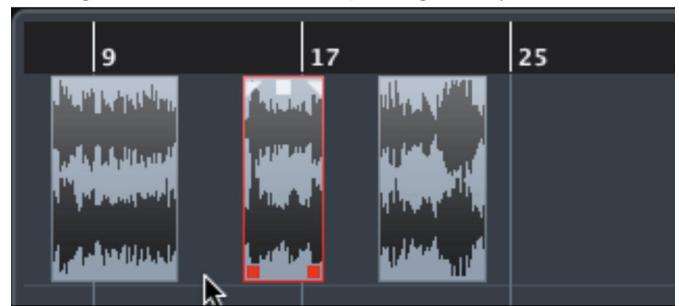


Figure 16.9 Moving multiple events in Shuffle mode



Enlarged event maintains spacing to adjacent events



Extending end of middle event



Spacing maintained between adjacent events



Figure 16.10 Trimming events in Shuffle mode

Magnetic Cursor

In this grid mode, editing functions will snap to the playback cursor position. This is helpful when editing to picture, as the playback cursor is tied to the video. Also the cursor can be a convenient alignment tool for moving events all to the same position.

Combined Snap Modes

Nuendo offers additional snap modes that combine the various types.

- ❖ Grid + Cursor
- ❖ Events + Cursor
- ❖ Grid + Events + Cursor

These are simply convenience modes that can prove useful with various editing tasks, relieving you of the need to continually switch between different modes in certain editing situations.

Event Snap Point

Normally, events use their boundaries to snap position in the timeline. However, it is possible to use another point within the event to snap their position, called the Event Snap Point. Figure 16.11 shows an event with a red vertical line in it that represents this snap point.



Figure 16.11

Red line is the Event Snap Point

The Snap Point will be used as the anchor that aligns to the grid. Figure 16.12 shows the same event after it has been moved using Snap to Grid in Bars. Notice that the red line is now aligned with bar 4 on the timeline, not the start of the event. This appears to be similar to the Relative Grid mode but only in looks.



Figure 16.12
Event Snap
Point aligned
with Bars Grid

Event Snap Points are created in several ways:

- ❖ When using a pre-record buffer
- ❖ From field recorder metadata
- ❖ Manually in the Sample Editor

The Event Snap Point can be altered using the Sample Editor, discussed in Chapter 19. Manually positioning the Event Snap Point can be useful in sound design when the key moment of a sound effect occurs somewhere other than at the beginning.

Origin Time

The Origin Time is the place on the timeline where the material was originally recorded. Also, it can be included in metadata provided by a field recorder or other recording software that indicates the original recording timecode value. The Origin Time is displayed in the Pool, as shown in Figure 16.13. You may click in this column and edit the origin time for any audio file.



Figure 16.13 Origin Time Column in the Pool

The origin time can be used to place audio files in the Project window or move them if they are already there. The Pool's context menu has the option to insert a selected audio file into the Project at its origin time. Also, you may use the Edit>Move to>Origin command to move any audio event in the project back to its origin time.

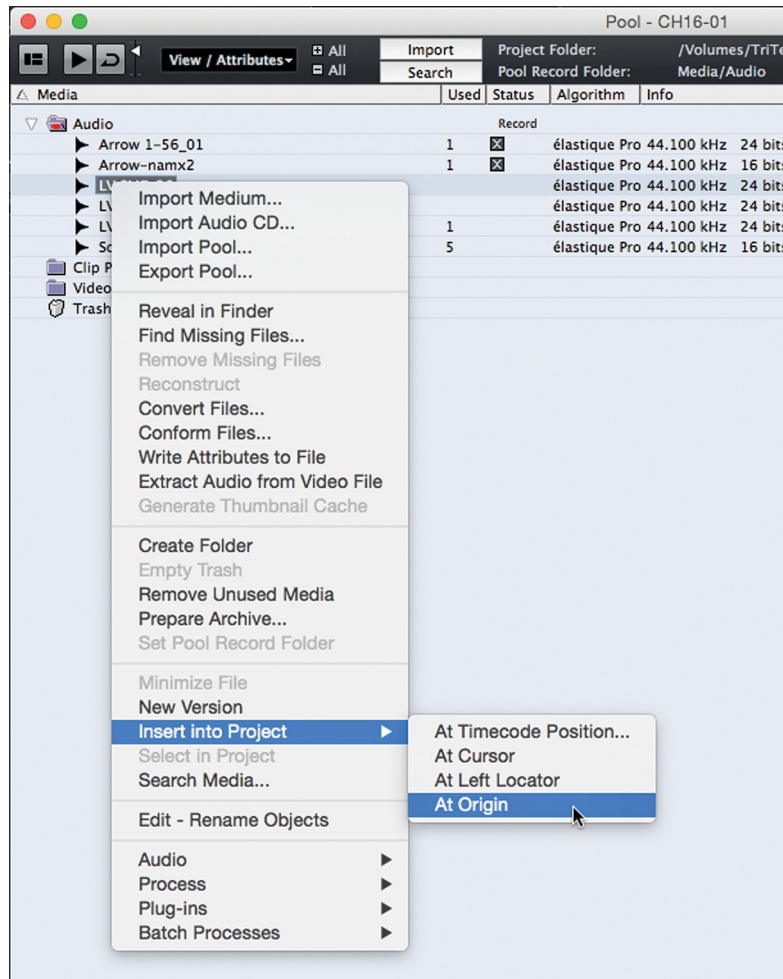


Figure 16.14
The Pool's context insertion menu

Pro Tools Editing Modes and Nuendo Equivalents

In this section, each Pro Tools editing mode will be compared to Nuendo's functions to make it easier to understand the similarities.

Pro Tools Grid Mode

Grid is equivalent to Snap to Grid in Nuendo. This is true for the Grid Relative modes as well. Nuendo's Snap can also be tied to event boundaries and the cursor.

Pro Tools Slip Mode

Pro Tools Slip mode is the same as Nuendo with Snap disabled. With Snap disabled, editing in Nuendo is unrestricted by any grid values.

Pro Tools Spot Mode

Spot mode in Pro Tools correlates to three things in Nuendo:

- ❖ **Insert the Current Time Code** – By inserting the current timecode value in Pro Tools you effectively move the region to the cursor position. In Nuendo use the "Move to Cursor" to achieve the same result.
- ❖ **Insert Original Timestamp** – By inserting the original timestamp in Pro Tools, the region is moved to the original position where it was recorded. In Nuendo, this is the same as the "Move to Origin" command.
- ❖ **Manual Timecode Entry** – In Pro Tools Spot mode you can manually enter a start time for the region. In Nuendo, the Info Line can be manually edited in the same way at any time. There is no need to enter a special mode to do this.

Pro Tools Shuffle Mode

In Nuendo, using Snap with the Shuffle enabled will give you the same results as the Pro Tools Shuffle mode.

Real World Example: Flying Background Vocals

In this example, let's use the grid relative mode with bars and beats to help copy background vocals from one chorus of a song to another. This is a common practice in pop music production where the singer only needs to sing one chorus of the background vocals and the engineer copies them to all subsequent choruses, thus saving a whole bunch of time, not to mention the voice of the singer. It is often referred to as "flying the background vocals into the other choruses."

In this example, the singer has created a part that uses 16 tracks of vocals to create the harmonies for the background vocals. The first chorus starts at bar 24 where the vocals were originally recorded. There are two more choruses in the song, one at 55 bars and the last one at 82 bars. The last chorus also repeats once before the end of the song.

Here's how to copy the eight tracks to all the choruses easily using the snap function and the grid.

1. Record sixteen tracks of vocals for the first chorus.
2. Trim out excess noise, as shown in Figure 16.15. For this step, leave snap off.

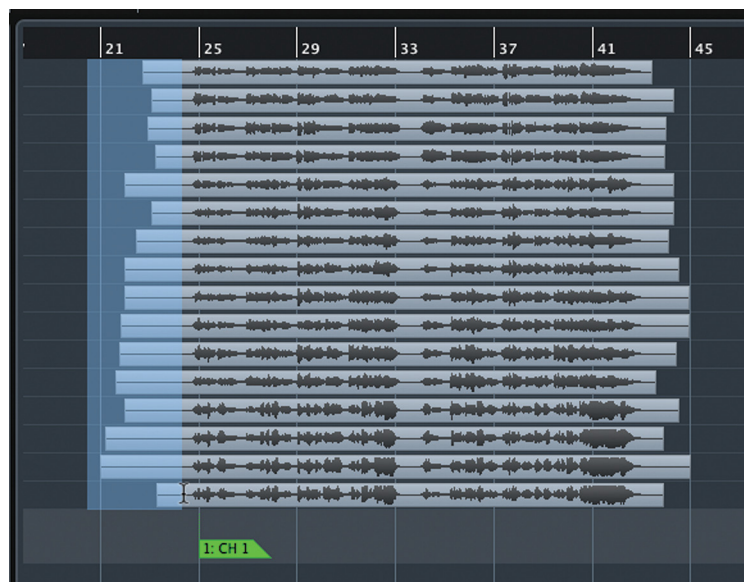


Figure 16.15
Trimming up
eight vocal
tracks

3. Place all 16 tracks inside a folder track.
4. Turn on snap and set to grid relative with the grid type set to Bar.

5. Select the folder track event for all the vocals.
6. Hold Alt/Option while dragging the group of events to create a copy.
7. Drag the copy all the way to bar 57. Notice how the info popup shows 56.2.2.63 as the destination point. This is the starting point of the first event relative to bar 57. The popup also shows a distance of +32 bars even, as seen in Figure 16.16. This is how grid relative works.

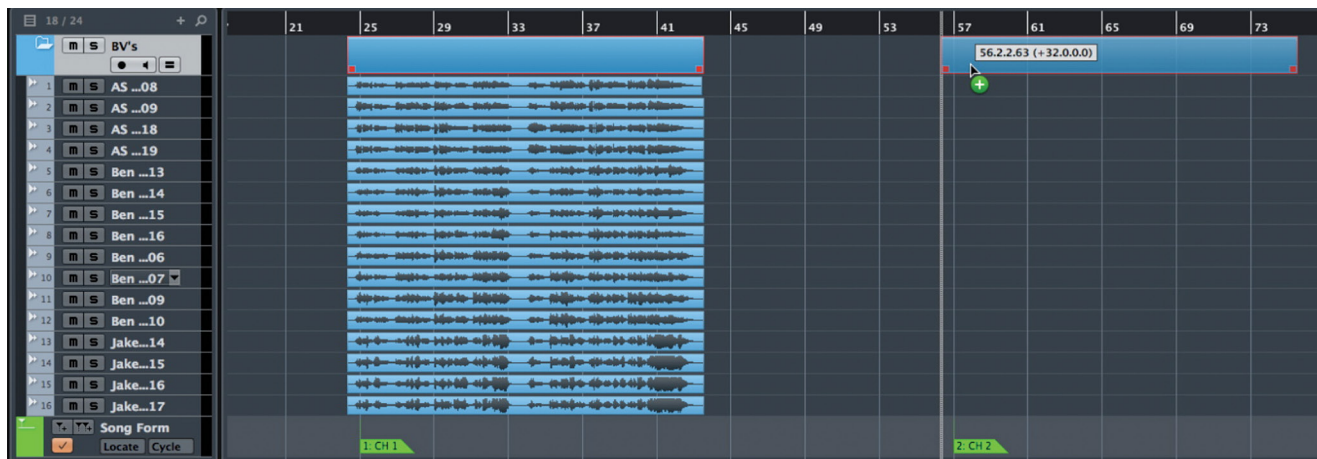


Figure 16.16 Moving the copies of the vocal tracks relative to bar 57

8. Holding Alt/Option again, drag a set of copies further, to the third chorus at bar 89.
9. Drag a last copy of the vocals to the repeat of the chorus. as shown in Figure 16.17.

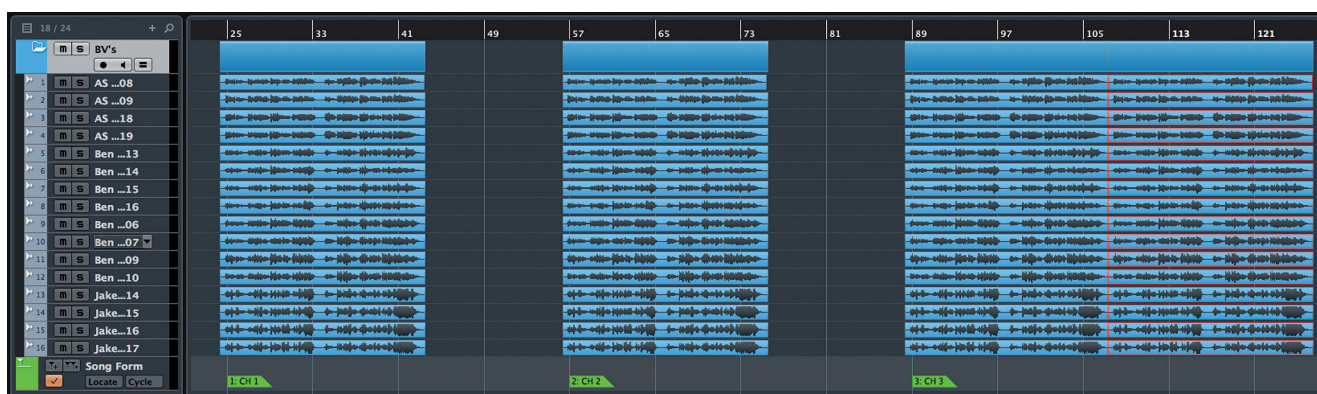


Figure 16.17 Copies placed at the second and third choruses with a final repeat

10. You might have to clean up the transition between the last two choruses as they might overlap a bit.

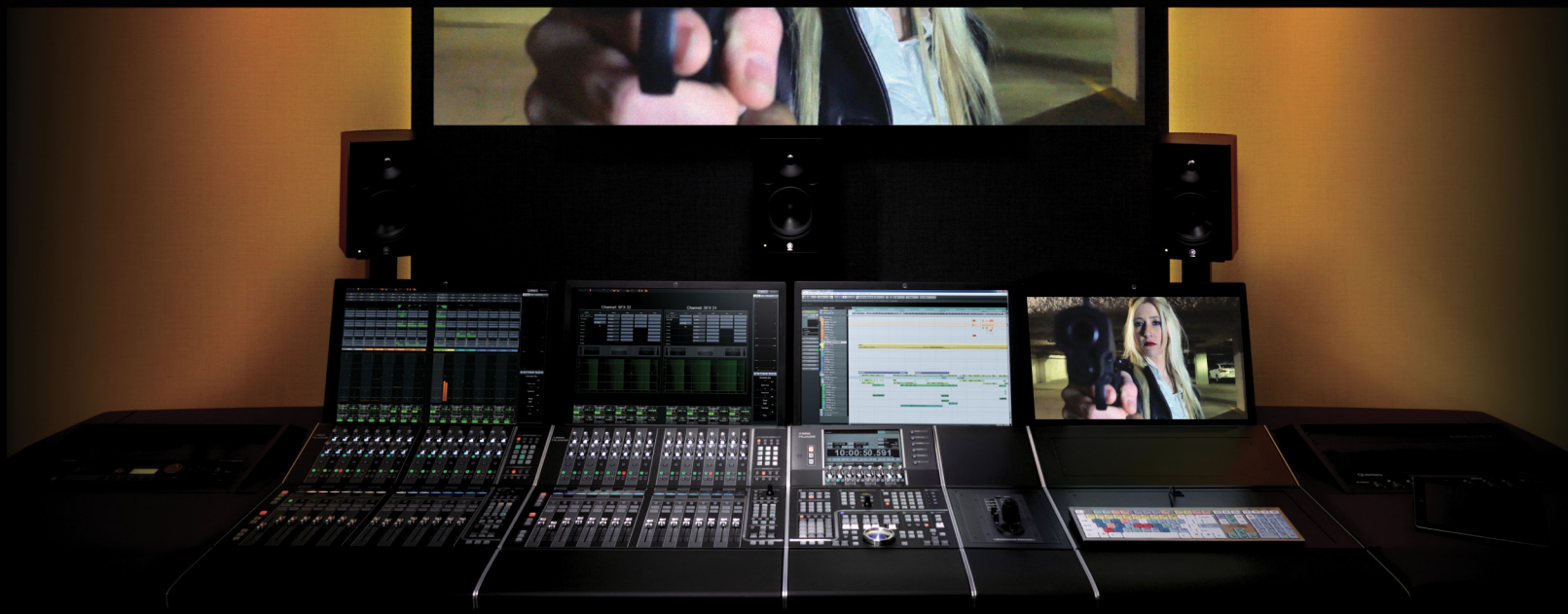
This all should take a matter of a minute or so under normal circumstances so more time is available for other things. The precision of the edits builds confidence so that your efforts can be directed in more creative ways rather than the mundane task of copying background vocals from one chorus to another.

EXPERIMENT!

This process is so quick and easy, it can be fun to experiment with placing vocals in places they were not intended to go. Try putting the background vocals over the bridge. It might sound horrible or it could trigger an inspiration for another part. Accidents of this type can lead to unexpected musical outcomes. This kind of fast and flexible experimentation shows what a creative tool Nuendo can be as an audio editor.

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PART III: EDITING

by Ashley Shepherd

Chapter 17

Advanced Editing



NUAGE

Advanced Editing

- ❖ The Crossfade Dialog
- ❖ Grouping
- ❖ Drum Editing
- ❖ Musical Editing

In this chapter we will explore more advanced editing techniques that utilize deeper features in Nuendo, from exploiting advanced grid and snap functions to tuning vocals and quantizing drums.

The Crossfade Dialog

To start, the Crossfade dialog offers a wide variety of tweaks to the crossfade shape and placement. Here's where you can tweak a crossfade to your heart's content.

The Crossfade dialog is a single window that can be used to modify crossfades. You can modify one at a time or many together at once. To access this dialog, select one or more events that have crossfades at either the start or the end of the event and choose "Open Fade Editor(s)" from the Audio menu.

CUBASE FADE EDITOR

Cubase uses a simplified fade editor with the basic fade shapes and duration. The advanced features such as overlap and event chaining are available only in Nuendo.

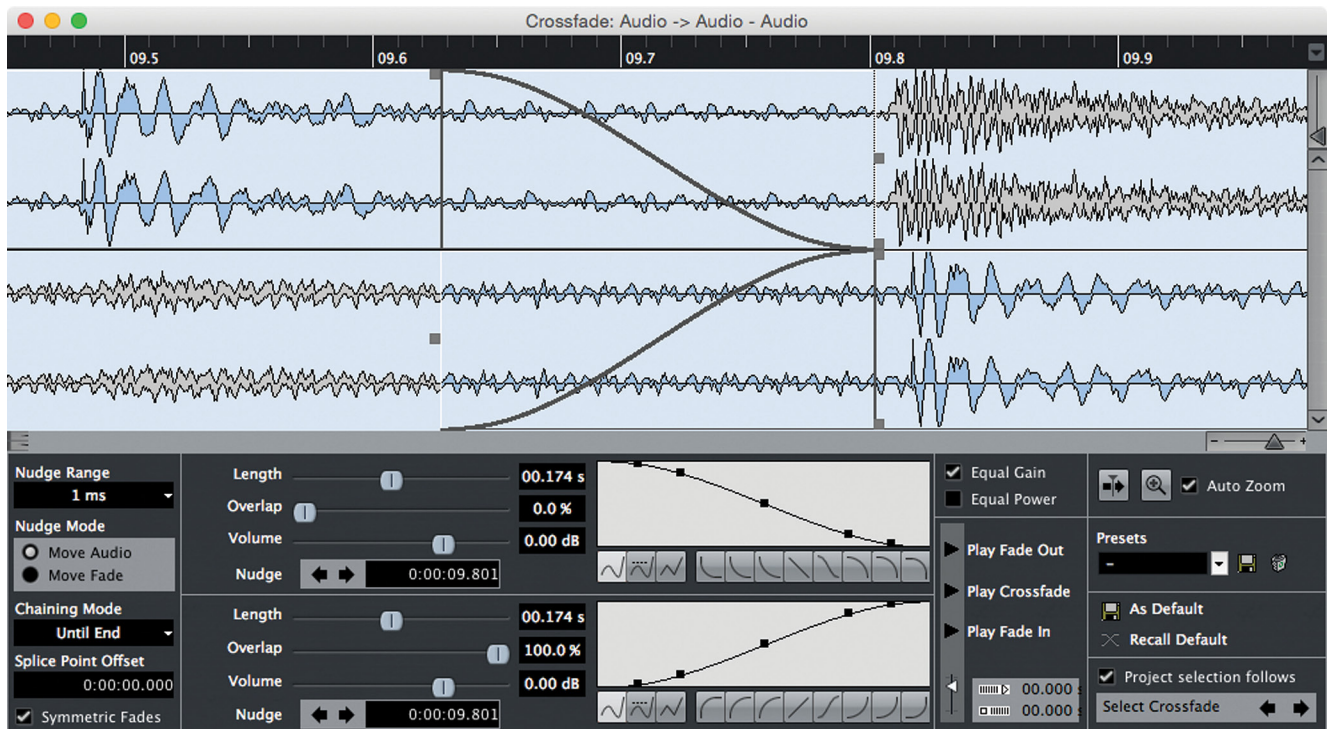


Figure 17.1 The Crossfade dialog

Creating Crossfades

In order to access the fade editor, a crossfade must already be present on the selected event(s). In order to quickly create a crossfade for editing, select one or more events and choose “Crossfade” from the Audio menu or press the default key command “X.” Note that if two adjacent events are selected, a crossfade will be created between them. If a single event is selected, a crossfade will be created between it and any adjacent event.

Events separated by less than 100 ms will have crossfades created between them when using the Crossfade command. This assumes that the underlying audio clips contain enough data for a crossfade to exist. If a crossfade cannot be created between events, you will get a warning message to that effect. Figure 17.2 illustrates how adjacent crossfades will be created.

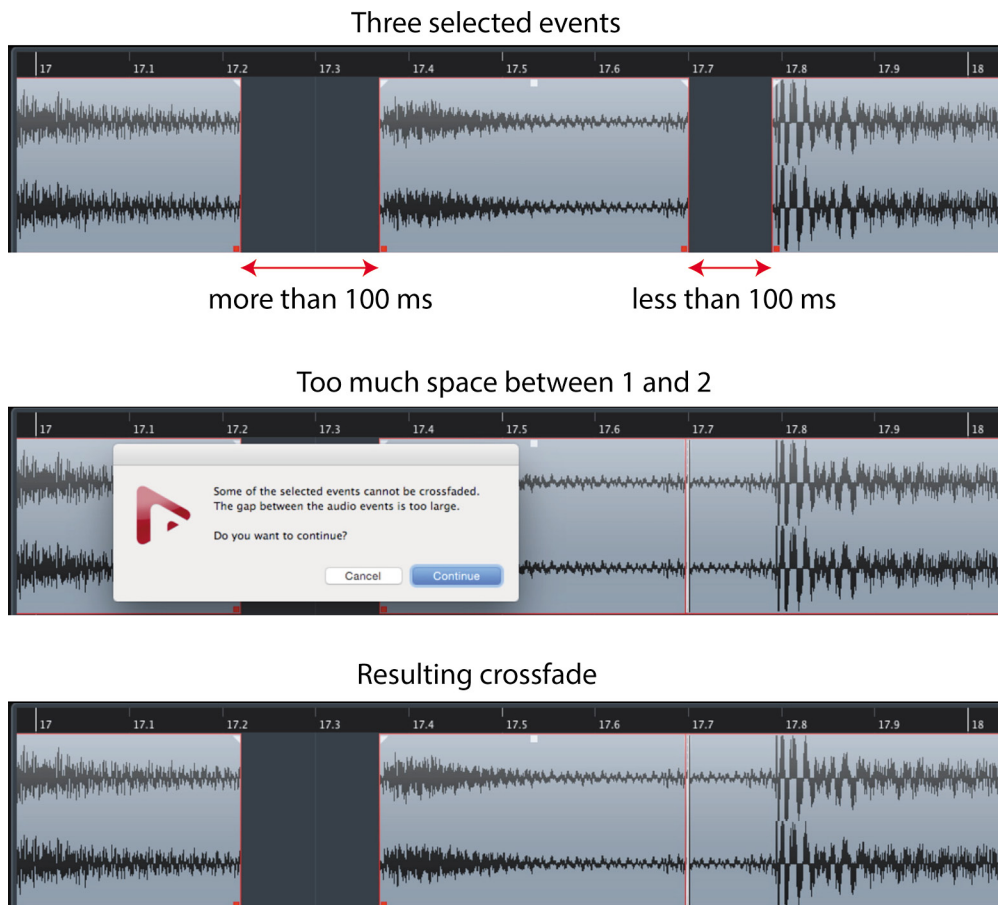


Figure 17.2
Creating crossfades between three events

Crossfade Selection

There are several methods of selecting crossfades for editing.

- ❖ Selecting individual crossfades
- ❖ Selecting individual audio events
- ❖ Selecting multiple audio events

How you access the fade editor determines which crossfades are affected.

Individual Crossfades

For individual crossfades, simply double-click on the crossfade to open its editor. Figure 17.3 shows where to click within the overlap area of the crossfade.

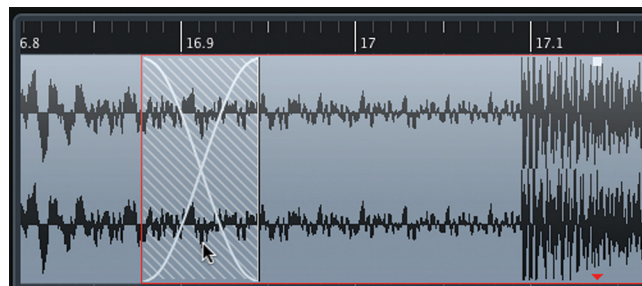


Figure 17.3
Crossfade editing by double-clicking in overlap area

Individual Audio Events

If you select a single audio event and choose **Audio>Open Fade Editor(s)**, any adjustments made to the fades will affect any existing crossfades at the start and end of the event.

A second method is to use the crossfade command (**Audio>Crossfade**). If a crossfade already exists, the fade editor will open and adjust the crossfade at the end of the event only. If there is a crossfade at the start of the event, it will be ignored unless it is the only crossfade associated with the event. This is not particularly intuitive, so be sure you know which crossfades you're editing.

Multiple Audio Events

When multiple events are selected, opening the fade editors will edit all crossfades attached to the selected events, as seen in Figure 17.4. When using the **Crossfade** command, the first crossfade is ignored.

5 crossfades are adjusted at once

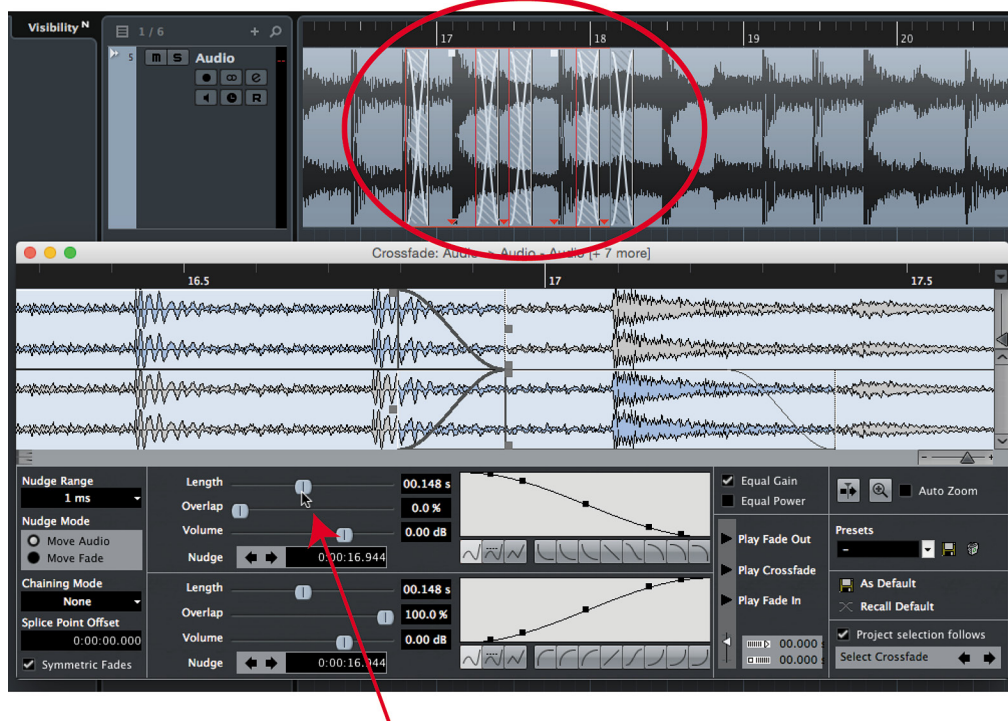


Figure 17.4
Editing crossfades of multiple events

Adjusting the length of all crossfades

Even completely non-contiguous events on different tracks can have all their crossfades edited at once. The rules to determine which crossfades will be edited always apply no matter where each event is located. Changes made to crossfades are absolute not relative. Each crossfade parameter will become identical once altered using the dialog.

INVISIBLE SELECTIONS

Be aware that you may alter crossfades that you cannot see on the screen by selecting multiple events. If you select an event that has a crossfade not visible in the current view, it can still be altered by the fade dialog.

Select Crossfade Buttons

The “Select Crossfade” buttons found in the lower right-hand corner of the dialog can be used to select crossfades on one track at a time moving contiguously left or right on the timeline. This lets you move through all the crossfades on a track without leaving the crossfade dialog. If the “Project selection follows” checkbox is active, the current selection will be reflected in the project window.

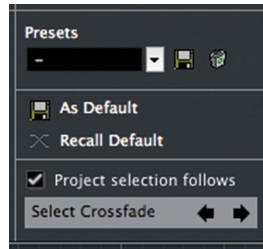


Figure 17.5
The select fade buttons in the fade editor

The Crossfade Sliders

There are three sliders for each side of the crossfade. When “Symmetric Fades” is checked, the Length and Overlap sliders are connected and work together. The volume sliders are always independent.

- ❖ **Length:** Moving the length slider will increase the length of the fade in or fade out. If symmetric fades is active, both length sliders move together to keep the fade in and fade out the same length.
- ❖ **Overlap:** The overlap slider determines where the fade in or fade out occurs relative to the edit point or where the two events meet. 100% overlap means that the fade portion will occur completely outside the boundary of the event. 0% overlap has the fade occur entirely within the event boundaries. When symmetric fades is active, these controls are inversely linked between fade in and fade out, as seen in Figure 17.6. Their combined values must always equal 100%.
- ❖ **Volume:** This slider is simply a duplicate control for the event volume handle. It offers a convenient way to adjust the volume of an event right within the crossfade dialog, facilitating a quicker editing workflow.

The overlap feature is very helpful when editing percussive material such as drums. Often drums are edited right on a transient point in the waveform. Placing a crossfade directly on a transient can cause distortion of the peak signal and loss of punch, as seen in the 50% overlap setting in Figure 17.6.

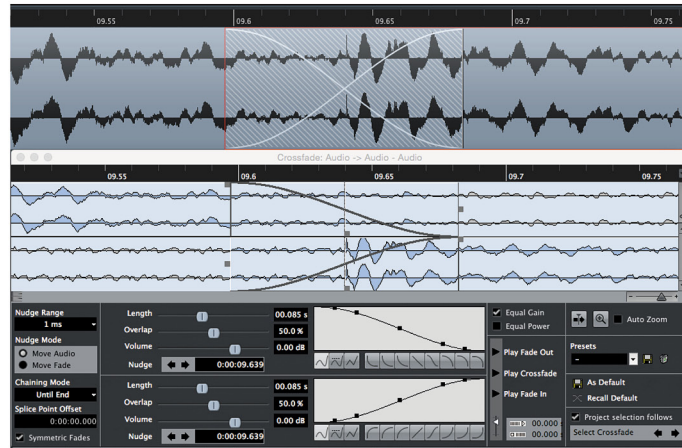
0% fade out overlap (100% fade in overlap) prevents the crossfade from happening on the transient at an edit point. By setting the default fade to 0% fade out overlap, 100% fade in overlap, you can edit percussive material right on the transients and not be concerned that a crossfade will smear the transient.

0% Overlap

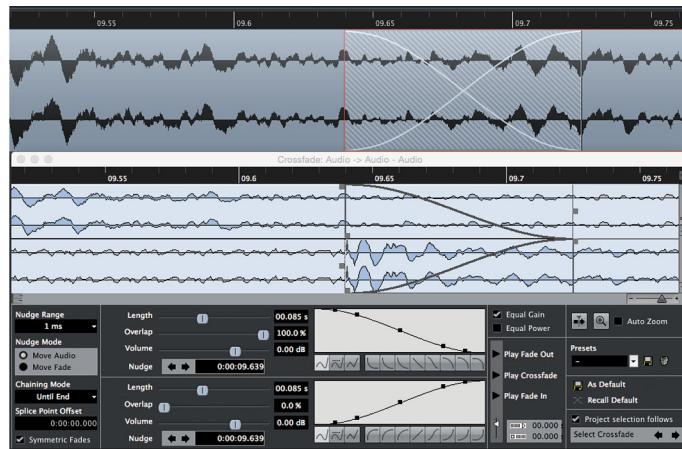


Figure 17.6
Fade Out
Overlap
Percentages:
0%, 50%,
100%

50% Overlap



100% Overlap



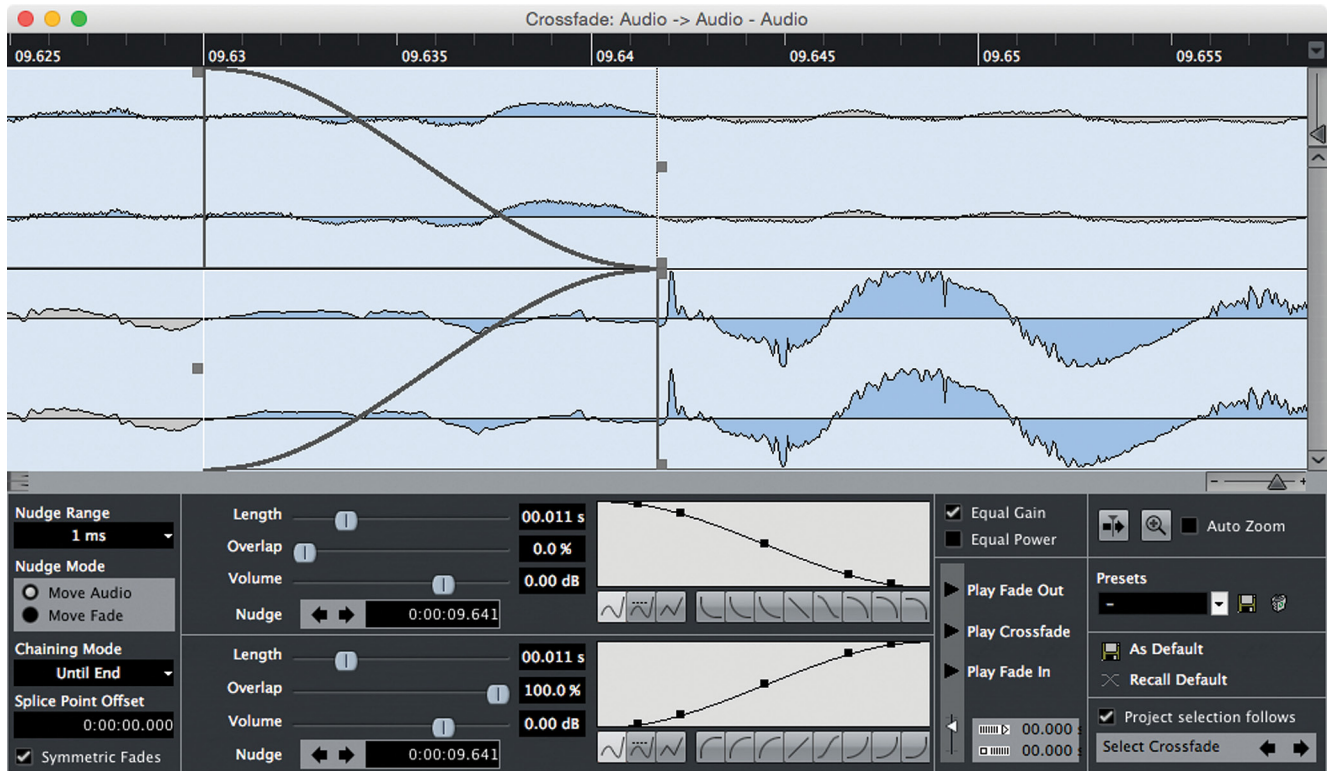


Figure 17.7 Crossfade with 100% overlap on the fade in to protect transient

By keeping the crossfade to the left of the edit point, you are not in danger of softening the transient with a crossfade. Using the ability to edit multiple crossfades at once, the crossfade dialog can fix these problems if they already exist.

DEFAULT CROSSFADE

The default crossfade that I use maintains the 100% overlap on the fade in and a short duration of 5 ms. The fade shape is equal gain with spline interpolation.

Crossfade Shape

The shape of the crossfade is freely adjustable although several useful shapes are provided and should be familiar from the event fade editors described in Chapter 9. All the same choices are available here except they are duplicated for both the fade in and fade out.

When symmetric fades is active, choosing one shape for either the fade in or the fade out will cause the inverse shape to be chosen automatically for the other fade. The same is true for the three choices of curve interpolation.

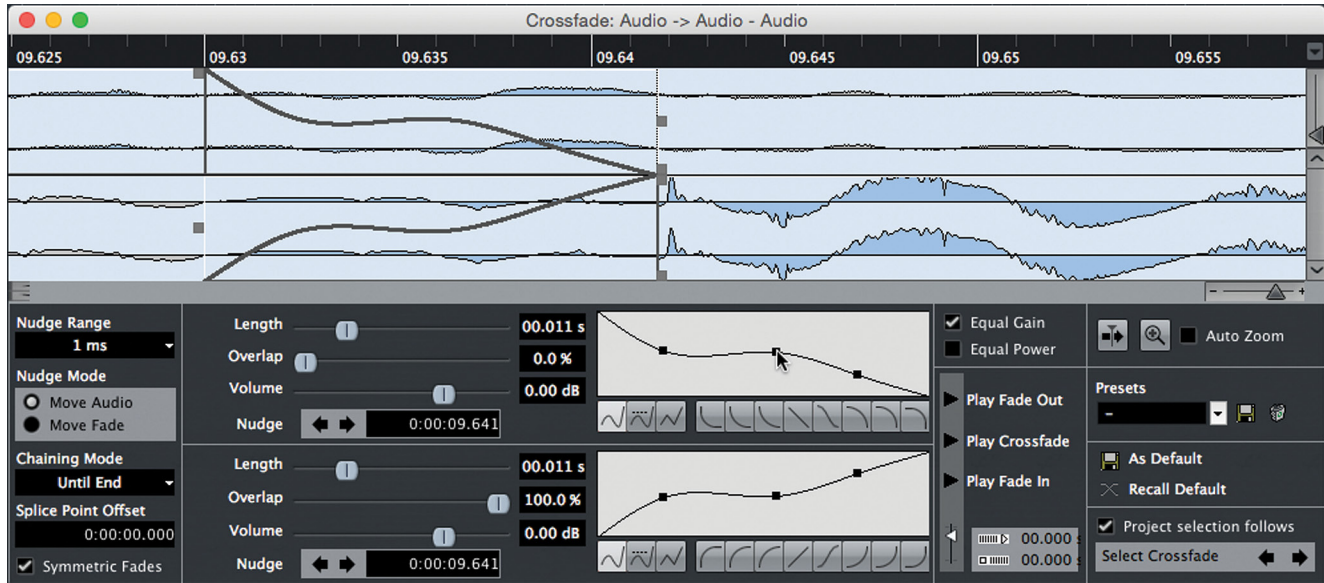


Figure 17.8 Adjusting curve points of a symmetric crossfade

Adjusting the individual curve points in the display is also inversely linked to achieve symmetric fades.

If symmetric fades is unchecked, you may adjust each fade independently for a more customized crossfade.

Nudging Fades

The crossfade dialog gives you some nudging options for fine-tuning the placement of the crossfade or the position of the audio around the crossfade. The nudging mode can either move the audio or move the fade.

Symmetric Fades

If symmetric fades is active, nudging either the fade in or out will result in the other fade moving the same amount to maintain symmetry. Otherwise, the fades can move independently.

Chaining Mode

When moving audio, the chaining mode determines what happens to other audio events on the same track to the right of the crossfade. There are three chaining modes accessed from its popup menu, shown in Figure 17.9.

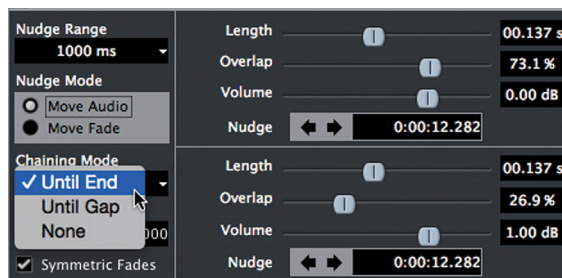


Figure 17.9
Chaining Mode
popup menu

- ❖ **Until End:** If the chaining mode is set to “Until End,” nudging of the audio will result in a rippling of that nudge to every audio event on that track from the crossfade point until the end of the project timeline.
- ❖ **Until Gap:** If chaining is set to “Until Gap,” the rippling effect of a nudge will move all contiguous audio events that come after the edited event. Once a gap between events is reached, the nudge will no longer have an effect.
- ❖ **None:** When set to “None,” no rippling effect will occur. Only the audio event that is being nudged will be altered.

Splice Point Offset

The splice point offset only works for non-symmetrical fades. Similar to the overlap setting, the splice point between two events can be offset from each other. This offset can only be as positive as the length of the fade. Otherwise the two events would no longer overlap or create a crossfade. However, this value can be negative to a greater degree, allowing the two audio events to overlap a great deal more without crossfading.

Grouping

There are two ways to group events together for editing in Nuendo. One method simply groups events together regardless of their position in time or track. Events from any part of the project can be grouped together for editing. The second method involves the use of a folder track. Events found within a folder track can be edited synchronously. In other words, events that occur at the same time can be edited together within a folder.

Each method has its advantages, and depending on the type of editing you are performing, one method will be more effective than the other. Examples will be used to illustrate the difference.

Event Grouping

The first method is event grouping. Any number of events from any location within the project may be linked together in a group. Events may be grouped by selecting them and selecting Edit>Group (Ctrl/Cmd+G), as shown in Figure 17.10.

Figure 17.11 shows events grouped on the same track.

Grouped events will be edited together, as shown in Figure 17.12.

- ❖ Selecting one event selects all members in the group.
- ❖ If you move one, the others will move the same amount.
- ❖ If you trim one, the others will be trimmed by the same amount.
- ❖ Adjusting the volume of one affects all others.
- ❖ Adjusting the fade in or fade out will affect all members of the group.

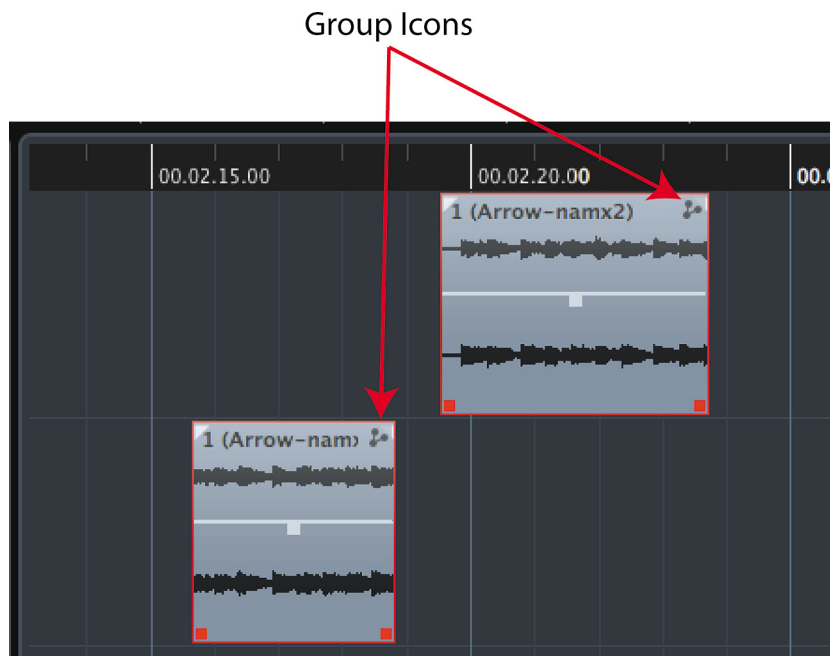
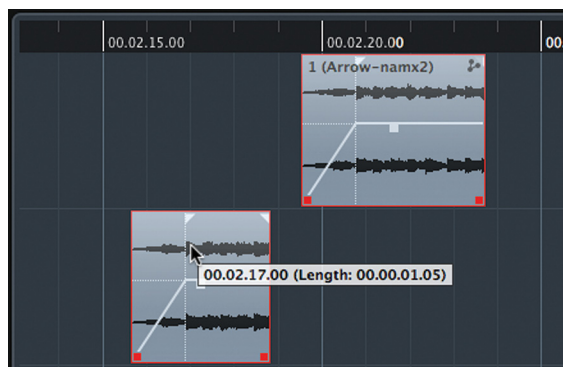


Figure 17.10
Two grouped events



Figure 17.11
Two grouped events on the same track

**Figure 17.12**

Two grouped events being faded together

However, the event envelope only affects one event at a time regardless of grouping.

Once you select any member of a grouped set of events, all members become selected so that any processing applied to the selection will be applied to all members of the group. For example, if you select one member of a grouped set of events and choose Audio>Process>Reverse, all events in that group will have their contents reversed.

With the advent of folder group editing, many group editing tasks can be performed using folder tracks instead. Editing that requires synchronized editing of many tracks is better handled using the folder track method. This method will be covered in the drum-quantizing example later in this chapter. Editing of non-contiguous or non-synchronous events is more suited to the event grouping method.

Multi-Channel SFX Spotting

A task that can benefit from event grouping is the spotting of multi-channel sound effect. In this example, a sound effect that is a composite of several sounds on multiple audio tracks occurring in succession needs to be placed at a specific timecode number in order to be in sync with the film. A good example of this would be a large gun sound effect consisting of the initial muzzle concussion followed by a series of various “ka-booms” and perhaps a Doppler projectile sound that together make a convincing rifle shot effect.

This single sound effect takes up six tracks with events starting at different times. The easiest way to place this sound effect and retain the timing of the individual sounds is by grouping the events together, as shown in Figure 17.13.

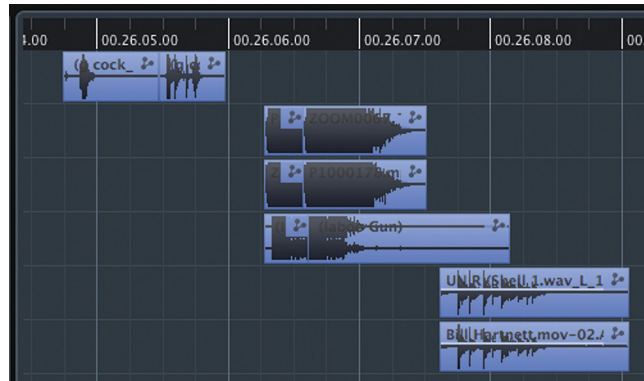


Figure 17.13
Composite gun sound across six tracks

Once these events are grouped together, they can be moved around as a unit in order to place them in sync with picture. Figure 17.14 shows the group of events being moved by dragging the bottom event to the right.

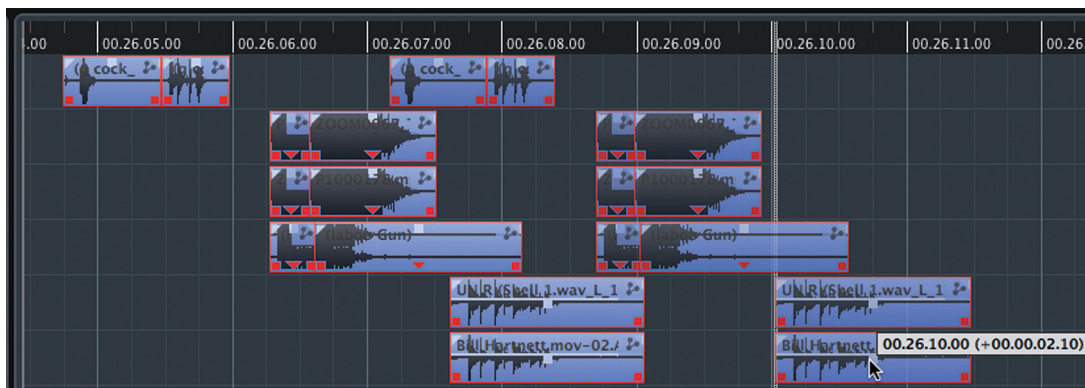


Figure 17.14
Grouped event being moved together

Groups of events can be moved by entering a start value in the info line. This will move all members of the group relative to the first event’s position.

INFO LINE DATA DISPLAY

No matter which member of a group you click on to select, the info line will display the data for the first member of the group in time. If more than one member of a group shares the same earliest start time, the top-most event will be shown in the info line.

If you click on one member of this composite gun sound effect, all will become selected and the info line will display the data for the earliest and top-most event, in this case, the “gun cock_03” sound starting at 00:26:04.20 TC (timecode). Go to the start field of the info line and increase the seconds value by one. Notice how the entire group of events is move to the right one second, as shown in Figure 17.15.

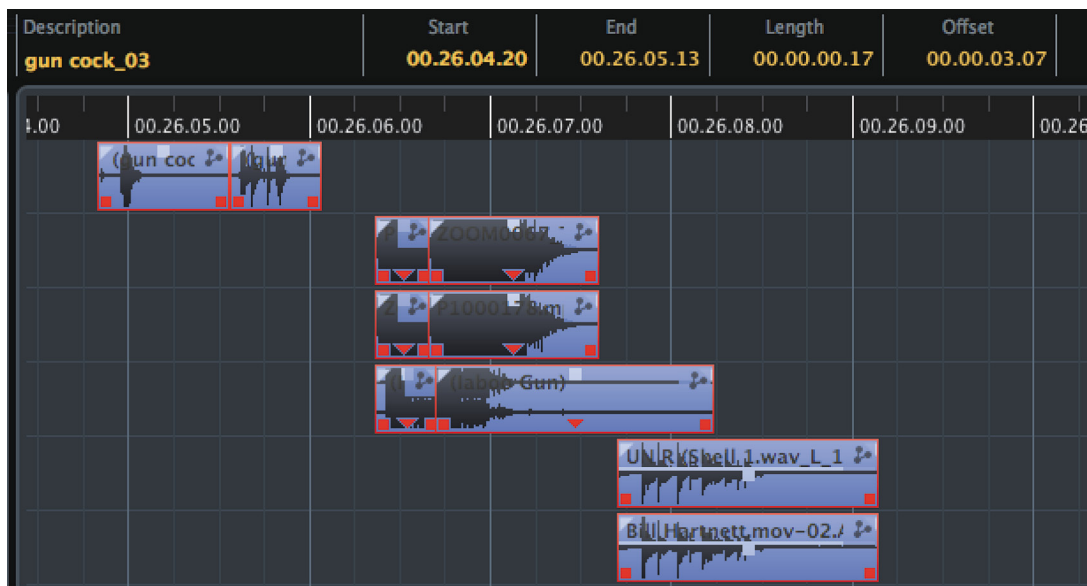
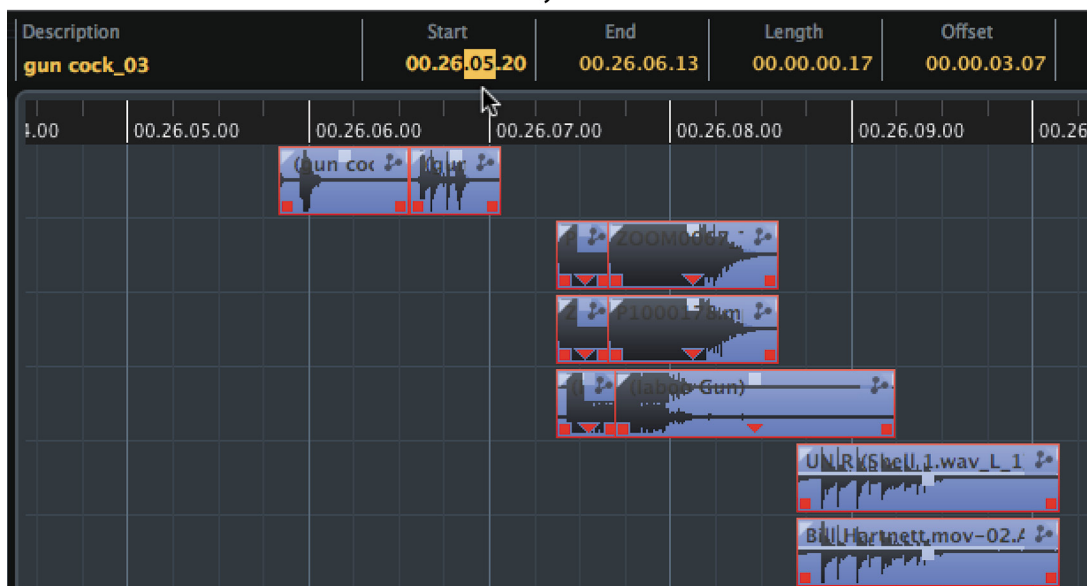


Figure 17.15
Grouped events
moved 1 sec-
ond by info line

Start field increased by 1 second



Clip Packages

If you have established a group of events as a composite sound and plan on using that group many times or in other projects, the entire group can be saved as a “Clip Package” and imported into other projects. Libraries of composite sounds can be generated this way and used in numerous projects and shared by multiple users.

In order to save a group of events as a clip package, first select more than one event either by clicking on a grouped event, selecting multiple events, or by selecting a range that contains multiple events. These events can be on different tracks and have multiple events on each track.

Choose File>Export>Clip Package and the export clip package dialog will open, as shown in Figure 17.16, allowing you to name and save the group of events. You can save the package to the default project folder or choose your own destination folder.

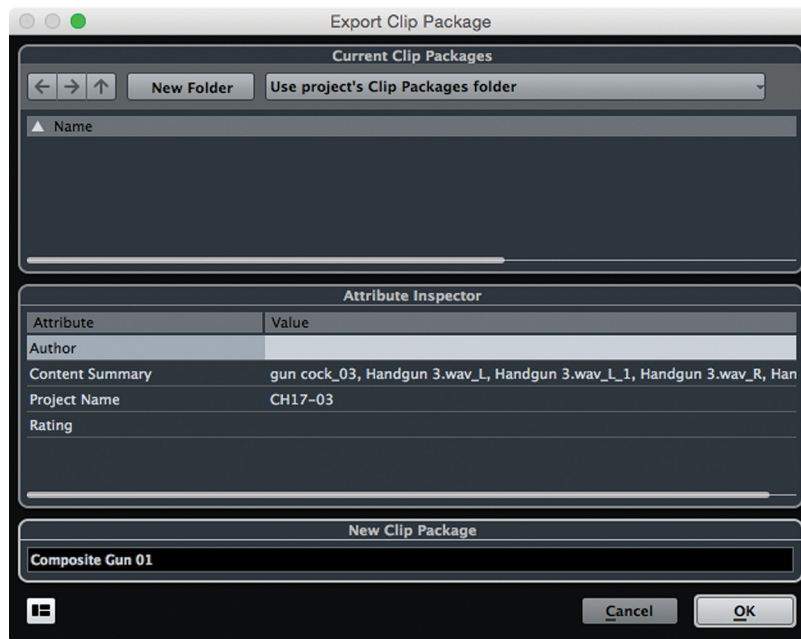


Figure 17.16
The Export Clip Package window

The Clip Package is self-contained. In other words, the file contains the audio content itself along with the edit data to organize it once imported into another project. The audio content is copied from the source material in the originating project including up to two second handles for each clip, giving you some wiggle room when fine tuning.

When you import a clip package into another project, the audio data is copied into that project's audio folder, keeping the project structures intact. You can then drag the Clip Package from the Pool directly into the Project. If you drag it to an empty area of the project window, tracks will automatically be created for each element of the Clip Package.

Folder Group Editing

Another way to edit multi-channel audio in Nuendo utilizes folder tracks. Tracks placed inside a folder can be edited extensively using the 'Group Editing' feature.

Normally you can perform rudimentary edits to contents of a folder track, such as moving, copying and pasting, by manipulating the events displayed on the folder track itself. “Folder Group Editing” offers advanced editing functions such as multi-track comping, sliding contents of all tracks at once, and specialized drum editing tools with the Quantize, performed by editing events directly within the folder.

To enable group editing, press the group editing button in the Inspector section of a folder track. Now, all events in the folder are vertically linked for editing purposes; i.e., cutting one event on the top track will cause all other events located at the same time to be cut as well.

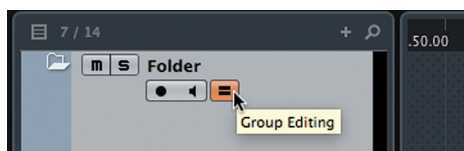


Figure 17.17
“Group Editing” button

Synchronized Events for Group Editing

When group editing is enabled, often you will get the message that not all events are in sync across all the tracks in the folder and group editing could “fail,” as seen in Figure 17.18. This happens when all the events on the tracks within the folder do not share these same attributes:

- Start Times
- End Times
- Playback Priority

Most of the time when this warning message appears it is because events do not have the same start and end times. Using the “Cut Head” and “Cut Tail” commands, it is possible to synchronize sets of events so that group editing will function properly.

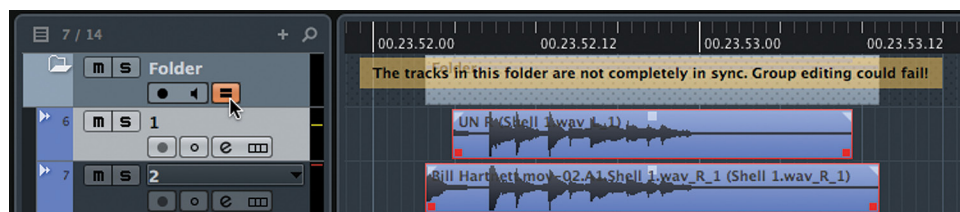


Figure 17.18
The two events do not have the same start and end times

In order to synchronize sets of events for proper group editing, follow these steps:

1. Place all tracks you wish to edit as a group within a folder track.
2. Place the cursor at a point that crosses all the events you wish to group at the beginning of the area you are editing.
3. Select all the events you wish to group.

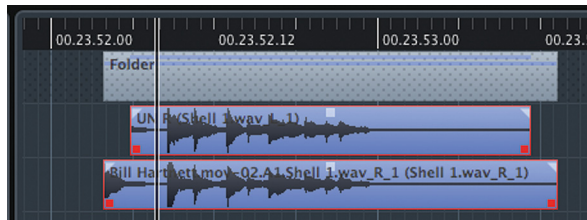


Figure 17.19

The cursor is placed across both selected events

4. Choose Edit>Range>Cut Head to trim the events to the same start time.

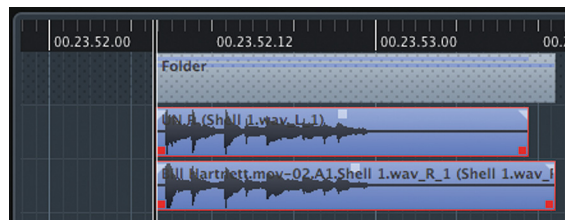


Figure 17.20

After the “Cut Head” command, both events have the same start time

5. With the events still selected, place the cursor across all the events at the end of the section you wish to edit.
6. Choose Edit>Range>Cut Tail to trim all events to the same end time.

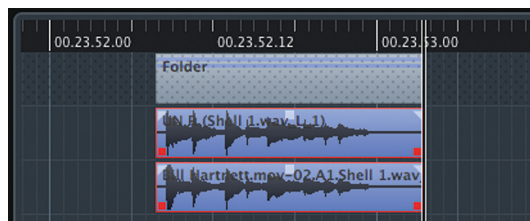


Figure 17.21

The two events now have the same end times and will be in sync

7. Enable “group editing” for the folder track. You will now be able to edit the two events using the special group editing functions.

WARNING MESSAGE

You may still get the warning message if there are other events within the folder that are not in sync. However, group editing will still function for those sets of events that are in sync.

Group Editing Functions

When group editing is enabled, the folder track displays a dotted pattern (shown in Figure 17.22) to give you visual indication of the editing mode.

Once group editing is successfully enabled, editing an event will cause the same edit to be performed to all synchronous events. For example, simply cut one event in the folder track and see how all events will be cut at that point simultaneously, as shown in Figure 17.23.

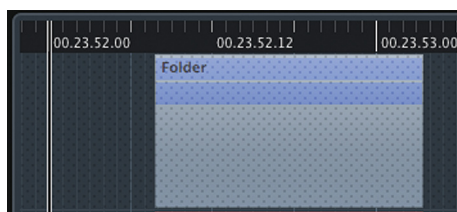


Figure 17.22 Dotted pattern in the folder track indicates group editing mode

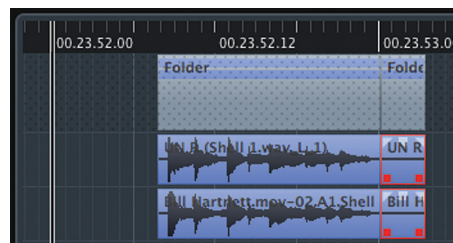


Figure 17.23 Cutting one event causes the same cut to be made on all synchronous events in the folder

Now, editing performed to any event in the folder will cause all synchronous events to be edited in the same fashion. These operations include:

- ❖ Adjusting the event gain
- ❖ Adjusting fade-ins and fade-outs
- ❖ Trimming
- ❖ Moving
- ❖ Cut, Copy, Paste
- ❖ Sliding Contents
- ❖ Quantizing Audio (see Drum Editing example)
- ❖ Muting
- ❖ Locking
- ❖ Transposing (if in Musical time base)
- ❖ Offline Processing (for example Reverse or Time-stretching)
- ❖ Events to Part (and similar arrangement functions)

Basically anything you can do to a grouped set of events, you can also do to events in a folder with group editing enabled.

Drum Editing

In modern record production, editing acoustic drum performances to a strict tempo has become ubiquitous. We do it all the time. This is often necessary to meld production styles that use drum loops and electronic drums in combination with acoustic drums without generating “flamming” and other synchronizing errors that could deter the listener. The acoustic performance might need to be mapped to the beat placement of a drum loop from an old record that is far from perfectly on the click track.

Nuendo can provide a fast and sophisticated method for adjusting multi-channel drum recordings to either a fixed grid or other timing reference such as a groove quantization preset. Several operations must be completed in order to make this process transparent to the listener. Using the folder group editing feature along with the specialized features of the Quantize Panel, a process which used to take a great deal of time now passes quickly and routinely, freeing up more creative time in the studio.

The following example outlines a typical drum editing process for a basic beat, starting with beat detection of the files and ending with crossfade smoothing of the resulting edits. We will start with a nine-channel recording of a drum kit and match its beat placement to Nuendo’s bars and beats grid.

The drummer performed the beat while listening to the click track in headphones but was not consistent in beat placement and lagged behind the beat during some drum fills. We want to rectify this without making the performance sound too robotic or machine-like.

In Figure 17.24, the preference “Transparent Events” has been enabled to better see the grid lines in relation to the waveform, which shows us visually how the drums are not lined up with the grid lines. This makes it so much easier to see what you are doing while editing to a grid.

Follow these steps to edit the drums so each beat falls much closer to the relative grid line:

1. First, ensure that all the drum tracks you wish to edit are located in a folder track and that group editing is enabled for that folder.
2. By listening to the performance, determine which drums are forming the basis for the beat. This is typically the kick and snare for a normal rock-pop drum kit. If there are other key elements to the beat, such as the hi-hat, make note of that as well.

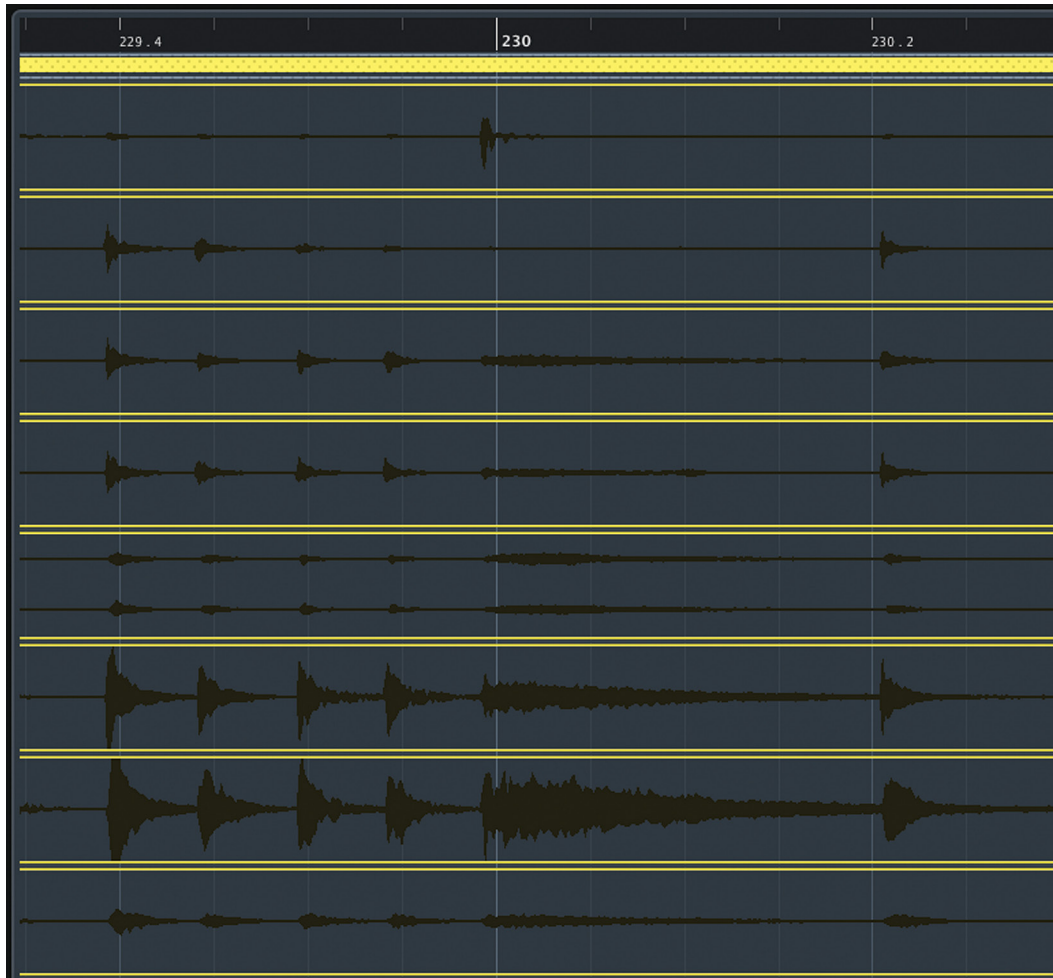


Figure 17.24
Nine tracks of drum, not perfectly in time

3. Double-click on the first audio event on a track chosen as the basis for the drum beat—in this example, the kick microphone. This will open the Sample Editor. (The Sample Editor is covered in more detail in the next chapter.)
4. Click on the Hitpoints tab shown in Figure 17.25.
5. Click on the Edit Hitpoint button to generate hitpoints for the event. Nuendo analyzes the audio and tries to determine which places in the waveform are beats or transient points. Vertical lines will appear in the display indicating each Hitpoint. These can be adjusted in several ways.
6. Use the threshold slider to raise the level necessary to trigger a hitpoint. This avoids false triggers based on background sounds such as the snare drum leaking into the kick microphone. You will see a visual representation of the threshold—two lines moving away from the center of the waveform display, as shown in Figure 17.26.

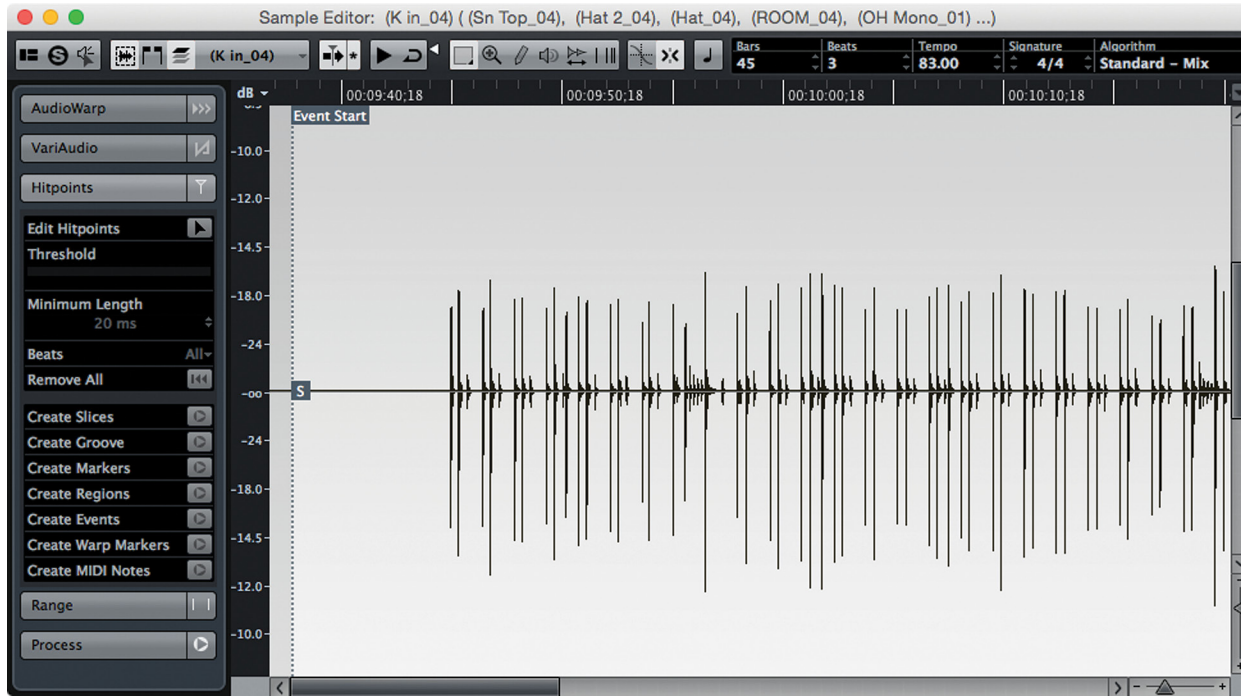


Figure 17.25 Kick drum event open in the Sample Editor and the Hitpoints tab



Figure 17.26
Raising the hitpoint threshold slider

- Next, choose a musical note value in the Beats pulldown menu that correlates to the rhythmic resolution that best fits the performance, as shown in Figure 17.27. The trick here is to use the largest note value that relates to the basic beat in the song. There may be sections that have much smaller notes values, especially during fills. Those sections can be better addressed on a case by case basis for the best results.



Figure 17.27
Choosing a
beat value for
hitpoints

- Once you are satisfied with the generated hitpoints for the event, close the sample editor. You can always come back and edit the hitpoints later if needed before cutting up the events.
- Repeat steps 3 through 8 for each event that you wish to use as a basis for quantizing the drums. In this example, the hitpoints are generated for the kick, snare, and hi-hat tracks.
- From the Edit menu, select "Quantize Panel." The Quantize Panel now has some extra features relating to group editing. The top pane contains the "slicing rules," as seen in Figure 17.28. The three tracks in which hitpoints were detected should now be listed here.

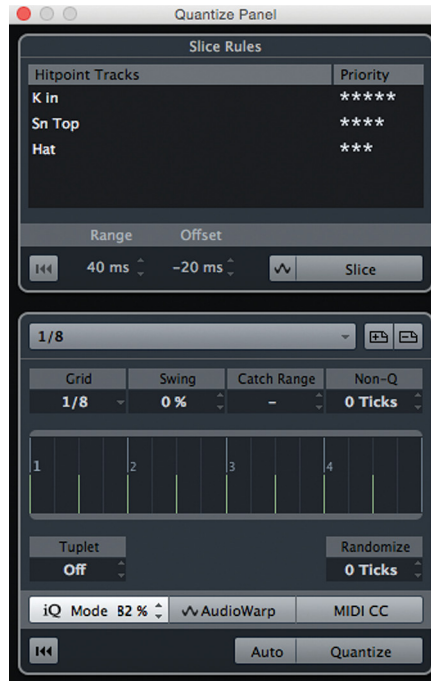


Figure 17.28
Quantize Panel
with three
tracks as slicing
rules

- Each track can be given a priority value to determine which hit point will be used in the case of two being very close to each other. With acoustic drums, this will happen often with mic leakage between drums. You want to prioritize the most important drums, such as the kick and snare, so that their tracks will be sliced accurately.

MIC PLACEMENT AND HITPOINT DISPARITY

The distance between microphones will create a slight disparity between the hitpoints on various tracks. For example, the kick drum might generate a hitpoint on the hi-hat track several milliseconds after the same hitpoint on the kick drum track. Prioritizing the kick track will cause Nuendo to slice the events based on the kick hitpoint.

- You can view a visual representation of the slices that Nuendo will create in the project window once the priorities have been set in the quantize panel, as seen in Figure 17.29. This is a great tool for checking the accuracy of the process before executing the slicing of the drum tracks.

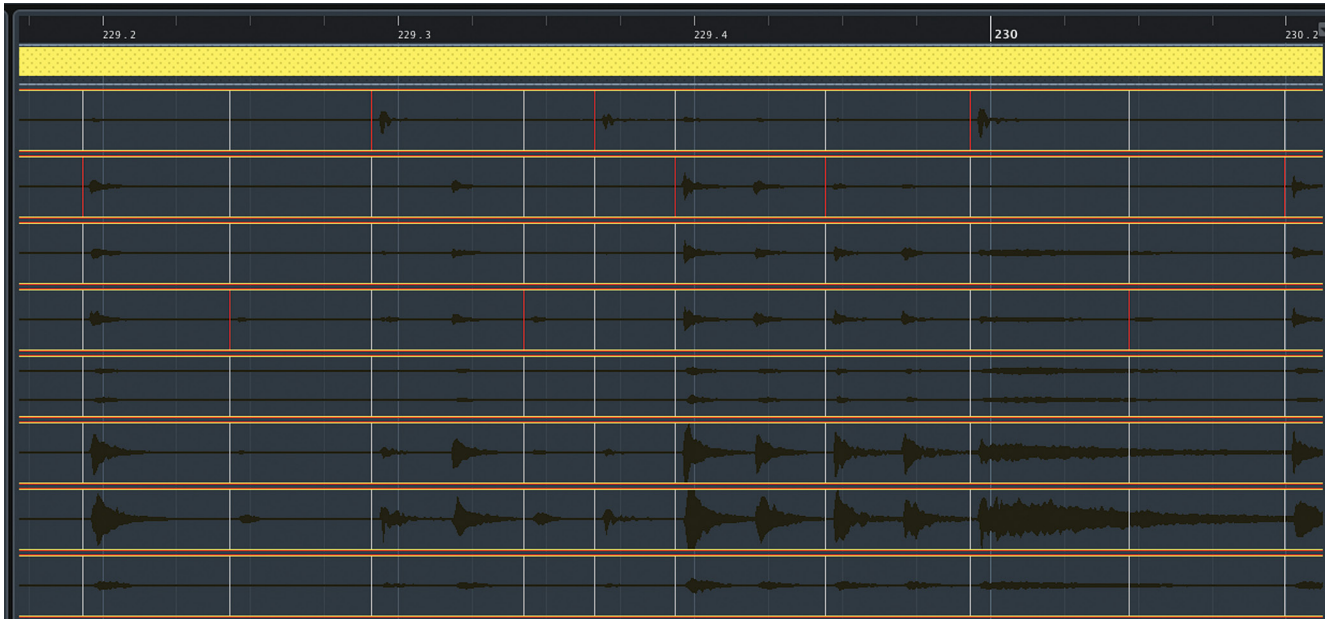


Figure 17.29 Visual preview of slices

13. Adjust the Range parameter as needed in the quantize panel. Range determines the minimum distance between slices. This helps prevent extra slices being needlessly created.
14. Adjust the offset value to create slices slightly ahead of the actual transients in the recording. This will impact how crossfades are created once quantizing is complete. Having the slices offset from the actual transient gives you room to create smooth crossfades without distorting the transients. While viewing the slicing preview in the project window, adjust the offset parameter until you have enough space for a reasonable crossfade later.

CROSSFADE AND OFFSET VALUE

If your default crossfade uses 100% overlap on the fade in, the offset value here may be much smaller as the crossfade will not go to the right of the edit point. A value of as little as 5 ms can be sufficient.

15. Press the slice button. All the drum tracks will be sliced up into multiple synchronized events, as shown in Figure 17.30. Each set of events will have their snap points set right on the hitpoint while the start of the event will be offset by the amount set in the quantize panel.

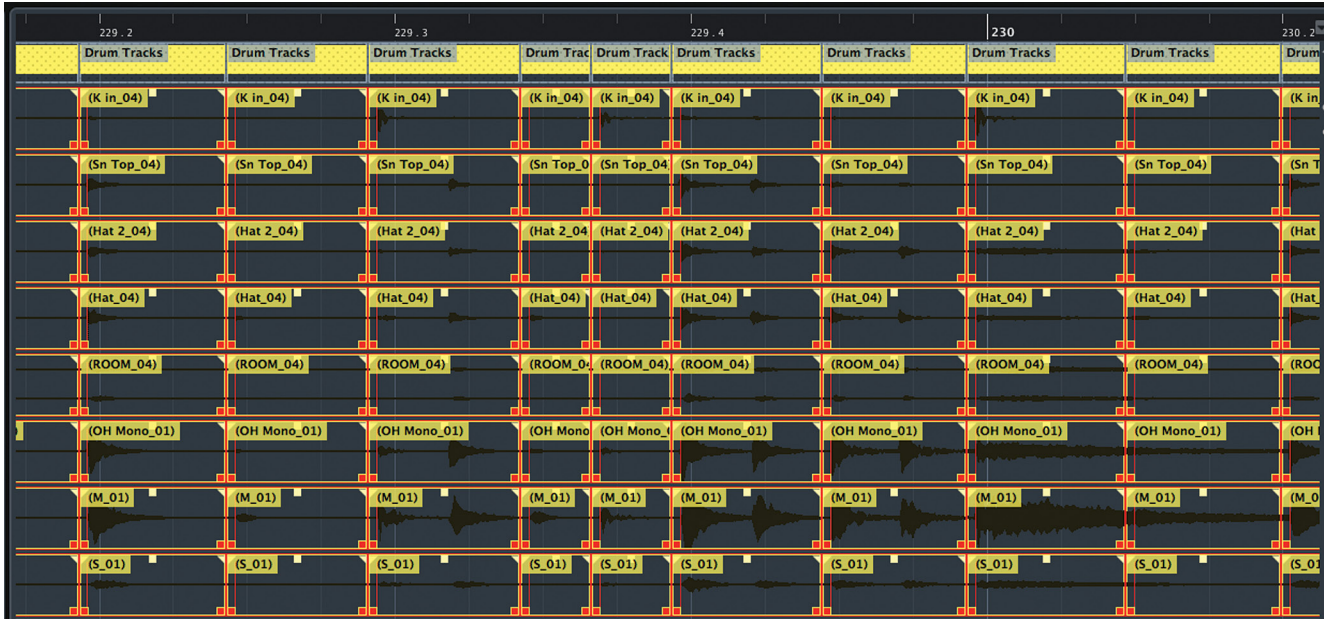


Figure 17.30 Sliced events

BOUNCE EDITED DRUM TRACKS

Slicing an entire song can generate thousands of events. Depending on your CPU's abilities, Nuendo can begin to behave sluggishly while dealing with this many events at once. Once editing is completed on the drum tracks, it is advisable to bounce all the edits to new events to free up resources.

- Now you can apply quantization to the events as needed to tighten up the drum part. Typically it makes sense to work on a section at a time rather than the entire song at once. Differing musical parts may require slightly different quantization settings, especially drum fills and transitions. Figure 17.31 shows the same events after quantizing to 16th notes.

ITERATIVE QUANTIZING

Iterative quantizing lends itself to tightening acoustic drum performances. Check the “iQ” box in the quantize panel to activate it and set a percentage value for how far an event should be moved towards the quantize location. This can help alleviate the “robot” syndrome common with strict quantizing of acoustic drums.

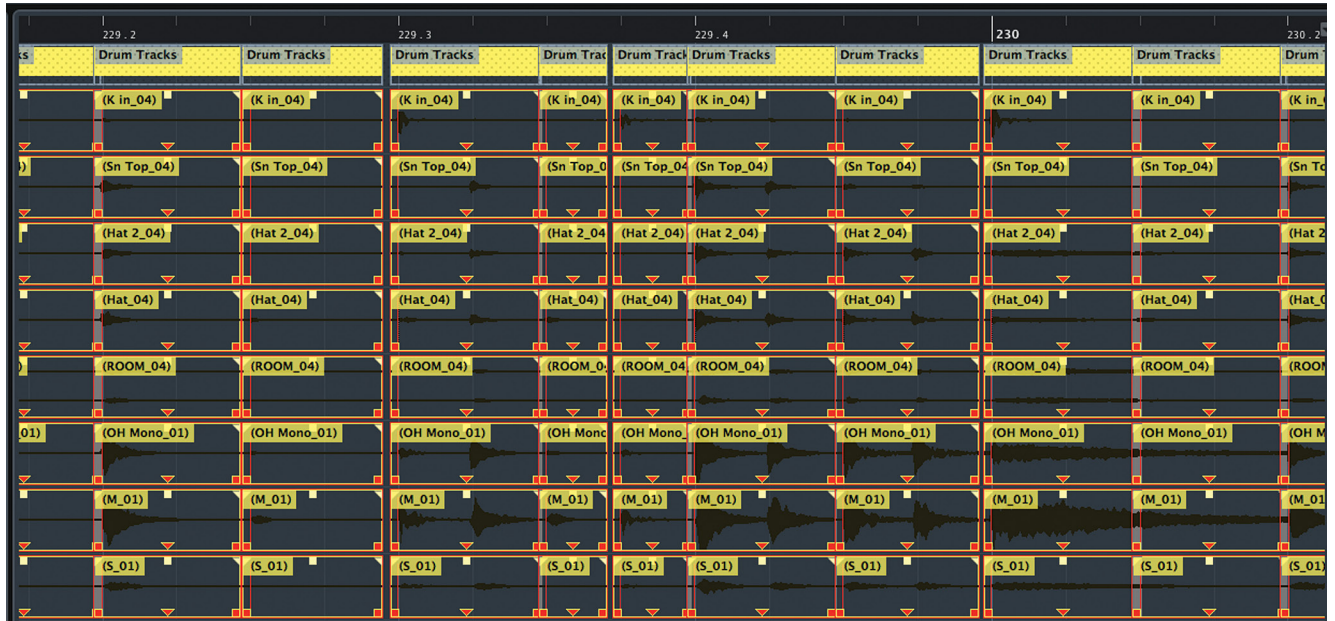


Figure 17.31 Quantized events

17. Once you have quantized all the drums, it is time to smooth out and crossfade the edits. When you initially sliced up the events, another pane appeared in the quantize panel: “Crossfades.” Here you can determine the size and placement of the crossfades, even open up the editor to fine tune them. When creating crossfades using the quantize panel, there is one important difference. Crossfades are intelligently created so that overlaps between events do not cut off any beginnings so that all the transients remain intact. Enter a size value.
18. Press the Crossfade button to delete overlaps, close gaps and crossfade all in one step, as shown in Figure 17.32.
19. Once you have created and adjusted all the crossfades, it is advisable to render the edits to new audio files by using the “bounce selection” command found in the Audio menu or Render In Place from the Edit menu. This will free up CPU resources.

It is always possible to manually adjust any of these events as a part of the process. Sometimes, the best method is by hand, adjusting each event by ear in order to get the best feel. However, the group editing tools provided by the quantize panel offer incredible time saving workflow over other methods, leaving more time for creative choices.

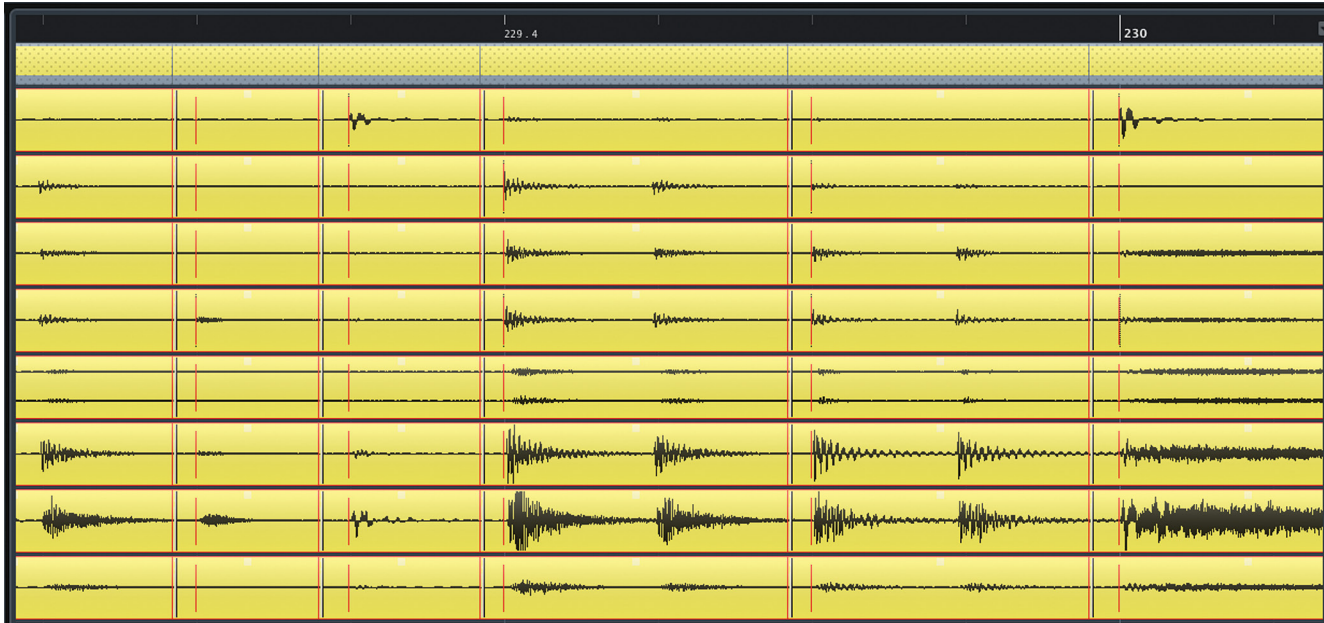


Figure 17.32 Crossfaded drum tracks

QUANTIZING USING AUDIO WARP

It is possible to perform this same task using AudioWarp instead of slicing individual events. AudioWarp is part of the Sample Editor musical processing algorithm discussed in the next section.

Musical Editing

Simple audio editing is mostly about playing portions of audio files at specific times during playback. From a music perspective, editing involves that as well but also includes facets such as pitch and tempo. Not only can audio files be played back at a specific time, but also at a specific speed and pitch.

This section explores two tools that address these musical facets of editing.

Linear Vs. Musical Timebase

The timebase is how the position of the audio is related to the timeline. Nuendo offers two timebase standards that audio tracks can use: Linear and Musical.

- ❖ **Linear** - This timebase is what might be considered “normal” as it relates the audio to “clock on the wall” time, minutes and seconds. Each sample of audio is located by the linear time of the project.
- ❖ **Musical** - Audio events in musical timebase are related to their musical position on the timeline: bars and beats. Now each audio event is related to a specific musical position in time. This musical timebase can be changed simply by changing the project tempo track. If that happens, any audio track that is in musical timebase will have its audio events adjusted so they still match the same musical position in the new tempo.

While linear timebase is used for most standard recording, musical timebase is very useful while composing, as changes made to the tempo will be applied to the musical timebase automatically.

Tempo Change Example

In this example, there is an audio track with hand clap samples placed on the beat at 83 bpm, as seen in Figure 17.33. Notice we only see about 4 bars worth of time.

Now if we change the tempo of the project to 120 bpm, the bars+beats ruler at the top will show smaller bar lengths and the clap samples will no longer be on the beat, as shown in Figure 17.34. Notice we now see up to 6 bars worth of time.

If you change the timebase of the track to musical using the timebase button, as shown in Figure 17.35, we will now be able to change the tempo and have the clap samples stay on the beat.

Now we change the tempo from 83 to 120 bpm and see the result in Figure 17.36. The claps are still on the beat but they have moved relative to the Seconds ruler.

Using musical timebase, audio events will keep their relative position to the bars+beats ruler regardless of how the tempo changes. The audio events will still play back at their normal pitch and speed unless they are in Musical Mode, as explained in the next section.

MIDI MUSICAL TIMEBASE

Due to the musical nature of MIDI tracks, they default to musical timebase. However, you can change them to linear timebase if that is what is needed.



Figure 17.33 Hand clap samples placed on the beat at 83 bpm



Figure 17.34 Bpm set to 120 in linear timebase

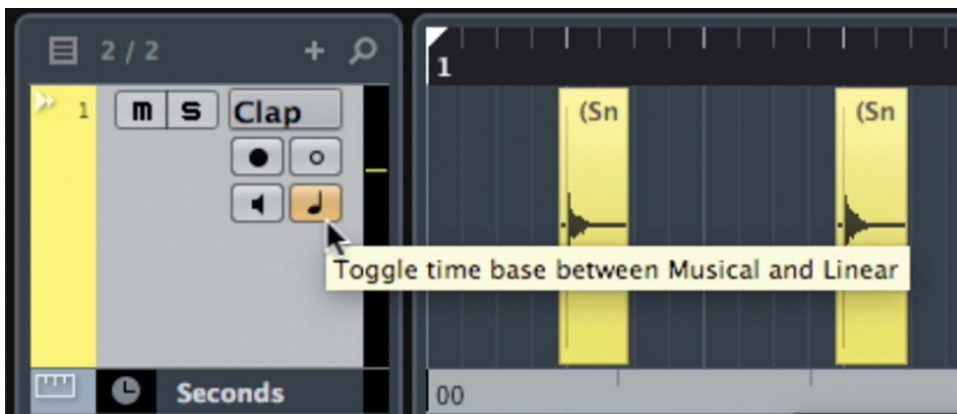


Figure 17.35
The timebase has been changed to Musical



Figure 17.36 Clap samples moved to 120 bpm tempo

Normal vs. Musical Mode for Audio

Each audio file in the project can be played back in two modes:

- ❖ Normal Mode, in which audio is replayed exactly as it was recorded.
- ❖ Musical Mode, in which audio is replayed at different speed and pitch as determined by the project itself.

If you import audio files from something like a loop library, the files may already be in musical mode. Importing them to a track will create an audio track in musical timebase so that the event is ready to follow any musical changes made to the project tempo or key (transpose).

Figure 17.37 shows a drum loop imported to a new audio track. Notice the drum loop is exactly 2 bars long. It was prepared this way by the library.

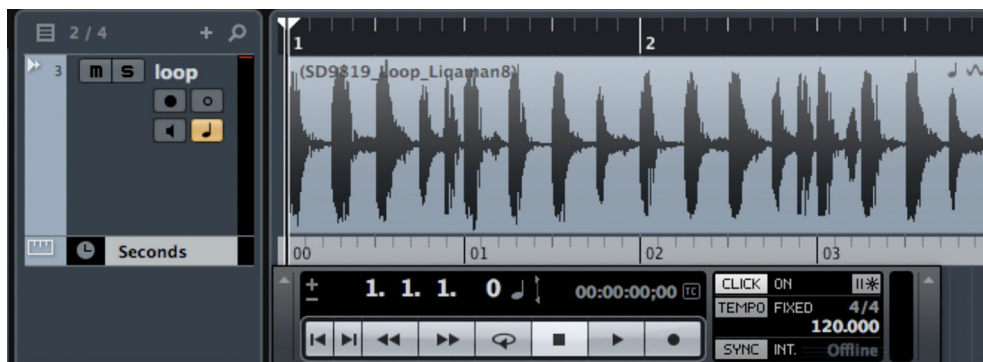


Figure 17.37
A library drum loop imported to a new track

If the tempo of the project is changed to 140 bpm, the drum loop will automatically speed up to play at the new tempo, as seen in Figure 17.38. Notice the musical mode icon in the upper right corner of the event.



Figure 17.38
The drum loop playing back at 140 bpm

There are two ways to switch the playback mode of an audio file, one in the Pool and the other in the Sample Editor. In the Pool, you must view the Musical Mode attribute by selecting it from the attribute menu shown in Figure 17.39.

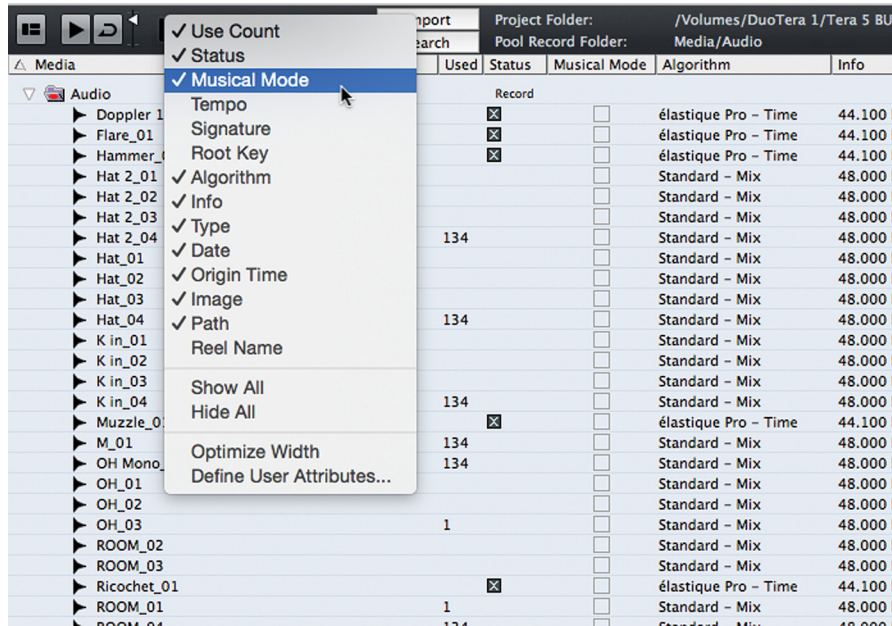


Figure 17.39
The Pool's
attribute view
menu

The musical attributes of tempo, time signature, and root key may also be viewed in the Pool. To enable musical mode for an audio file, click the box in the musical mode column. Now changes to tempo and key will alter how the audio file is played back in Nuendo.

In the Sample Editor (discussed in the next chapter), you can click the musical mode icon found in the toolbar to enable musical playback, as seen in Figure 17.40. The musical parameters of length, current tempo, and time signature are also available to edit.

This type of playback processing is called Warp processing and uses one of several algorithms. Each algorithm is suited for a different type of audio. Some are better for percussive material such as drum loops, while others are better for sustained pitched sounds such as violins. Experimentation with each algorithm will help you determine what sounds best in any given situation.

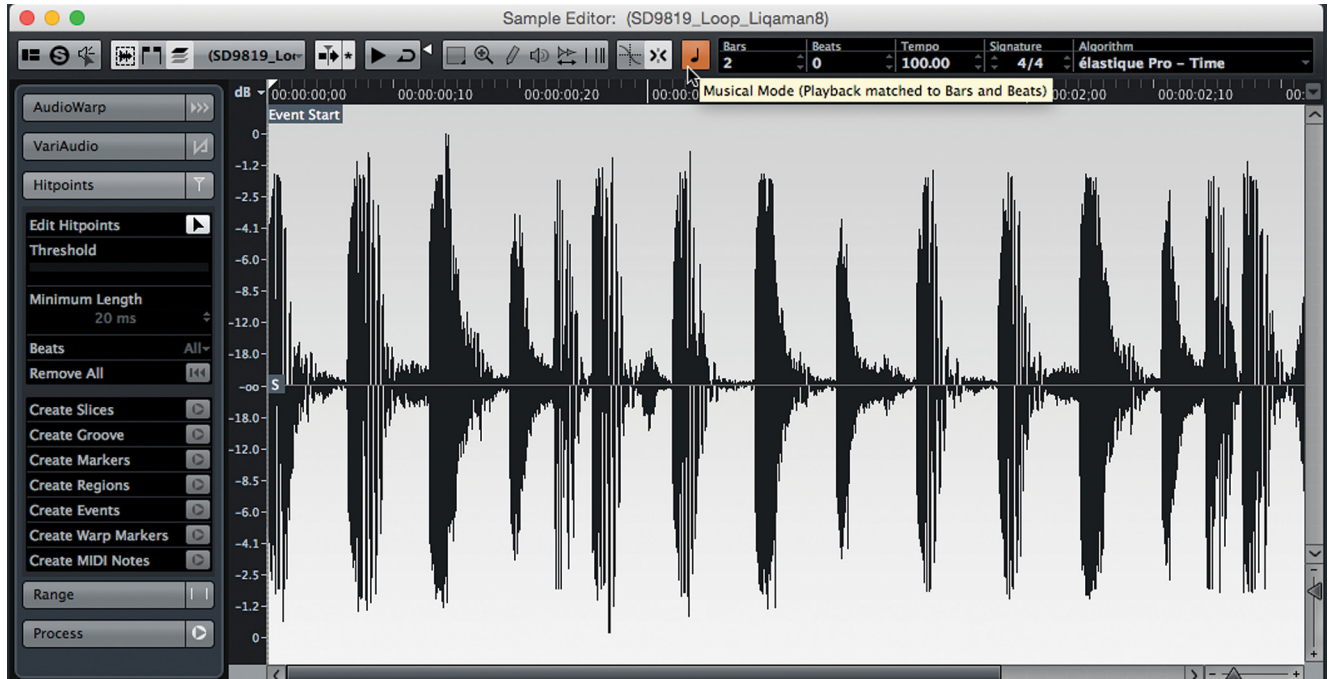


Figure 17.40 The Sample Editor with Musical Mode enabled

There are seven standard and nine élastique algorithms available for warp processing.

- | | |
|---|--|
| <ul style="list-style-type: none"> ❖ Standard ■ Drums ■ Plucked ■ Pads ■ Vocals ■ Mix ■ Custom ■ Solo | <ul style="list-style-type: none"> ❖ élastique ■ Pro – Time ■ Pro - Pitch ■ Pro - Tape ■ Pro – Formant Time ■ Pro – Formant Pitch ■ Pro – Formant Tape ■ Efficient – Time ■ Efficient – Pitch ■ Efficient - Tape |
|---|--|

To determine what processing algorithm is used to time-stretch or warp the audio, open the Pool window and locate the event in question. In a Pool with a large number of audio files, this can be a daunting task. However, there is a command that will do this for you.

Once you have the files selected in the Pool, the algorithm for time-stretching (warping) is listed in a column. Here's how to change the warping algorithm for multiple events at once.

1. Select one or more audio events in the project window. Using the drum editing example, we can select one event within the "Drum Tracks" folder and with group editing active, all synchronous events will automatically be selected.
2. From the Audio menu, choose "Find Selected in Pool," Cntrl/Cmd+F by default. All files that are referenced by those events will become selected in the Pool.



Figure 17.41
Multiple audio files selected in the Pool

3. In the Algorithm column, click on the algorithm setting for one of the files. You will see a popup menu listing all the choices for warp processing.

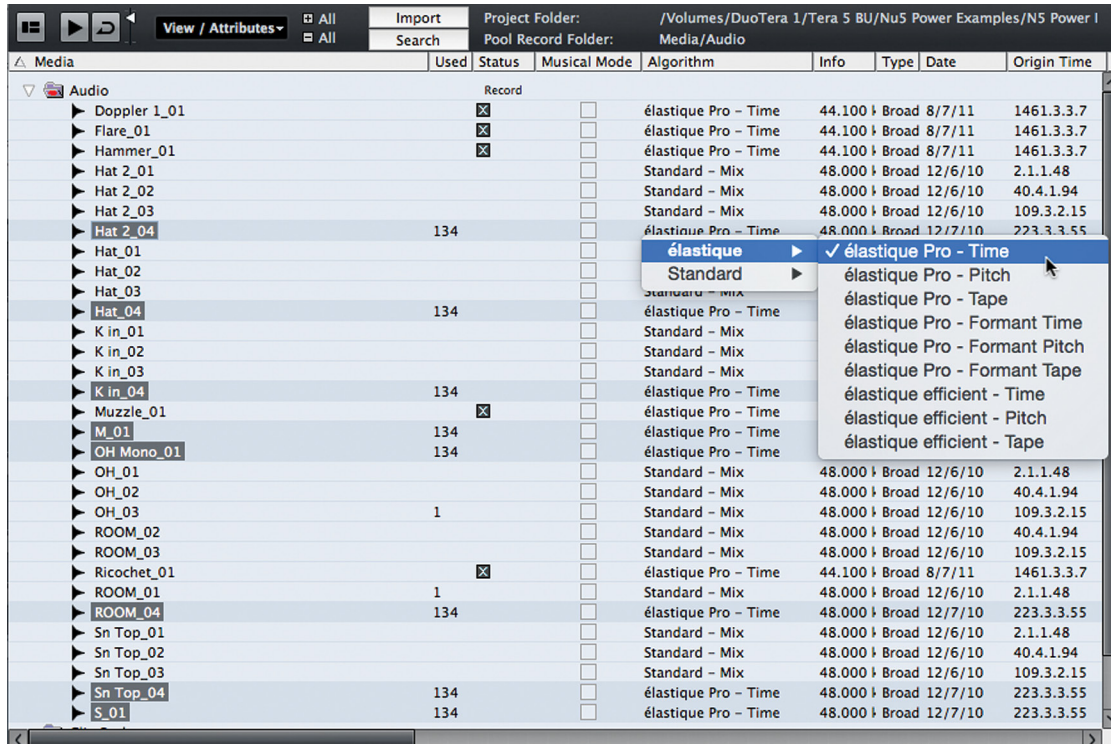


Figure 17.42

Selecting a Warping algorithm

4. Select an algorithm and all selected files will change to that choice.

Now any changes made to the project tempo will cause audio events on tracks that are in musical timebase, to have their speed changed using the selected algorithm in order to match the tempo changes.

WHICH ALGORITHM?

This algorithm is not the same algorithm that will be used by the time-stretching tool in the project window. That algorithm is set in preferences under Editing>Audio. Also, the time-stretching and pitch-shifting offline processes have their own set of possible algorithms that may be chosen separately.

AudioWarp for Drum Quantizing

The drum quantizing example described earlier in this chapter can also be performed using the time stretching algorithms of musical mode playback. The process is exactly the same until the point of creating slices using the Quantize Panel. At that point, instead of clicking the Slice button in the Quantize panel, you must switch to AudioWarp Quantize, as shown in Figure 17.43.

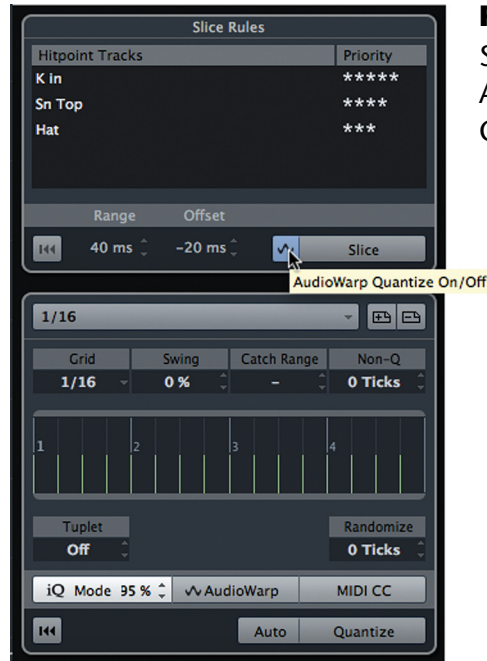


Figure 17.43

Switching to
AudioWarp
Quantize

Next, the Hitpoints from the three Slice rule tracks will be converted into AudioWarp tabs by clicking the Create button, as shown in Figure 17.44.

Notice now that the crossfade adjustments are no longer available since we are in AudioWarp mode. Quantizing the Warp tabs will timestretch the audio files to line up the tabs with the quantize grid, as shown in Figure 17.45.

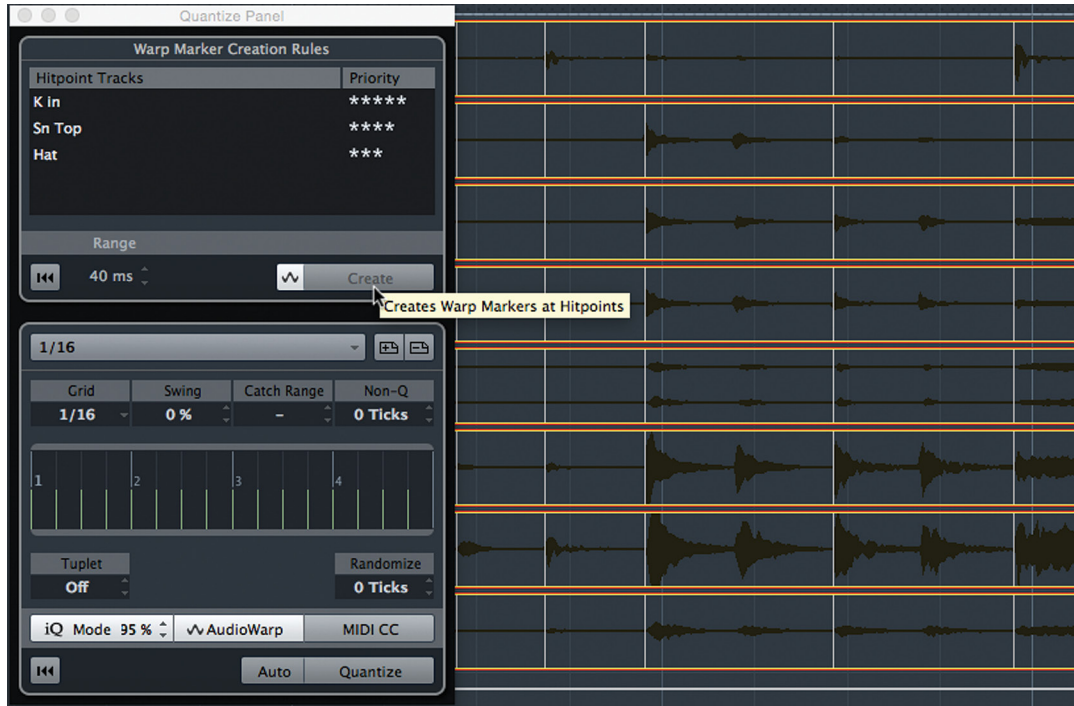


Figure 17.44
Create
AudioWarp tabs

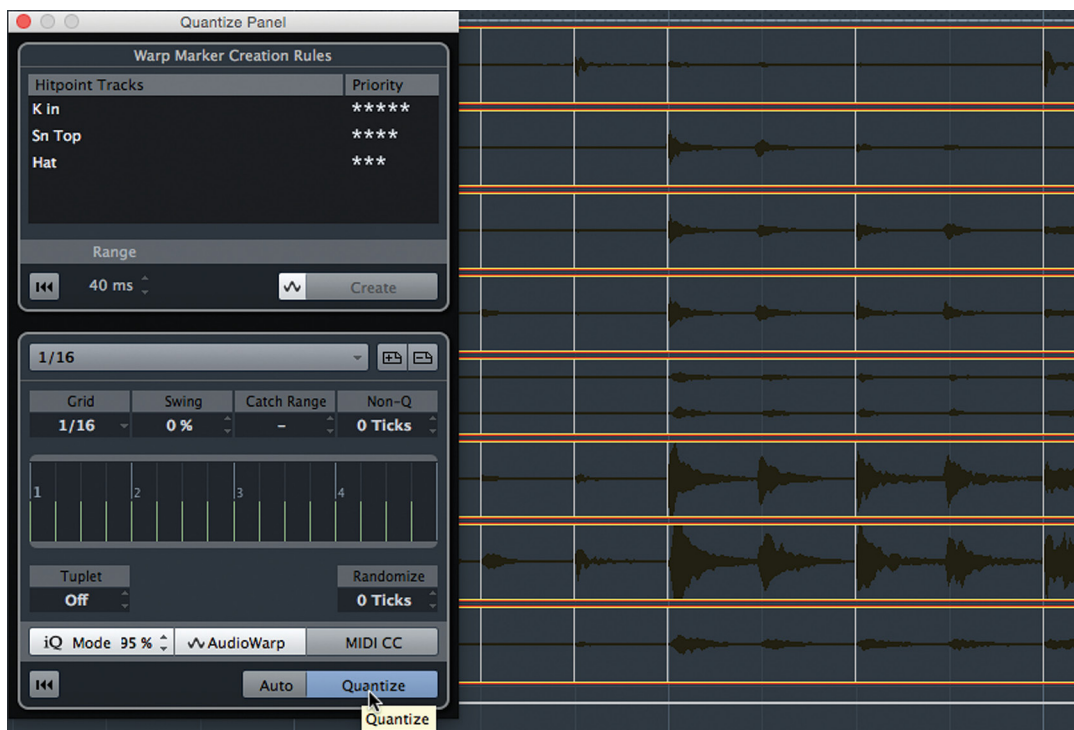


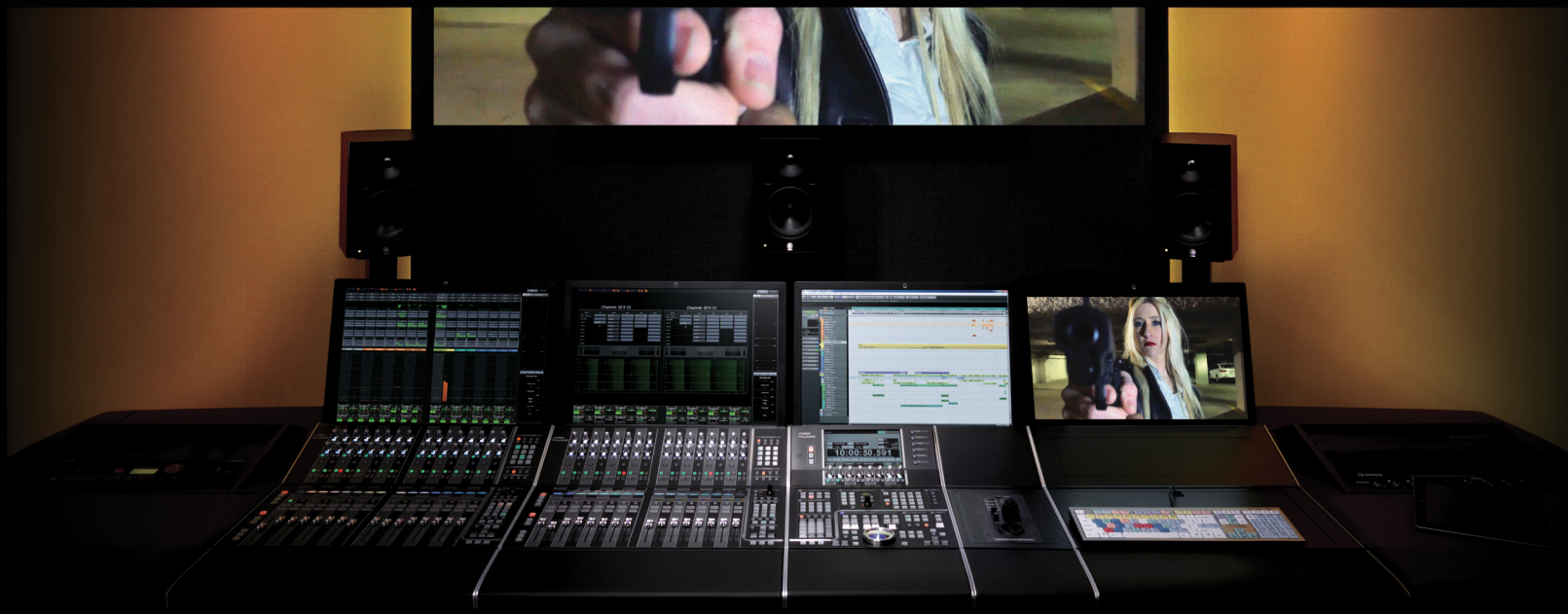
Figure 17.45
Warp tabs
quantized to
the grid

Now the transients are lined up with the grid without creating multiple audio events. This method can be more or less effective depending on the material being processed. Time stretching can leave artifacts depending on the extent of the stretching.

Experiment with different algorithms to see which one sounds the best. Sometimes the sliced events method yields better results. It's up to you.

NUAGE

COURSEWARE



PART III: EDITING

by Ashley Shepherd

Chapter 18

The Sample Editor



NUAGE

The Sample Editor

- ❖ Sample Editor Playback
- ❖ Sample Editor Inspector
- ❖ Real World Example: Glitch Removal
- ❖ Matching Two Drum Loops
- ❖ VariAudio
- ❖ Offline Processing

The Sample Editor gives you direct editing access to the audio clip. It is used for more detailed editing of the audio waveform itself, processing of various portions of the clip, and tracking the history of your edits.

If you double click on any audio event, the sample editor will open. There is a toolbar at the top, an overview and info line display, plus the Inspector tabs on the left, as seen in Figure 18.1. Not shown is the Regions pane on the right side, which is used to define various regions within the clip. Using the standard Windows Layout button, you can choose which areas to display in the Sample Editor.

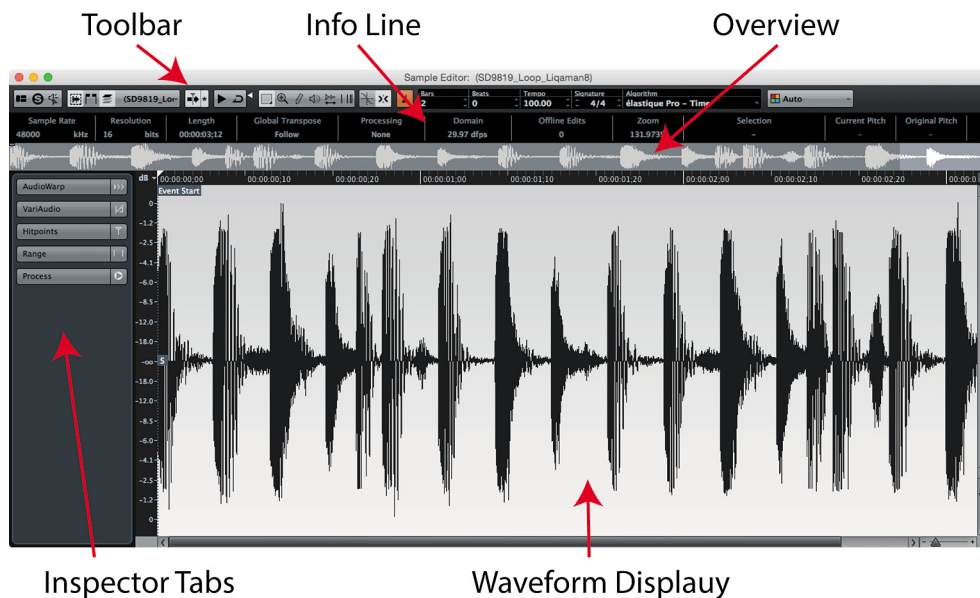


Figure 18.1
The Sample Editor with a drum loop opened

When opening the Sample Editor from the project window by double-clicking on an audio event, only one Sample Editor window will open at a time. If you select another audio event, the Sample Editor will switch to display the clip for that event.

You may open the Sample Editor for more than one event at a time but they will all remain in a single window. Use the current audio event pulldown menu to switch between multiple events for editing, as shown in Figure 18.2.

You can also open the Sample Editor from the Pool window by double-clicking an audio file from the list. In this case, another Sample Editor window will be opened. You can have multiple Sample Editors opened at the same time from the Pool.



Figure 18.2
Active Audio
Event selection
menu

Sample Editor Playback

The Sample Editor is independent of the Project and the Project mixer. Playback of audio in the Sample Editor is routed directly to the Control Room channel or the Main Mix VST Output when Control Room is not activated.

When you click on the Audition icon in the toolbar, as shown in Figure 18.3, audio within the Sample Editor will play back by itself. You can also enable the Audition Loop for continuous playback of the selected area. Since playback is independent of the project mixer, you may need to adjust the audition volume in the Sample Editor.

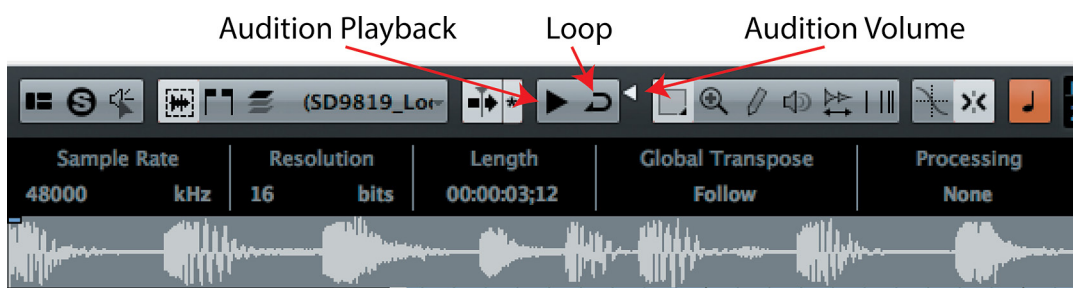


Figure 18.3
The Audition
playback, loop,
and volume
icons in the
toolbar

THE SAMPLE EDITOR FOR REFERENCE MATERIAL

The Sample Editor is a useful tool for playback of reference material since no audio processing is applied through the project mixer and the signal is routed directly to the Control Room channel. For example, if you are mixing a song for radio, it is extremely helpful to use commercially released material as a reference for your mix. Importing a file from a commercial CD into your project and opening it in a Sample Editor will allow you to listen to this reference material directly in the project without switching to another system.

Sample Editor Inspector

There are six tabs in the sample editor inspector, each providing different editing features.

AudioWarp

AudioWarping allows you to time stretch portions of the audio to match musical timing and tempo. Free warping gives you complete control over time stretching outside the musical grid for other purposes.

VariAudio

VariAudio is the pitch correction tool in Nuendo. Think “Built-in AutoTune.” In addition, timing of musical notes can be adjusted here as well.

Hitpoints

Hitpoints are transient peaks in the audio that usually correlate to rhythmic beats in a musical sound such as a drum loop. Once detected, hitpoints can be used to cut up the audio, create groove quantize templates for later use and also tempo match loops without the use of time stretching.

Range

The range tab helps you to define areas of the audio to edit or process.

Process

The process tab gives you access to plug-in processing, Nuendo’s standard audio processes, and the “Flatten” function to render all realtime processing (VariAudio, Warping) into a new file and reduce the CPU load.

Real World Example: Glitch Removal

The Sample Editor allows you to directly edit the waveform itself. This can be useful for editing glitches, lip smacks, digital clicks and pops out of the sound. In this example, there is a digital pop that needs to be repaired. Figure 18.4 shows the Sample Editor with a small digital spike visible in the middle.

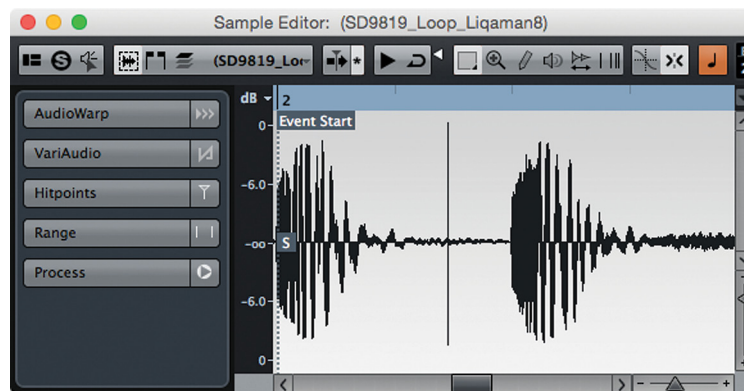


Figure 18.4
Digital spike visible in the Sample Editor

If you zoom in to the very smallest level, eventually the waveform appears as a series of blue dots, as shown in Figure 18.5. These dots represent individual samples of audio and can be edited directly using the pen tool.

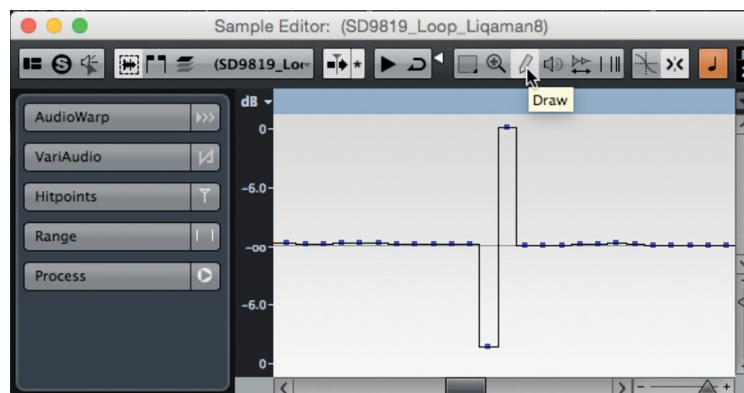


Figure 18.5
Zoomed in to the sample level: blue dots

At the sample level, the pen tool becomes available and can be used to redraw the waveform manually. Figure 18.6 shows the pen tool altering the waveform to correct the glitch in the audio.

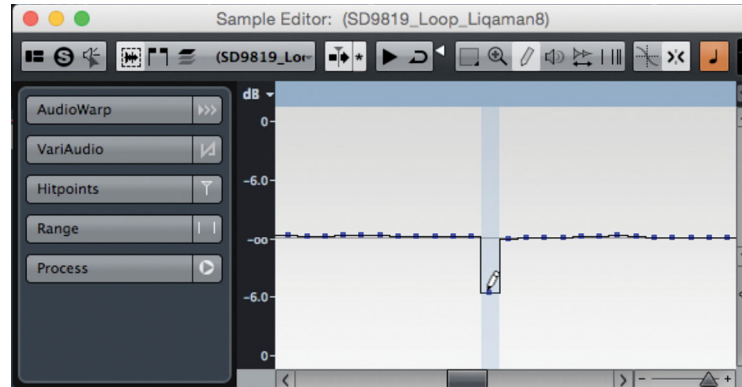


Figure 18.6
Manually editing the waveform with the pen tool

Matching Two Drum Loops

It comes up quite often that a drum loop is found that has the right sound but does not match the feel or “groove” of an already existing song. Using the sample editor we can extract the “groove” from one drum loop and apply it to a second loop in order to keep the same feel while adding the new sonic texture of the second drum loop. This is a step-by-step method for doing just that without the use of time stretching algorithms that can distort the sonics of a drum loop.

OUT OF SYNC

The two loops in this example are already playing at the same tempo, but their differing beat placement within the bar causes them to be out of sync with one another.

1. Place two drum loops on separate tracks lined up at the same bar line. You can use snap in grid mode set to bars to quickly place the drum loops together.

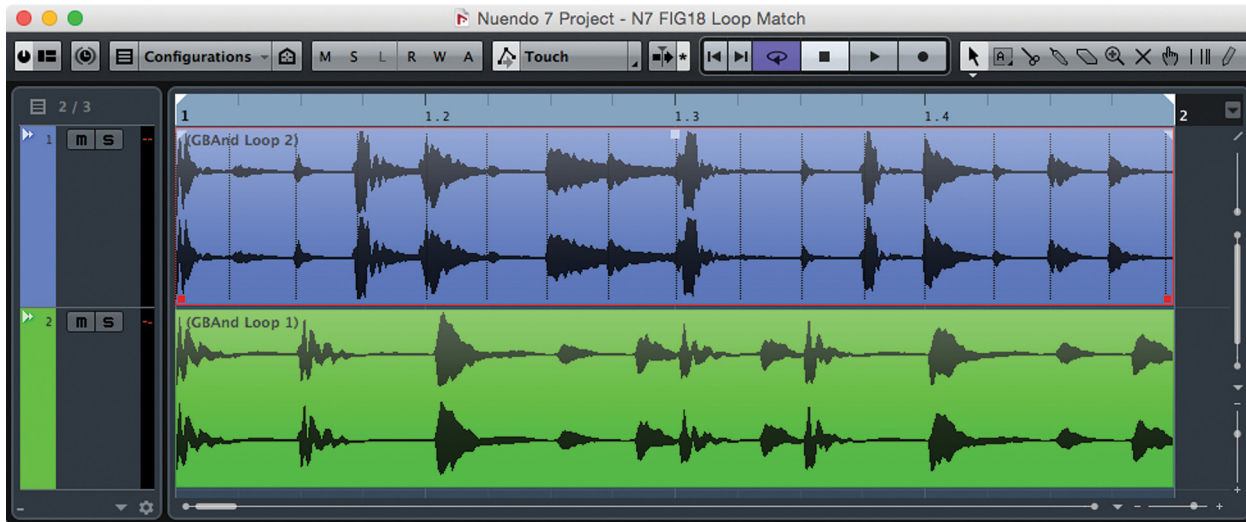


Figure 18.7 Two drum loops placed at bar 1

2. Create a cycle marker the length of the main drum loop in order to hear loops over and over while editing. Select the main drum loop and press “P” in order to place the left and right locators at the boundaries of the loop.
3. Open the main loop (the one with the groove you wish to copy) into the sample editor by double clicking on the event.

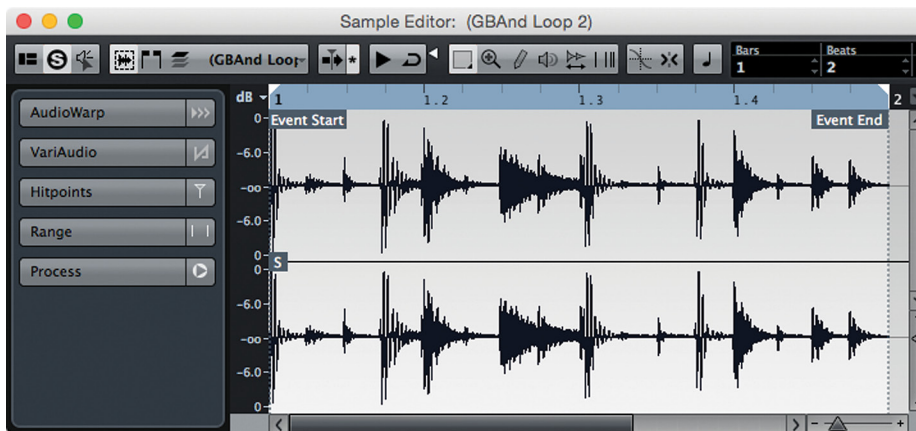


Figure 18.8 The Sample Editor with the main loop opened

4. Open the Hitpoints tab and press the “Edit Hitpoints” button to generate hitpoints.

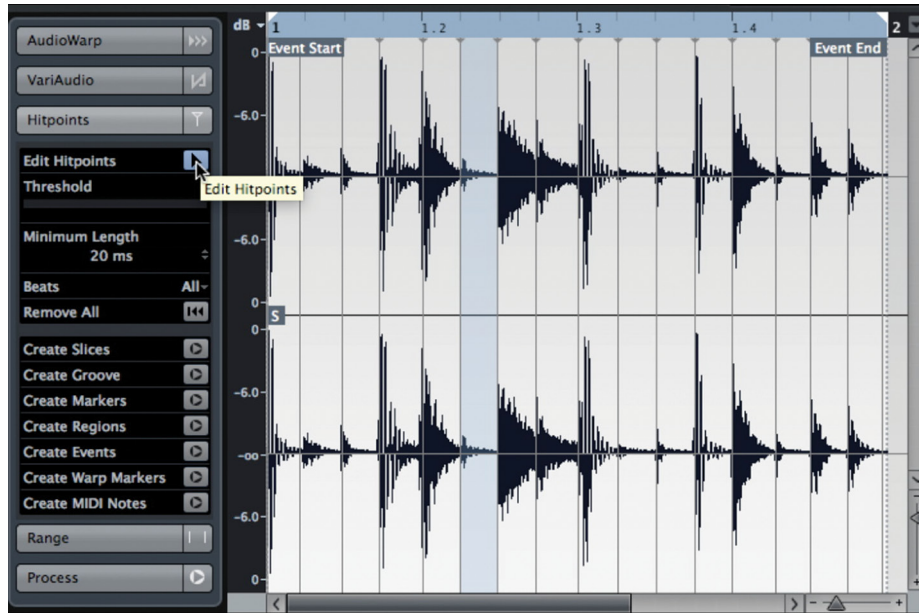


Figure 18.9
Hitpoints detected in the main loop

5. Edit the hitpoints if they are not already in proper locations. You can manually drag the hitpoint indicators to identify rhythmic beats in the loop. The threshold slider adjusts how loud a transient peak needs to be in order to trigger a hitpoint detection. If it is set too high, the very beginning of some drum sounds may not be recognized as a hitpoint.

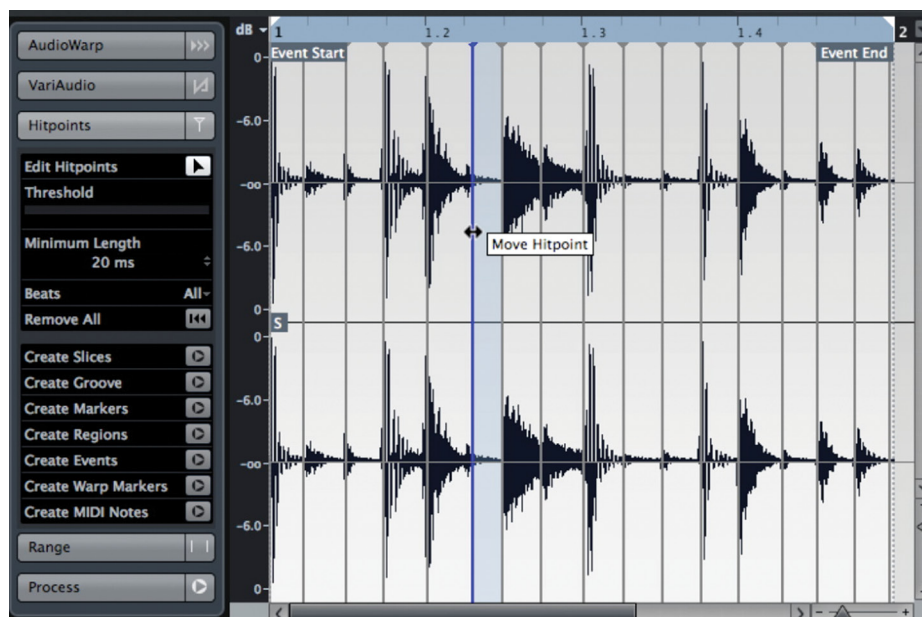


Figure 18.10
Adjusting a hitpoint

6. Once all the hitpoints have been checked and adjusted if necessary, create a groove quantize template from their positions. This groove template will then become available in the Quantize panel, allowing you to use that pattern to quantize MIDI data and the position of audio events to the groove of the drum loop.

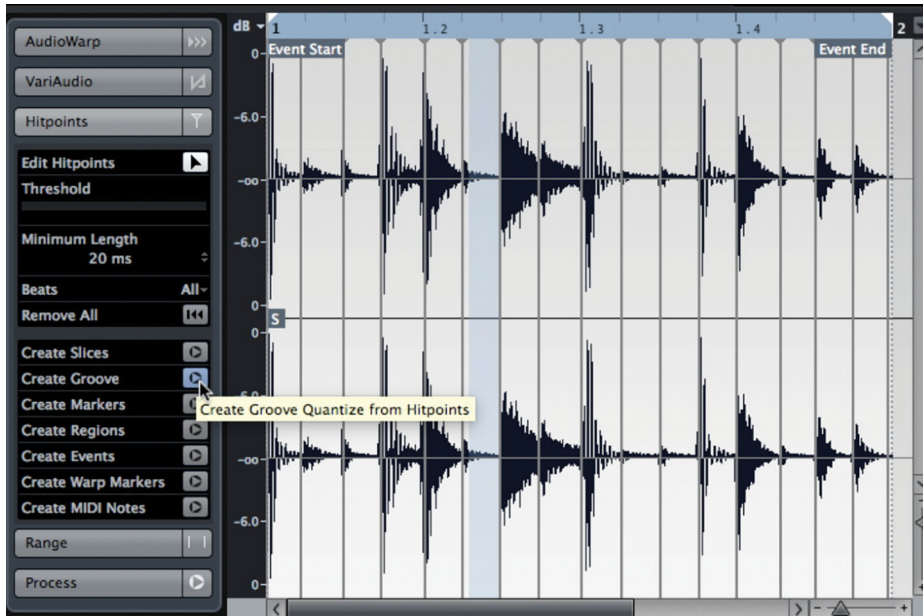


Figure 18.11
Create a groove quantize from the pattern of hitpoints

7. Open the second loop into the sample editor. In this example, the second loop has a more swing feel to it and does not match up well to the first loop.
8. Detect hitpoints in the same fashion as in the first loop. Correct any misplaced hitpoints by editing or removing them.

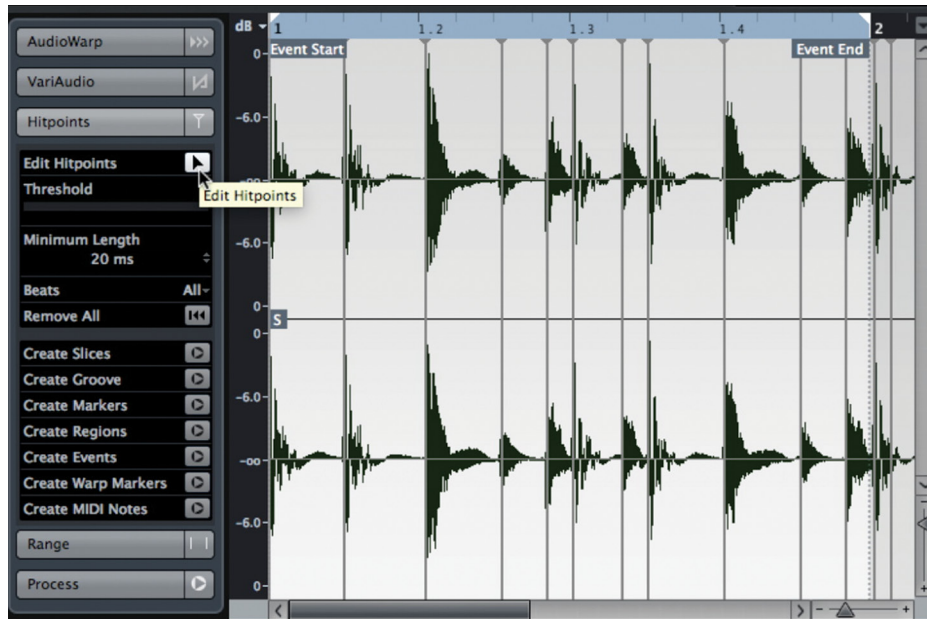


Figure 18.12
The second loop with hitpoints detected

- Now instead of creating a groove quantize from the hitpoints, create slices. What happens is that the loop is broken up into several audio events, one for each hitpoint.

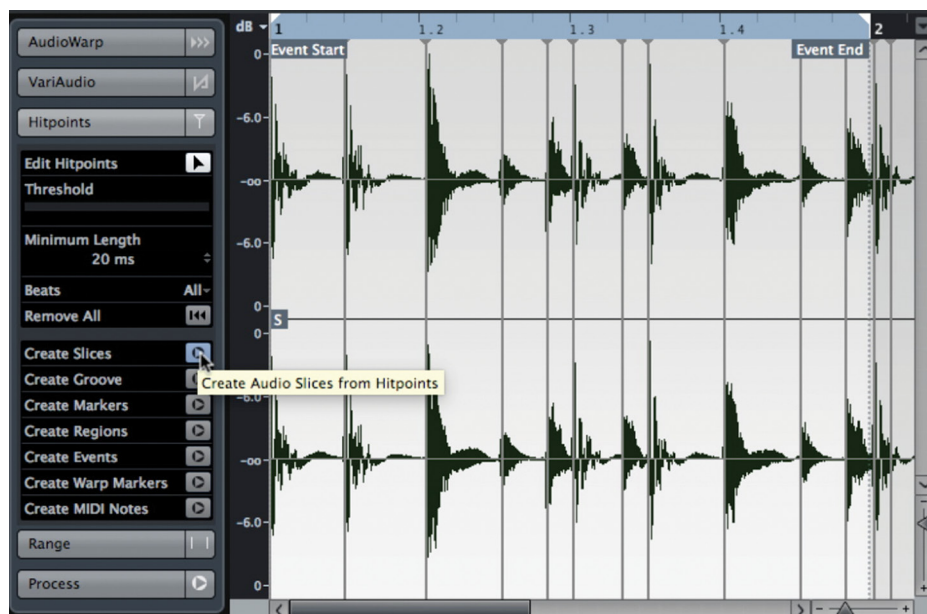


Figure 18.13
Create slices from hitpoints

- Nuendo creates an audio event for each hitpoint and then places those events in an audio part at the same position so the loop will play back exactly as it was, just in a sliced up fashion within the audio part.

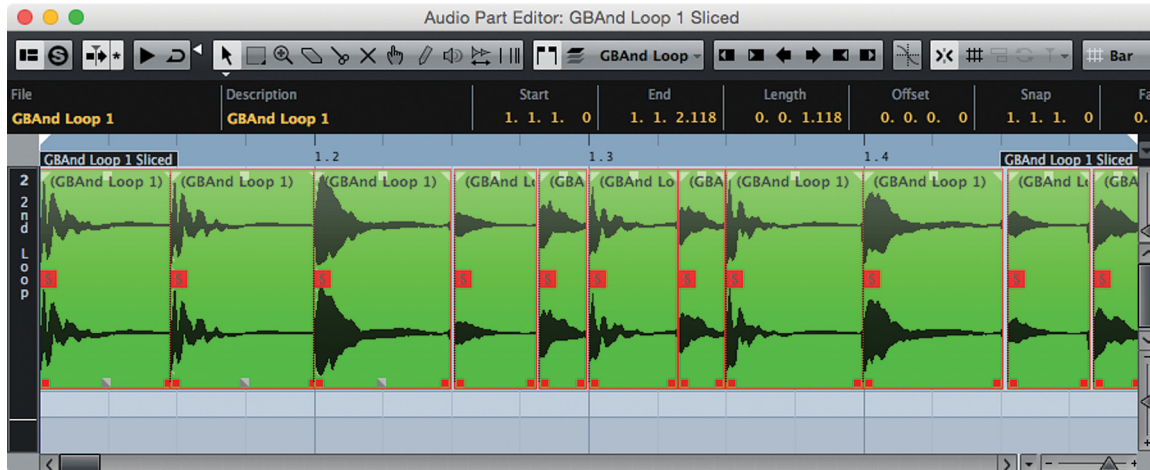


Figure 18.14 Second loop is now an audio part with individual events for each hitpoint slice

- Open the quantize panel from the edit menu. Notice there is now a quantize preset from the popup menu that is named for the main loop.

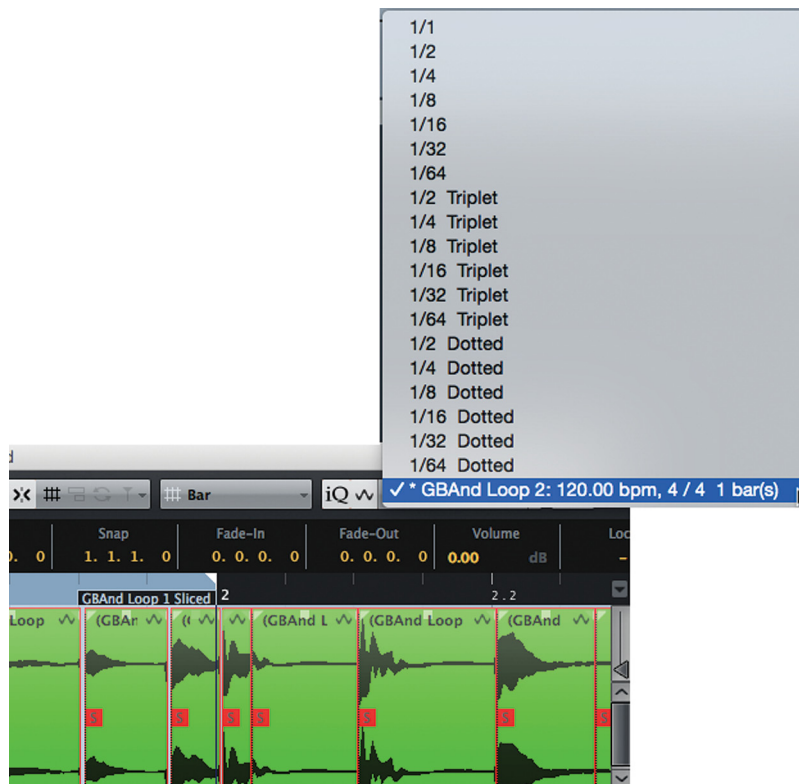


Figure 18.15
The quantize popup menu with the new groove template selected

- With the new audio part selected, apply the groove quantize and notice the events within the part have now shifted to match the transients in the main loop.

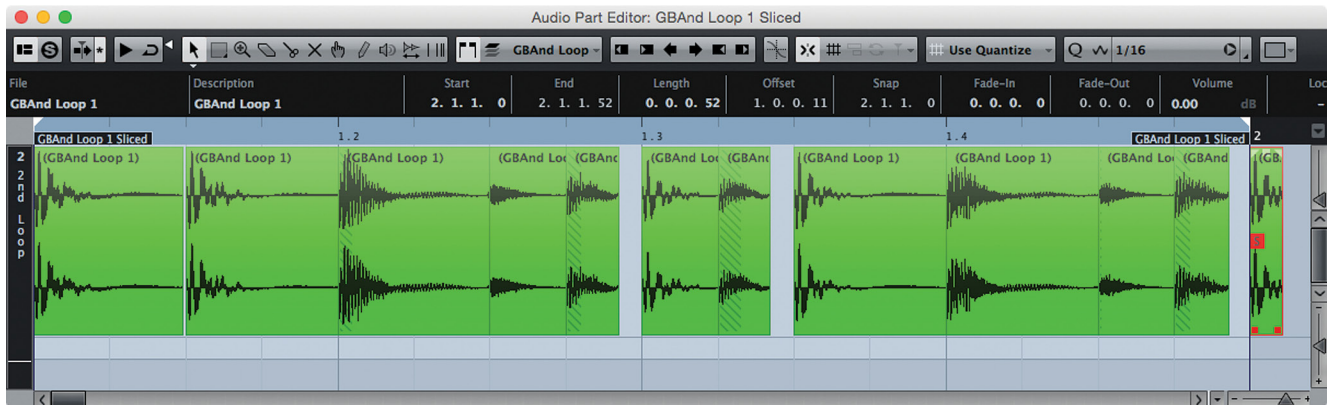


Figure 18.16 The quantized audio part

- The quantizing has left some gaps in the audio part where the individual slices had been moved to match the groove of the main loop. The quantize panel offers a specialized function to remedy this. The crossfade button does more than simply create crossfades between the slices. It will delete any overlaps, close open gaps between slices, and then create crossfades to make the audio play smoothly.

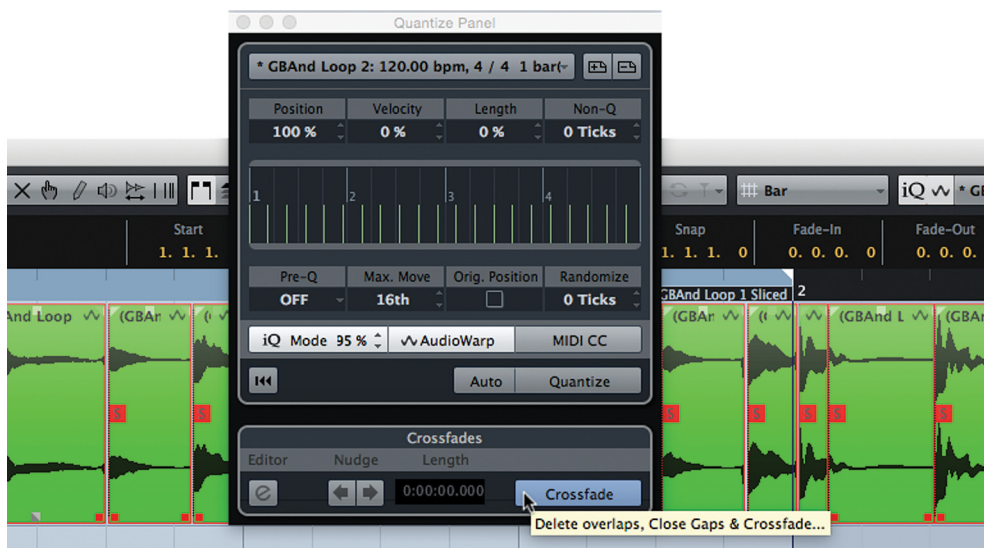


Figure 18.17 The crossfade function in the quantize panel

- You can make any fine tuning adjustments to the crossfades as needed to smooth out the playback of the second loop. The two loops should now be playing in sync to the groove of the main loop.

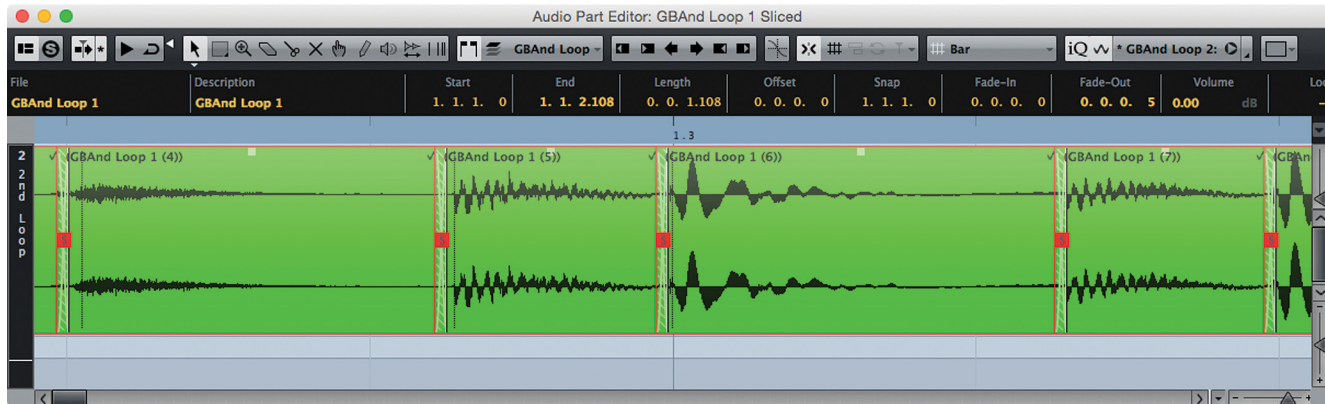


Figure 18.18 The crossfaded audio part of the second loop

VariAudio

VariAudio is Nuendo’s built-in auto-tuning and time-stretching editor. Similar to the ubiquitous AutoTune and Melodyne software, VariAudio can adjust the pitch of individual notes in an audio recording. However, VariAudio is not a plug-in. It is part of the Sample Editor, seamlessly integrated into Nuendo. The most obvious use for this tool is tuning of vocals but it certainly is not limited to that use alone and can be effective as a sound design tool for manipulating sounds in new and creative ways.

To access the VariAudio features, first open an audio event in the sample editor by double clicking an event. For this example, a vocal will be used. It needs to be tuned to perfect the performance.

Tuning the Lead Vocal

Vocal tuning has become a common procedure in pop music production over the years, taking each performance and perfecting the pitch to robotic precision in some cases. Nuendo’s VariAudio can be used with extreme settings to get the “robot” auto-tune effect when desired. But it also may be used in a more conservative and discreet way to carefully correct pitch in an otherwise good performance without the obvious processing sound often heard with over-tuned vocals.

The following is an example of how to tune a lead vocal in an unobtrusive way that will not distract the listener. Of course this is a subjective situation, and each song, singer, and performance is unique.

1. Open the vocal take in the sample editor.
2. Click on the VariAudio tab to access the pitch and warp tools.



Figure 18.19
The VariAudio
tab in the sam-
ple editor

3. Press the Pitch & Warp button to initiate analysis of the audio. This will change the display into what Nuendo calls pitch “segments.” Each segment is a note in the vocal performance.

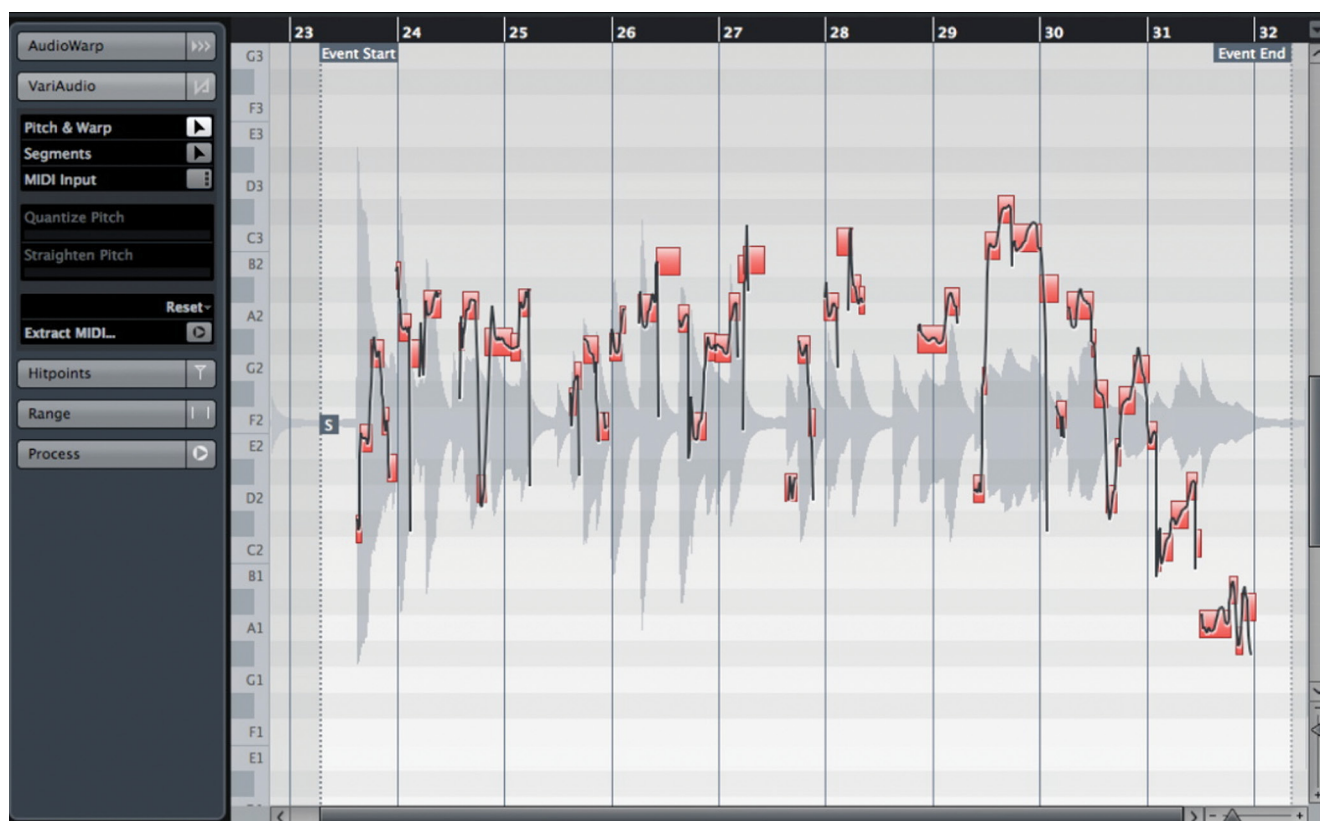


Figure 18.20 The audio event analyzed and displayed as pitch segments

4. Zoom in on a pitch segment to better see how in tune the vocal is. The colored block indicates the average pitch of the entire segment and is aligned with a piano roll displayed on the left. Roll over the segment to get a display of the pitch value, in this case, G# 2 +10%. The line within the block is the actual detected pitch as it changes over time.



Figure 18.21 Zoomed in on a single pitch segment

5. The boundaries of the pitch segment can be altered to either include or exclude portions of the audio in the pitch detection. Usually, the detection process is accurate and does not need to be altered. However, if there is pitched material outside the segment that you wish to include, you can adjust the segment by first pressing the segment button in the VariAudio tab.

- The pitch segment now appears with slashed lines through it, indicating you are in segmentation editing mode. Move the cursor to either the start or ending boundary and you can trim the segment.

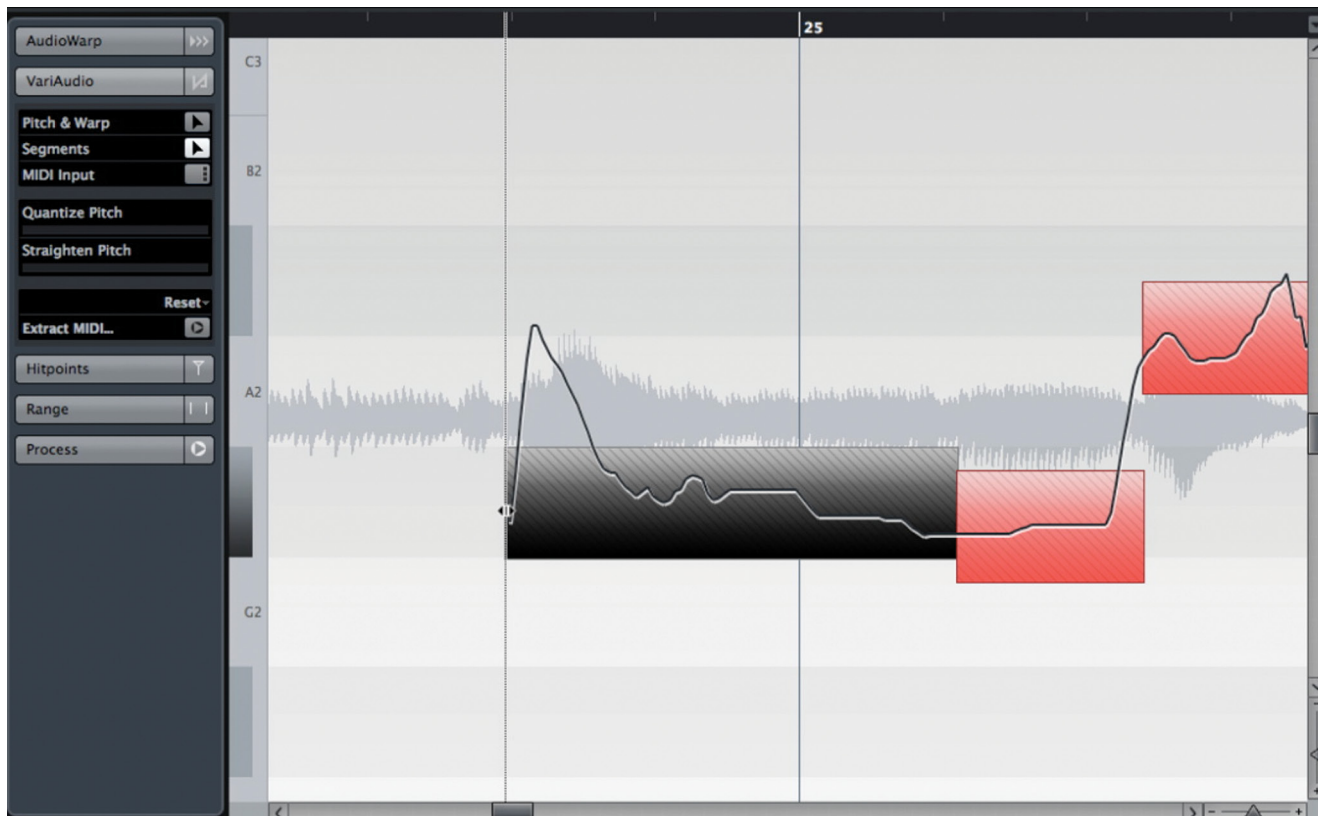


Figure 18.22 Trimming the pitch segment

- It is also possible to divide segments when they contain more than one pitch. When you place the segment tool towards the bottom of the segment, a line appears and the cursor turns into scissors. A vertical line appears, indicating the splice point. Click to cut the segment at the splice point. The two resulting segments will then move to their average pitch locations.

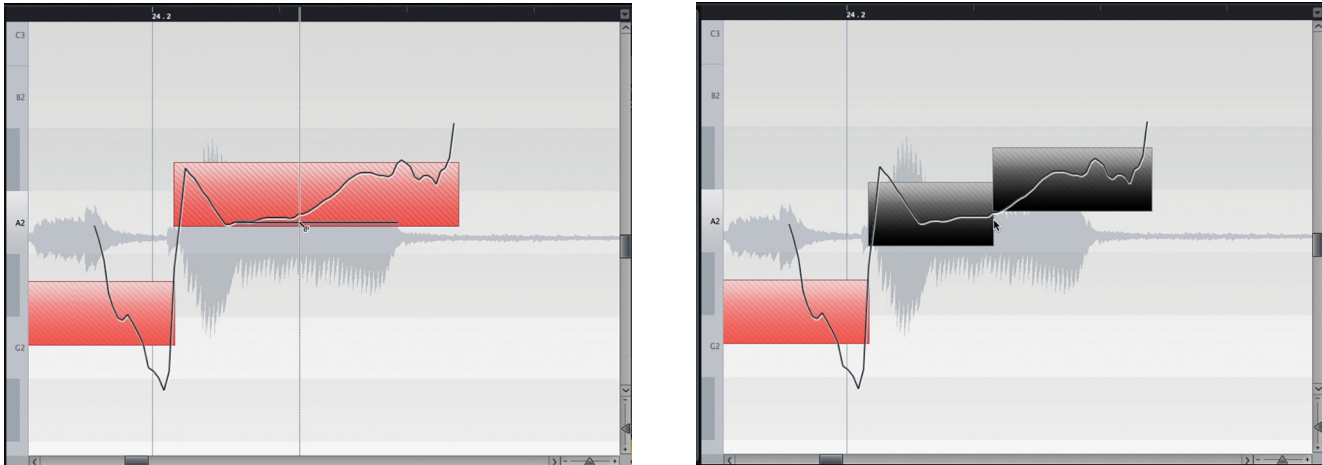


Figure 18.23 Before and after dividing a pitch segment

8. Once you have all segments adjusted as needed, you can start correcting pitch.
9. First, change back to the Pitch & Warp tool. The simplest thing to do is to drag the segment in line with the desired pitch. In this case, G# 2 is the desired pitch. Dragging the segment will cause it to snap into position at G# 2. Dragging it farther will snap it to the next available pitch, either A 2 or G 2. The default behavior is for the segments to snap to exact pitches.

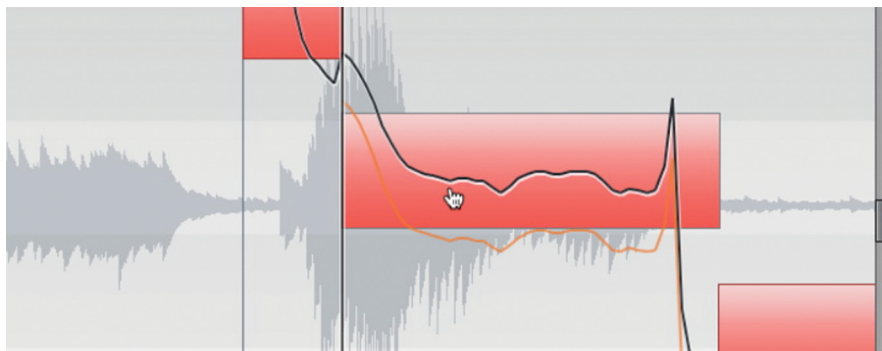


Figure 18.24
Dragging a segment to an exact pitch

OPERATING ON MULTIPLE PITCH SEGMENTS

You may perform this operation to more than one pitch segment at once. Simply select more than one segment by either dragging across multiple segments or pressing the Shift key while clicking on additional segments. Most of the operations described in this section can be applied to multiple segments at once in this fashion.

10. It is also possible to avoid the pitch grid and freely move the segment between pitches by holding the Alt/Option key while dragging. Notice that the original detected pitch curve is also displayed in gray while you perform pitch changing. This gives you a reference to the original recording.

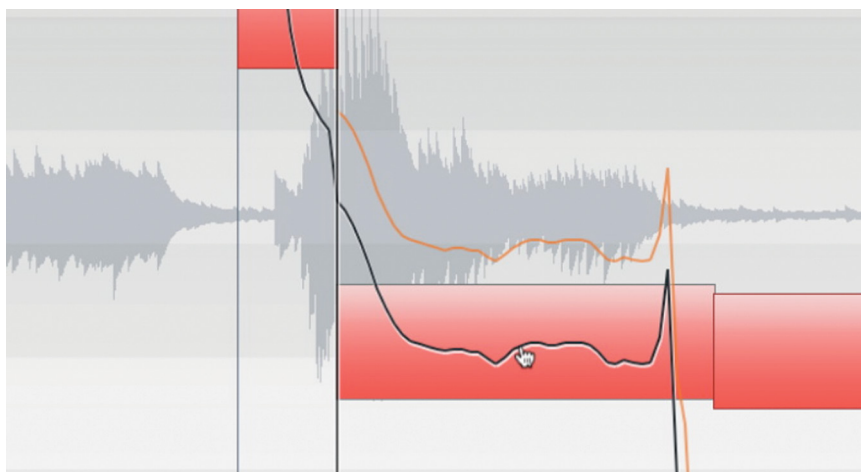


Figure 18.25
Shifting a segment freely between pitches

ORIGINAL PERFORMANCE REFERENCE CURVE

Notice that in both figures, the original pitch curve is displayed lightly along with the newly edited curve. This is always the case so that you have a reference to where the original performance was pitched.

11. Sometimes moving a segment up or down is not enough. The pitch curve must be adjusted within the segment itself. The simplest tool is the straighten pitch setting. Moving this slider to the right will cause the pitch curve to flatten, reducing the changes in pitch during the segment. When the slider is all the way to the right, the pitch curve becomes a straight line, the “Cher” effect or perhaps “T-Pain” or “Perfume.”

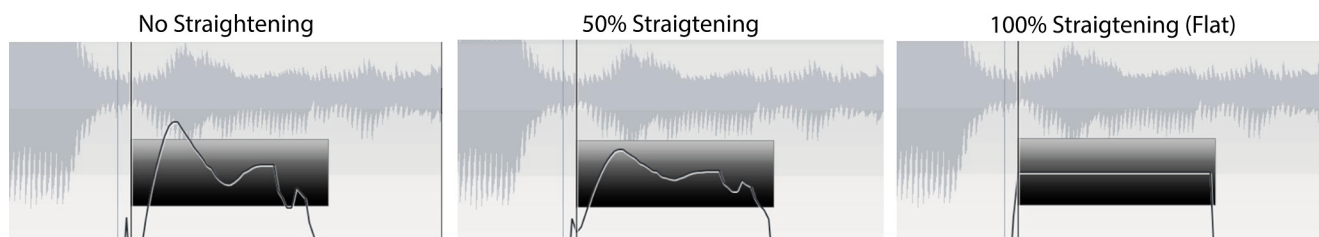


Figure 18.26 Straighten pitch, none, halfway, and full

12. You can lift one side of the pitch curve to level out the curve. This is handy for when a vocalist swoops into a pitch or has a tendency to fall flat at the ends of phrases. Move the cursor to either the top left or right corner of the segment and drag the curve up or down.

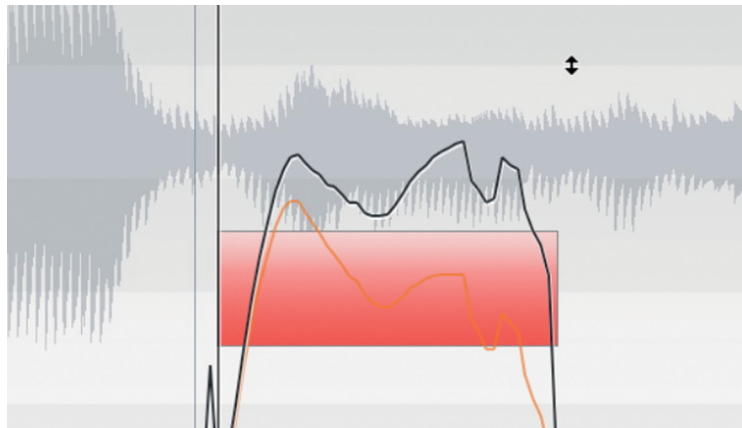


Figure 18.27

Moving one side of a segment

13. You can rotate the curve around its center point by dragging on a top corner with Alt/Option pressed.

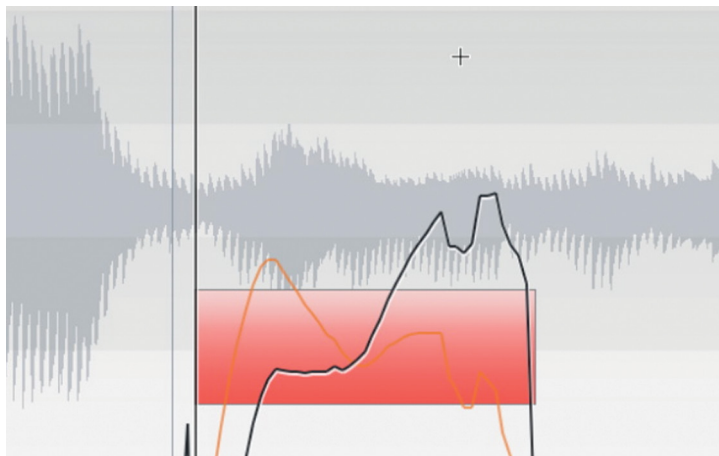


Figure 18.28

Rotating the pitch curve around the center point

14. When moving the ends or rotating around the center are not precise enough, a new rotational anchor can be defined. This will allow you to tilt or rotate the pitch curve around a new point in the segment. While in Pitch & Warp mode, move the cursor to the top of the segment until it turns into an I-beam. Click anywhere along the segment to place the tilt anchor. You will see the vertical line showing the new position of the anchor.

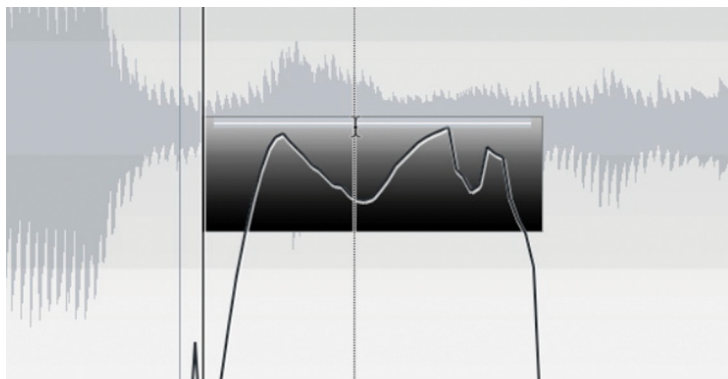


Figure 18.29
Placing a new
tilt anchor

15. Once this new tilt anchor has been placed, you can move the endpoints of the pitch curve and they will bend at the anchor point. This allows you to isolate portions of the pitch curve and adjust them without using more drastic measures such as “straighten pitch.” This helps pitch-corrected vocals sound more natural.

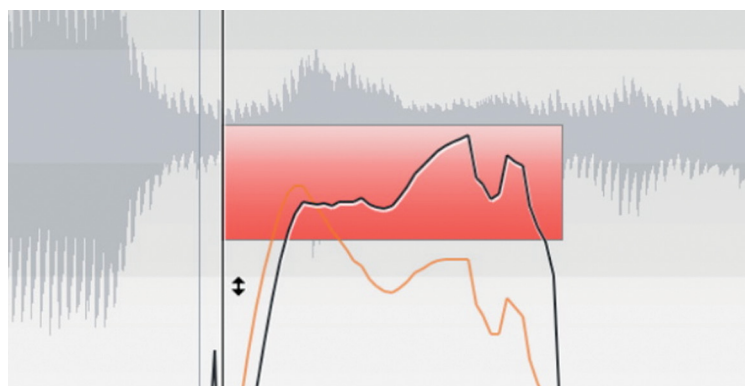


Figure 18.30
Tilting a pitch
curve with a
new tilt anchor

16. Now it is possible to rotate around the new tilt anchor. In this Figure, the tilt anchor has been moved closer to the start to illustrate this better.

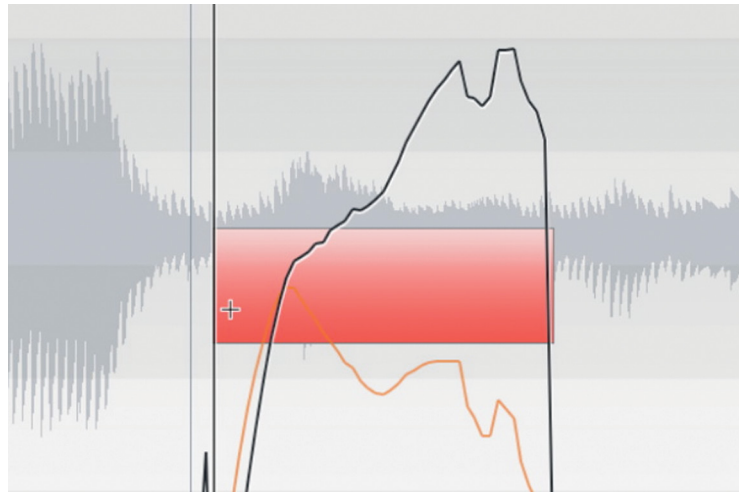


Figure 18.31
Placing a tilt anchor closer to the beginning of the segment and rotating around it

17. For additional adjustments, you can repeatedly move the tilt anchor and make adjustments to a single segment to get the best pitch correction.
18. Using all of the techniques in this tutorial, you can transform a quaky, out-of-tune note into something acceptable.

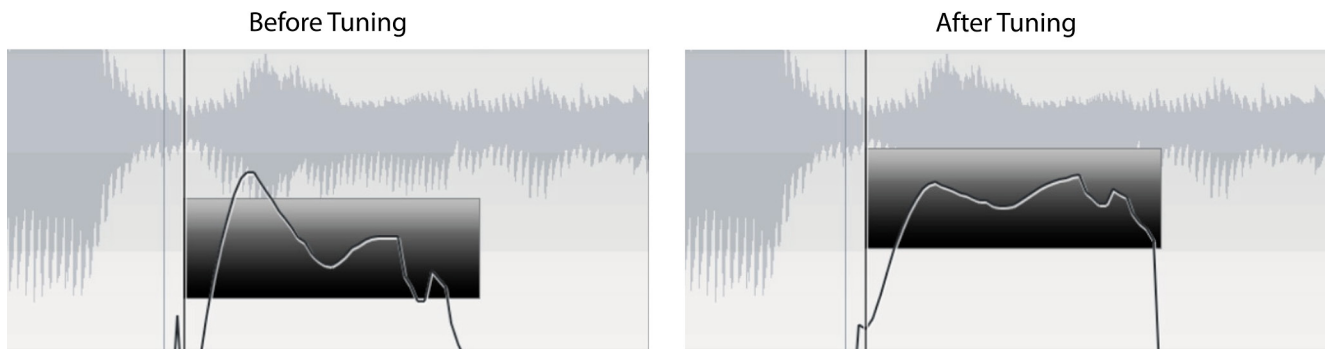


Figure 18.32 Before and after tuning adjustments

Warping Timing Adjustments

The other aspect of a performance that can be addressed by VariAudio is the timing of each segment. You can adjust the timing of segments at the same time that you adjust the pitch of those segments.

Using the Pitch & Warp tool, move the mouse pointer to either the left or right edge of a segment and watch the pointer change to a trimming icon.

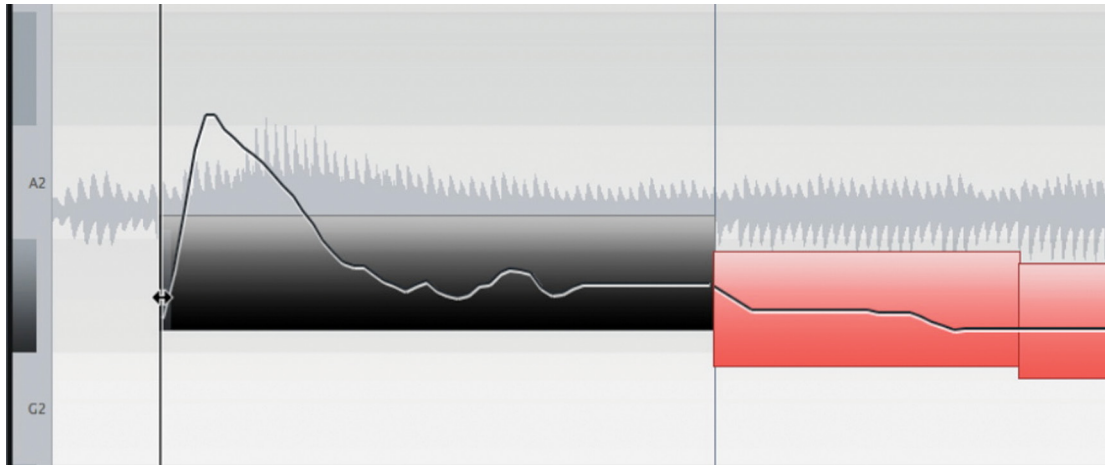


Figure 18.33
The trim-
ing icon

Click and drag the segment boundary to either shorten or lengthen the segment. The segment will be time-stretched to match the change in duration. If there are adjacent segments, they will be stretched or compressed to compensate for the change in the segment boundary as well.

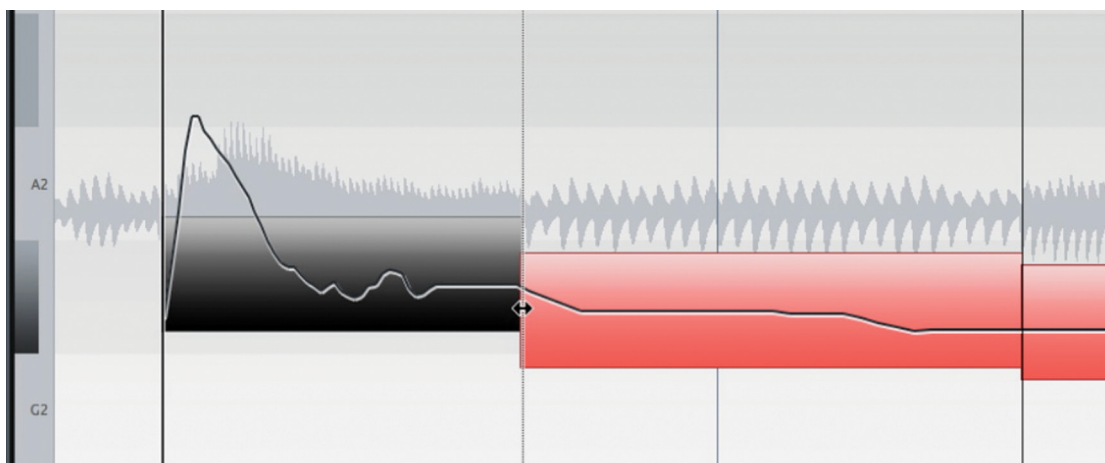


Figure 18.34
Moving the
segment's
boundary
time-
stretches that
segment and
adjacent
segments

This feature is most helpful for aligning vocal performances between background vocals or doubles of lead vocals when sibilance and articulation timing are very important. This can also be used to help align ADR takes with production dialog when replacing unusable recordings.

The result of having both pitch and timing control in VariAudio is like having an intuitive pitch shifter and time stretching plug-ins running within the application all referenced to the time-line. It certainly beats having to export to Melodyne or render files in AutoTune.

Rendering Pitch and Time Correction (Flattening)

The analysis and resulting data from the VariAudio process put great demands on your system's processing power and memory. Once you have completed tuning a vocal performance or adjusting an ADR take, it is a good idea to render those processes to disk to conserve processing power and memory.

The rendering function is accessed from the Process tab. Click on the process tab in the sample editor. The Flatten button appears at the top of the tab.



Figure 18.35

The Flatten button in the Process tab

Simply pressing this button will cause Nuendo to render all of the VariAudio and other processing applied to this clip to disk in the form of a new file. Flattening can be undone if needed. No original material is destroyed by processing and rendering files in Nuendo.

When you initiate the Flatten process, a dialog will appear offering a choice of algorithms. For VariAudio, there really is no choice other than the “Realtime” algorithm. Simply press “OK” to flatten and render the clip.

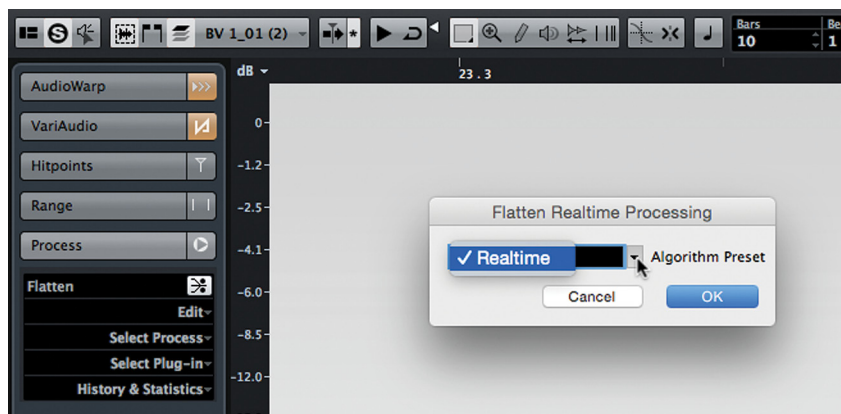


Figure 18.36

Flatten algorithm preset dialog

Offline Processing

Offline processing is simply audio processing of any kind that is written to hard disk for playback later. In other words, it is not realtime processing that occurs during playback. Offline processing does not require any additional CPU power to play back.

There are some types of processing that must be offline, such as reversing the playback of an audio file. Some advanced time-stretching algorithms and de-noising plug-ins need to operate as offline processes due to their non-linear complexity. But any audio processing, including any plug-in, can be performed offline.

Nuendo's offline processing method is flexible and non-destructive. Any changes made to audio files are written to new audio files without overwriting the originals so that you may return at any time to the unprocessed recordings.

The Sample Editor is one place where offline processing can occur. You can select portions of audio within the Sample Editor or the entire contents to process. Once your selection is made, choose either a process or plug-in from the Process tab of the Sample Editor's Inspector, as shown in Figure 18.37.



Figure 18.37

Selecting a Process from the Sample Editor

Figure 18.38 shows the select portion of audio that has now been reversed. This processed can be removed by opening the Offline Process History for this audio clip from the History and Statistics menu.

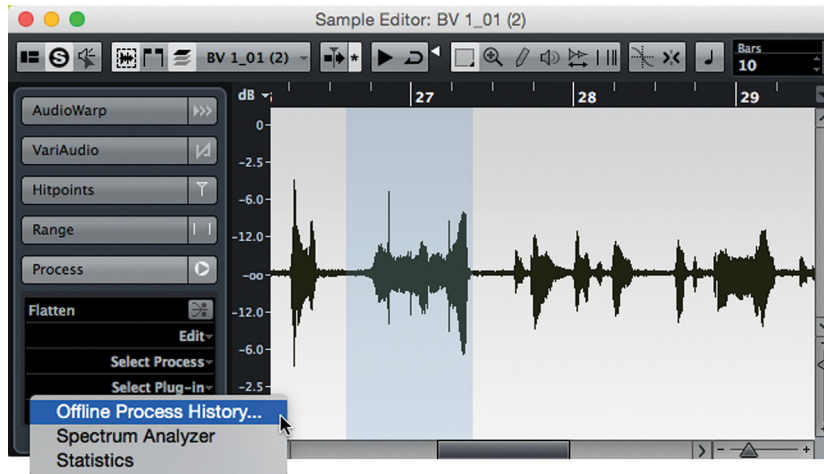


Figure 18.38
Reversed audio portion

Offline Process History

Figure 18.39 shows the current offline process history for this clip. The one entry is for the Reverse process applied to a portion of the clip.

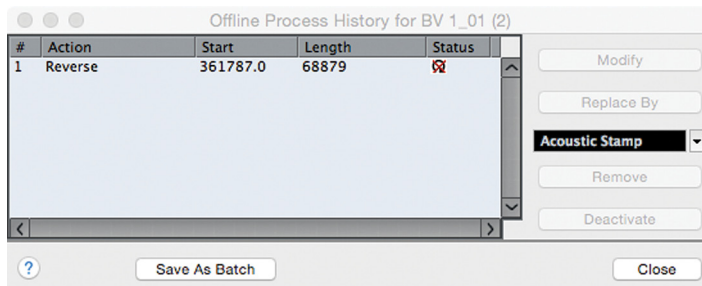


Figure 18.39
Offline Process History with one entry

Next, choose a plug-in from the Process tab. In this case, we will apply a high pass filter from the Steinberg PostFilter plug-in, as seen in Figure 18.40. Once this plug-in processing has been applied, it will appear as another line in the Offline Process History.

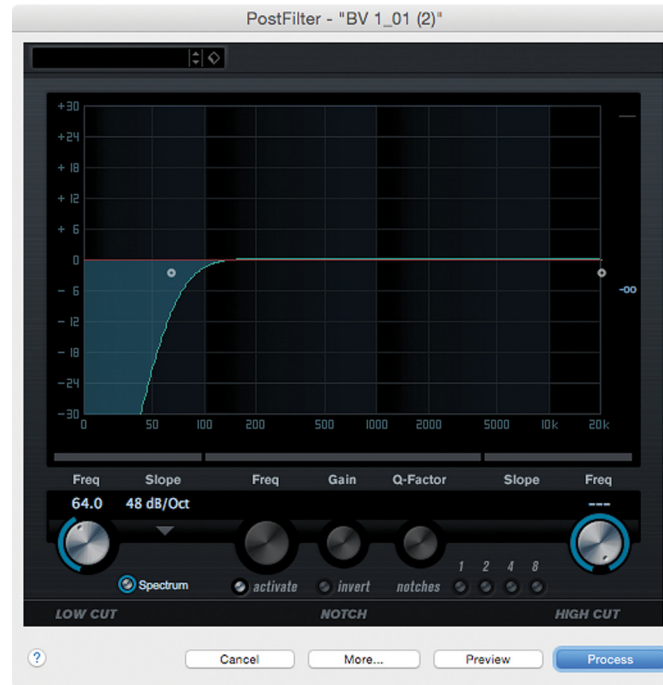


Figure 18.40
PostFilter set for
HPF of 64 Hz

Figure 18.41 shows the second entry for the PostFilter process. Selecting an entry gives several options:

- ❖ Modify the settings for that process
- ❖ Replace the process with another
- ❖ Remove the process step altogether
- ❖ Deactivate the process but leave the setting intact

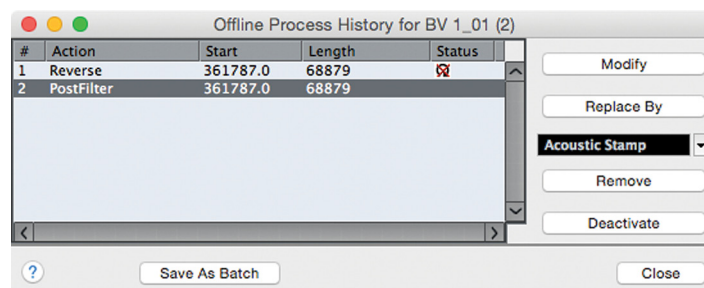


Figure 18.41
Offline Process
History with
options

The list of process steps can be as long as you like. Each process step can be modified, replaced or removed independently of the others. The remaining process steps will be retained by the clip.

Certain exceptions that include non-linear processes (Reverse, Pitch Change, etc.) cannot be modified if they interact with other process steps that cause a change in clip length. But that is really the only limitation here. This system provides a powerful set of tools to endlessly process audio clips without destructively altering the audio file.

Batch Process

Once you have more than one processing step in the history, you can create a Batch Process from these steps and recall them to be applied to other audio clips. Each Batch Process is given a name and saved for use later, as seen in Figure 18.42.

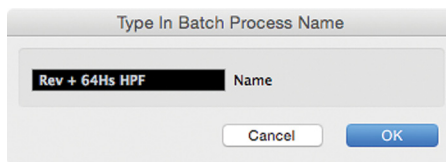


Figure 18.42
Naming a Batch Process

Now this Batch Process is available from the Audio menu and can be applied instantly to any audio event in the Project window or the Sample Editor. Batch Processing can be applied to multiple events at once, which can save huge amounts of time with certain tasks.

Quick Process Trick

This is a good example of how a Batch Process can be used to speed up your workflow in all sorts of ways. In this example, we are going to create a batch process that only performs one task: high-pass filtering at 80 Hz. This high-pass filtering can be used often in dialog editing to remove wind pops or plosives from close mic recordings.

Instead of opening up the PostFilter each time you want to process a pop on the mic, a Batch Process can be triggered by a key command to do this instantly, saving valuable time during editing.

Here are the steps to follow to create a key command to high-pass audio at 80 Hz:

1. Select an audio event that needs processing.
2. Choose the Gain process from the Audio menu or Process menu in the Sample Editor, as seen in Figure 18.43.

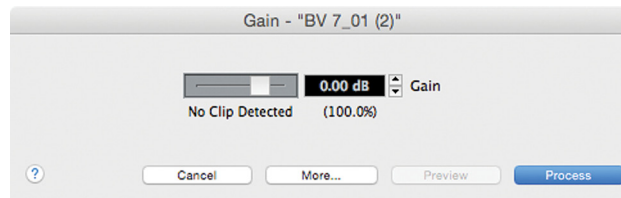


Figure 18.43
The Gain process dialog set to 0dB

3. Leave the value set to 0 dB so that this step does not change the audio at all and process the clip.
4. Select the PostFilter plug-in process and set it to 80 Hz and process the clip.
5. Open the Offline Process History for that clip and see the two steps, as shown in Figure 18.44.

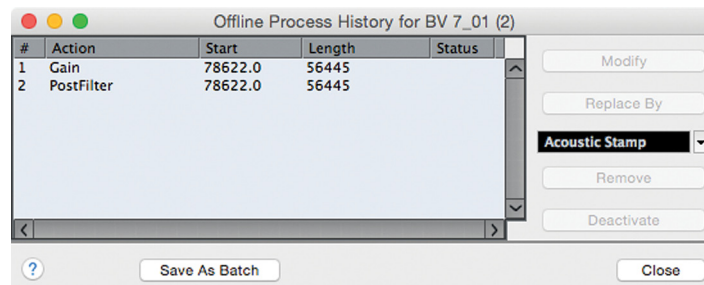


Figure 18.44
Offline Process History with Gain and PostFilter steps

6. Save these two steps as a Batch Process named “HPF 80Hz.”
7. Open the Key Commands window from the File menu, as seen in Figure 18.45.
8. Select the HPF 80Hz batch process and assign the desired key command to it.

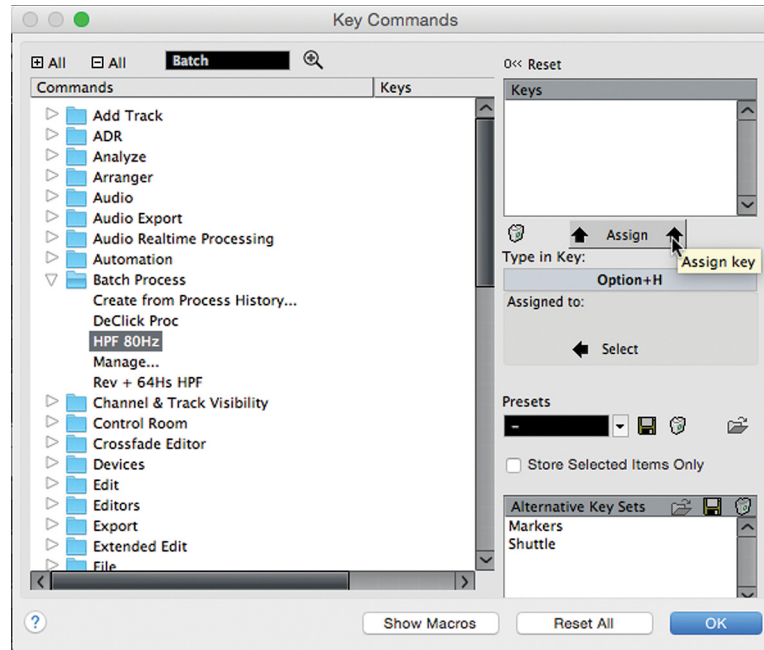


Figure 18.45
Key Commands
Batch Process

Now anytime you want to apply an 80 Hz high pass filter to an audio event, select it and use the key command to process the audio.

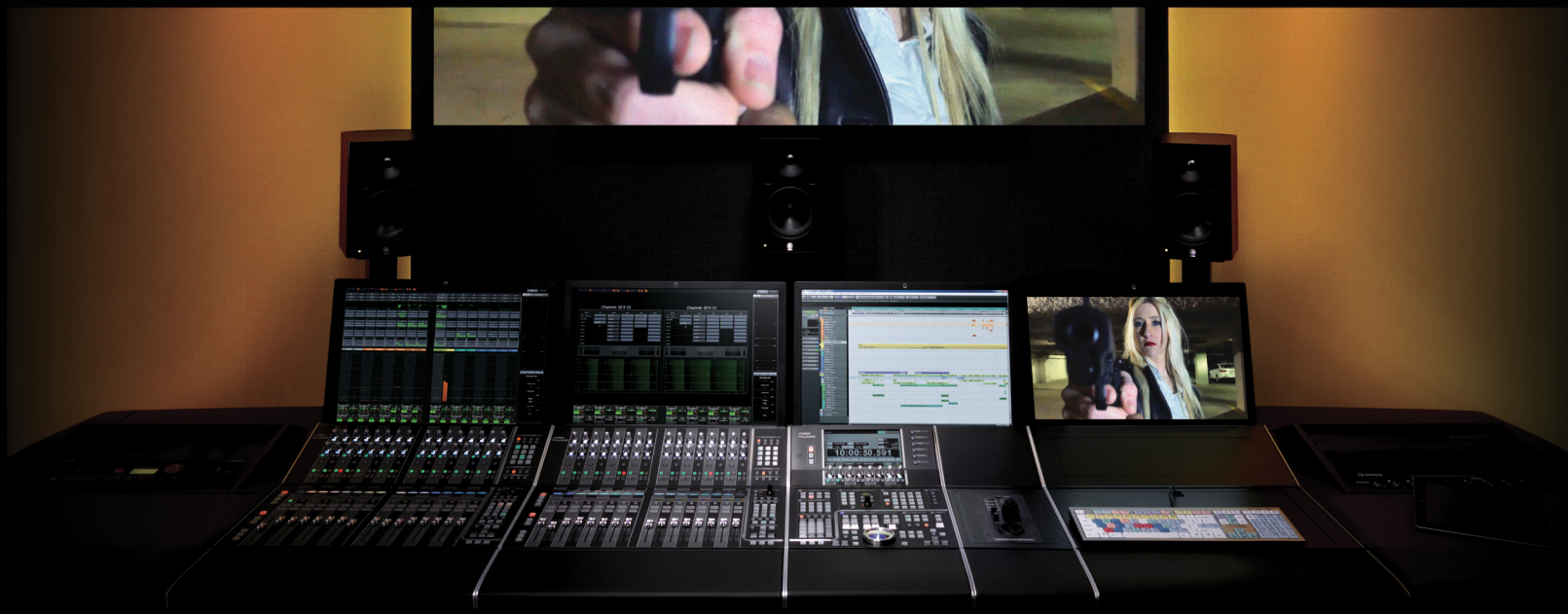
The trick is using the first Gain process step to create a two-step process that can be saved as a batch process in order to be available as a key command. Single process steps cannot be assigned to a key command.

USER DEFINED BUTTON FOR BATCH PROCESSING

You can assign a Batch Process to a User Defined Button on the Nuage Master unit for easy and quick processing of audio with a button push.

NUAGE

COURSEWARE



PART III: EDITING

by Ashley Shepherd

Chapter 19

Editing to Picture



NUAGE

Editing to Picture

- ❖ Video Tracks
- ❖ Edit Mode
- ❖ Move to...
- ❖ Nudging
- ❖ Marker Tracks
- ❖ Post Production Editing Examples

Editing to picture is one Nuendo's central tasks. The software is designed from the bottom up to perform this task with advanced features and workflows tailored specifically for video post-production. In this chapter, unique post features and advanced workflow examples will be highlighted to demonstrate this capability.

Video Tracks

The most obvious need for editing to picture is the addition of a video track where movies can be imported, placed, and viewed in the project. You can either create a blank video track and add video files to it later or import a video file and the track will be automatically created for you. It is possible to have more than one video track in a single project.

Importing A Video File

ALSO IN CHAPTER 12

This process was covered previously in Chapter 12 for the 50/50 dialogue edit example and is reproduced here for convenience.

Let's start by importing a video file and let Nuendo automatically create a video track for you. Create a new, empty project and follow these steps with any compatible video file you have on hand. This example uses the trailer video for 50/50.

1. Go to File>Import>Video File...
2. Navigate to a compatible video file and select it. The compatibility of any video file is dependent on the type and configuration of your computer system.
3. Before opening the video, decide whether or not you would also like to import any audio that is contained in the file. If so, check the box for Extract Audio From Video. Audio from the video is very useful for confirming correct synchronization.

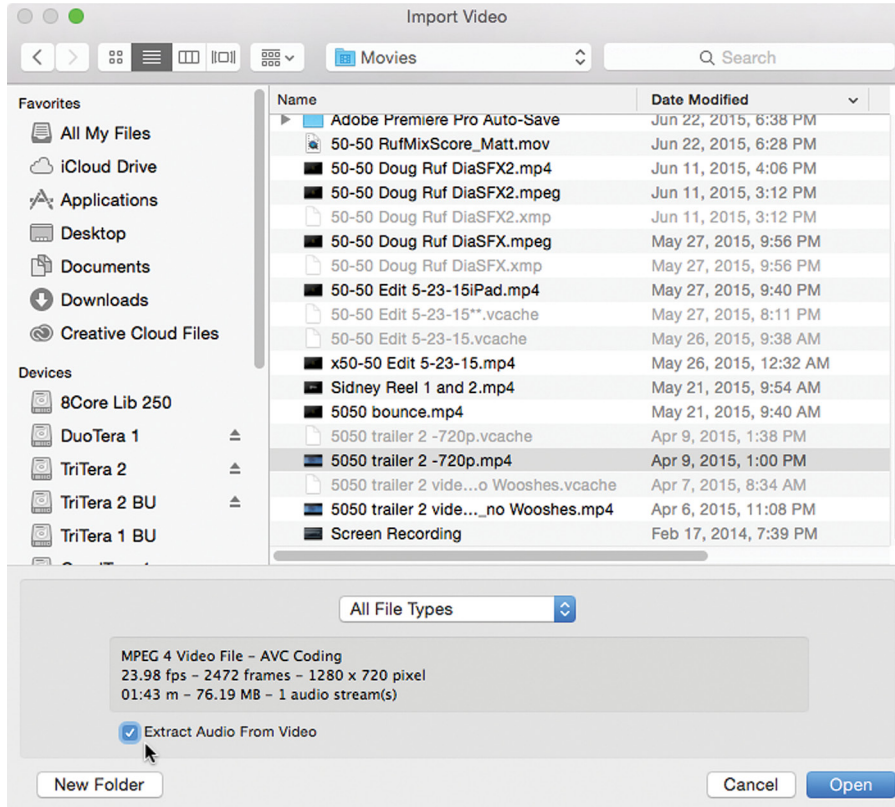


Figure 19.1
Import Video dialog

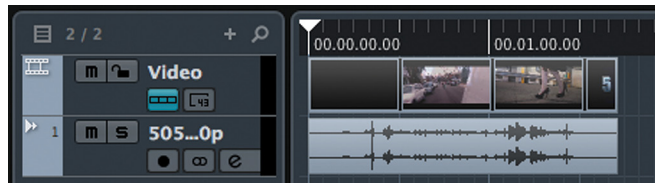


Figure 19.2
Imported video and audio tracks

4. Press “Open” and a progress bar for audio extraction will appear if selected.
5. If you extract the audio from the video file, two tracks will be automatically created: a video track and an audio track. Both the video and audio events will be placed on these tracks at the cursor position.

CAUTION: GROUP EVENTS TO PREVENT SYNC LOSS

It is a good idea at this time to group the video and audio files together so they remain in sync, preventing their timing relationship from being accidentally altered.

6. Press F8 or choose Video Player from the Devices menu to open the Video Player window. This is where you will see the video images. You may also connect your computer to an external monitor, such as a large flat panel TV or projection system to view the images in a large format.
7. Press play and watch to see that the video and audio are actually playing in perfect sync. Some video devices, including large flat-panel TV's, induce a processing delay in the chain and can cause sync issues between audio and video. This can be addressed by entering an offset in the Device Setup for the Video Player.

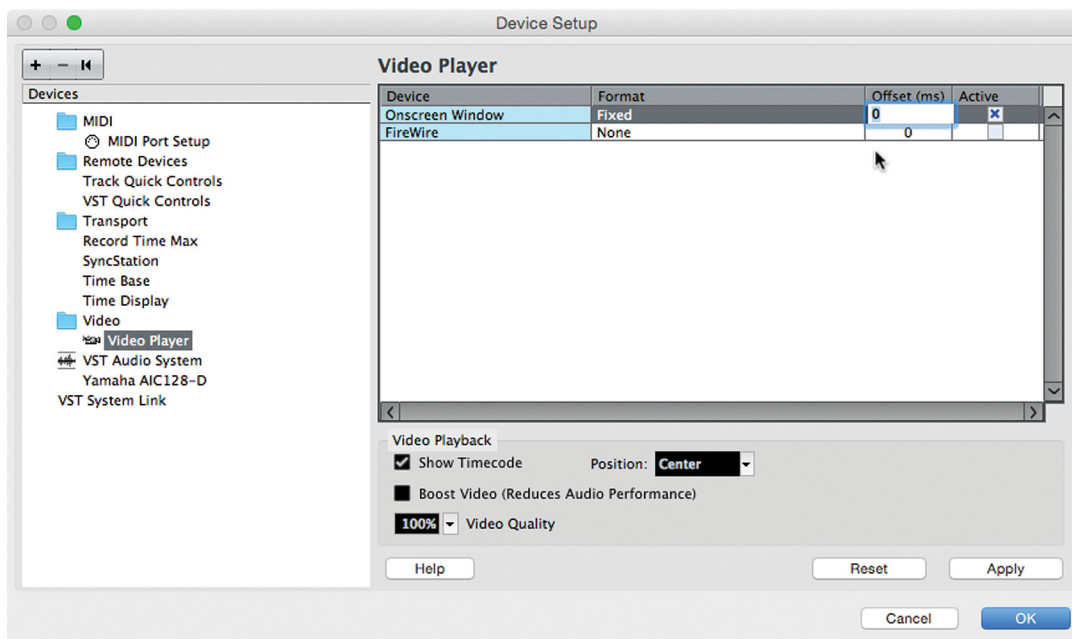


Figure 19.3
Video Player
Device setup

8. Ensure that Nuendo's timecode settings are the same as the imported video frame rate. If they are not matched, this will be indicated in the video track by red text overlaying the video event. Both frame rates will be listed to help better diagnose the problem.

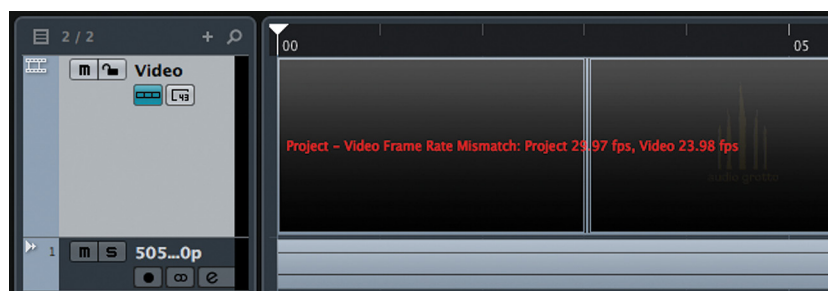


Figure 19.4
Framerate
mismatch

9. Ensure that the sample rate is running at the proper speed for the video. Usually, this is 48 kHz, the standard audio for video sample rate.
10. Place both the imported audio and video files at the appropriate location in the project, often at 01:00:00:00. Typically, one hour is a good starting point as it leaves room prior to the start of picture for calibration tones and for certain synchronization tasks. You can use absolute grid mode with the main ruler set to timecode and a grid value of one frame or one second. Turn snap on and move both files together to the desired location. You may also enter that value in the start field of the info line of the video file.
11. Play the video. Watch and listen to ensure that lip sync is accurate and the timing between the imported audio and video is correct. Common mistakes are operating at the wrong sample rate and timecode mismatches between the video and project settings.

Video tracks have much fewer options than other track types. They are as follows:

- ❖ **Lock.** As with other track types, pressing the lock button will prevent any further editing of events contained on that track.
- ❖ **Mute.** Pressing the mute button for a video track will stop any playback of videos for that track and turn the video output to black.
- ❖ **Frame Numbers.** Nuendo will display the frame number for each frame of video in the lower left corner of each frame box in the track display when this is active.
- ❖ **Frame Thumbnails.** Each frame box will contain a thumbnail image of that video frame when this feature is on.

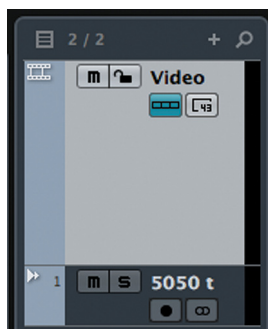


Figure 19.5
Video Track
controls

Multiple Video Events

You may place more than one video on a video track. Just like audio and MIDI events, videos can be played in sequence on one video track, one after the other.

You may also create more than one video track. Multiple video events can be placed on all video tracks. However, unlike audio and MIDI events, only one video can be seen at a time. So, when they overlap, only the video event on the bottom-most track will be seen.

MUTING VIDEO TRACKS

Note that if the bottom track is muted, the upper track will play back video. For example, there could be one video track that has a 720p version of the video and then a second that has a 1080p version of the video. The 720p uses less resources and is better for quick editing while the 1080p is best for final playback. Simply muting either track will let you choose which video resolution you are watching.



Figure 19.6 The bottom video track (Video 2) has playback priority

Video events can be edited in a limited fashion by adjusting their start and end handles, thereby trimming the video. Video events can be placed next to one another in the timeline for a basic form of video editing.

This can be used to create a rough edit from raw footage or for other tasks such as sequencing permutations of TV spots for rapid editing and mixing in one project (covered later in this chapter). Multiple video tracks can contain various versions of a piece that can easily be switched in and out for editorial purposes.

VIDEO EDITS FOR REFERENCE ONLY

Bear in mind that any video editing should only be used for reference as there is no professional method to output or deliver the results of video editing in Nuendo.

Edit Mode

Once you have a video file to play with, Nuendo can edit in a different mode known simply as “edit mode.” In this mode, the transport behaves differently as you manipulate events in the project window, enabling you to reference video frames for editing tasks.

To turn it on, choose “Edit Mode” from the transport menu.

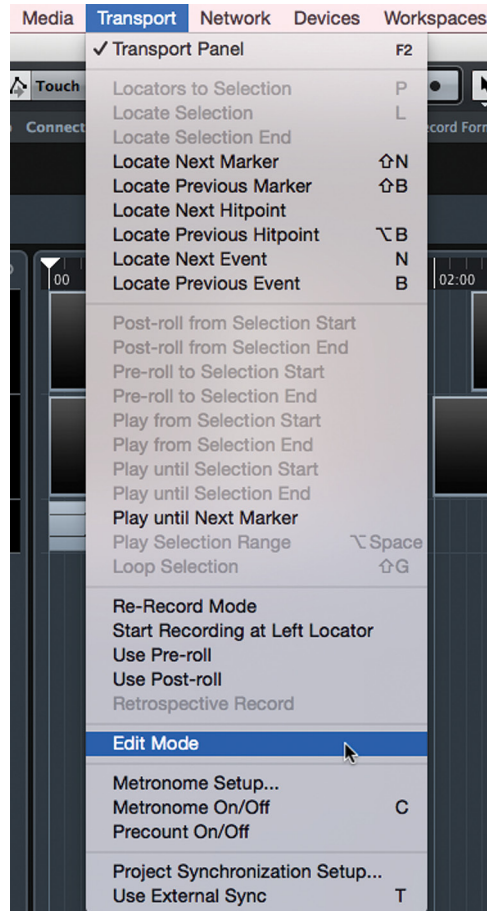


Figure 19.7
Transport Menu
Edit Mode

The first thing you might notice is that the cursor bar disappears from the project window except in the ruler display at top. This is the only visual indication in the project window of being in edit mode. The idea is that the cursor is now tied to the event selection. When you select an event, the transport will snap to the start of that event. The video will also snap to that frame.

To best see how this works, use the reference audio already imported from the video file in this example. The audio has been trimmed to have a different start time than the video.

1. Put the transport in Edit Mode.
2. Select the video event. Notice how the video jumps to the first frame, 01:00:00:00.

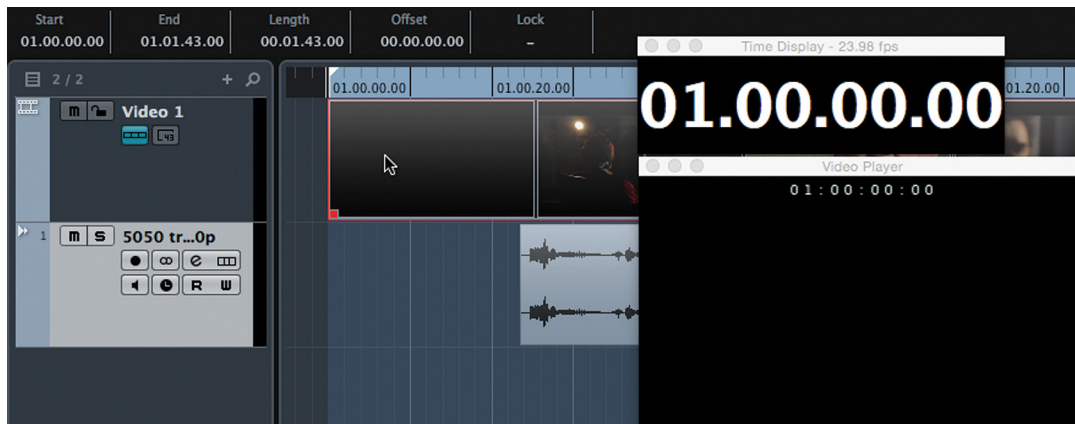


Figure 19.8
Click on the video event

3. Select the audio event. Notice how the transport, including the video display, snaps to the start of the audio event, 01:00:23.11. This equals the start time of the selected event in the info line.

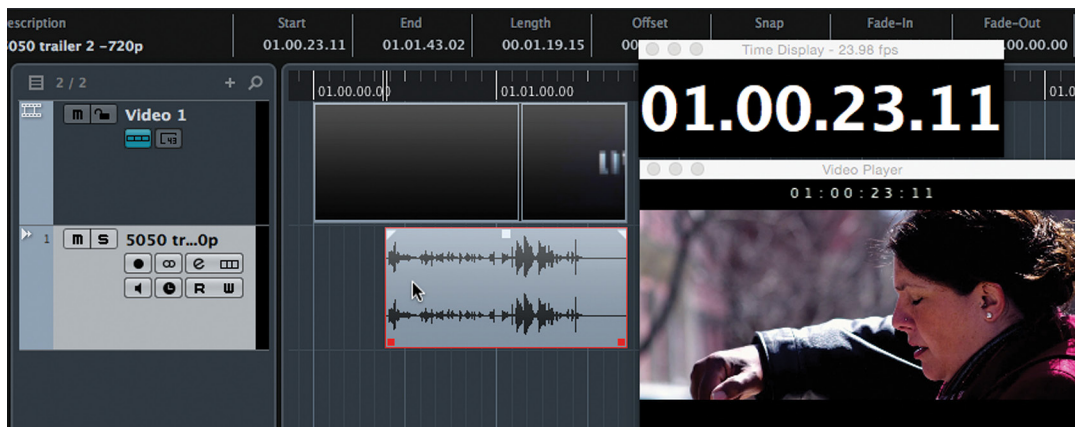


Figure 19.9
Select the audio event

4. Now trim the audio event by moving an event handle. Notice how the video scrubs along as you move the handle. This gives you instant feedback on where you are in the film.
5. Adjust the fade-in handle. The video scrubs along as this adjustment is made. The same is true for the other editing handles.

6. Switch to the range tool and make a range selection. The video scrubs along as you drag. Once you let go, the video will snap to the start of the selection.
7. Double-click the audio event to open the sample editor.
8. Move the snap point from the start of the event to another location. The video will scrub along with this, too.

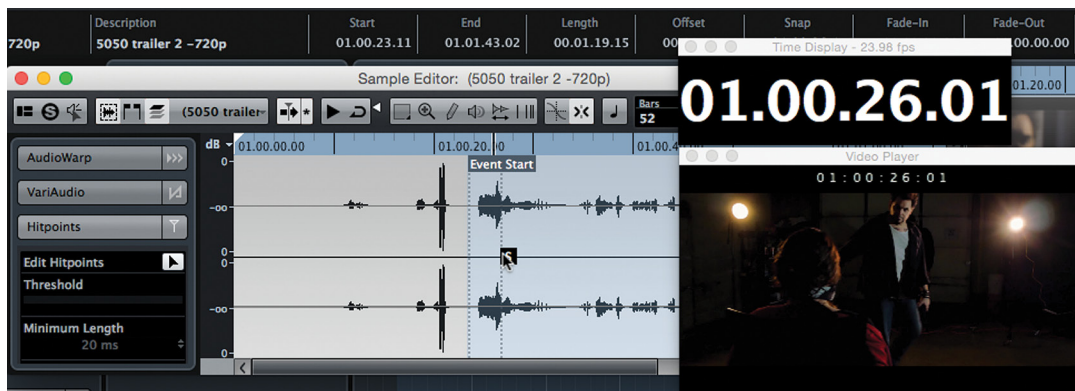


Figure 19.10
Moving the
snap point

9. Close the sample editor and click on the audio event. The video will now align with the snap point of the event and not the start.

Editing any event in Nuendo while in Edit Mode will have this same behavior. Even editing the info line or nudging will cause the transport to follow those changes in real time.

This becomes helpful for spotting sound effects to picture by giving you instant feedback on where you are in the video as you move, trim, and fade events in the project window.

PRO TOOLS NOTE: LINK EDIT AND TRANSPORT = EDIT MODE

Since Nuendo and Pro Tools use fundamentally different approaches to the transport, users switching to Nuendo can get confused by this behavior. Normally, Pro Tools has the edit selection and the timeline linked so what you have selected to edit is where playback will begin. When Nuendo is in Edit Mode, it operates much like this Pro Tools default behavior. When Nuendo is not in Edit Mode, the cursor position and edit functions are not linked.

Move to...

The Move to... commands found under the Edit menu come into use when working with picture.

Move to Cursor

Since the cursor is such an integral part of Nuendo, it can be used to position events in the project window. If you are viewing a video and find a location of interest where a specific sound should be placed, you can use the Move to Cursor (Cmd/Cntrl+L) command to instantly move any selected event to the cursor's position. Using the transports scrub mode, you can slide the cursor around the timeline searching for just the right moment for a sound cue and then use the Move to Cursor command to finish the task.

NUAGE NOTE: JOG WHEEL EDITING

Since the Nuage editing functions utilize the jog wheel, all editing functions are linked to the cursor. In this sense, Nuage editing is always moving events to the cursor since the cursor actually does the moving action. Nuage editing functions are covered later in this chapter.

Move to Origin

The Move to Origin command is a bit more involved. The "origin" of an audio event can be the timeline position in Nuendo where it was recorded originally or it could also be a time-code value added to the file by a remote field recorder during location filming, commonly known as the timestamp.

The timestamp of all audio files is visible in the Pool in the Origin Time column.

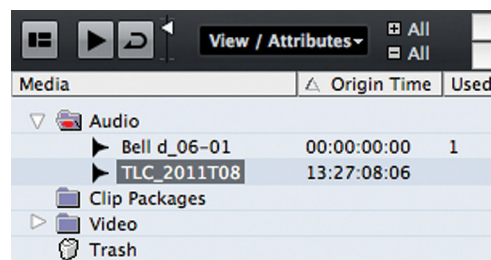


Figure 19.11
Origin Time displaying audio file timestamps

In this case, the origin time of the file TLC_2011TV08 is 13:27:08:06, or around 1:30 pm the day of the shoot using time-of-day code in the location recorder. This timecode is also used by the video editing process so both audio and video can be precisely aligned during editing.

MOVE TO ORIGIN AND RECOVERING FILES

The Move to Origin command can also be helpful in music recordings where some audio files have been inadvertently removed from the project and need to be brought back in. In order to return the audio file to its proper position in the timeline, the Move to Origin command is used to place the event where it was originally recorded in the music.

Nudging

Nudging commands can be very helpful in editing to picture, bumping the audio event around the timeline in small increments, usually one timecode frame. Key commands are in place for the more common nudging commands so that bumping an event around is quick and simple. While in Edit Mode, any nudging of events will be reflected in the cursor and video's position.

Nudge commands can be performed using the Nudge palette or by key commands. The following are the basic nudge commands:

- ❖ Trim Start Left
- ❖ Trim Start Right
- ❖ Move Left
- ❖ Move Right
- ❖ Trim End Left
- ❖ Trim End Right
- ❖ Move Up (a track)
- ❖ Move Down (a track)

The Nudge increments follow the Grid value. Whether Snap is on or off, nudging an event will move it by one grid value. For audio editing to picture, start by setting the grid value to one frame for nudging.

Marker Tracks

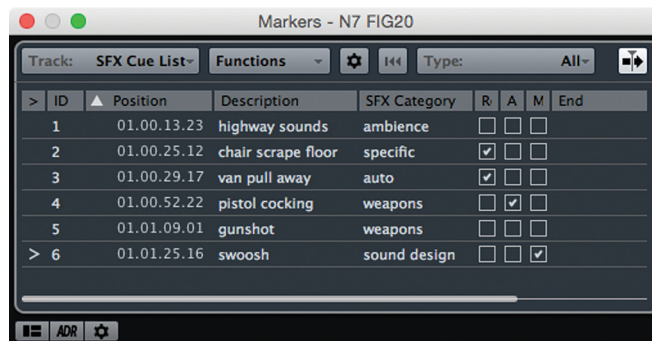
Now that Nuendo supports multiple marker tracks, film post-production engineers can take advantage of this and enter a great deal of data into a project in the form of markers. Separate marker tracks can be created for dialogue editing, FX spotting, ADR, music cues, scene and script notes. The ability to separate these markers on individual tracks keeps things more organized and less cluttered as a production gains complexity over time.

Take the time to create marker tracks for spotting sound effects and dialogue edits to help speed up the editorial process. Once a movie has been spotted and this data is in a marker track, it can be imported into other Nuendo projects for editors to work with.

Creating Cue Sheets with Marker Tracks

As an example, let's create a SFX (Sound Effects) spotting marker track and export it for use in other Nuendo projects.

1. Add a new marker track.
2. Label it appropriately, such as "SFX Cue List."
3. Enable Snap mode set to one frame to place markers exactly on frame boundaries.
4. Spot the film, entering markers at each frame where a sound FX is desired.
5. Use Edit Mode and scrub through to find the exact frame for a sound FX to begin.
6. Using a key command for "Insert and name Marker," you can quickly create and name markers for each sound FX.
7. Open the Marker window (Cntrl/Cmd+M) to see a detailed list of all the markers you have created.



ID	Position	Description	SFX Category	R	A	M	End
1	01.00.13.23	highway sounds	ambience	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2	01.00.25.12	chair scrape floor	specific	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3	01.00.29.17	van pull away	auto	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4	01.00.52.22	pistol cocking	weapons	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5	01.01.09.01	gunshot	weapons	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6	01.01.25.16	swoosh	sound design	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Figure 19.12
SFX spotting
marker list with
SFX attributes
visible

8. Select the Marker track in the project window.
9. Choose File>Export>Selected Tracks to create a Track Archive of just the marker track.

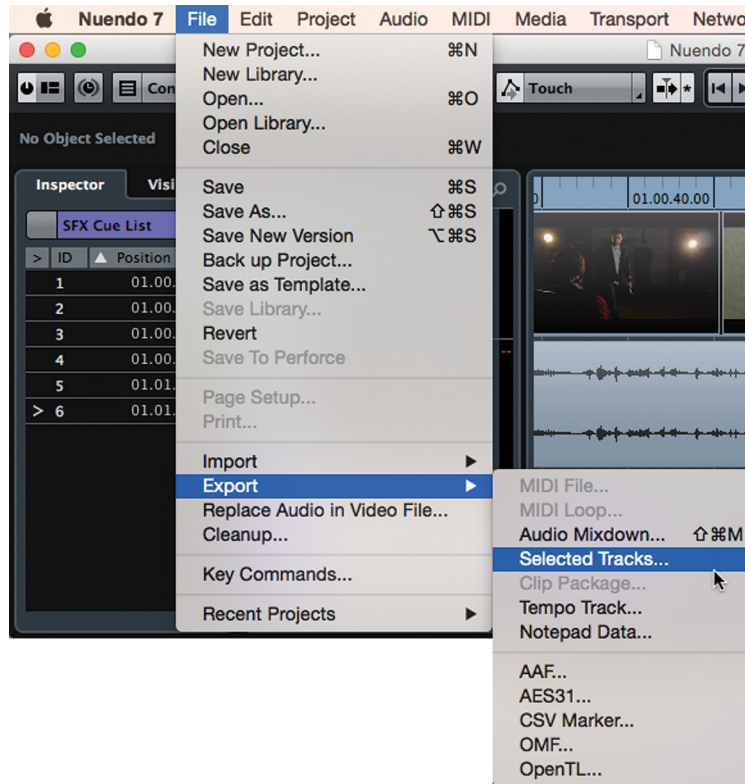


Figure 19.13
Export Selected
Tracks

10. Name the .xml file appropriately, such as “SFX Cue List” and save the file.
11. Open another project or create a new empty one.
12. Choose File>Import>Track Archive... and select the .xml file you created.
13. You will be prompted by the Import Options dialog window to select tracks to import. You can click “Select All” or click the box to the left of the Marker track name.
14. The Marker track will then be added to the current project, giving you a complete list of the desired sound FX in a new or existing project to get you started working.

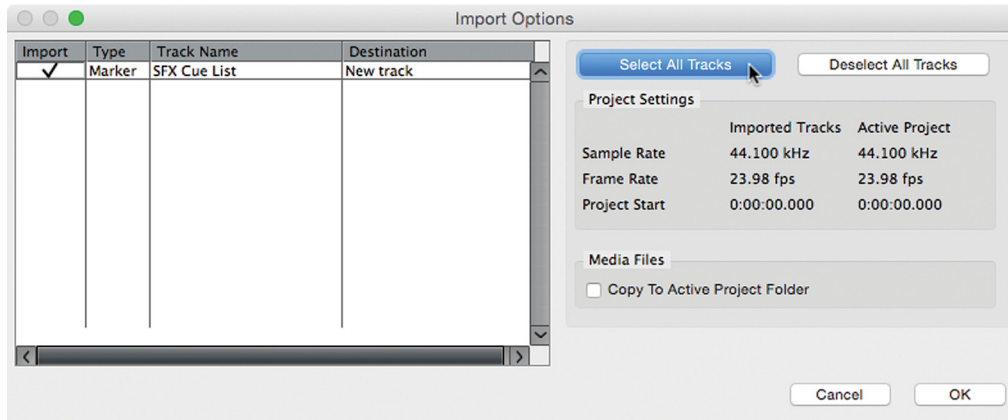


Figure 19.14
Import Options

When working on feature-length material with multiple sound editors, this ability to share marker tracks makes it easy to work from the same information, without having to re-enter the data in each project. Using multiple marker tracks to organize various types of information offers editors the flexibility modern production schedules need.

Post Production Editing Examples

Multiple TV Spots

When working on a TV spot with multiple iterations, you can speed up the process by putting all the spots into one project file, sequentially. Each version of the spot can then be mixed on the same channel, so continuity between them (in terms of signal processing, levels, etc.) is preserved.

Here's how Nuendo's features can be combined to make this an easy process.

1. Into a new project, first import the video files for all the spots. Import the audio as well in order to double check sync on everything.
2. Place the timeline in timecode mode and enable Snap set to 1 second.
3. Either place the video and audio tracks into a folder and enable group editing or group each video and audio spot together to prevent accidental loss of sync.
4. Place each spot at a one minute mark in the timeline so there is space between each one.

5. For each spot, create a cycle marker that matches the start and end points of the spot. You can use the “P” key command to set locators to selection and then create a cycle marker. Note that the length of each cycle marker should be the exact length of the final spot for accurate delivery—i.e., a 30 second spot for TV should have a cycle marker of exactly 30 second and no frames. This will speed things up later.
6. Name each cycle marker with the exact file name that is required for delivery. This could include spot codes for broadcast or simply unique titles to identify each spot. These cycle marker names will be used to name the exported mix files when you are finished.
7. Perform all editing and mixing tasks for each spot, importing OMF files, spotting FX, music, etc. Having them all in one project will make it easier to match sonics between spots, helping the entire ad campaign be more consistent. The example below shows a project with 16 TV spots including :30’s, :15’s and :10’s editing and prepped for delivery. Each cycle marker has the appropriate name for each spot.

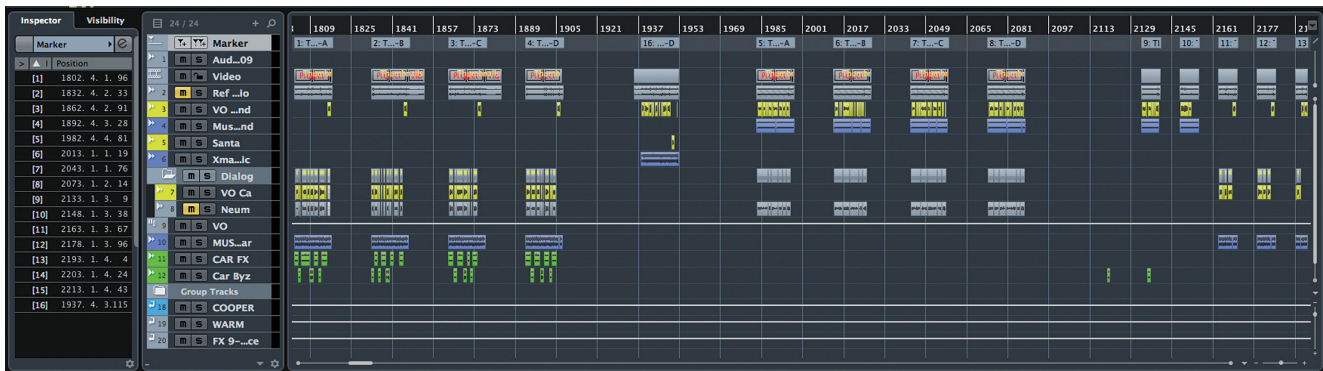


Figure 19.15 Example project with multiple TV spots

MULTIPLE TAG LINES: COPY THE SPOT

Often, an ad campaign will have several spots that are identical except for tag lines or special promotions at the end. Being able to simply copy an entire sound mix from one spot and paste it into another in the same project will speed up the process of generating permutations of spots, just replacing the tag line for example.

8. Optimize your output levels to meet any delivery requirements such as maximum dBFS and average dialogue levels with the Master Meter in the MixConsole.
9. Open the Export Audio Mixdown window from the Files menu (Cntrl/Cmd+Shift+M). This window provides extensive options for exporting multiple files using various methods with a flexible naming scheme. Note that this window is not a dialog box and can remain open while you continue to work on a project. This allows you to prepare everything and set up your export easily.

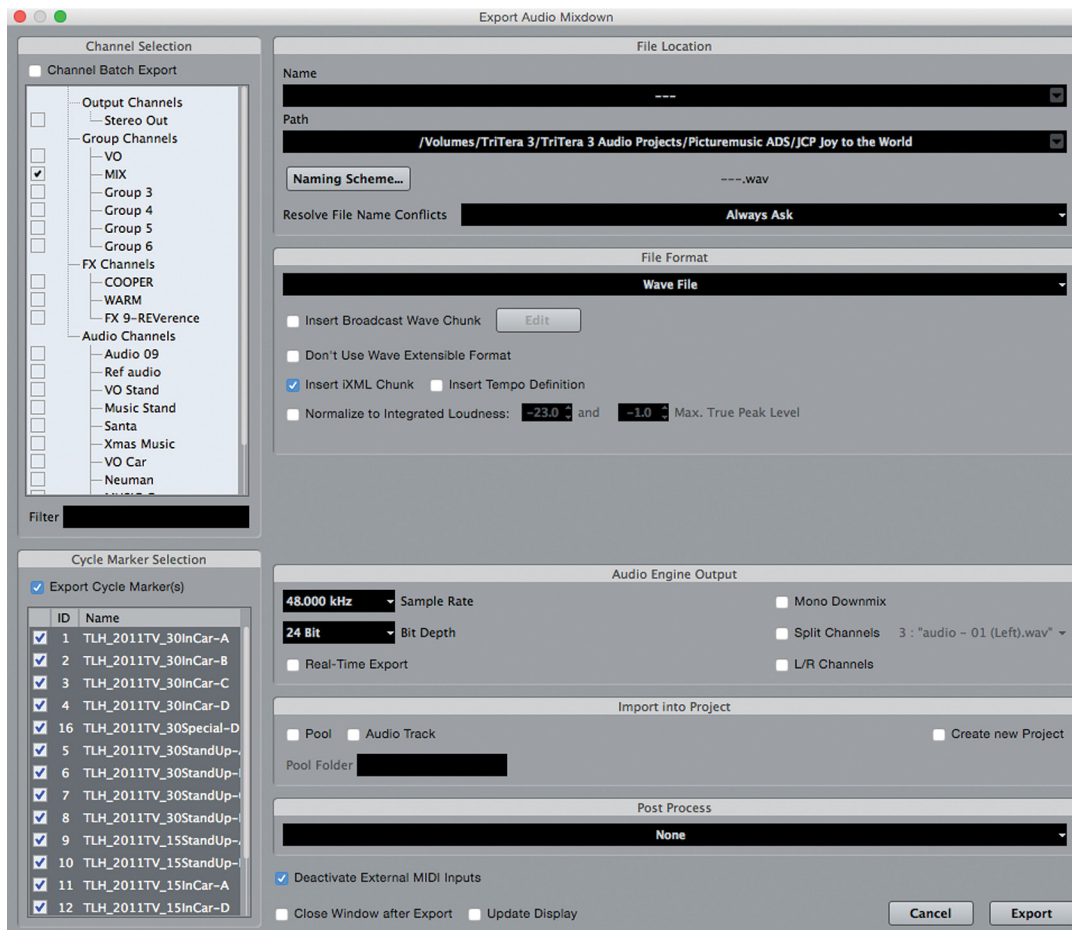


Figure 19.16
Export Audio
Mixdown
window

10. Check the Export Cycle Marker(s) box. This enables Nuendo to export multiple files in one process, allowing you to grab a cup of coffee (tea, Red Bull, water, etc.) while Nuendo does the work.
11. Click the Naming Scheme... button to access the options for automatic naming of files.

- From the pull-down menu, choose Cycle Marker Name. This will cause Nuendo to use the cycle marker name as the name of the file that is being exported.

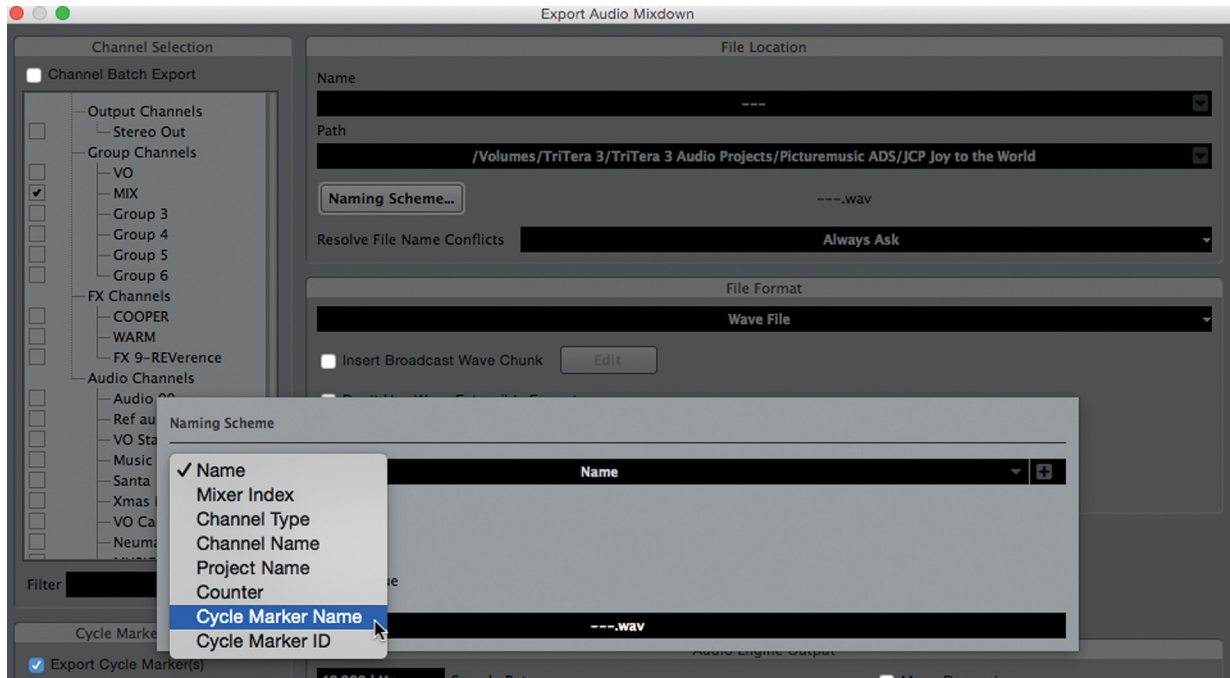


Figure 19.17 Naming Scheme

- Now, check the boxes next to each cycle marker you wish to export in the lower left area of the Export Audio Mixdown window. If there are many cycle markers that need to be checked, you can shift+select multiple ones and then click on a box to check all selected markers at once. For game audio that might have hundreds of files that need to be exported, this is a massive time saver.
- Press “Export” and watch Nuendo process each file. As a confidence monitor, you may choose Real-Time Export to actually hear each file as it is rendered.

SELECT THE MIX OUTPUT

Make sure that the proper output channel is selected in the Channel Selection area of the Export window to ensure that the correct signal is rendered to the file. It is possible to render files for every channel in the mixer if you wish, so this setting is critical.

This is a huge time saver in time-constrained and budget-limited commercial work. Just imagine if the client comes back and wants to change the level of the VO in 30 television spots. With these exporting options, you could turn up a fader and re-export all the files in one step.

Preparing Production Audio in Feature Film Post

The most fundamental element in film audio is dialogue. It's all about the story. Film dialogue has evolved from mixed production audio and ADR into complete ADR replacement of all production audio in effects-heavy movies (*Star Wars* and its prequel episodes, *Lord of the Rings*, etc.) and now into the return of more production sound as budgets shrink, location recorders and microphones improve in quality, and smaller digital cameras run far more quietly than earlier film cameras.

PRODUCTION AUDIO

Production audio is the term used in the film industry to denote audio that is recorded during filming (during production) as opposed to any audio recorded or created after filming has taken place. For the most part, this is limited to dialogue recording and sounds of the environment.

This return to capturing and using more production audio requires that much of the ambience and background noise be stripped out and the dialogue isolated so that the sound designers can control and create all the background sounds.

Modern digital field recorders are capable of recording more tracks than ever, allowing the production sound crew to capture more sources than ever. In post-production, these extra channels must be combed through to find the best recordings of the dialogue and retain them for the mix.

In the past, film mixers have relied on sophisticated mixing consoles and automation to create a smooth dialogue track for the movie. As DAWs have taken over the film sound industry, their mixing limitations have made it necessary to use a great number of tracks to make it possible to mix a movie with the same level of control and detail possible in a traditional dubbing facility with a large format console.

Today, those limitations have been lifted by the state of the art automation system implemented in Nuendo, allowing mixers to use the same techniques to create smooth dialogue with fewer channels. We will talk about the automation system in Chapter 24: Automation and Chapter 26: Film Mixing. But for now, this helps us outline a dialogue editing scenario that is complimentary to this ability.

Apply the following process to the 50/50 Film Project starting with the imported AAF file from Chapter 12.

Strip Out the Dialogue

The first step is to strip out the dialogue lines from all the background noises. You can use the detect silence feature, but often this is not sensitive enough to catch every detail. Going through the film with a script and manually editing all the dialogue lines down is the best method.

Figure 19.18 shows the AAF file for 50/50 with the three main microphone tracks of the production audio. These usually consist of two lavalier body mics and one shotgun boom. Listen to each line of dialogue on each channel to determine which microphone has the best-sounding version of each line.



Figure 19.18
50/50 AAF
three main
tracks

The idea is to be left with nothing but the actual dialogue lines and then rebuild all the nuance and details in sound design and Foley work. This method gives you the power to overcome issues such as traffic noise, planes, etc.: anything that does not fall upon the actual dialogue line is eliminated.

Organize Dialogue by Characters

As you strip the dialogue lines down, place them on new tracks to provide mix control later. These could be mapped out like this:

- ❖ Character A - This is the star of the film. They get their own special track.
- ❖ Character B - Another special track for the secondary character or co-star.
- ❖ Character C – Create new tracks for every major character in the film.
- ❖ Support A - All of the rest of the dialogue can be placed on this track.
- ❖ Support B - Adding a second supporting dialogue track allows some flexibility when several non-principal characters are in one scene, allowing you to go back and forth between Support A and B as needed.

In the case of 50/50, create a track for each character and move the selected microphone from the AAF to the character's track for each line. Figure 19.19 shows lines placed on Erica's track in red and Jamie's track in blue. Continue this process for the entire film and all the dialogue lines will be organized by character on each track.

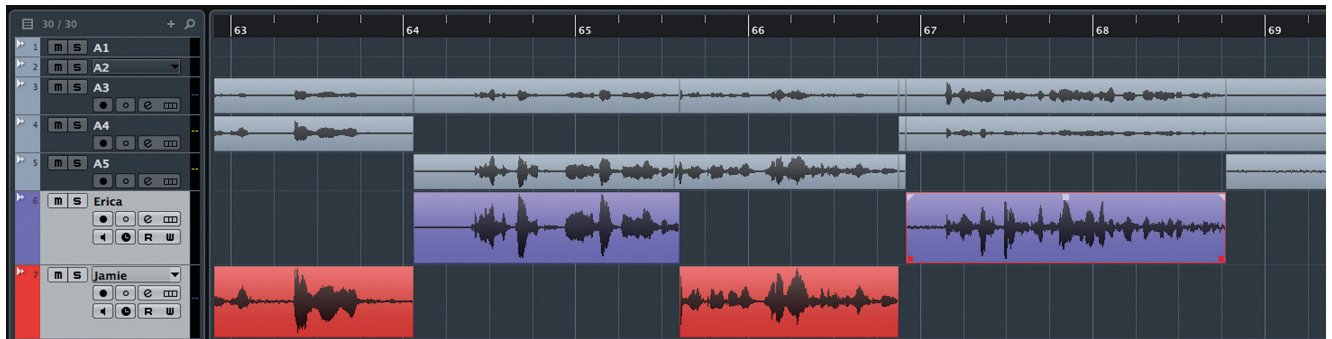


Figure 19.19 Erica and Jamie's dialogue lines moved to character tracks

This keeps things relatively simple for editing. During the mixing process, there are tracks for each character so that automation can be used to bring the dialogue together into a smooth, cohesive track. Barring any extreme on-screen moves, all of these tracks will be heard primarily through the center channel of a 5.1 mix.

Production SFX

During filming many sound effects will be captured as part of the recording, including Foley elements such as footsteps, clothing rustles, furniture, etc. Even background ambience is captured. Some of this material will be usable and some will not. Carefully choose the useful sounds from the production audio and place them on a track called “Production SFX.” These sounds might get replaced later or be used as one layer in a composite sound effect in the final mix.

Having these production sound effects isolated on their own track is useful for creating foreign language versions of the movie where you want to retain as much of the original sound as possible without the dialogue. Figure 19.20 shows the chair scraping sound from the warehouse scene recorded on location and placed on the Prod SFX track that is used in the final mix of the movie.

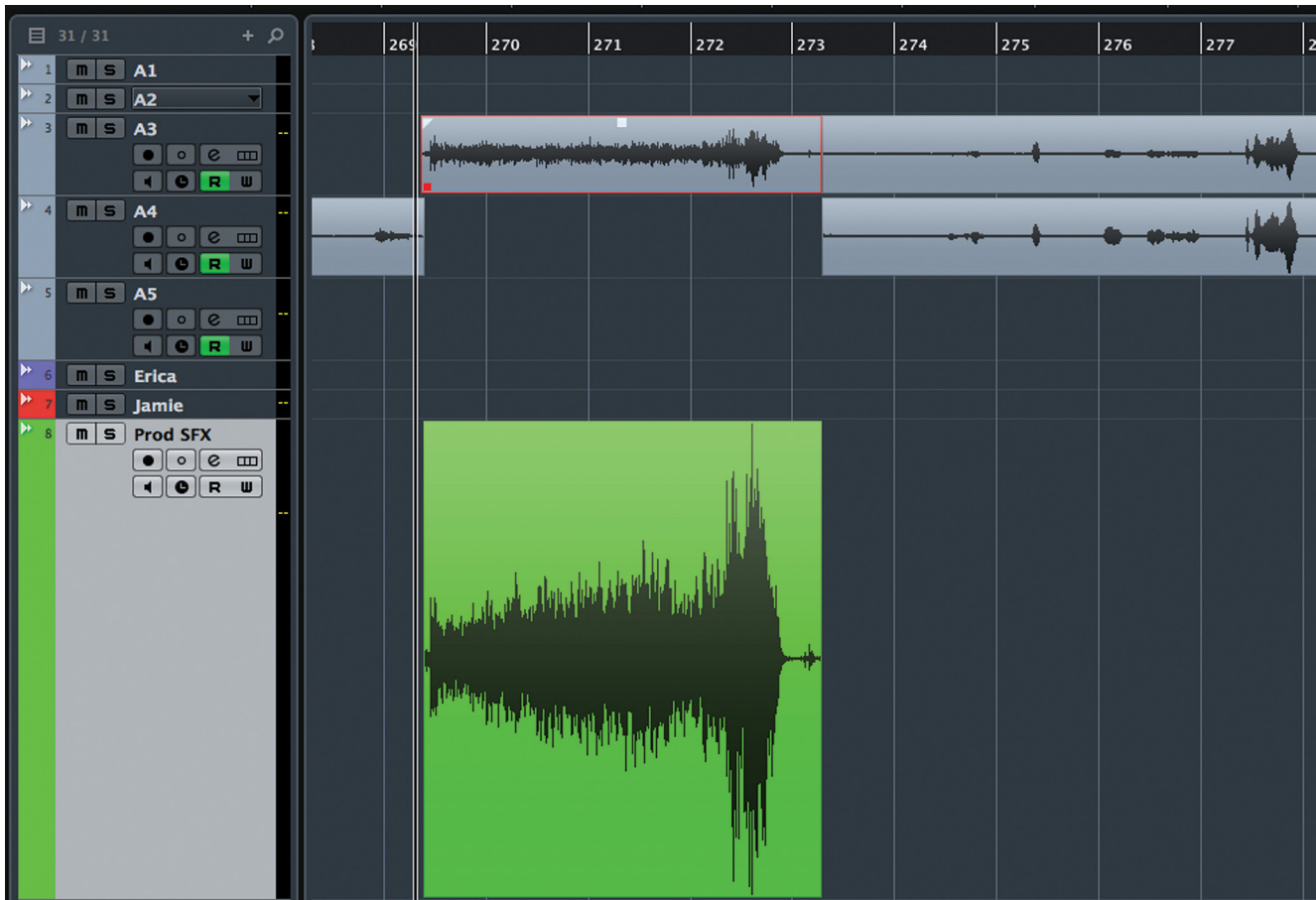


Figure 19.20 Chair scraping production sound effect

Production Audio: Save the Scraps

You should keep all of the remaining production audio on its original tracks in case the director calls for something later or just for reference. These tracks can be disabled if not needed to avoid wasting CPU resources.

The 50/50 AAF file contains much more than just the production sound (26 tracks total). There are temporary sound effects, temp score and ambience sounds that could be used in the final mix so keep all of these tracks in the project in a folder called “AAF Audio” and mute the folder track to isolate them from the mix.

Create Sound Cue Sheets

Now that you have picked over the production sound and selected all the usable dialogue lines and sound effects, its time to go through the film listening for what’s missing:

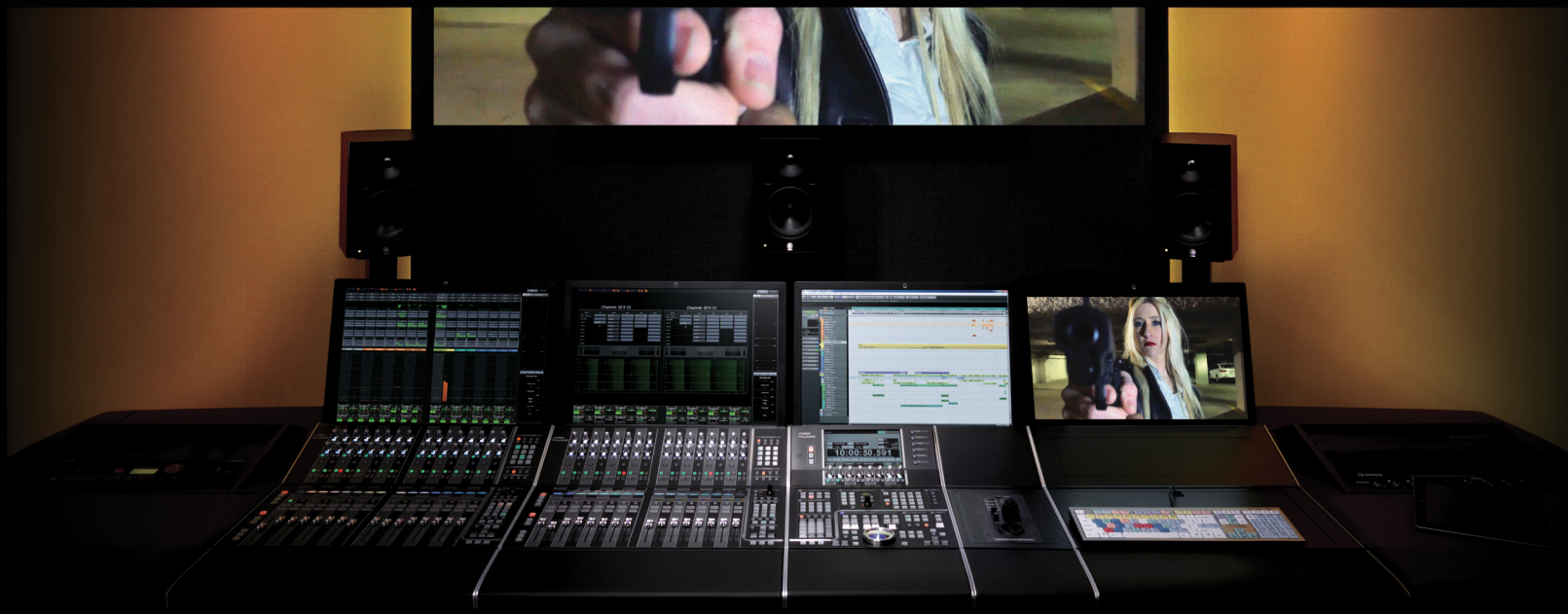
- ❖ Sound effects
- ❖ Ambience
- ❖ Dialogue lines for ADR
- ❖ Foley
- ❖ Sound design elements

Create a marker track and enter each specific sound element that is missing or needs to be created. Use the SFX attributes of the Marker list to categorize each sound as described earlier in this chapter. Make this list as complete as possible as this becomes the road map for tasks to complete before the mix can begin.

If you are working in teams, each category of sounds can be listed separately so that each team has a consolidated list of sounds that need to be recorded or created. This is essentially the job of Sound Supervision in feature films, organizing the tasks of the sound team once the initial production sound has been edited and then making sure everything is completed before the mix.

NUAGE

COURSEWARE



PART III: EDITING

by Ashley Shepherd

Chapter 20

Nuage Editing



NUAGE

Nuage Editing

- ❖ The Jog Wheel Editing Model
- ❖ Selecting Techniques
- ❖ Selection During Playback
- ❖ Cut, Copy, and Paste
- ❖ Audio Event Editing
- ❖ Moving
- ❖ Edit Mode vs. Nuage Jog Wheel
- ❖ 50/50 Dialogue Edit

In this chapter we will discuss editing using the Nuage Master unit. Editing on the Master unit uses a different paradigm than editing with a mouse and keyboard. Once this editing model is understood and familiar, new techniques can be explored that were simply not possible with the mouse.

The Jog Wheel Editing Model

Editing in Nuage utilizes the jog wheel as the main tool for selecting and editing. Since the jog wheel moves the project cursor, the cursor becomes the visual editing tool, replacing the mouse pointer.

The jog wheel moves the project cursor from left and right, up and down the timeline. That gives you control over the X-axis in the project window. The second aspect of this editing model is track selection. Track selection controls the Y-axis in the project window. Together, you have control over selecting and editing audio, MIDI and other events in the project window.

The Fader unit gives you very flexible methods of selecting tracks while the jog wheel gives you smooth and precise control of the project cursor. These two factors together open up novel editing techniques not previously available with the traditional mouse and keyboard approach.

Selecting Techniques

To begin, you must select events in order to edit them. There are two modes of selection in Nuendo:

- ❖ Object selection
- ❖ Range selection

Object selection is based on selecting entire events in the project window while range selection is based on selecting portions of the timeline. While both modes are similar in operation, the differences are what allow for such a wide variety of editing techniques.

Object Selection



(tutorial video: “Nuage Object Selection”)

In order to select anything using the Nuage Master unit, you must first select a track in the project window or by using the select buttons on the Fader unit, as shown in Figure 20.1.

Once you have a track selected in the project, the cursor can be used to select events on that track. To select an audio event, press and hold the Select button on the Master unit and move the cursor with the jog wheel till it touches the event. At that point, the event will be selected, as seen in Figure 20.2.

If you continue to move the cursor past other events while holding the Select button, multiple audio events will become selected, as seen in Figure 20.3. If you select another audio track and select events on it, other selections will be removed.

If you want to select events on more than one track at once, select additional tracks and press the Select button while moving the cursor over the audio events. Events on all selected tracks will become selected, as shown in Figure 20.4.



Figure 20.1

Selecting a track on the fader unit



Figure 20.2 Audio event selected by cursor



Figure 20.3 Two selected audio events



Figure 20.4 Audio events selected on multiple tracks

SELECT BUTTON: MOMENTARY OR LATCHED

The Select button on the Master unit can be either momentary or latched. If you press and hold the Select button, it will be momentary. Releasing the button will exit select mode. If you tap the Select button once, it will become latched and stay in select mode until you tap the button a second time.

Range Selection



(tutorial video: “Nuage Range Selection”)

The second selection mode is Range select. In this mode, portions of the timeline are selected instead of events. It operates in much the same way as object selection with some exceptions.

In order to select a range, press the Range Select button on the Master unit, as shown in Figure 20.5. Now you can use the jog wheel while holding the Select button to make a range selection.

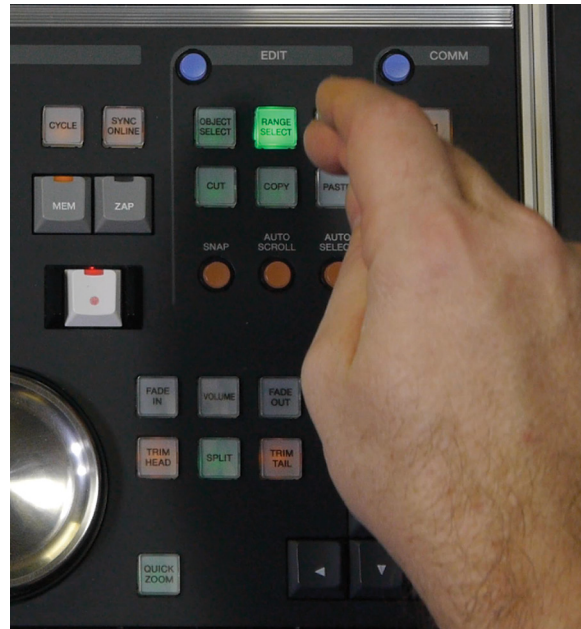


Figure 20.5
The Range Select button on the Master unit

Just as with object selection, you must first select one or more tracks in the project to create a range selection. Figure 20.6 shows a range selection being made on the top track, A25. The blue highlighted area defines the range selection.



Figure 20.6 Making a range selection

Trimming a Range Selection

The Trim Head and Trim Tail buttons may be used while in Range Select mode to adjust the beginning and end of the selection. By pressing and holding either the Trim Head or Trim Tail buttons, Select will automatically become enabled so that the selection can be adjusted with the jog wheel, as shown in Figure 20.7.



Figure 20.7 Trimming the range selection tail

Moving a Range Selection

Range selections can be made in areas that do not contain any events. It is possible to move an empty selection by pressing and holding the Move button and using the jog wheel to reposition the selection.

A Selection and B Selection

Nuendo has two independent range selections; A and B. You can switch between them by pressing the Range Select button. The A selection is indicated by the letter A in the toolbar and the blue highlight in the project window, as shown in Figure 20.8.



Figure 20.8 A Selection in toolbar and blue highlight



Figure 20.9 B Selection in toolbar and green highlight

The B selection is indicated by the letter B in the toolbar and a green highlight in the project window, as shown in Figure 20.9.

Four-Point Editing Model (Source and Destination)

Through the use of the A and B range selections, a four-point editing technique can be achieved. This may be familiar to those with some video editing experience. It is based on a source and destination concept where the four points are as follows:

- ❖ Source Start
- ❖ Source End
- ❖ Destination Start
- ❖ Destination End

The A range functions as the source and the B range functions as the destination. Since these selections are completely independent, you can take audio material from one location as the source and paste it in another location as the destination. These two locations can be far apart in the project.

When you switch from one range selection to another, the project window will automatically move to either location, no matter how far away in the project. This reduces the steps needed to complete a four-point edit with the Range tools.

VIDEO EDL FOUR-POINT MODEL

The CMX3600 EDL format discussed in the next chapter (Chapter 21: ReConform) is a four-point model with four timecode values used to describe each editing step in the EDL.

Selection During Playback

Both the Range and Object modes can make selection during playback, including Scrub and Shuttle modes. This allows you to make selections based on listening rather than looking at the audio.

Any time you press and hold the Select button during playback, you will begin making your selection. When you let go of the Select button, the selection will end at that point. The same holds true during Scrub and Shuttle.

Cut, Copy, and Paste



(tutorial video: “Cut Copy Paste”)

Once a selection has been made, editing can begin. The most basic editing functions involve cutting, copying, and pasting of the selection. These editing functions operate much as would be expected with certain caveats.

Paste with Object Select

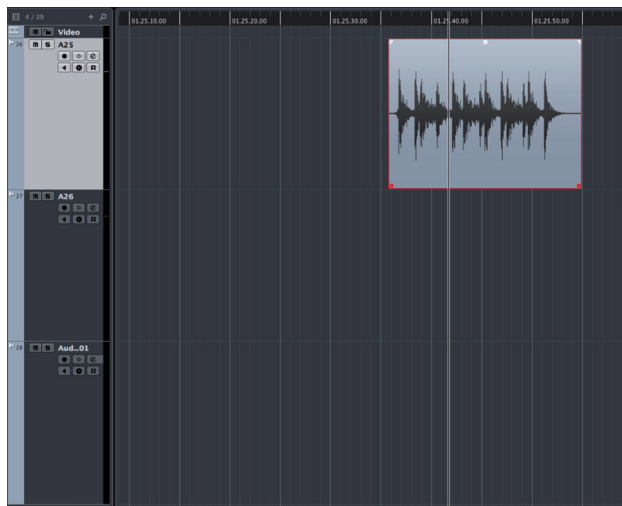
When Object Select mode is enabled, events that have been copied or cut are then pasted into the project starting at the cursor position on the currently selected track. What this means is that you can cut events from one location on one track and then paste those events at another location on another track.

Figure 20.10 shows an event copied from one track and then pasted on another track at the cursor position. With Object Select mode, events are always pasted relative to the cursor position.

Paste with Range Select

Pasting data with the Range Select mode enabled works much the same as Object Select mode except that the data is pasted starting at the Range selection start rather than the cursor position. This enables audio to be moved from one track to another and maintain the same position when pasted in the destination track.

Figure 20.11 shows data copied from one track and pasted on another at the exact same position. In Range Select mode, audio is pasted from the start of the range selection.

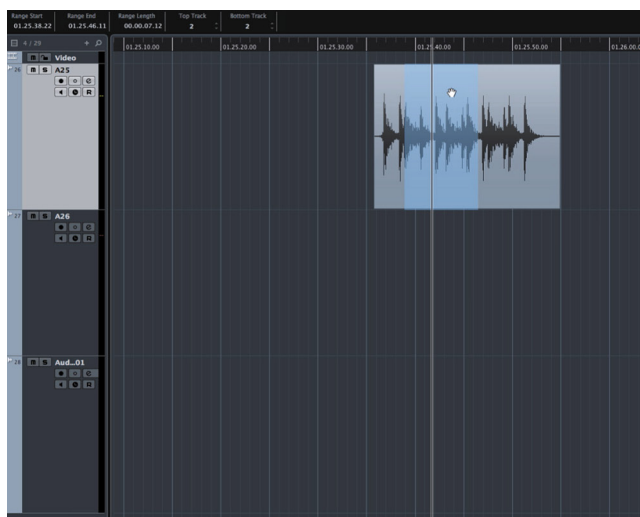


Event copied from top track

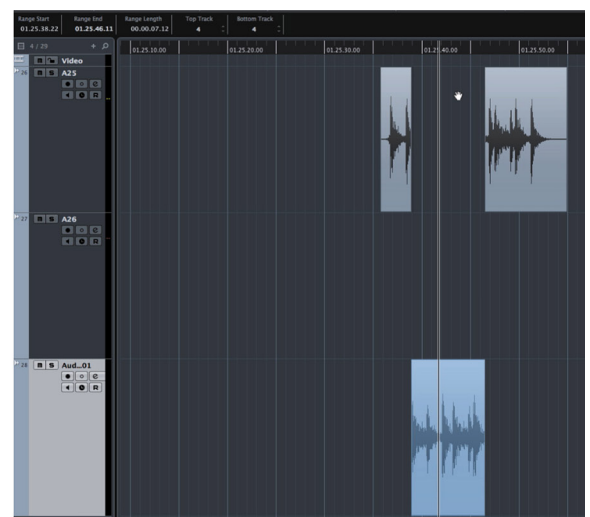


Event pasted relative to the cursor position

Figure 20.10 Copy and Paste in Object Select mode



Event copied from top track



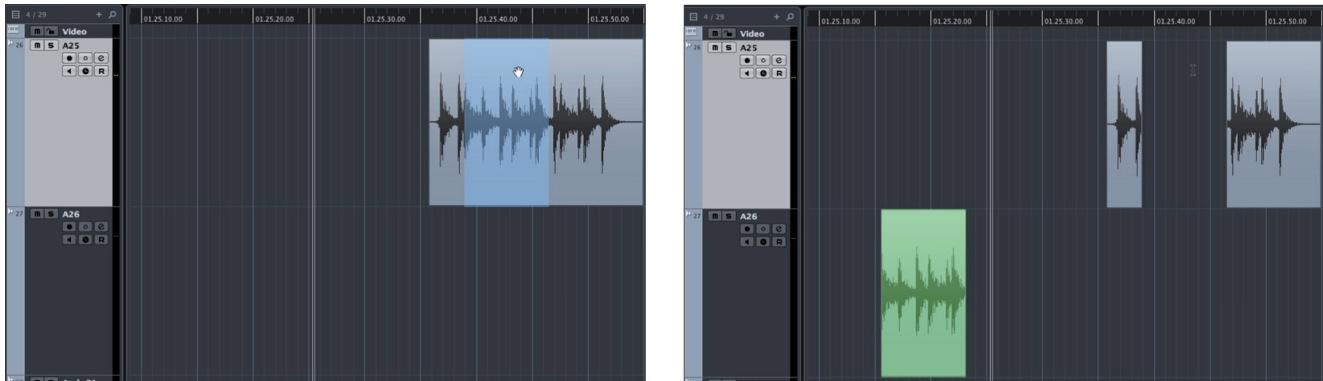
Event pasted relative to the range position

Figure 20.11 Copy and Paste in Range Select mode

A and B Selections for Copy and Paste

Since there are two range selections, copy and paste can take advantage of both selections. Material may be copied using the A Range and then pasted using the B Range. This is how the four-point editing model can work in Nuendo.

Figure 20.12 shows material copied from the A Range and then pasted using the B Range. Since switching between the A and B selections is a one-button operation, this type of cut and paste can be a very fast and efficient editing model.



Event copied from top track

Event pasted relative to the range position

Figure 20.12 Cut and Paste using A and B Range selections

Audio Event Editing



(tutorial video: “Audio Event Editing”)

When using Object Select mode, you can use the jog wheel to edit audio event handles and trim the selected events. The event editing buttons to the right of the jog wheel shown in Figure 20.13 are for this purpose.



Figure 20.13
Audio Event
Editing buttons

Once an event has been selected, these buttons are used to adjust the various handles of the event:

- ❖ Fade In
- ❖ Fade Out
- ❖ Event Volume
- ❖ Trim Head
- ❖ Trim Tail

The last button, Split, is used to divide the event into two events at the cursor position. Since the project cursor is tied to the video playback, all of these event editing operations are tied to the video position in Nuendo. This is ideal for editing audio to picture.

Figure 20.14 shows the audio event volume handle being adjusted by the jog wheel. By placing these editing buttons all together, it makes the work of editing audio events quick and easy.

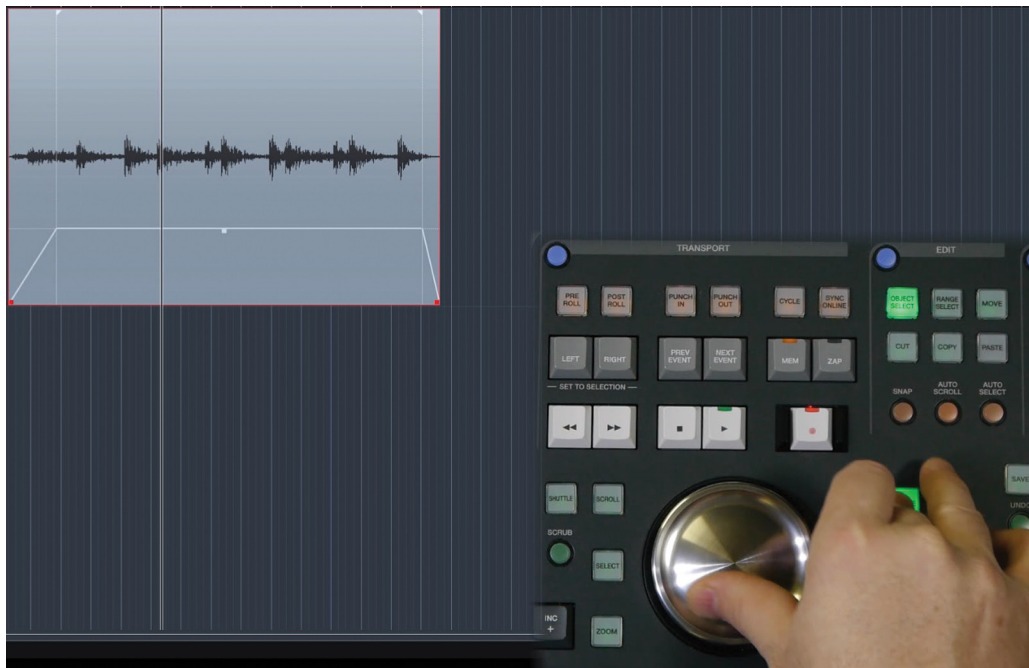


Figure 20.14
Adjusting the volume handle with the jog wheel

Moving



(tutorial video: “Move”)

The Move button allows the jog wheel to move selected events around the project window. When you press and hold the Move button, the jog wheel will move selected events relative to the cursor position. This is important for editing to picture since the cursor is tied to the video playback, giving you visual feedback from the video that shows you where the audio is being placed in time.

Figure 20.15 shows the selected audio event being placed such that the cursor position is lined up with the video frame displayed in the video window. The key distinction is that the cursor is not at the start of the audio event but at a point within the event relative to the start. This makes it very easy to align any point within an audio event to a particular video frame.



Figure 20.15
Using the jog wheel to move an audio event to picture

MOVE BUTTON: TOGGLE OR MOMENTARY

The Move button works the same way as Select, Scroll, Zoom, and Shuttle in that it can be either momentary when held or toggled on and off when tapped. The timing of the switch delay for momentary operation can be adjusted in the Nuage Master setup on page 2: Smart Switch Delay.

Moving Contents

One unique aspect of event moving in Nuendo is the ability to move the contents of the event without moving the event itself. Using the jog wheel, first press and hold both Alt and Shift while turning the wheel to move the contents of the audio event. Figure 20.16 shows the same event before and after moving its contents.



Before

Figure 20.16
Moving an audio event's contents

Contents Moved



Moving Range Selections

Moving a range selection is similar to moving events except it is possible to move portions of audio event. When you move only a portion of an audio event, as seen in Figure 20.17, three audio events are created as a result.

By pressing the Alt key, range moving can be vertical across tracks in the project.

Moving an Empty Selection

One unique aspect of Range selections is that they can be moved even when the selection contains nothing. This can be helpful when selecting an area to paste data into or for range edits such as Cut Time or Insert Silence.



Figure 20.17
Moving a portion of an audio event

Range Selection



Moved Range Selection

Edit Mode vs. Nuage Jog Wheel



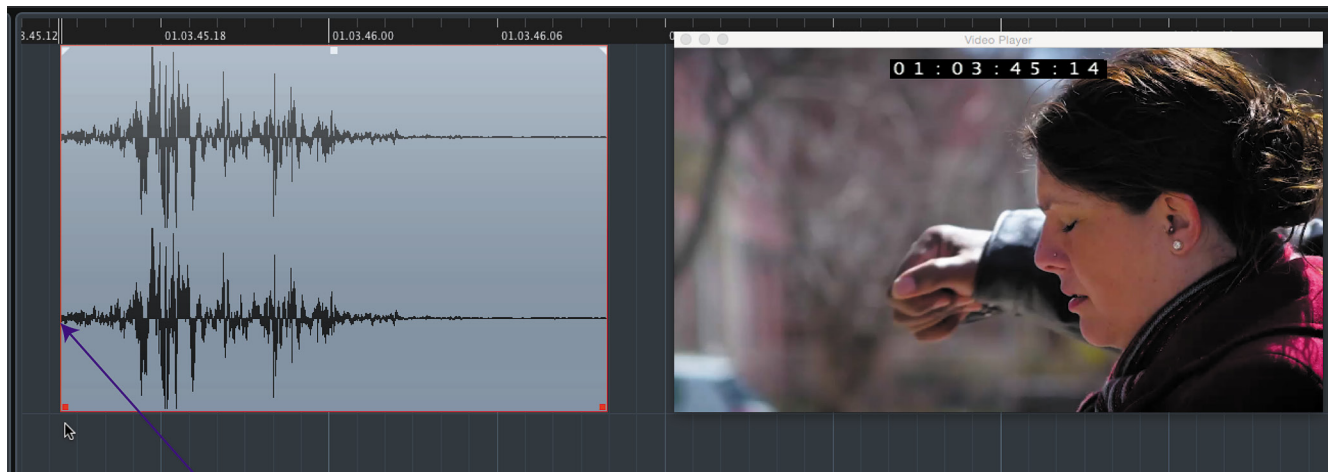
(tutorial video: “Edit Mode vs. Jog Wheel”)

Nuendo has a specific mode for editing to picture called Edit Mode. Editing of events becomes tied to video playback. When selections are made using the mouse, the playback cursor will move to the selection and the video window will show the corresponding frame.

When editing audio events, including moving, trimming, and adjusting the fades, Edit Mode will make the playback cursor and video window follow the editing position for visual feedback of timing. Editing with the Nuage jog wheel does the same thing with one distinction.

When you are moving audio events in Edit Mode, the video window and cursor follow the sync point of the audio event (which is normally the start of the event itself). When you move audio events using the Nuage jog wheel, the video window follows the position of the cursor, which may or may not be located at the sync point of the audio event.

This distinction is important since the video window follows an absolute position in Edit Mode while following a relative position using the jog wheel. To illustrate this, look at Figure 20.18. Here, the audio event is selected in Edit Mode. The video frame displayed is 01:03:45:14 and shows the kidnapper’s arm coming around Erica just about to grab her.



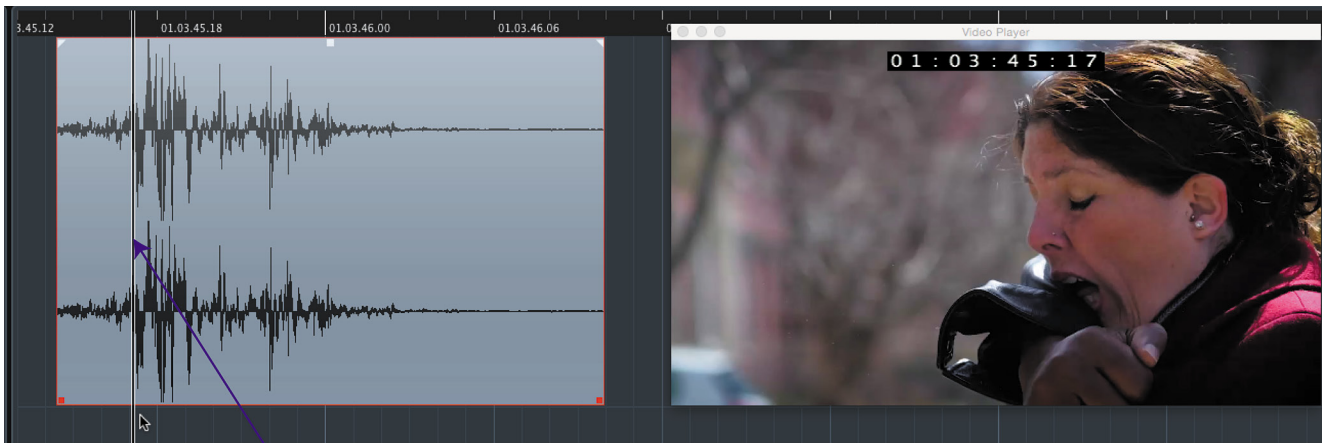
Video Sync Point

Figure 20.18 Audio event selected in Edit Mode

The object is to place the sound of his arm impacting her around the neck. However, the start of the audio event is prior to the impact that you can see in the waveform. Figure 20.19 shows the same audio event with the cursor placed at the point in the waveform where the impact transient is located.

Now the video displays frame 01:03:45:17, in which the kidnapper's arm has made contact with Erica's neck and chest. This is where the transient occurs in the sound file. Using the Nuage jog wheel, this audio event can be accurately placed directly to the correct frame for the sound to align with the impact.

This key difference is what makes editing to picture with the jog wheel more intuitive. You can place sounds exactly where they need to go without adjusting the sync point in each event to the pertinent portion of the audio waveform.



Video Sync Point now at transient using scroll wheel

Figure 20.19 Audio event selected with Nuage jog wheel placed at the transient

50/50 Dialogue Edit



(tutorial video: “50-50 Dialogue Edit”)

In order to develop an editing workflow, you must apply these techniques in a real world example. The AAF tracks that were imported into Nuendo in Chapter 12, must now be edited in preparation for mixing. This is the first step in the film post production process. The dialogue in a film is the central sound element and requires the most care and precision as it conveys the story and emotional weight to the audience. Poor dialogue audio in a film can ruin the experience.

Evaluate the Recordings

Nothing is perfect in this world, especially location dialogue recording with all the variables involved: traffic noise, airplanes, birds, insects, other people, broken equipment, low batteries.... The list is endless. Your job is to sort through what was recorded on location and select the best choices for each sound.

Often there are several microphones recording at once. There may be wireless lavalier microphones on each actor along with a boom shotgun microphone that is moved constantly to pick up each actor. Typically, the boom microphone sounds superior to the lavalier microphones but it is susceptible to more background noise and has less isolation. The lavaliers will have a duller sound due to the common placement in the collar of a shirt, may have radio interference, and are usually a lesser quality capsule than the larger shotgun microphone. But they will have superior isolation from other actors and background noise of all sorts.

In the 50/50 production, we most often used both types of microphones during filming so as to provide as many options later in post-production as possible. Each microphone is on a separate track in the AAF file. In most scenes, this ends up being two lavalier channels and one boom channel.

Begin by familiarizing yourself with a scene by just watching and listening to it several times. Then begin isolating each microphone channel to evaluate the quality of the recording for each actor. You may find the boom mic works best for both actors or one actor sounds better on the lavalier. It can change from line to line. The film is sometimes shot from different angles and the microphone setup changes so its quite possible that the preferred microphone for one actor may change depending on the angle of the shot.

Sort Dialogue by Character

Once you have found the preferred channel for an actor in a scene or from one angle, copy those audio events to a new track designated for just that actor's character. By carefully going through the entire film, you can sort the best recordings for each character onto their own track, which makes mixing much easier.

For supporting characters and bit parts, they may share one or more tracks as needed. It is not necessary to have a separate track for a character that has one line in a film. All small parts could share a track labeled "Extras" or something similar.

Isolate Production Sound Effects

The next step is to isolate the production sound effects. These are any noises recorded during filming that can be used in the final mix. As you sort through the recordings, any sound that you think can be used in the final mix can be placed on another track called "Production Sound FX" or something similar.

Now all of these sounds are isolated on their own track and can be used later in the mix or as temporary sound to be replaced in foley or sound design. The advantage to isolating these sounds extends to foreign language versions where all the dialog tracks need to be replaced. With production sound effects isolated, they can remain in the new language version, reducing the amount of work necessary to complete each language dub.

Trim Away Noise

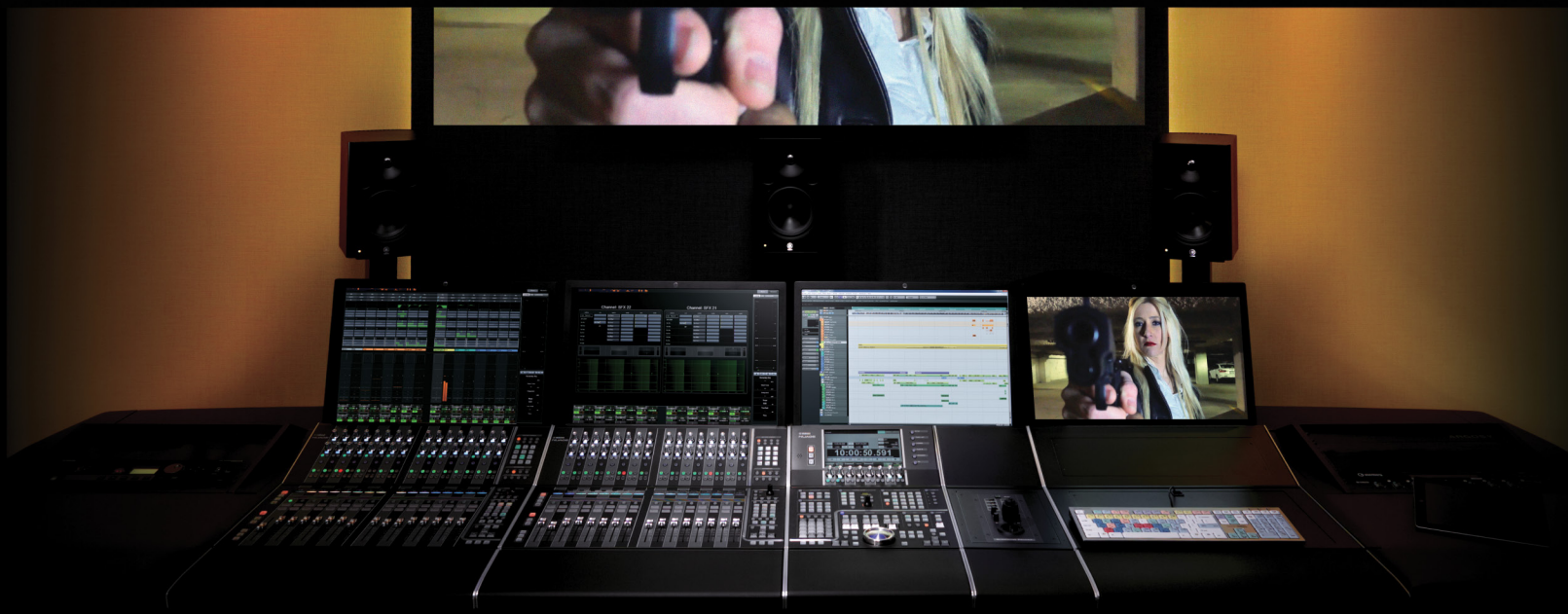
The production technique used in 50/50 involves replacing much of the ambient sound from the production audio. Removing background noise gives you more isolation of dialogue lines, better control of dynamics and freedom to be creative in sound design.

Trim away all the background noise from each dialogue line, leaving only the speech and breaths if possible. Use fades to smooth the entrance and exits of each line. Once this is done, listening to the conversation will be unnatural sounding as there is no ambience. Locate the ambience audio files within the 50/50 project folder and insert them in each scene on new audio tracks to help the dialogue sound more natural.

Once this is complete, it is time to watch the movie again and determine what other sounds should be added to finish the production and be ready for mixing; sound effects, foley, music etc.

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PART III: EDITING

by Ashley Shepherd

Chapter 21

ReConform



NUAGE

ReConform

- ❖ The EDL (Edit Decision List)
- ❖ ReConforming Process
- ❖ Analysis Stage
- ❖ Preview Stage
- ❖ ReConform Execution Stage

Once the audio-editing process has begun on a film and many tracks are added to the project, perhaps even a hundred or more tracks, audio editors prefer that everything in the video remains the same, unchanged. But this is hardly ever the case these days. Production schedules are tight, leaving very little room for changes to be made. However, changes often happen, and when they do, the sound team has to react fast.

Nuendo has a set of tools called ReConform which is designed to adapt to changes made to the video and apply them to the entire project, even hundreds of tracks. This process involves examining the original video next to the new video and determining what has been removed and what has been added. Then Nuendo will apply those changes to all the tracks in a project so that all of the sound remains in sync with the updated version of the video.

For a feature length film with many changes, this process used to be cumbersome and time consuming. Now ReConform automates this process, freeing up that time for more creative work.

The EDL (Edit Decision List)

When a video is edited together in a video workstation such as Final Cut Pro or Adobe Premiere, a series of video segments are placed together to make a final edited piece. This is oversimplified for the sake of this example. Each step in this chain of video segments can be considered an “edit decision.” After making all of the edit decisions necessary for the complete video, an edit decision list is compiled that describes each step in the process. Figure 21.1 is an example of a short edit decision list or EDL for a video.

This EDL shows three events where a portion of video from the source timecode is played back at the destination timecode position. The source could be a video tape, video file, or piece of film that was transferred to video for editing. Either way, reel names and timecode are the language of the EDL.

EDL Step #	Edit Type	Source In TC	Source Out TC	Reel Name	Destination In TC	Destination Out TC
001	V C	01:01:32:02	01:02:03:10	TAPE_01	01:01:32:02	01:02:03:10
002	V C	01:02:17:05	01:02:30:23	TAPE_01	01:02:03:10	01:02:17:03
003	V C	01:02:31:13	01:02:59:24	TAPE_01	01:02:17:03	01:02:45:15

Figure 21.1
A short CMX
3600 EDL

A single event in an EDL works like this:

1. The number on the left signifies which event of the edit we are looking at. There could be thousands of edit events. This example has three.
2. The “reel” name identifies the source material.
3. The first two timecode numbers describe start and end times (the in and out) of the material to be used: the source.
4. The third and fourth timecode numbers describe the position in the final edit where this material will be placed: the destination in and out.
5. The letters in the middle describe the type of edit that is being performed, in this case V for video and C for cut, a simple video cut.

Other edit types would include AA for stereo audio edit, V D for video dissolve, A 34 for audio tracks 3 and 4, and so on. For re-conforming, we are only interested in the V edits as they affect the video.

This type of EDL is a CMX 3600 format that is very old and based upon a tape editing system. But because of its age, it is fairly simple and widely used as a standard in post-production. ReConform will also accept EDLs in the File16 and File32 formats, which are essentially CMX EDLs with some character restrictions removed.

ReConforming Process

Nuendo’s ReConform compares two CMX 3600 EDLs; the original and the new version, to come up with a list of edits that need to be applied to the project to match the changes in the video. One of two things can happen in a single change edit event:

- ❖ Some portion of the timeline is removed
- ❖ A portion of empty space is added to the timeline, leaving a gap in the audio

When a gap is created by the addition of new material, it will be necessary to import the production audio for that change and place it in the gap.

Here is what you will need in order for ReConform to work properly:

- ❖ Original Video File
- ❖ Updated Video File
- ❖ Original EDL of video edits only (CMX 3600 format)
- ❖ Updated EDL of video edits only (CMX 3600 format)
- ❖ Nuendo Project with the original video and audio
- ❖ AAF File containing all newly added production audio material

The ReConform process happens in three stages:

1. Analysis – Comparing the two EDLs to generate a list of changes
2. Preview – Examining the change edits and adjusting details as needed
3. Execution – Performing the edits to the Nuendo Project

STEINBERG NUENDO 7 RECONFORM DEMO PROJECT

For this example, use the ReConform Demo Project from Steinberg. Copy this project onto your system in order to follow the steps in the upcoming example.

To begin with, all the materials must be imported into Nuendo and the EDLs will be analyzed to create a list of changes to be made. For demonstration purposes, open the ReConform Demo project and start from there.

Figure 21.2 shows the ReConform Demo project with folders containing various sounds that have been added to the production: Foley, sound effects, music, etc. The video starts at a somewhat random timecode number; 01:01:32:02. This could be just one scene out of a

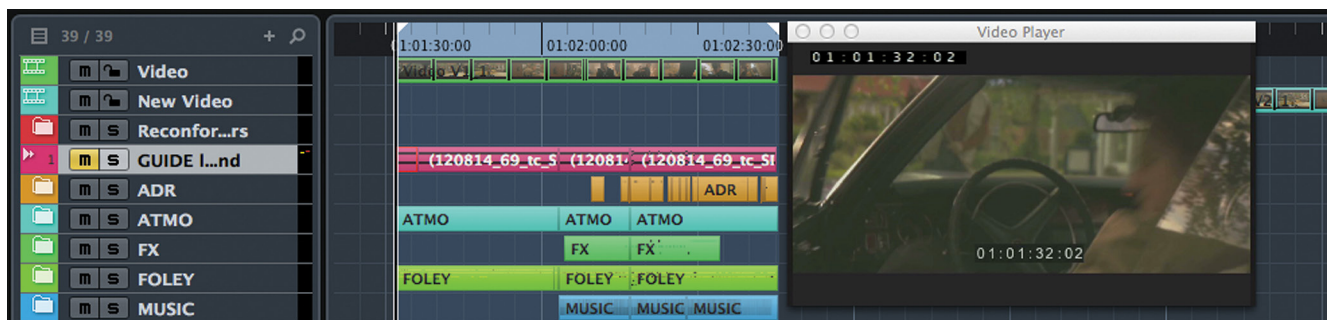


Figure 21.2 The ReConform Demo project

feature length film that is being worked on. It will be added to the entire film later. For now, we are dealing with just this one scene.

Notice there are two video tracks, one for the original video and another for the new version. When the ReConform process is finished, the new version of the video will be on the second video track.

Next open the ReConform dialog from the Project menu. Figure 21.3 shows the ReConform dialog as it appears in the Demo project. This is how the ReConform dialog appears after the analysis and preview stages.

The upper left window shows the events in the original or “Old” EDL. The upper right window shows the events in the updated or “New” EDL. The bottom window shows the “Change” EDL or list of edits that have been calculated from the analysis of the top two EDLs.

In order to start from the beginning, press the trash icons in each window to delete the EDLs and start with an empty ReConform dialog, as shown in Figure 21.4.

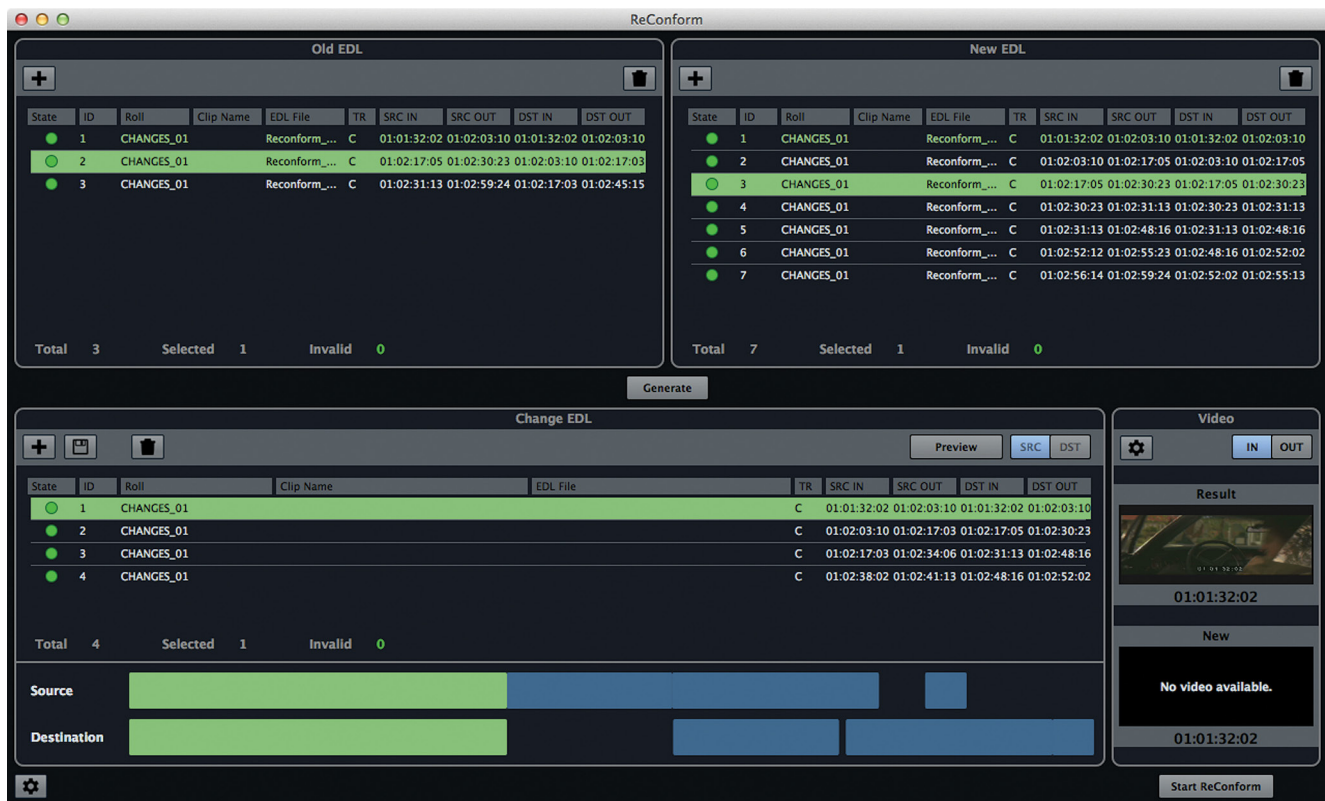


Figure 21.3 The ReConform dialog

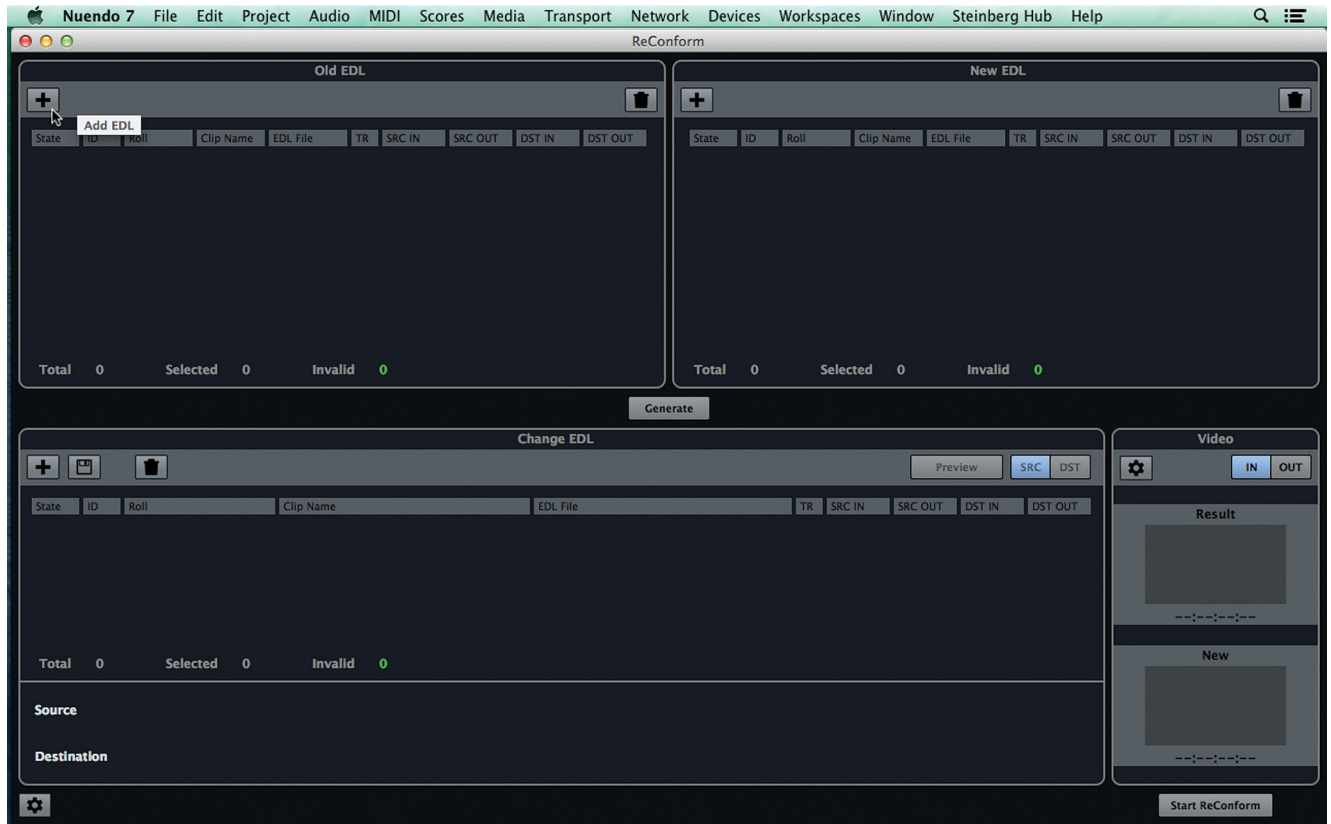


Figure 21.4 A blank ReConform dialog ready to begin

STEINBERG RECONFORM DEMO 25 FPS

Note that the ReConform Demo Project is running at 25 fps PAL format. If you're working in an NTSC region, make sure your project TC is set to 25 fps!

Analysis Stage

You must import the two EDLs in order to perform an analysis of the changes.

1. Click the "+" button in the Old EDL window to load the original EDL file, as shown in Figure 21.5. For the demo project, this is "ReConform_Demo_V1.edl."

MULTIPLE EDLS

Note that it is possible to load more than one EDL into either the Old or New windows. The combination of edits will be treated as one EDL. Watch for overlaps between multiple EDLs.

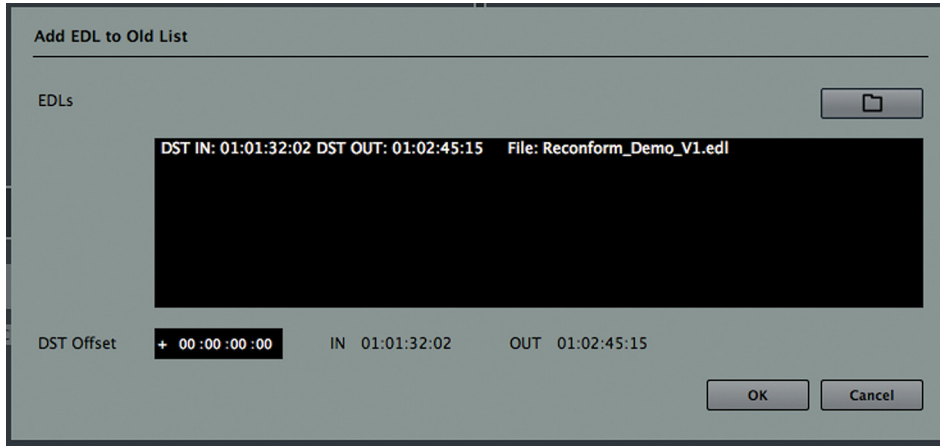


Figure 21.5
Load EDL
window

2. Do the same thing in the New EDL window and load the modified EDL file, "ReConform_Demo_V2.edl."
3. Press the Generate button to analyze and create the Change EDL in the lower window as shown in Figure 21.6.

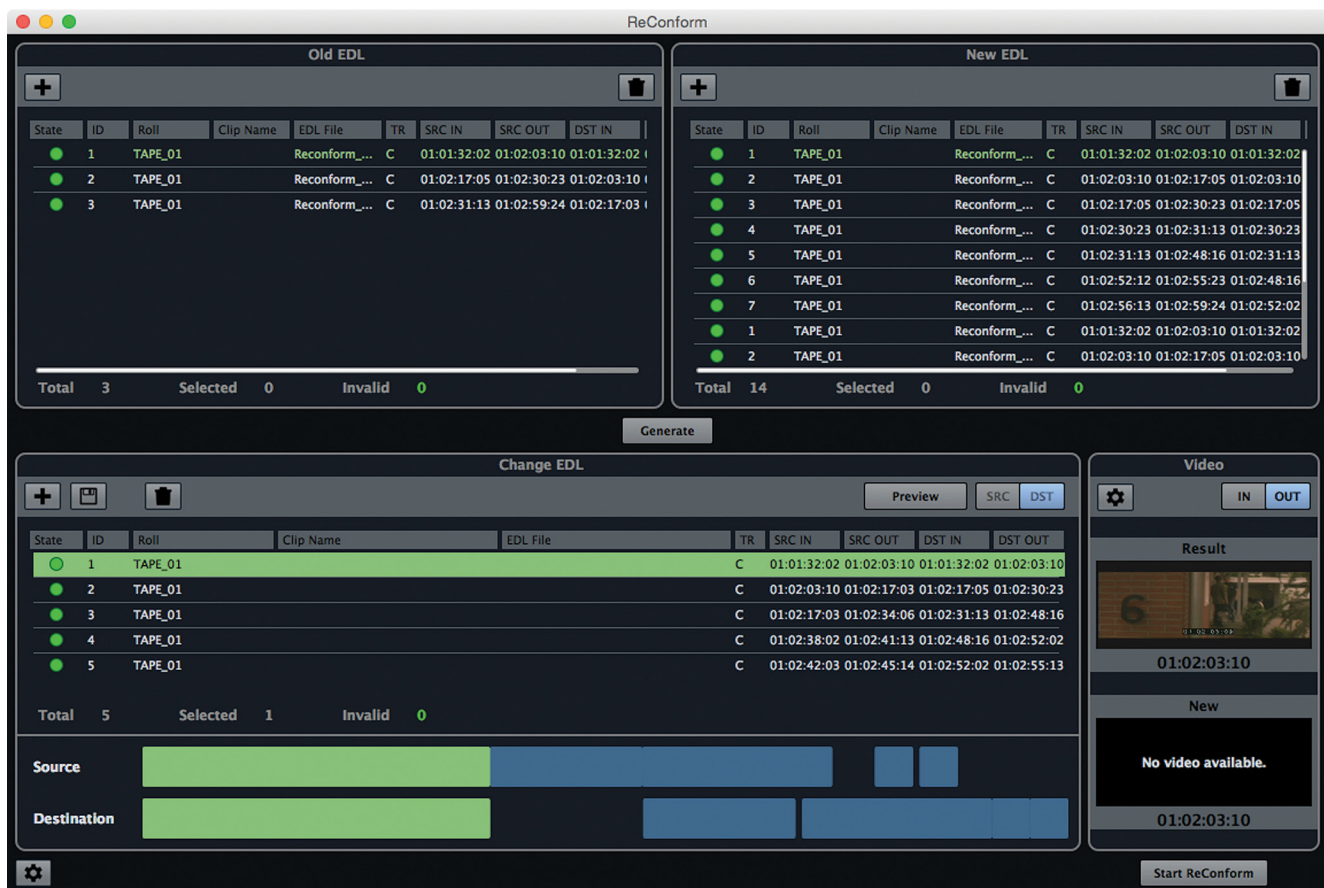


Figure 21.6 Change EDL generated from analysis

Preview Stage

Notice the Source and Destination overviews at the bottom of the dialog. By clicking on an event in the Change EDL, you can see the lighter-colored chunks in the overview that represent that event in the EDL. Figure 21.7 shows event 2 of the Change EDL displayed in the overview. Also, the corresponding events in the Old and New EDLs are highlighted the same color to show the relationship. This helps visualize how the ReConform process will work.

Previewing each event of the Change EDL will avoid problems in the actual ReConform process. Each event can be verified by previewing both the audio and video in each event.

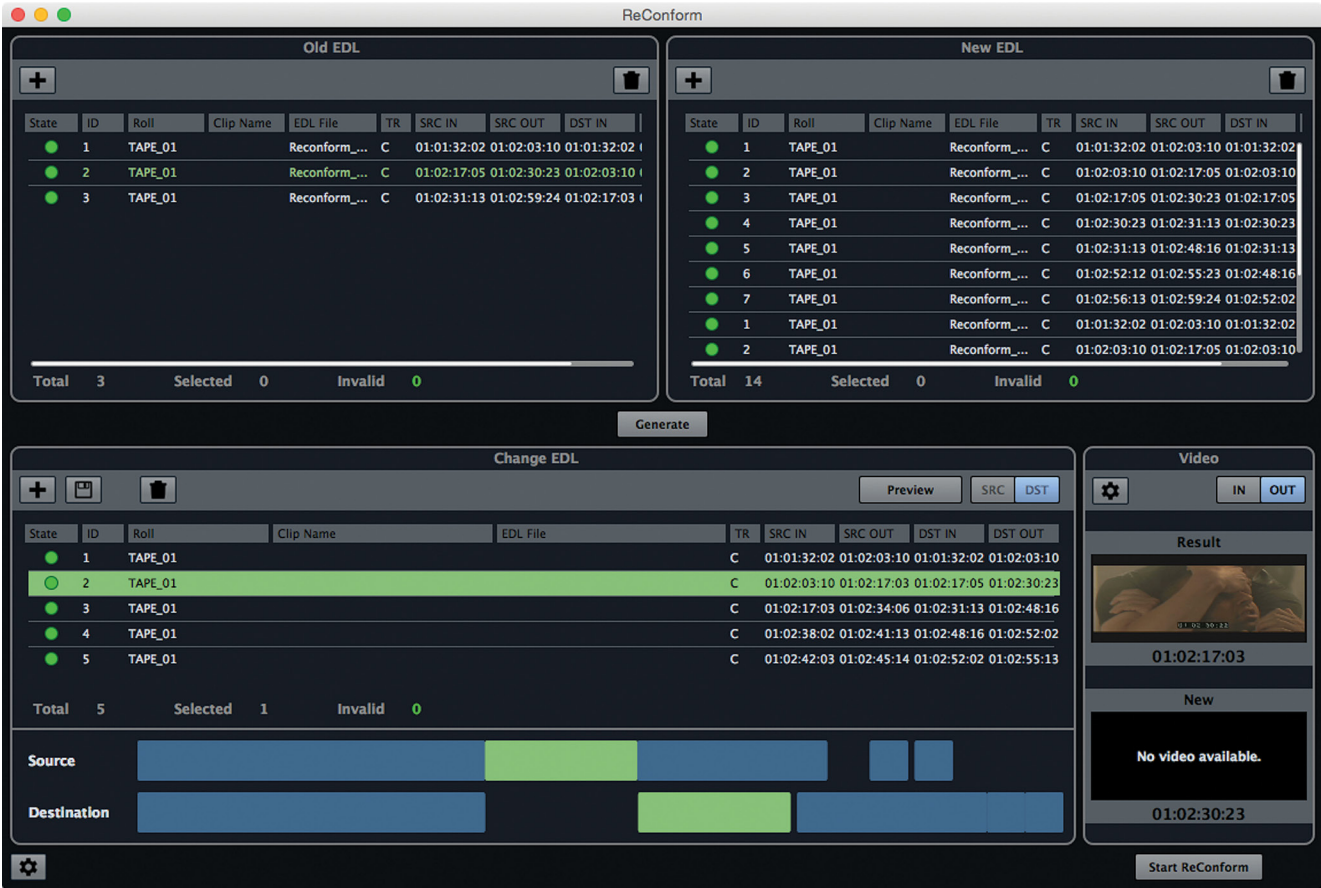


Figure 21.7 Event two of the Change EDL

Video Preview

The ReConform dialog has a video preview function that allows you to see both the old and new videos at the edit points to ensure that they line up correctly. In order for this to work, the New video must be loaded into the video preview window in the lower right corner.

Video Track Assignment

Figure 21.8 shows the Video Preview Settings where you can select the video track for the new video. This is where the video file will be placed when you complete the ReConform process.

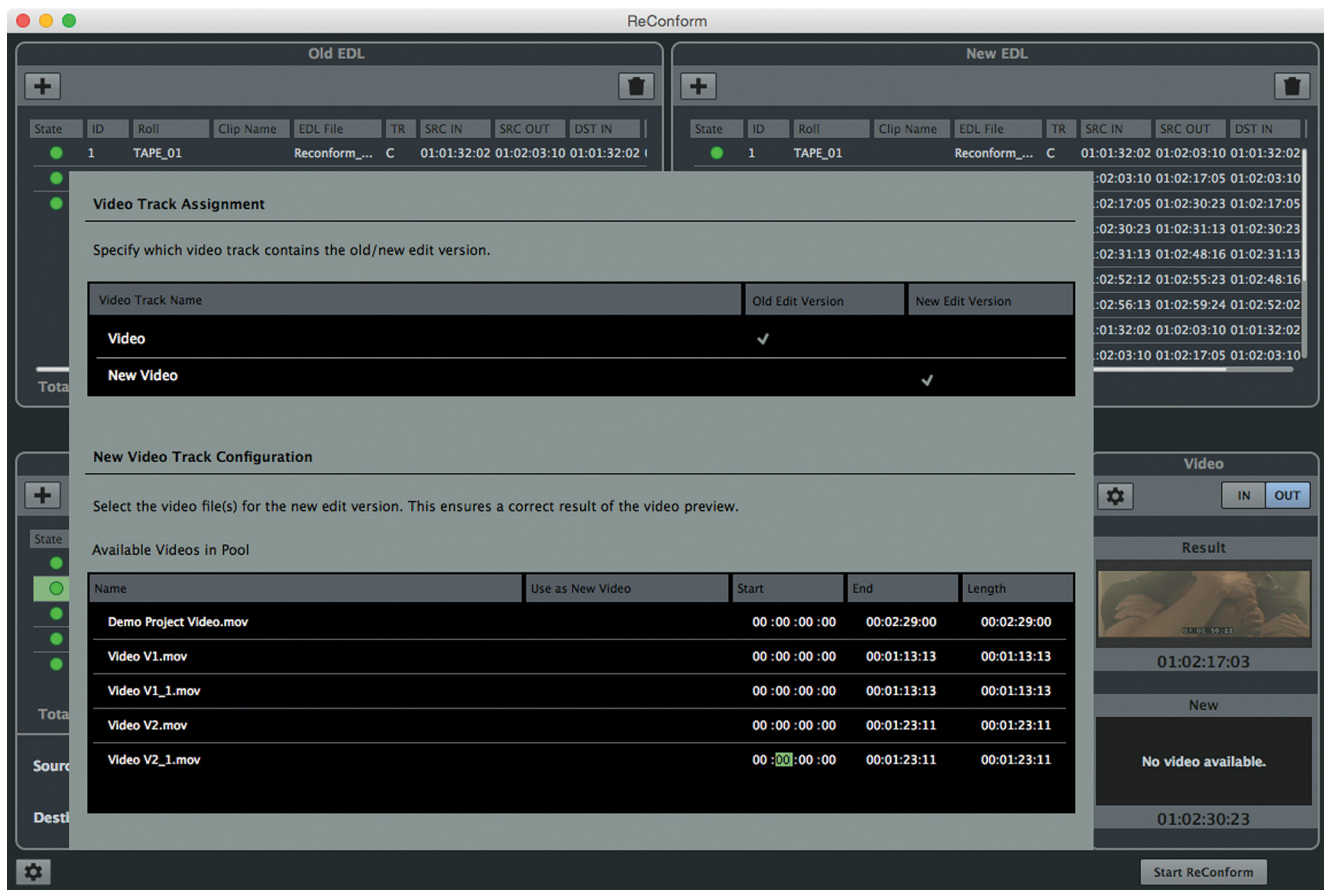


Figure 21.8 Video Preview settings

Video Configuration

The video configuration is where you choose which video file from the Pool is the New video. There may be multiple files available and whichever one is checked will be used as the New video.

As with many video files, there may not be a timestamp that is relevant to the EDL start time. You may need to manually enter a video start time for the selected file as shown in Figure 21.9. The new video should start at the same timecode value as the start of the New EDL.

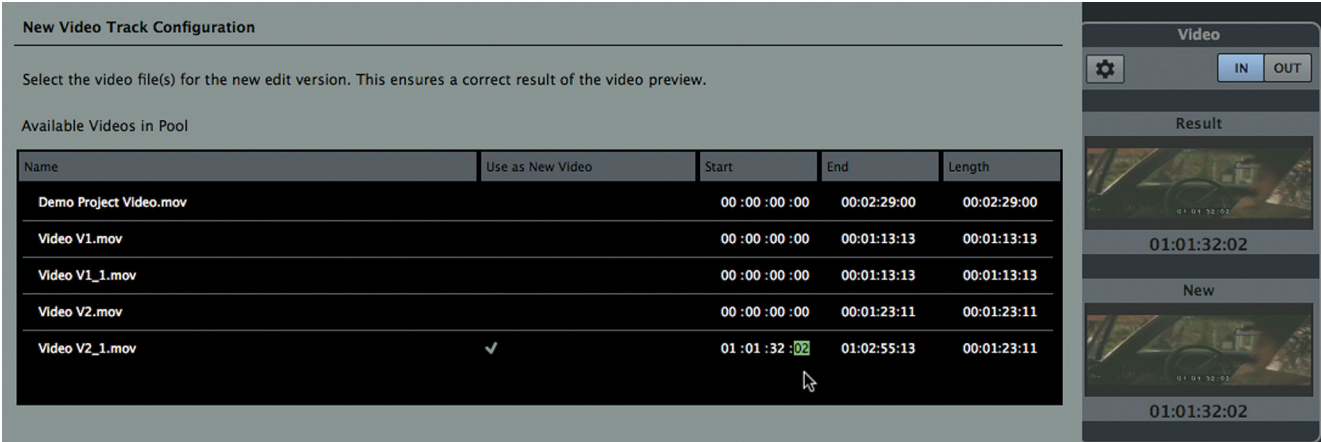


Figure 21.9 Manually entering the start time to match the New EDL

As you enter this value (01:01:32:02), notice that the New video preview window will now show an image from the New video (Video V2). As you click on each event of the Change EDL, you will see video frames from the Old and New video files in the preview windows. Each event also has an in and out point that can be viewed independently.

For each event in the Change EDL, the video frames in the preview windows should match, indicating that the edit points in both the old and new videos line up. If they do not, there is an error in the Change EDL. Right clicking on an event will open up the context menu for that event where you can manually change the timecode values, as shown in Figure 21.10.

The context menu has options to delete the event or extend it to encompass adjacent events as may be the case with visual effects changes that do not require separate audio edits.

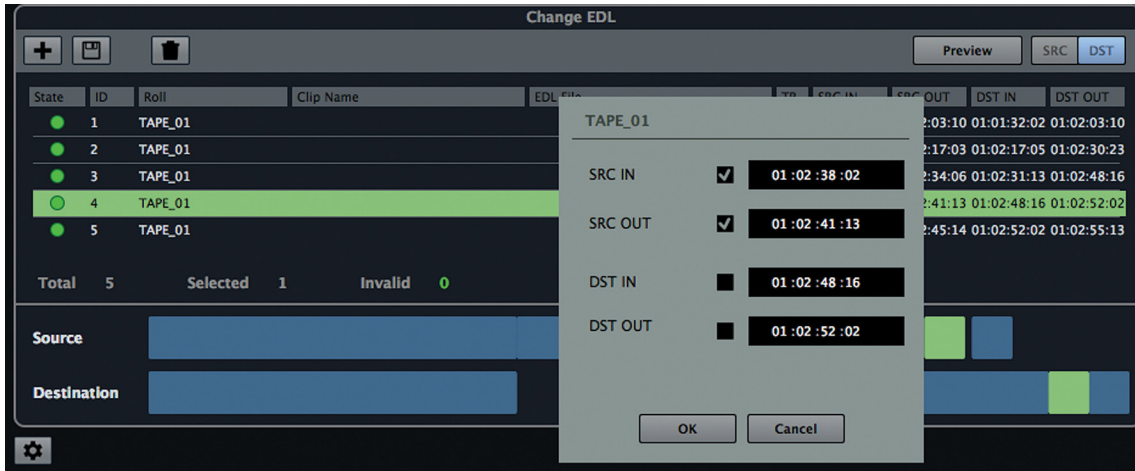


Figure 21.10 Edit timecode of Change EDL event

Audio Preview

In order to preview the audio results of ReConform, the Preview button must be enabled, as seen in Figure 21.11. Nuendo will preview each event in the Change EDL by temporarily executing each event down the timeline by a whole day. This temporary render of the EDL event can be played back to check for any errors or issues. You can select whether to preview the source or destination. Figure 21.11 shows the preview in destination mode.

Previewing the Destination is perhaps the most useful preview as it shows the actual result of the conforming event, as seen in Figure 21.12.

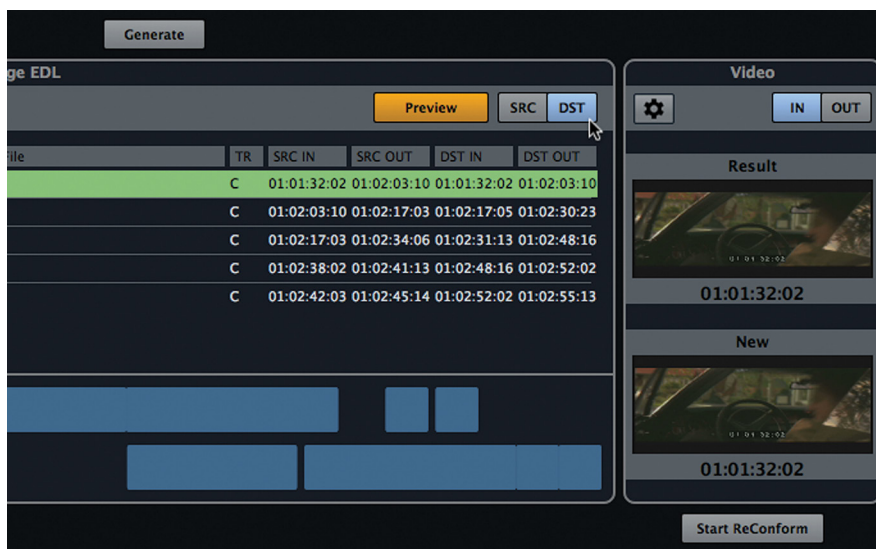


Figure 21.11 ReConform in Preview Destination mode

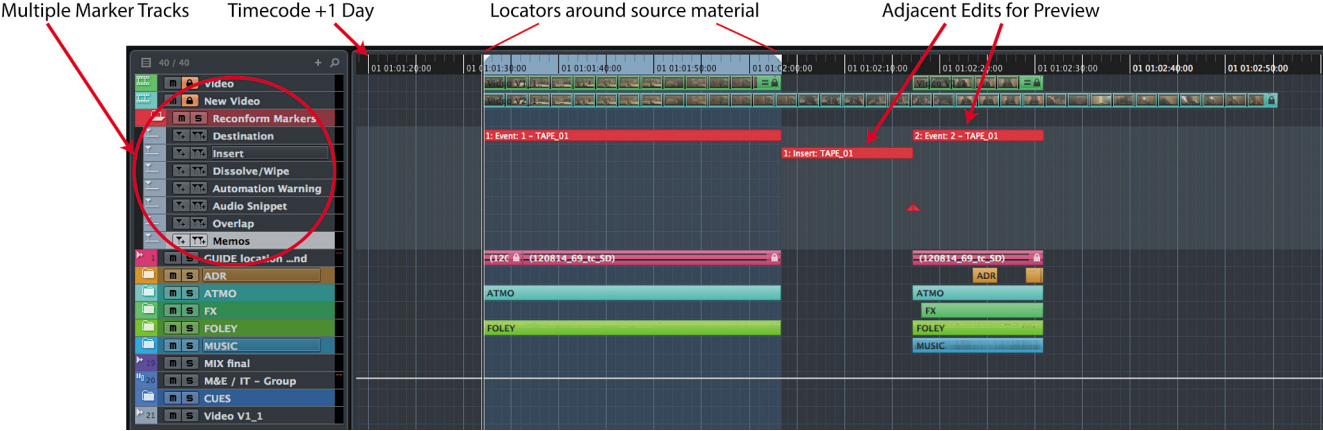


Figure 21.12 Project window Previewing Event 1 of Change EDL

There are several things to notice in this figure:

- ❖ Timecode values have the added day field (01) to indicate their position on the timeline.
- ❖ Left and Right locators are placed around the source material.
- ❖ Multiple Marker tracks have been created to indicate aspects of the edit event.
- ❖ Adjacent edits are also displayed so that you may preview transitions between edit points.

Notice to the right of the first event is blank space where a cycle marker on the Insert track has been placed. This event is where new material has been inserted into the video, hence the blank space in the audio.

Newly inserted material will have to be imported from the video workstation in the form of an AAF or OMF file in most cases. ReConform only shuffles all existing audio into its new locations so that they line up with the old parts of the video. New video inserts require new audio material.

ReConform Marker Tracks

ReConform will create several Marker tracks containing various pieces of information that relate to each edit event in the Change EDL. These markers make it easy to locate any potential issues that result from ReConform process.

Destination Markers

These cycle markers indicate the destination in and out points for each change event.

Insert Markers

These cycle markers indicate newly inserted video material and will have no audio within them. This will show you where new audio needs to be added to the project. This information can be communicated to the video editor to assist them in providing any production audio that goes with the inserted video.

Dissolve/Wipe Markers

In the case where a change event involves a video dissolve or wipe transition, the length and position will be indicated by cycle markers. You may need to crossfade audio events at these points to make a smooth transition.

Automation Warning Markers

These markers indicate places where the resulting automation curves may be problematic. There may be spikes or jumps in the automation curve that need attention. The marker track makes it quick to identify these problem areas that might not be apparent visually. The name of the marker will indicate the affected track.

Audio Snippet Markers

Audio Snippets are small pieces of audio that are moved as part of the ReConform process. Perhaps a small bit of a fade out was overhanging the edit point and was pasted at the new location. These little audio bits might need to be removed if they have no relevance in the new location. Audio snippet markers make it easy to locate these small audio events so they may be removed or adjusted as necessary.

You may adjust the length threshold for audio snippets in the ReConform Processing Options shown in Figure 21.13.

Overlap Markers

In cases where audio from one event now overlaps audio from another event, an overlap marker is created so these places can be found quickly.

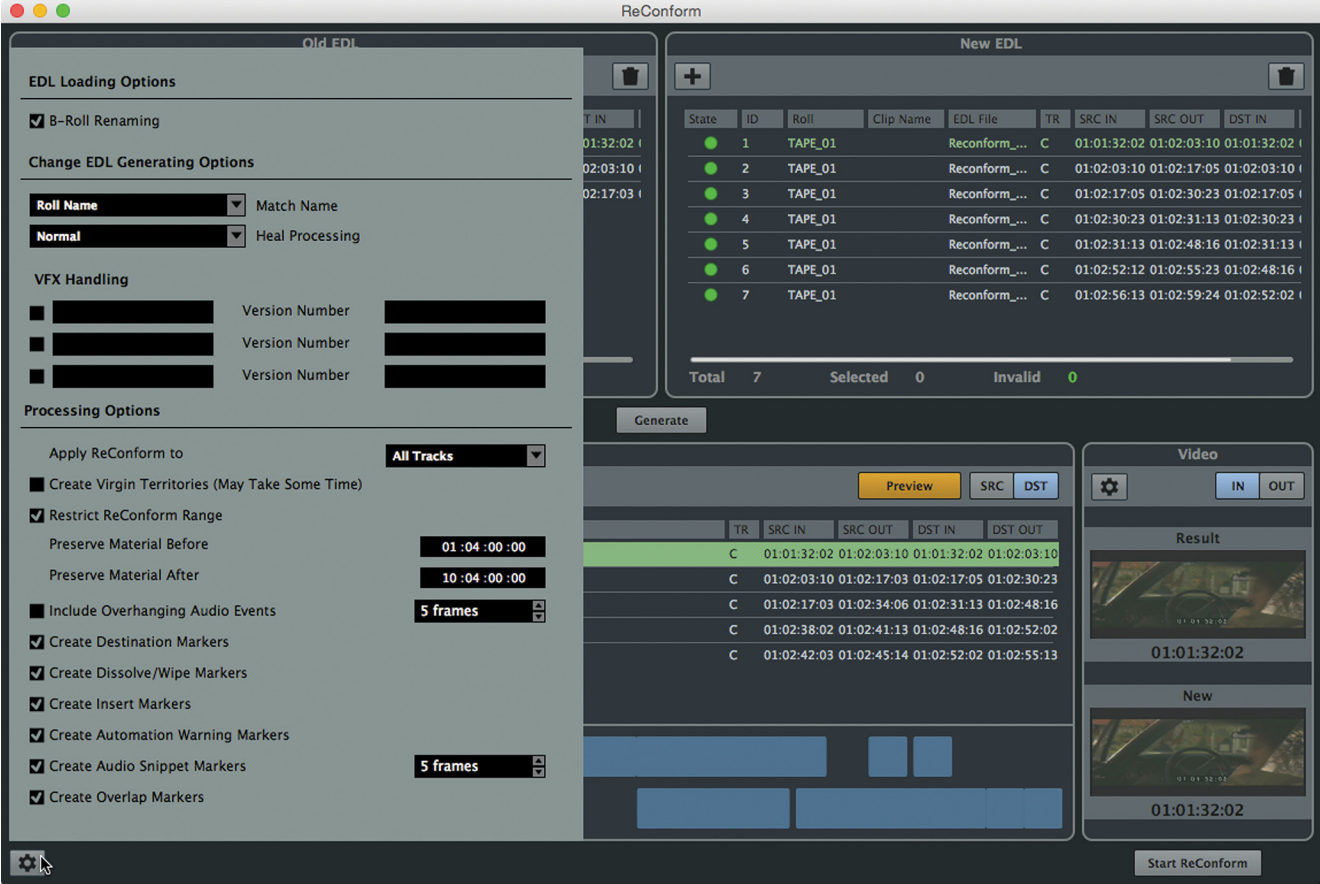


Figure 21.13 ReConform Settings

ReConform Settings

In the bottom left corner of the ReConform dialog, you can access the ReConform Settings, as seen in Figure 21.13. Here you will find options for EDL loading, Change list generation options, and final processing options. The EDL load and Change EDL options deal with naming schemes within the EDL file itself.

For example, the VFX handling options are designed to deal with visual effects in the video. Visual effects usually go through many versions during the production of a film and can trigger change events in ReConform. Since visual effects often do not involve any changes to the audio, you can ignore these changes by indicating their naming scheme here. When a visual effect is identified, ReConform can ignore that event, preventing unnecessary audio edits.

You can also choose which marker tracks will be created from the ReConform process.

ReConform Execution Stage

Once the Change EDL has been created and verified during the preview stage, the ReConform is ready to be executed. This is as simple as pressing the Start ReConform button and allowing Nuendo to process each change event. Depending on the length of the Change EDL, this can be quite fast.

SAVE A NEW VERSION!

Once completed, make sure to save a unique version of the project in case you need to return to the original version.

You can also save the actual Change EDL itself for future use by clicking the disk icon in the ReConform Change EDL window.

Preserving Original Audio

Since ReConform replaces everything in the timeline, the original audio edits are overwritten. Any events that were in a range that was removed by the Change EDL will not be there after the ReConform is executed. This may not always be desirable.

One case is when you wish to preserve the original version of the audio in its entirety after the ReConform. For example, let's say that an entire gun shootout scene is being removed in the ReConform. However, you know that another scene is being inserted that also has a gun-fire sequence. Since all the shooting sound effects have already been assembled in the current version, it would save time to be able to paste those composite sounds into the new scene. With the original edit intact, you can copy from the first gun scene.

In order to do this, two things must happen:

- ❖ The new version ReConform must be placed at a different location than the original.
- ❖ The original audio must be preserved in its current location.

Placing ReConform at a New Location

When you import a New EDL to conform to, you have the option of offsetting its destination. In the Add EDL to New List window, shown in Figure 21.14, you can edit the DST Offset time-code value to place the destination events at a different time in the project window.

For example, if you enter a value of 00:10:00:00 into the DST Offset, the IN and OUT values increase by 10 minutes. This will place the ReConform 10 minutes later in the project timeline.

Notice that the generated Change EDL overview in Figure 21.15 shows the Source at the left and the Destination now far to the right, indicating the 10 minute difference in their position.

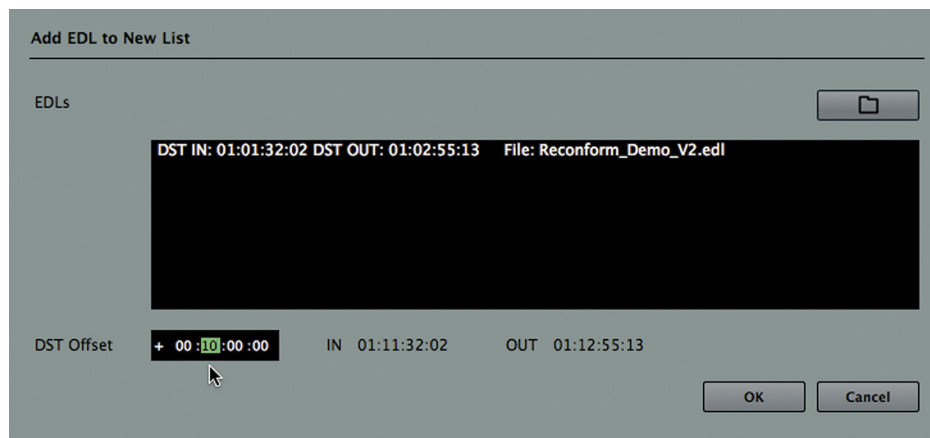


Figure 21.14
DST Offset of
+10 minutes

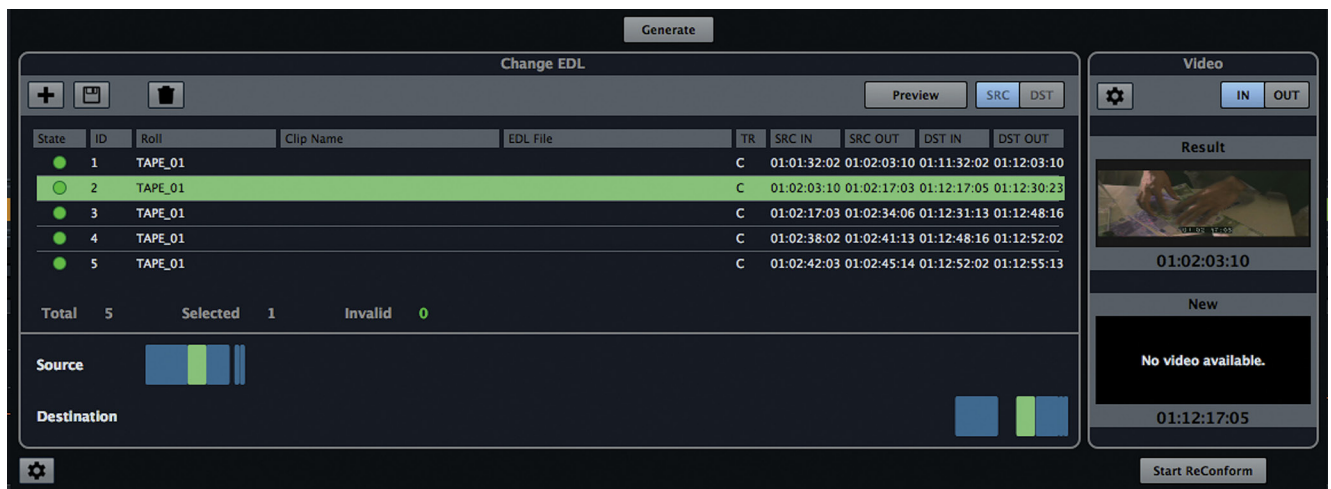


Figure 21.15 Source and Destination Overviews show distance of 10 minutes

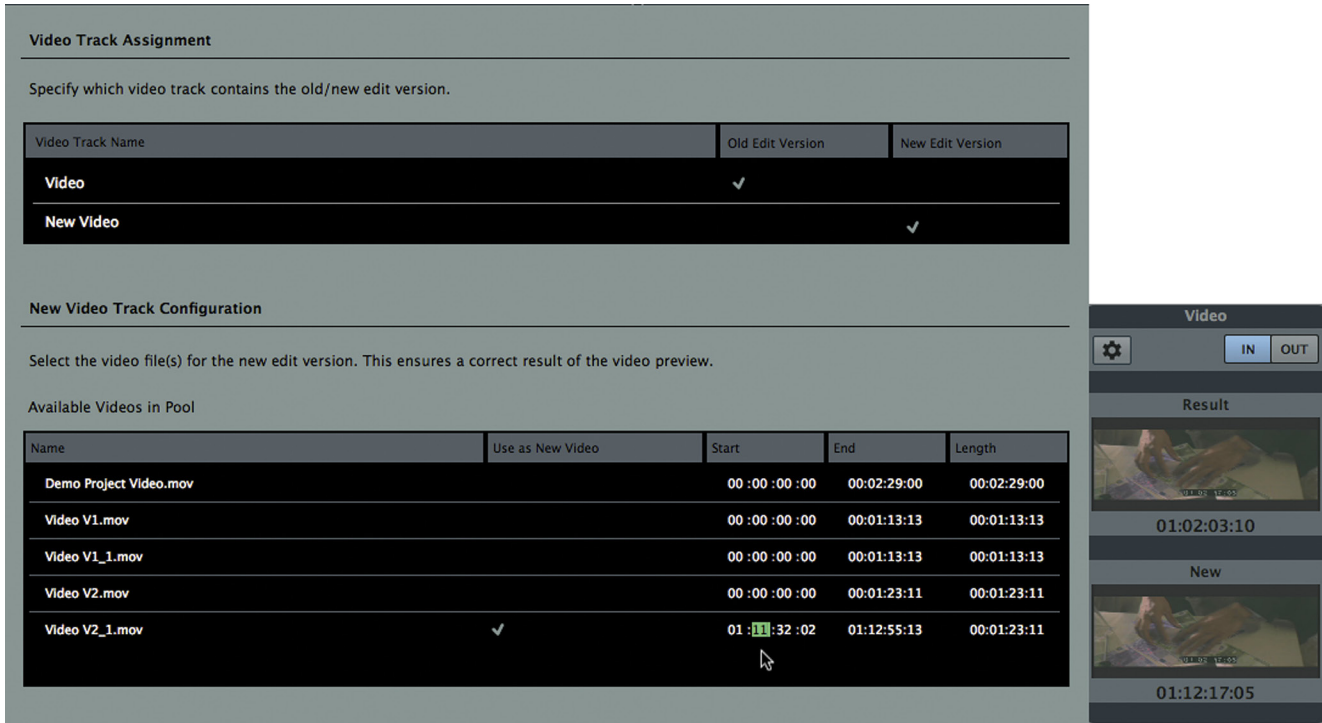


Figure 21.16 Changing New Video start time to offset value

There is only one issue: the New video preview window is blank, no preview available. This is because the Video Track Configuration has not been changed to reflect this new position on the timeline. Figure 21.16 shows the Start being changed to 01:11:32:02 to fix this. Notice how the New video preview is back.

Now the ReConform process will place the new edits at a safe distance from the original. But that will not protect the original audio from being overwritten by ReConform.

FEATURE FILM RECONFORMING

Note that for long-form projects, the destination offset can be made several hours later in the timeline (+03:00:00:00), enough to make room for the original version. This example is much shorter for demonstration purposes.

Preserving Original Audio

In order to keep the original audio edit intact, you must change the processing options to preserve that area of the timeline. Figure 21.17 shows the option being set to preserve material before 01:04:00:00, plenty of space after the end of the original audio material.

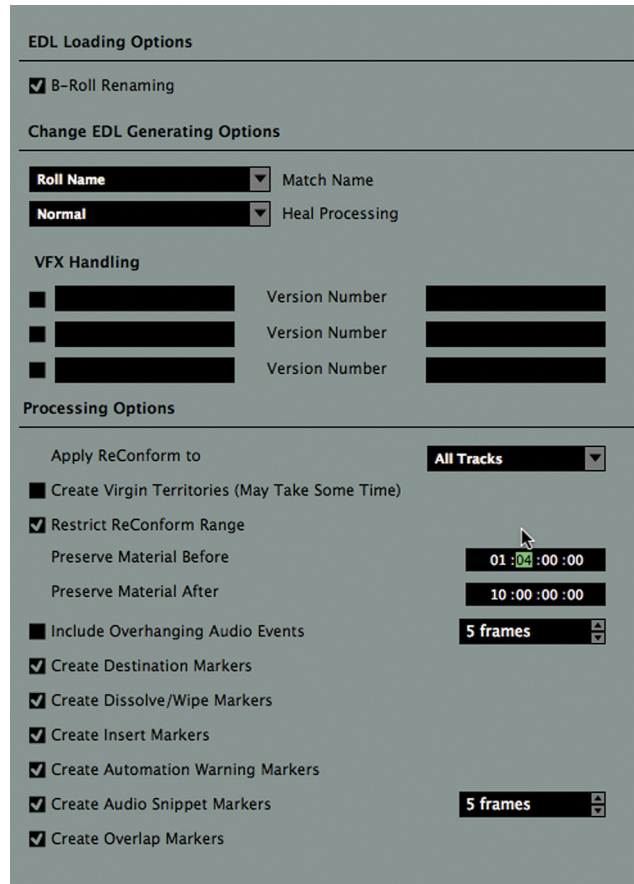


Figure 21.17
Processing Options set to preserve original material

Now when the ReConform process is executed, the original audio will stay where it is and the new edit will start at 01:11:32:02, as seen in Figure 21.18. Now, if there is any audio material from the original that you can use again in the new version, it is available right in the same project.

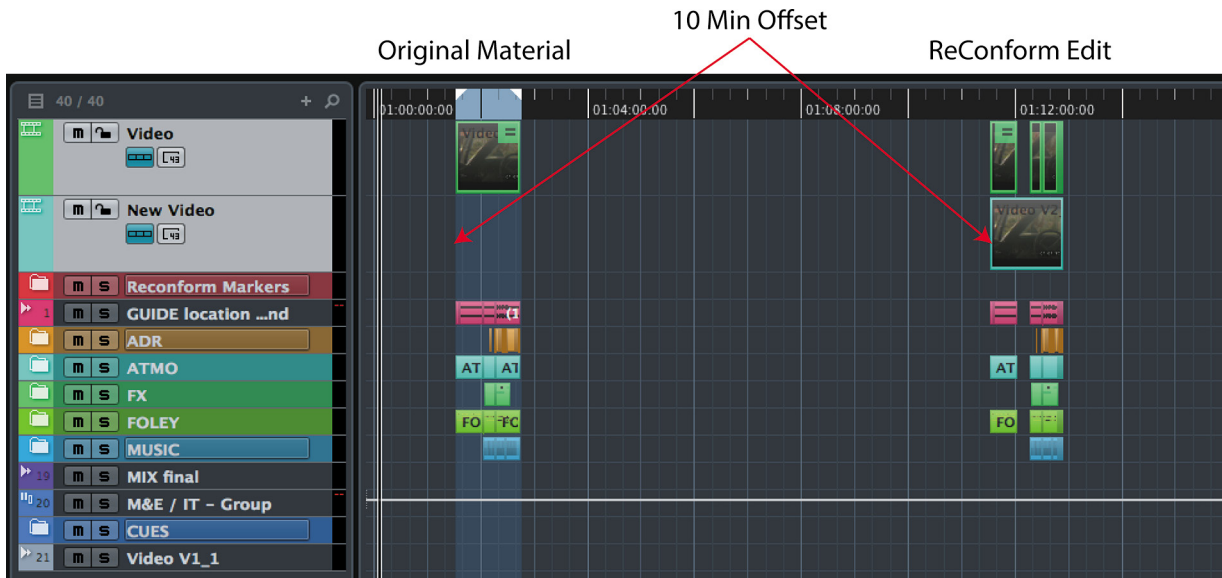


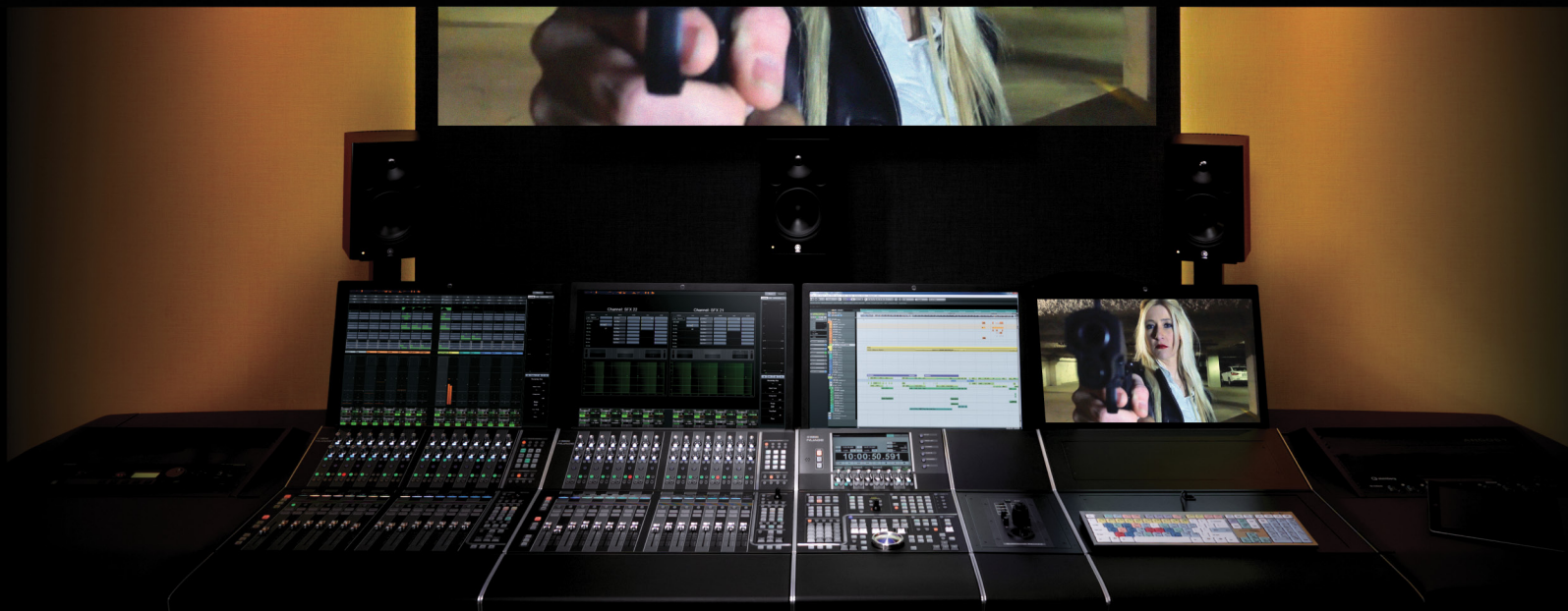
Figure 21.18 ReConform with original material preserved

The ReConform tool is a big time saver in post production. Performing the analysis and preview stage manually takes an enormous amount of time and is prone to errors. The ReConform tool reduces that burden and allows you to concentrate on the creative process instead.

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PART IV: MIXING



by Ashley Shepherd

In this part we come to the last stage in audio production: mixing. After all the elements of a film, song, commercial, or other audio production have been recorded, edited, and processed, it's time to combine them into a finished mix. This can be as simple as a voiceover by itself or as complex as a feature film mix with multiple stems and delivery formats comprising 50 channels or more. Nuendo's MixConsole and export features are designed specifically to make complex mixing tasks easier and faster with a focus on creativity.

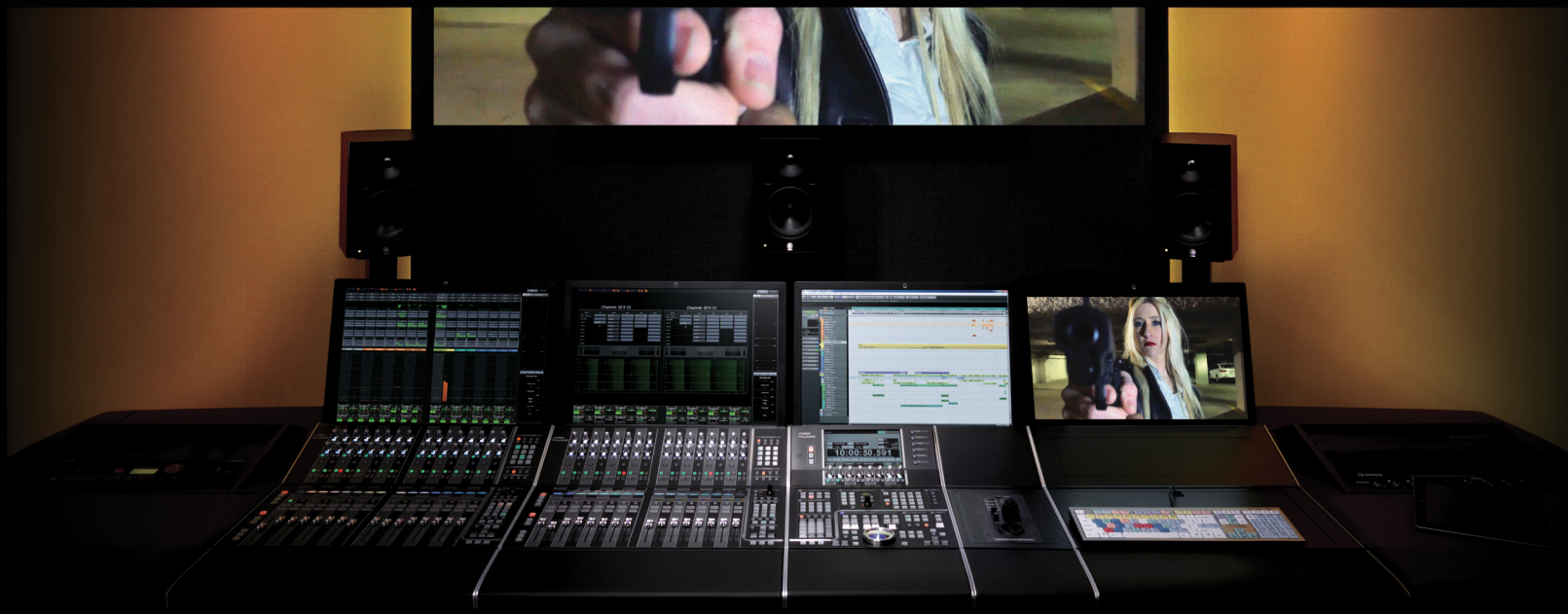
In Part IV: Mixing, we will take a look at how Nuendo can be configured to mix in multiple formats, from mono and stereo to 5.1 on up to 10.2 Auro and other immersive formats, though we will focus on stereo and 5.1 formats. The mixing engine in Nuendo has extended flexibility for working entirely in the box or interfacing with traditional analog consoles and analog outboard gear. Various scenarios will be explored to demonstrate these configurations and how they can be achieved.

The Control Room Mixer provides professional features to aid in calibrated mixing environments, metering and room equalization and optimization, multiple speaker systems, and external inputs for working with other devices. We will look at ways to configure the Control Room to aid the mixing process.

The Export Audio Mixdown window has advanced features for delivery of audio files to multiple output configurations. For those working in game audio and other areas that require the creation of thousands of individual files, batch exporting relieves the tedium of this task. Creating final delivery format audio files is a mundane but critical task that will be outlined for several workflow scenarios.

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PART IV: MIXING

by Ashley Shepherd

Chapter 22

Mixing Basics



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Mixing Basics

- ❖ Stereo Mixing Control Room
- ❖ Basic Mix Routing
- ❖ EQ
- ❖ Channel Strip
- ❖ Inserts
- ❖ Send FX
- ❖ Subgrouping (Group Channel)
- ❖ VCA Grouping
- ❖ Mix Bus Processing
- ❖ Multiple Outputs to Console
- ❖ Managing Settings

Mixing is the process of combining all of your edited material into a final presentation for the audience. This can take many forms, from a simple mono voiceover recording to be heard on the Internet to a stereo music mix that could be heard on anything from an iPod to a high-powered club system with subwoofers. In the video and film world, the options for delivery expand to include multiple surround formats for theatrical release, DVD and broadcast, stems mixes for archival and foreign language versions, down-mixes for stereo and Internet streaming, and the list goes on.

With all these varied delivery formats, the mixing engine needs to be flexible enough to provide many different things all at the same time. Part of that process involves the ability to listen to your mix on several monitoring systems and compare with external sources for reference material in a calibrated and controlled environment.

Stereo Mixing Control Room

Nuendo's Control Room features accommodate all types of mixing environments, from stereo through multi-channel theatrical surround systems with 12 or more speaker channels. In this section, the use of Control Room in a stereo configuration will be explored.

In a typical stereo mixing configuration, a studio might have three sets of monitor speakers, two external stereo playback sources, and a dedicated headphone amplifier for the engineer. Some functionality for metering, mono compatibility, and even corrective room EQ should be available, as well as basic features such as speaker volume with "dim" control, external source switching, and a speaker selector.

Nuendo's Control Room has all the features of the "center section," including some intelligent features not available on a traditional analog console, as shown in Figure 22.1.

In this studio configuration, we have two control room channels:

- ❖ **Main:** This "Control Room" channel functions as the speaker volume control and source selector from a traditional console. Use the knob to adjust the speaker volume and the buttons above to select the audio source.
- ❖ **Phones:** This secondary channel is set up to feed a pair of headphones used by the engineer. It has the same volume and source controls as the Main channel. This should not be confused with the Cues that can be configured to feed headphone mixes to people recording in the studio.



Figure 22.1
Control Room
Mixer config-
ured for stereo

Each channel can listen either to a mix source, external input, or cue mix. In addition, the Listen bus is routed to Control Room channel by default. When you listen-enable a channel, its signal will be routed directly to the Control Room without disturbing the main mix. This is very helpful during live broadcasts for isolating channels without interrupting the broadcast feed. Also, any material played from the Sample Editor is heard directly in the Control Room.

The Listen bus and Sample Editor signals are considered Preview sources, not mix sources. In Preferences, you may select “Use Phones Channel as Preview Channel” (Figure 22.3) to hear preview sources in the Phones channel without interrupting the Control Room speakers. This may be helpful if you have clients in the control room listening to the mix but still need to hear signals in isolation with the headphones.

The red and green knobs adjust the output volume of these channels to the audio interface. So, the Control Room channel knob becomes your “volume knob” for your speakers. Adjusting this fader in no way affects the level of your mix, just the output level going to your speakers. There’s even a special calibrated volume button (Figure 22.2) to set your speaker volume at a fixed level you set in preferences.



Figure 22.2
Reference level
setting

NUAGE CONTROL ROOM

Nuage users have direct hardware access to all of the Control Room parameters directly on the Master and Fader units.

When you press this button, the control room fader jumps to a preset level (-20dB by default) used as a reference. This is more important in a film mixing environment but music mixing can also benefit from a reference volume level. To set this reference level, go to Preferences>VST>Control Room and enter the desired level, as shown in Figure 22.3.

Just below the reference level preference is the Dim volume setting. The Dim button reduces the control room level by this preset amount, allowing you to quickly reduce the speaker volume with the touch of a button for conversations, phone calls, whatever is interrupting the session, without stopping playback or fooling with the fader. This can be enabled using a key command or from a control surface button.

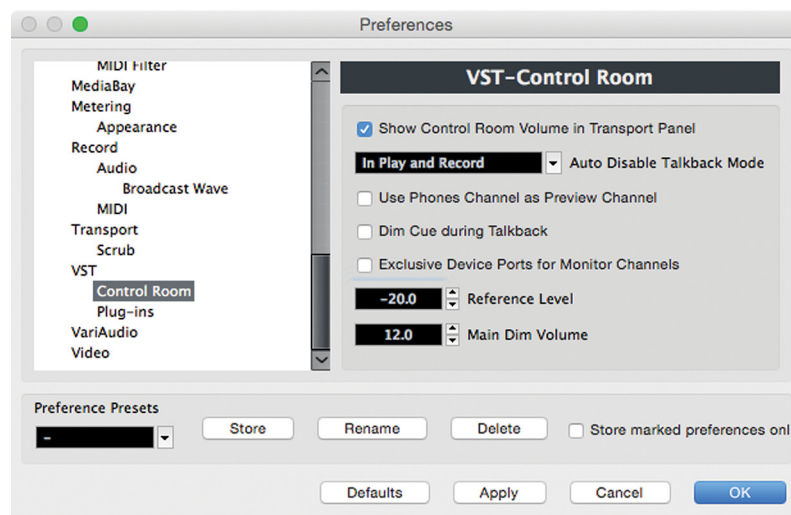


Figure 22.3
Control Room
Preferences

External Inputs

Just above the fader are the input selector buttons. You may switch from “MIX” to “EXT.” When EXT is selected, one of the six possible External Inputs you can create in VST Connections will be heard through the Control Room channel.

This is useful for listening to anything from an old analog 2-track deck to playback from a multi-channel dubber in surround. I have various external inputs in use, including a laptop computer for listening to music and watching movies, an analog summing device for hybrid mixing, and the Otari 1/4” two-track tape deck. Each studio is unique in this regard, and the Control Room provides the ability to customize your setup.

Prior to the Control Room, listening to an external device required some piece of analog hardware or a convoluted channel setup in the mixer. Either way, having this feature now built in to the software makes the convenience irreplaceable.

A/B TESTING

Note that the “EXT” switch itself is a toggle-type switch. Pressing it once switches the Control Room input from MIX to EXT. Pressing it again switches back to MIX. Since this requires only a single mouse click to go back and forth between MIX and EXT, it can be helpful in A/B testing.

Use this function to perform a quasi-blind AB testing. By closing your eyes and pressing the EXT button many times in succession, you can lose mental track of which input is selected. Then merely pressing the switch again and again (clicking the mouse button), you can switch between A and B sources without knowing which one is which. Then you can compare two similar sources without being biased toward one or the other.

Control Room Inserts

One thing that is not possible with analog console master sections is the ability to insert plug-ins as part of the monitor signal chain. Not so with Nuendo’s Control Room. The pragmatic things we all need in the studio can now be part of the monitor signal path, such as level meters, spectrum analyzers, tuners, etc. It is very handy to have complete metering in the control room along with such creature comforts as a tuner that will react to any signal in the mix. Figure 22.4 shows the Span plug-in inserted into the Main channel of the Control Room.

No matter what project is opened, the Control Room configuration stays the same. All the plug-ins and other settings do not change as you open and close various projects.



Figure 22.4 Control Room Mixer with Span meter

PROTECT YOUR SPEAKERS

During large tracking sessions where the monitoring level might be high and the potential for speaker-damaging spikes to come through the mix, insert a brick-wall limiter to protect the speakers in the event of a large spike being accidentally generated.

Speaker Outputs (Monitors)

The Control Room's outputs are called "Monitors" in Nuendo. This refers to the various sets of monitor speakers that might be in any studio. For example, if you have the main set of speakers configured in 5.1 surround, that would be considered a "Monitor." If you have a second set of speakers such as Auratones, those would be considered another "Monitor." It is possible to have up to four Monitors configured in the Control Room, each with a different speaker configuration, from mono all the way up to 12 or more channels.

Switching between different speaker systems is as easy as pressing the lettered buttons in the Control Room Mixer or on the Nuage Master unit.



Figure 22.5
Control Room
Mixer monitor
selectors

MONITORS AND MONITOR SOURCES

“Monitors” should not be confused with “Monitor Sources” as defined in the Control Room. “Monitors” are sets of outputs from Nuendo that are connected to speaker systems in your studio. “Monitor Sources” are channels within the Nuendo mixer that can act as External Sources or alternate MIX signals.

Each Monitor has its own set of plug-in inserts, gain adjustment, and phase reversal that is unique. In other words, when you switch between each speaker system, the plug-ins and gain settings change automatically. This is handy for applying corrective room EQ or bass management for a surround speaker system and then adjusting the playback level of a smaller stereo speaker system to match.

Listen Bus

The Listen bus in Nuendo replicates the functionality of AFL and PFL solo bus on a traditional analog console. Most DAW software is capable of Solo-in-Place (SIP), where the solo is created by muting all other channels in the mixer besides the soloed channel. But most DAWs do not provide a true solo bus that does not interrupt the main mix as the Listen bus does in Nuendo.

The Listen bus AFL/PFL utilizes a separate bus system to isolate the solo signal and then route it to the control room main channel to be heard through the speakers. The Listen bus does not interrupt the normal mix signal path and is irreplaceable for live and broadcast audio where the main mix signal must be fail-safe. If the engineer needs to listen to one or more channels isolated from the rest of the mix, the Listen bus in Nuendo does this without disrupting the main mix path.

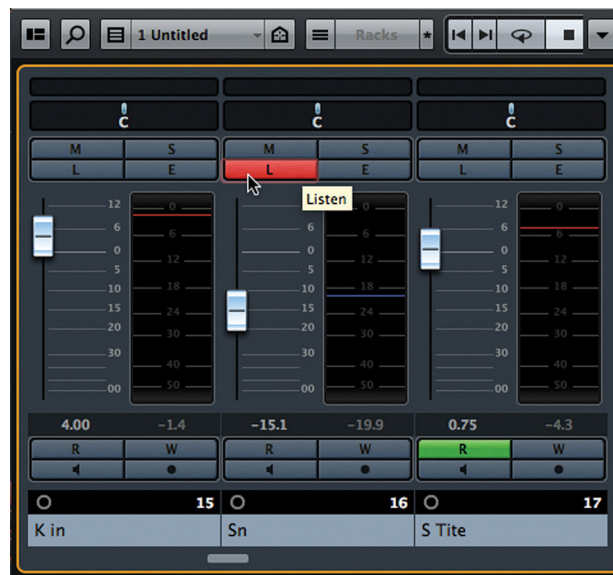


Figure 22.6
Channel Listen
buttons

NUAGE SOLO SWITCHES

On the Nuage Fader unit, the solo switches operate both the SIP solo and the Listen bus functions, depending on the status of the Listen button found in the Control Room section. When Listen is active, solo switches enable the Listen bus for each channel.

Once a channel is listen-enabled, its signal is routed either pre- or post-fader directly to the control room mixer. Multiple channels may be listen-enabled at the same time. The Listen bus can be set to AFL or PFL to determine where the isolated signal comes from.

The two Control Room channels (Main and Phones) must have Listen enabled on them in order to hear these signals. In addition, the slider displayed just below the Listen-enable (LE) button indicates the level at which the Listen-enabled tracks are heard prior to the Control Room Mixer's level. This is especially helpful with PFL signals, as they might be significantly louder than the entire mix itself. Understand that the Listen bus, when activated, is added or mixed with the Control Room signal, whether set to MIX or EXT.



Beyond that, there is the Listen-deactivate button and Listen Dim level indicated just below on the main control room channel. The Listen-deactivate button lights up red whenever one or more channels are Listen-enabled. Pressing the button then causes all the channels to deactivate listen, returning the button to a gray color.

The Listen Dim level sets the amount of level reduction the main mix will have when a channel is listen-activated. In other words, when you activate listen on any channel in the mixer, the main mix will be turned down by the amount set in Listen Dim and the listen-activated signal will be added either AFL or PFL to the Control Room channel. The effect is as if the listen-activated channel steps out in front of the mix so you may examine it without losing perspective on the overall mix.

If the Listen Dim level is set to -infinity, listen-activated channels will be heard in the Control Room alone as the mix is reduced to nothing. This is how a typical solo bus works on an analog console. The ability to add the mix in at a reduced level adds a layer of flexibility to Nuendo's Control Room.

SIP AND THE LISTEN BUS

One thing that the ubiquitous SIP (Solo-In-Place) found in most DAW software cannot do effectively is allow you to listen to effect returns by themselves. If you SIP solo an FX return, the source channels that are feeding the FX channel get muted so you cannot hear the reverb return by itself, for example. Using Nuendo's Listen bus, simply activate Listen on the reverb (or other effect) returns and you can hear the reverb by itself provided that the Listen Dim is set to -infinity.

Basic Mix Routing

OK, so Control Room is set up and you want to get mixing. If the project is not already set up this way, simply route all channels in the mixer to one stereo main VST Output. When using Control Room features to monitor your mix, it is not necessary to actually connect the Main Mix VST Output to a physical audio interface channel (device port). That is handled by Control Room. The VST Output acts as a virtual mix bus that will be used to export a final audio file when your mix is complete.

Your VST Outputs tab should look like Figure 22.8.

Since "Stereo Out" is designated the Main Mix, it will be routed to the Control Room channel where you can choose which Monitor (speaker set) to listen to and that's how you hear the virtual mix bus.

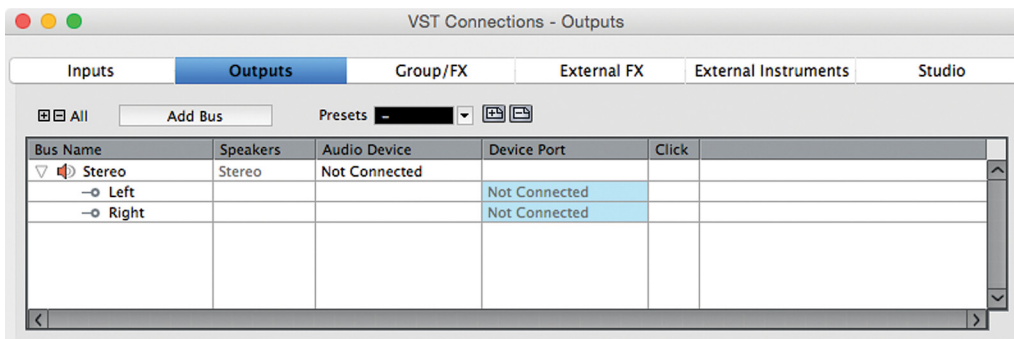


Figure 22.8
Basic stereo mix VST Output, not connected

Nuendo's mixer offers some quick ways of routing many channels at once. Using Shift+[Alt/Option] you can route all selected channels to the same output at once.

1. Select all the channels in the mixer.
2. Ensure the Racks are visible so you can see the routings.
3. Press Shift+Alt while choosing an output for one of the selected channels.
4. All output designations for the selected tracks should now be the same.

NUAGE MULTI-CHANNEL ROUTING

The Nuage Fader unit works the same way by holding the Shift and Alt buttons on the fader unit; routing assignments are applied to all selected channels at once.

For the current example, your mixer should look something like Figure 22.9.

Now you may blend and pan all the signals together to create a rough mix of everything. Then the fun begins.



Figure 22.9
Basic stereo mix routing, all channels to one stereo bus

EQ

Each channel in Nuendo has a built-in four-band equalizer just like most professional analog consoles. There is no plug-in to insert; you can simply grab the EQ and go to work. You access the EQ from either the Inspector in the project window, the channel settings window, or in the MixConsole's racks.

Graphical EQ Editing

There are three places to access the EQ graphic display: MixConsole Rack, Inspector, and Channel Settings window. Here you can simply click the mouse anywhere in the curve display and a band of the EQ will become active. In the MixConsole Rack, clicking on the display pops up a larger version for editing with more accuracy, as shown in Figure 22.10.

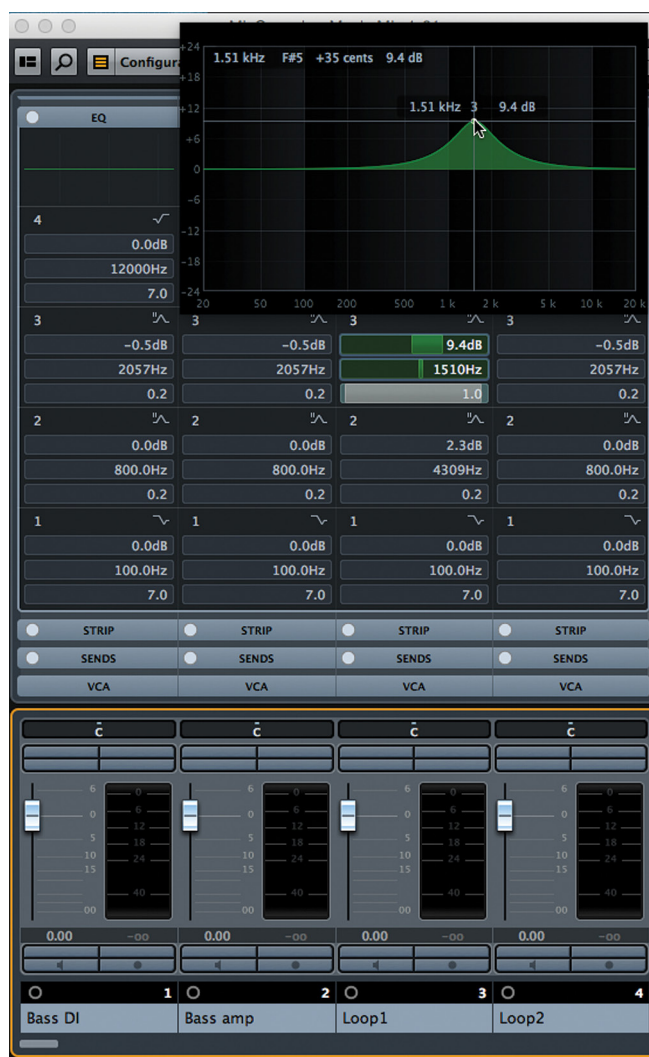


Figure 22.10
EQ curve in
MixConsole
Rack

You can move the mouse up and down, left or right and the corresponding gain and frequency controls will change to reflect the curve you are drawing. The two outer bands are set by default to shelving filters while the two inner bands are set to parametric filters. Clicking within certain frequency ranges will activate the EQ band in that range.

While dragging the EQ point around the curve area, modifiers can be used to affect only certain parameters of the filter individually for more control.

- ❖ [Control/Cmd] - Gain
- ❖ [Alt/Option] - Frequency
- ❖ Shift - Slope or Q

Filter Type

Of course you can change the filter type of any of the bands to fit your needs. Use the popup menu found at the top right of each band of EQ. Outer bands can have shelving, parametric and high/low pass filters while the inner bands can only be parametric.

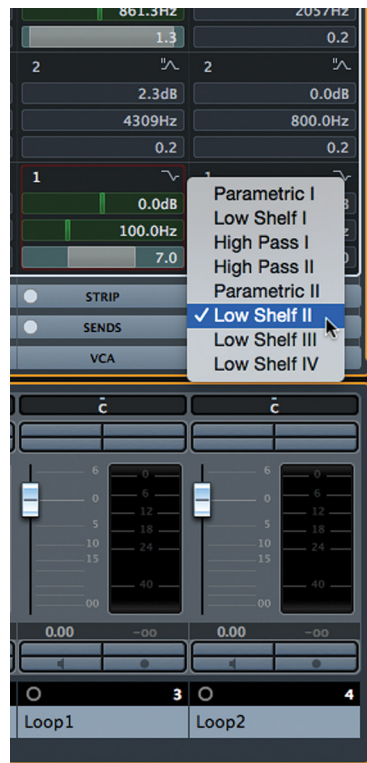


Figure 22.11

Filter type selection of band one

Once you have activated a band of EQ, clicking again in the EQ curve area will activate adjacent bands depending on the frequency you click.

This graphical method of setting EQ can be quick and intuitive, allowing you to move along in the mix at a good pace. All the parameters are of course editable using the sliders or numeric entry for further tweaking.

Filter Versions I to IV

Each of the filter types has multiple versions: I or II for parametric and high/low pass filters and I, II, III, or IV for the shelving filters. Type I filters are the original Nuendo/Cubase filters used for many years and are available primarily as a backwards compatibility feature. The Type II filters generally sound much better and should be used in most cases. The four types of shelving filters feature different response curves around the turnover frequency and should be experimented with to find the best curve for the signal source.

EQ Inversion

One handy feature of the EQ is the ability to invert each band's gain using the context menu for each band. If you have ever used the boost and sweep technique to isolate resonant frequencies, this button makes it easy to quickly invert the gain of any band. So, once you have found the offending frequency by sweeping, open the context menu and select Invert EQ Band. Simple, yet handy.

The entire EQ curve can also be inverted using the context menu in the EQ curve display, as shown in Figure 22.12.

EQ Presets

As with just about every setting in Nuendo, EQ settings can be stored as a preset and used later on similar signal sources. Whenever you see the preset management icon, click and you will find the familiar preset menu, giving you choice to load a preset or store a newly created one into the library.

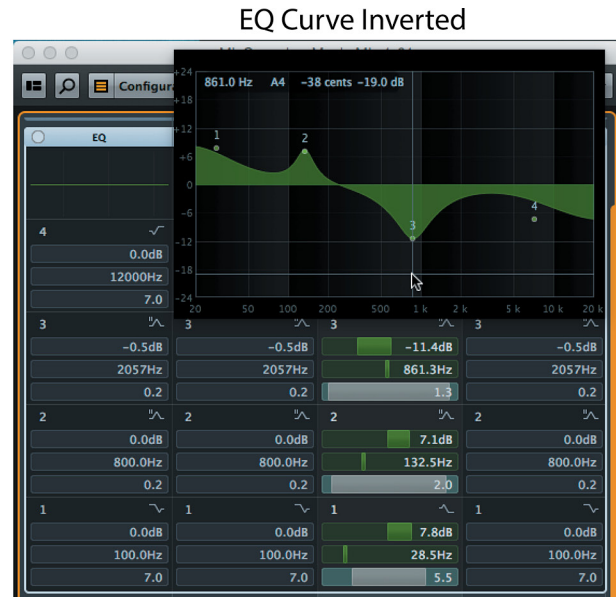


Figure 22.12 Inversion of EQ curve



Figure 22.13 Preset management

DEDICATED HIGH AND LOW PASS FILTERS IN PRE RACK

Remember that there are dedicated high and low pass filters located in the Pre section of the channel. These effectively enlarge the EQ to seven total bands, standard on world-class analog consoles such as Neve and SSL.

Channel Strip

In addition to the equalizer on every channel, there is also a complete dynamics section found in the channel strip rack of the MixConsole. There are five processors in the strip:

- ❖ Gate
- ❖ Compressor
- ❖ Tools
- ❖ Saturation
- ❖ Limiter

Gate

The gate is a standard gate with the usual controls. It features a key filter to isolate frequencies that the gate will react to. You can monitor the filtered signal with the Filter listen button, shown in Figure 22.14. The gate can also be triggered by a side chain input.



Figure 22.14
Channel Strip
Gate

Compressor

Next is the compressor. This is a fairly sophisticated compressor with three models to choose from, as shown in Figure 22.15:

- ❖ Standard
- ❖ Tube
- ❖ Vintage

Standard Compressor

The standard compressor uses the traditional parameters of threshold, attack, release, and makeup gain. The release and makeup gain can be set to auto modes for quicker setup. A side-chain input is also available.

Tube Compressor

The tube compressor utilizes a fixed threshold with input and output controls. The higher the input gain, the more gain reduction you will get. The tube compressor features a drive control with a wet/dry blend so you can add uncompressed signal back in. This defaults to 50% to begin with, as seen in Figure 22.16.



Figure 22.15
Selection menu
of compressor
types



Figure 22.16
The tube
compressor

Vintage Compressor

The vintage compressor model also works with a fixed threshold. More input gain results in more gain reduction. It features a punch mode activated with a button, shown in Figure 22.17, to add more attack to the signal.

Tools

The tools processor has two functions:

- ❖ DeEsser
- ❖ EnvelopeShaper

As their names imply, these are very useful tools often needed in mixing for taming problem signals.

DeEsser

The DeEsser is a frequency-dependent compressor focused on the sibilant frequencies where sounds like the “ssss” and other consonants are centered. You can adjust the amount of reduction in decibels while using the auto-threshold or manually set your threshold. The LF and HF filters allow you to choose the frequency range the de-esser will operate in. The “Solo” button will monitor the filtered signal while the “Diff” will monitor just the sounds being reduced so you can fine-tune your settings. There is also a side-chain input available, as seen in Figure 22.18.



Figure 22.17
The vintage compressor



Figure 22.18
The DeEsser

EnvelopeShaper

The EnvelopeShaper gives you control over the volume of transient signals and sustained signals. By turning up the attack value, short transients in the signal will become louder. Conversely, turning them down will smooth the attack of a source. The length parameter determines how long transients are measured. Longer times reduce more of the signal when lowering the attack level, as seen in Figure 22.19.

Saturator

The saturator processor is designed to add musical distortion and harmonics to the signal using one of three types of saturation devices:

- ❖ Tape Saturation
- ❖ Tube Saturation
- ❖ Magneto II

Tape Saturation

The tape saturator emulates the sound of analog tape recording, which, when recorded with a high signal level, will tend to compress and distort the signal. Sometimes this effect is described as adding warmth and fatness to the sound. A little can go a long way.

Figure 22.20 shows the drive parameter, how hard the tape is being hit. The Dual button emulates the use of two tape machines together. The LF parameter is a shelving filter to emulate the “head bump” common to different tape speeds. The HF is a low pass filter used to avoid harshness in the processed signal.



Figure 22.19
The Envelope-Shaper



Figure 22.20
Tape Saturation

Tube Saturation

Tube Saturation emulates the sound of tube compression and the saturation that can come with it. The LF is a shelving filter and the HF is a high shelf for adjusting any resulting harshness.

Magneto II

The Magneto II processor (Figure 22.21) is from an earlier version of Nuendo and has been included here due to its popularity as a great tape saturation plug-in. It operates in much the same way as the tape saturator with some added functionality.



Figure 22.21
Magneto II
plug-in



Figure 22.22
Magneto II in
the Channel
Strip

The LF and HF controls the frequency range that the saturation will be applied to and you can solo this filtered signal with saturation, as shown in Figure 22.23. Then the HF-Adjust sets the amount of saturation in the higher frequencies.

Limiter

The limiter section has three options:

- ❖ Brickwall
- ❖ Maximizer
- ❖ Standard

Brickwall Limiter

The brickwall limiter acts like its name. It will limit the output signal to a set level, making sure the level never exceeds this setting. You may also adjust its release time or choose the automatic release setting, as shown in Figure 22.24.

Maximizer

The maximizer is a different concept than the limiter. It is designed to create the illusion of a louder signal without increasing the peak level of the signal. It does this by increasing the density of the sound as set by the optimize value. You also have control over the output level and mixture of dry and processed signal, as shown in Figure 22.25.



Figure 22.23
Magneto II



Figure 22.24
The Brickwall Limiter



Figure 22.25
The Maximizer

Standard Limiter

The standard limiter is similar to a compressor with a very high ratio. You have basic input, output, and release time parameters to adjust, as shown in Figure 22.26.

EQ Position

You can choose the position of the equalizer within this signal chain of the strip by dragging the EQ block up or down to a new position, as shown in Figure 22.27.

The processors in the strip provide a large palette of working tools for mixing. All the basics and even some more esoteric tools are there, ready to use at a moment's notice, bringing speed and ease-of-use to the mixing process. You no longer have to insert a plug-in just to make a simple EQ, gate, or compression setting.



Figure 22.26
The Standard Limiter



Figure 22.27
Moving the EQ position in the strip

Inserts

Having a nuts-and-bolts workhorse EQ and complete dynamics on every channel is a great starting place for mixing. But the fun has just begun. Plug-ins of all varieties can now manipulate audio signals in ways that were unimaginable only a few years ago.

VST plug-ins can be used in any channel of the mixer that contains an audio signal. They are placed in the signal path using the Inserts. Open the inserts rack in the MixConsole and click on the blank area of any insert to open the plug-in menu, as shown in Figure 22.28.

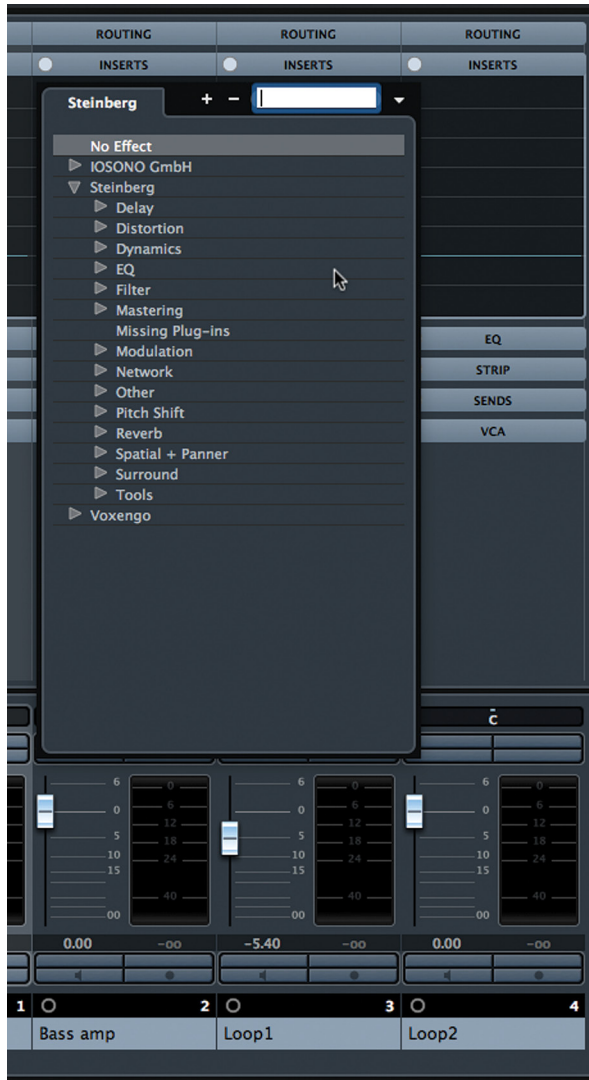


Figure 22.28
Plug-in popup menu with stock Nuendo plug-ins

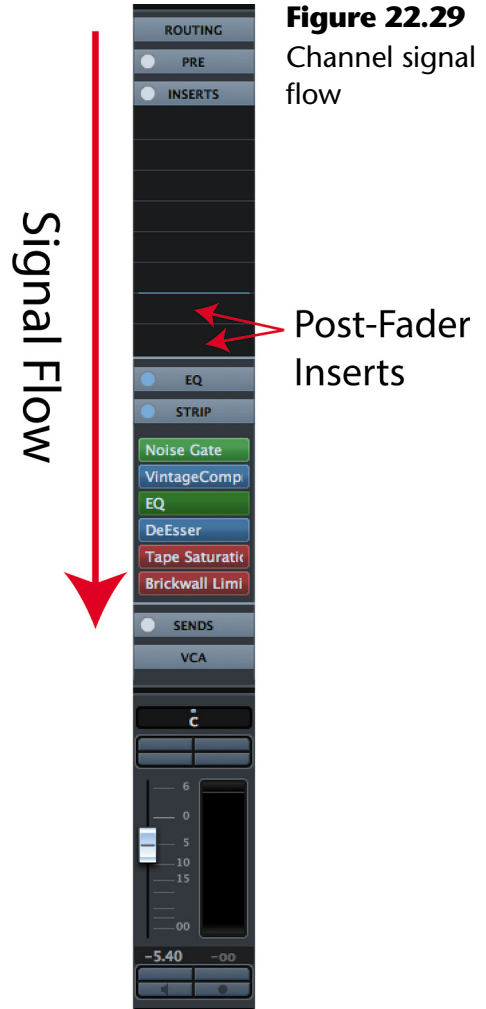


Figure 22.29
Channel signal flow

Depending on your system, you may have only the stock Nuendo plug-ins available to you. The tools provided with Nuendo are quite capable and provide all the fundamental processing tools you need for most audio mixing. However, you might have any number of third party plug-ins on your system, giving you endless processing tools at your disposal. Pick one from the list and it will be inserted into the signal chain.

Inserts 1-6 are placed in the signal path just after the input routing and pre sections and just before the channel strip, as seen vertically in the MixConsole. The signal flow starts at the top and generally flows down, as shown in Figure 22.29. Inserts 7 and 8 are placed just after the fader and before the aux sends. Typically, inserts will be placed pre-fader, hence there are 6 of those and only 2 post-fader inserts.

NUENDO EQ APPLIED AFTER INSERTS

Any EQ changes you make using the built-in EQ in Nuendo will not affect the signal going into any plug-ins found in inserts 1-6. The EQ is applied after the inserts. This is important for such things as compression since EQ changes can drastically affect how a compressor reacts to a signal. If you need an equalizer prior to a compression plug-in, an equalizer plug-in would need to be inserted in a slot prior to the compressor plug-in. The built in EQ cannot be placed before the Inserts.

MIXCONSOLE SLOTS

By default, the MixConsole displays the first Insert only. This is designed to save space in the GUI. However, you cannot see the post-fader insert slots this way. You must switch to the fixed slot view in the MixConsole by selecting it from the Racks menu, as shown in Figure 22.30.

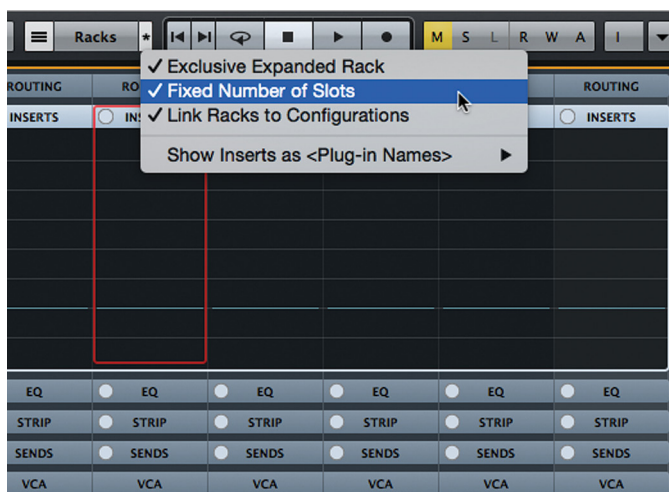


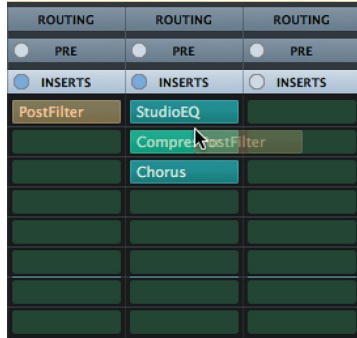
Figure 22.30
The slot menu in the MixConsole

An example of a commonly used post-fader insert would be a dither plug-in on the main mix output bus. This allows proper dithering of the mix, including a fade-out using the master fader. If the dither plug-in was pre-fader, as the signal was lowered with the fader, dithering would be reduced to below the LSB (least significant bit) and thus become ineffective. Having the dither post-fader allows the fade out to be properly dithered.

Moving Inserts

Inserts may be moved by clicking and dragging the insert slot to any other slot, including slots on other channels. If there is already an insert in that location, the moved insert will be placed in that slot and all others will be moved down one slot to accommodate it, as shown in Figure 22.31.

Dragging PostFilter to another slot



Plug-ins shuffled down one slot to make room

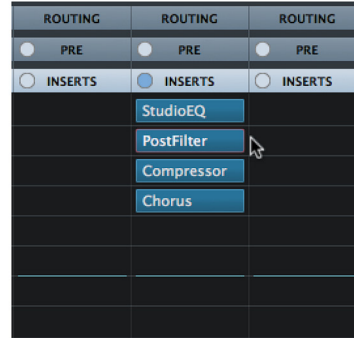


Figure 22.31
Shuffling inserts

TAKE CARE WHEN MOVING PLUG-INS

Inserting a plug-in that causes inserts to be moved down a slot might cause an insert to be moved from pre-fader (6) to post-fader (7) inadvertently. This could dramatically change how the signal is affected.

Using the same method and modifier (Alt) you can move and copy inserts freely in the mixer, as seen in Figure 22.32.



Figure 22.32
Copying an insert to another channel in the mixer

Insert Presets

Nuendo can save plug-in chains as presets. Once you have found that great vocal setting, it can be used again later in other projects. Use the preset management icon found at the top of the insert list in either the Inserts rack or the project window's Inspector.

STORING SETTINGS

There are many ways to store settings in the mixer and recall them later. These include insert presets as discussed here along with Track Presets, Track Archives and Channel Settings in the mixer. This will be examined later in this chapter.

Plug-In Manager

The number of plug-ins available today is staggering. Bundles often come with multiple versions of a single plug-in for various uses (mono, processing load, etc.). The plug-in list can get tremendously long. Fortunately there are ways to manage this in Nuendo.

To begin with, there is the text search when you insert a plug-in. Figure 22.33 shows the text search in action, looking for a chorus plug-in. The list automatically updates as you enter letters in the search field. Any plug-in that has a “ch” in the name will be in the list. This makes for very fast location of your favorite plug-in out of a list of hundreds.

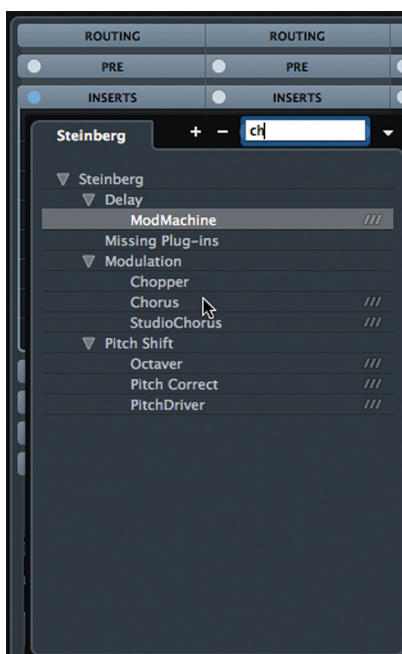


Figure 22.33
Text search for
plug-in insert

In addition, you can organize the plug-in list using the Plug-In Manager shown in Figure 22.34. The Plug-In Manager lets you create custom collections out of your full list of plug-ins, curating a select list of preferred ones without removing any plug-ins from the system. You can create multiple collections that organize the plug-ins in different ways; by manufacturer, type, style, or any other criteria you come up with.

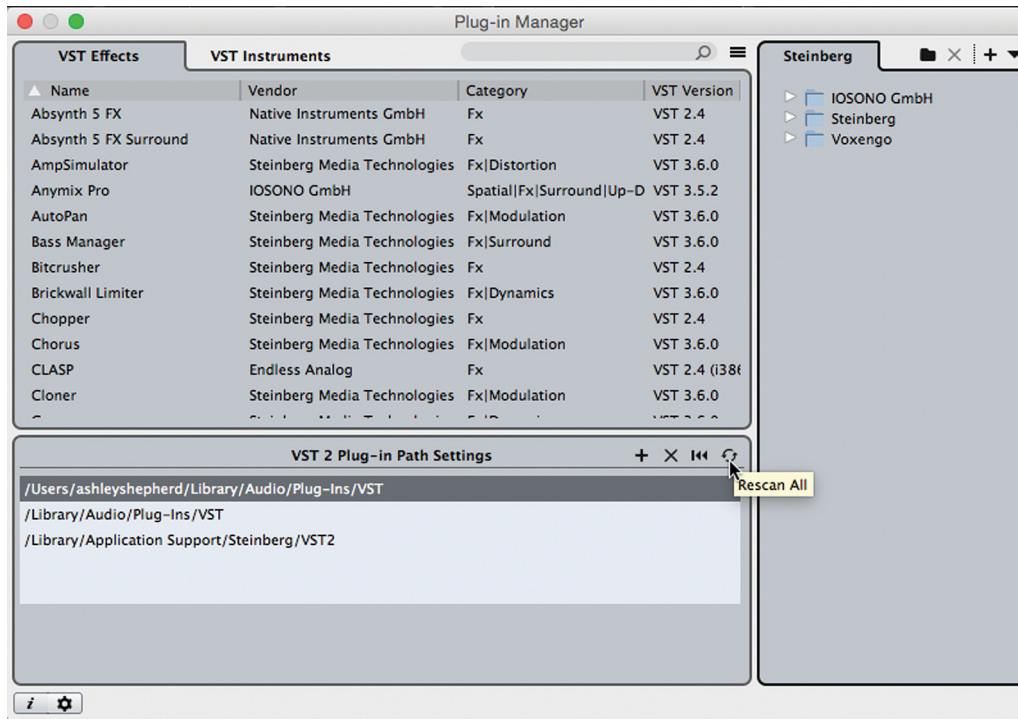


Figure 22.34
The Plug-In Manager

Here is where you can define all your VST folder paths and rescan them to update the plug-in list. The left side contains a complete list of all plug-ins recognized by Nuendo. On the right is where you create collections of plug-ins as you wish to organize them.

UAD PLUG-INS

UAD users will find this handy for removing all the mono versions of the UAD plug-ins from the list, as they are not necessary in Nuendo. This greatly reduces the list of plug-ins to choose from.

Send FX



(tutorial video: “Sends Routing”)

The Sends are eight auxiliary signal paths used to route signals to other destinations in addition to the channel output. Very often they are used to add effects to signals such as reverb and delay. For basic mixing, this section will review how to do this but understand that sends can be used for a variety of complex signal routing.

The sends can be found in all the same places as the inserts: channel settings, inspector, and the MixConsole racks. There are eight sends total and they take their signal source from either just before the channel fader or just after the channel fader, pre or post fader.

Let’s look at the most typical example of how a send can be used during mixing: adding reverb.

1. Add an FX Channel Track.
2. Insert a reverb plug-in on the FX Channel. This is done while creating the track, as shown in Figure 22.35. You can add additional plug-ins to the FX Channel later if you desire.

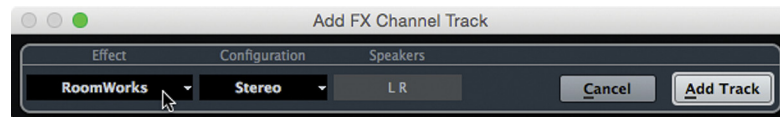


Figure 22.35
Create an FX Channel with RoomWorks

3. Ensure that the plug-in has its blend control set to 100% wet or effect. You should not have any dry signal present in the FX Channel return. Figure 22.36 shows the RoomWorks option to have the “wet only” signal.

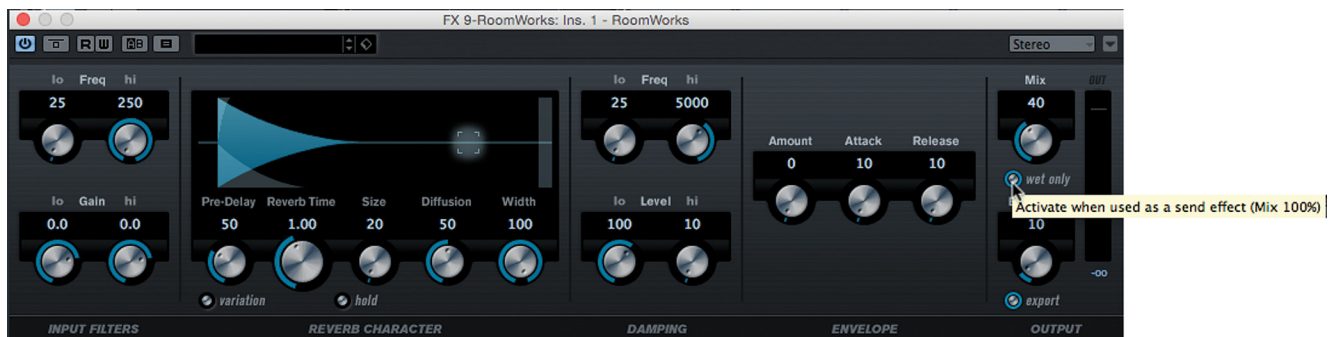


Figure 22.36 Setting the blend to 100% wet

4. On an audio track, add a send routed to the new FX channel.

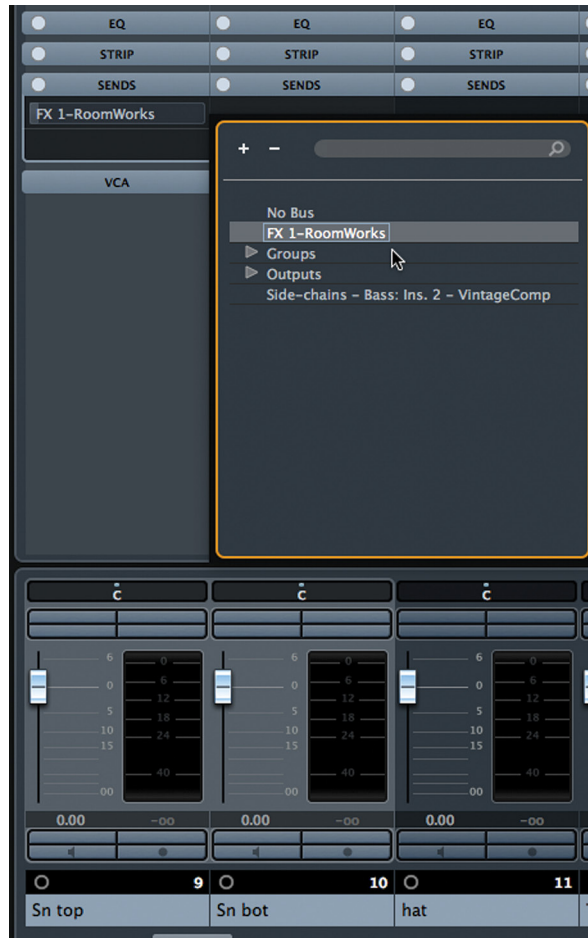


Figure 22.37
Adding a send to an audio channel routed to the RoomWorks FX return

5. Turn up the send level and hear the reverb from the FX channel in the mix.

Send FX Blending

You can adjust the blend of the direct and processed signals in two ways.

- ❖ **Send Level.** Adjusting the send level will cause more or less signal to be routed to the effect plug-in, resulting in different amounts of affected signal in the mix.
- ❖ **FX Return Level.** Adjusting the channel fader of the FX channel will do the same thing except that any other signals routed to the reverb channel will also have their blend affected this way.

The first method allows many different signals routed to the FX channel to have unique blends with the reverb. For example, the vocal could have less reverb than the lead guitar by lowering the send level on the vocal or turning up the send level on the lead guitar. This is the standard way of balancing reverb with multiple channels.

The FX channel itself can be altered independently from the source signals. For example, you can apply EQ to the reverb return alone, altering the character of the reverb without affecting the source signals. You can also route the FX signal to another FX channel using sends such as adding chorus to a reverb channel. The chorus is applied only to the reverb and not the original signals. More of these complex routings are covered in Chapter 14: Advanced Routing.

Reverb is only used as an example here. This same procedure can be used with any type of processing: delays, chorusing, compression (called parallel compression), you name it.

PRO TOOLS NOTE:

Creating a send FX in Pro Tools requires some additional steps involving Pro Tools buses. Instead of routing directly to the FX return channel in Nuendo, Pro Tools must use the intermediate step of routing to a bus first and then routing that bus to the input of an Aux channel in the Pro Tools mixer. These added steps waste valuable time for no apparent reason.

Send FX Shortcut

In the MixConsole, all of the above steps can be consolidated using a shortcut found in the MixConsole context menu shown in Figure 22.38: “Add FX Channel to Selected Channels...” This command save so much time by automatically routing sends from all the selected channels to a newly created FX Channel all in one step. The Add FX Channel dialog will open so you can choose a plug-in for the send effect, and that’s it. All of the routing is handled instantly.

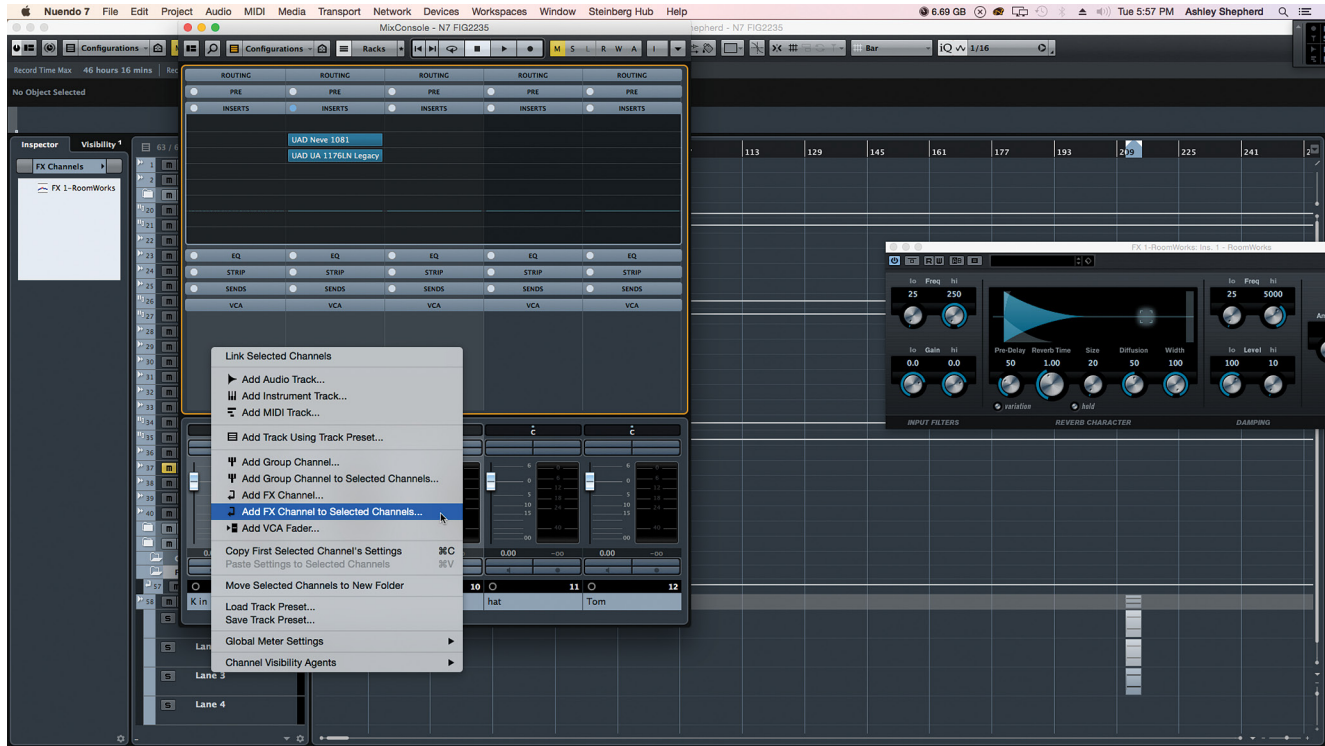


Figure 22.38 MixConsole context menu

Subgrouping (Group Channel)

 (tutorial video: “Group Channel Routing”)

Another basic mixing operation is the grouping of signals and mixing them together so they can be treated as one composite audio signal. A good example of this is background vocals. You could have as many as 24 channels or more of background vocals all singing the same phrase.

Instead of processing each vocal with separate plug-ins and sending each to a reverb channel, you can first subgroup them together into one Group Channel and process them as one. This will save a huge amount of DSP and allow you to mix them with one fader.

Follow these steps to group any set of tracks together.

1. Add a Group Channel Track. For background vocals, let's create a stereo group channel.

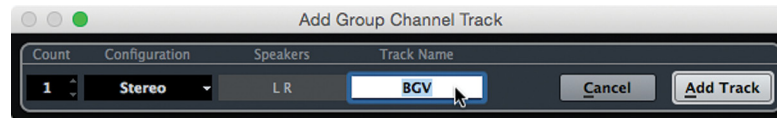


Figure 22.39
Create a Group Channel

2. Route all related tracks to the group channel "BGV's." By pressing the Shift+Alt keys, you can route all selected channels to the same group destination at once.



Figure 22.40
Routing tracks to the group channel

3. Insert any plug-ins you wish to use on the blend of vocals in the BGV's group.
4. Route the group channel to any FX channels, such as reverb, using sends.
5. Blend the final signal into the mix.

Grouping Channels Shortcut

There is another shortcut for creating a Group channel that can speed up your workflow. If you have several channels that need to be mixed together, you can create the Group channel and perform the routing in one step.

1. Select all the channels you wish to blend together with a Group channel.
2. In the MixConsole, open the context menu and choose “Add Group Channel to Selected Channels,” as shown in Figure 22.41.

Using the background vocal example, you could route all 8 vocal tracks to one group channel, insert a compressor on the group channel, and send to a reverb FX channel, which will add reverb to all the background vocals at once. Now adjusting the group channel’s fader will mix the group of vocals into the final mix. You may still make adjustments in the blend of vocals going into the group channel as you need to. This gives you quick control over many sources with one fader.

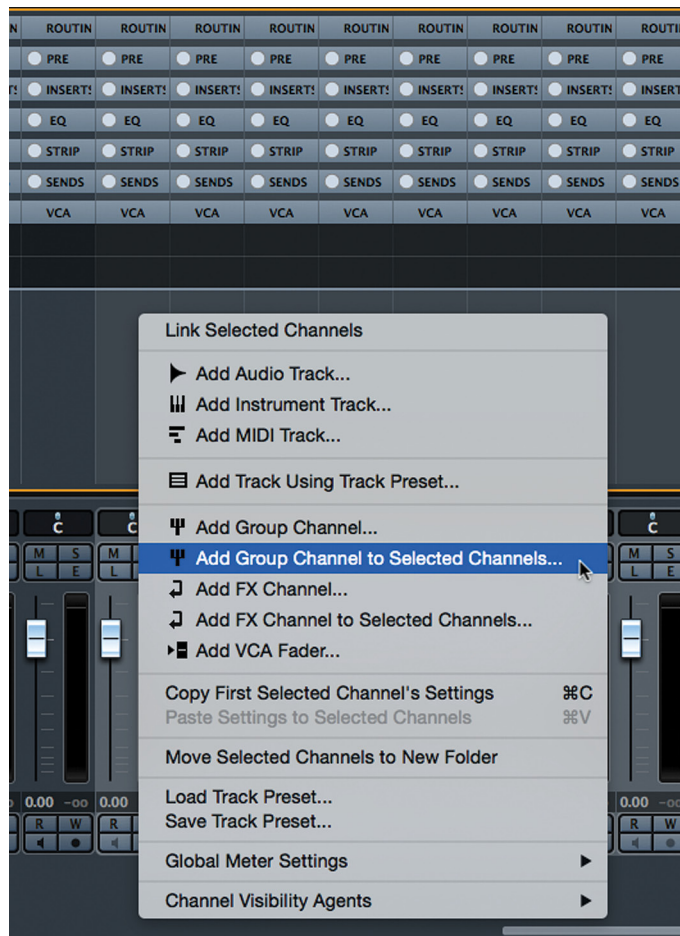


Figure 22.41
Group channel
shortcut
command

VCA Grouping



(tutorial video: “Nuage VCAs”)

There is another way of controlling multiple channels together without necessarily mixing their signals together as you would with a Group channel. The VCA channel is designed to control the level of multiple channels together.

VCA HISTORY

VCA stands for Voltage Controlled Amplifier and refers to analog consoles that used electronic amplifiers to control the volume of each channel rather than a physical fader attenuator. The faders on the console controlled the amplifier’s gain by means of adjusting the voltage going into the amplifier circuit. This allowed automation computers to replicate the voltage change and automate the mix without physically moving the faders themselves. VCA Master faders took advantage of this system by adjusting the gain of multiple channels at once, providing unique mixing control previously not possible.

VCA Setup

Follow these steps to create and set up a VCA channel:

1. Add a VCA fader: Project>Add Track>VCA Fader...
2. You will be prompted to name the VCA.
3. Open the VCA Rack in the MixConsole.
4. For every channel you wish to connect to the VCA, click in the rack slot to select a VCA fader, as shown in Figure 22.42.

Repeat step 4 for each channel you want to connect to the VCA. Now when you move the VCA fader, all the connected channels will move together relative to their start positions.



Figure 22.42
Selecting a VCA
Fader

Nesting VCAs

It is possible to nest VCA faders within other VCA groups. For example, the background vocals have been linked together by a VCA called “BGV.” The BGV VCA can be connected to another VCA for all the vocals together, named “VOX.” The VOX VCA could be connected to yet another VCA for all the music tracks called “MUSIC.”

- ❖ Adjusting the BGV fader will move all the background vocal channels.
- ❖ Adjusting the VOX fader will move all other vocal channels plus the BGV fader
- ❖ Adjusting the MUSIC fader will move all other musical channels plus the VOX fader.

Nested VCA faders provide another way to organize how the mixing process works and can save valuable time when dealing with large numbers of channels in the MixConsole.

ONLY SINGLE VCA CONNECTION PER CHANNEL

Note that each channel in the project (Audio, Group, FX, VST Instrument, Inputs, Outputs, and VCA) may be connected to only one VCA fader at a time. Each VCA fader can then be connected to one other VCA to provide the nested functionality.

Mix Bus Processing

Once your basic mix is complete, you might want to add processing to the mix bus as a final step. Just like all other channels in the Nuendo mixer, the VST output buses have inserts, sends, and EQ. Mix bus compression can easily be applied by inserting your favorite bus compressor plug-in on a pre-fader insert. Items such as final peak limiters and dithering can be placed on the two post-fader inserts to complete your mix, as shown in Figure 22.43.

When your mix is ready, it is time to export a final audio file of the mix. In fact, you might need to output several audio files to deliver to your client: 16 bit WAV for CD, 24 bit WAV for mastering and the ever-necessary MP3 file for email, listening, etc. The process of exporting a mix is handled by the Export Audio Mixdown window.



Figure 22.43 Main Mix VST Output with typical processing applied

Exporting a Simple Stereo Mix

A stereo mix can be exported by following these steps:

1. Set your left and right locators at the beginning and end of the mix. They determine the start and end of the file you will export. Figure 22.44 shows a project that contains more than one song so only a portion needs to be exported.

WATCH YOUR TAILS

Ensure that the right locator is set far enough to encompass any reverb tails or trailing echoes as they can be cut off if you are not careful. Just because the audio files end at a certain point does not mean that the audio engine stops processing audio!

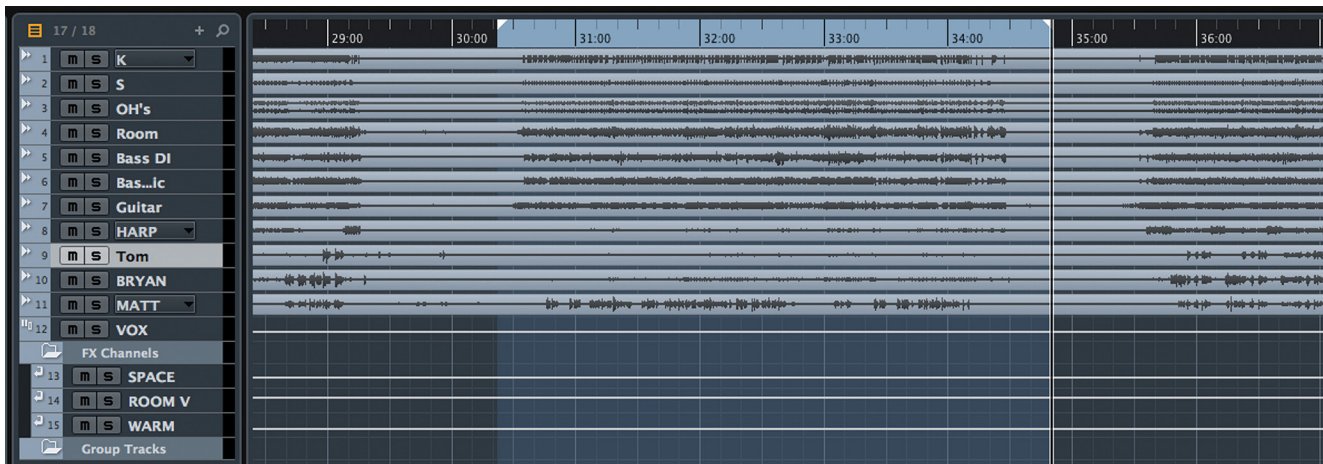


Figure 22.44 Setting locators for a final mix export

2. Choose File>Export>'Audio Mixdown...'
- to open the Export Audio Mixdown window.

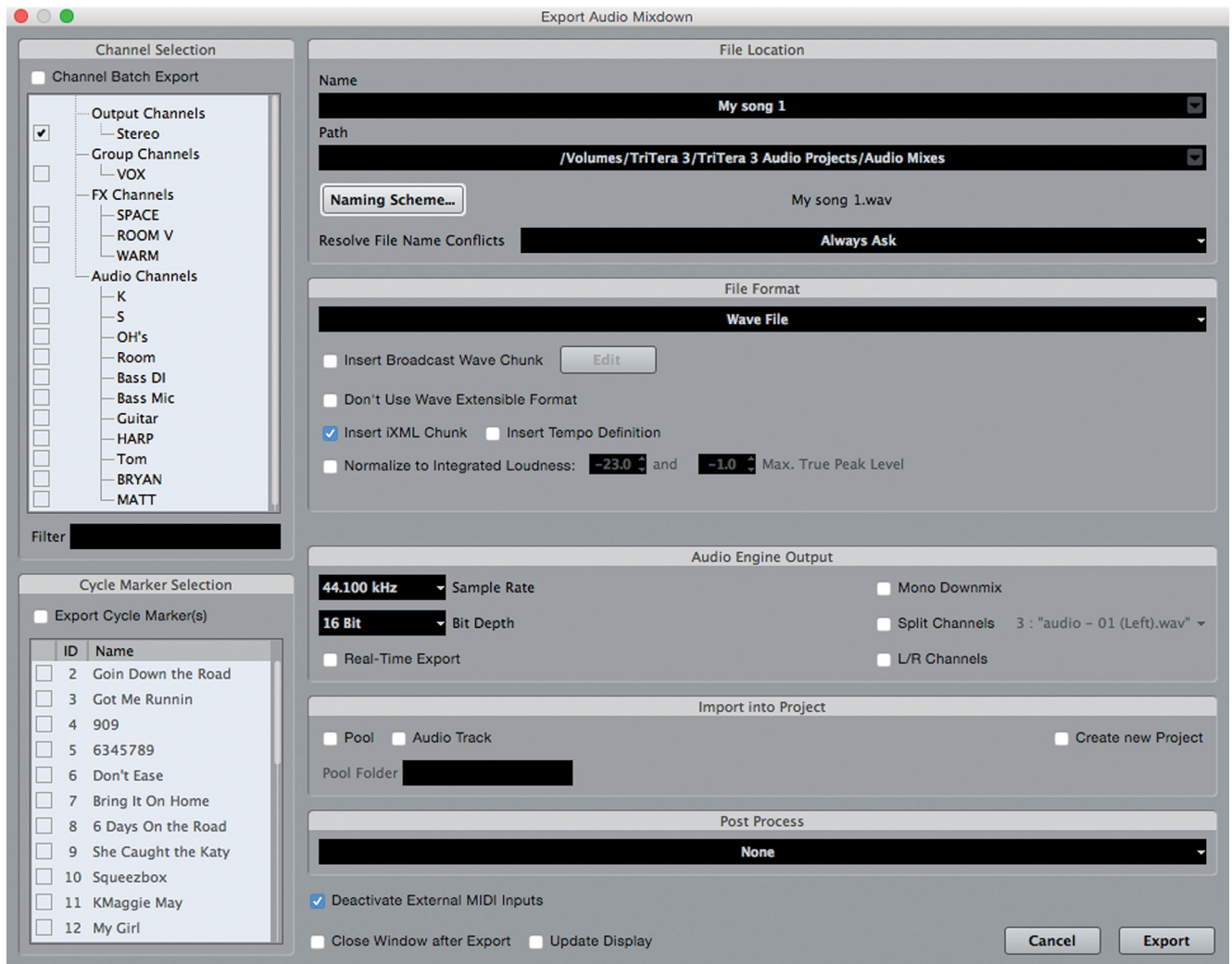


Figure 22.45 The Export Audio Mixdown window

3. For a simple mixdown, ensure that neither the Channel Batch Export nor the Export Cycle Marker(s) options are checked. These functions are for exporting multiple files at once.
4. Enter a name in the name field. This is the simplest way to name your file. The Export Mixdown window provides many other ways to automatically generate names for audio files using the “Naming Scheme” options.
5. Open the Naming Scheme options and select “Name” from the list so that Nuendo uses the text from the “Name” field for the audio file name.

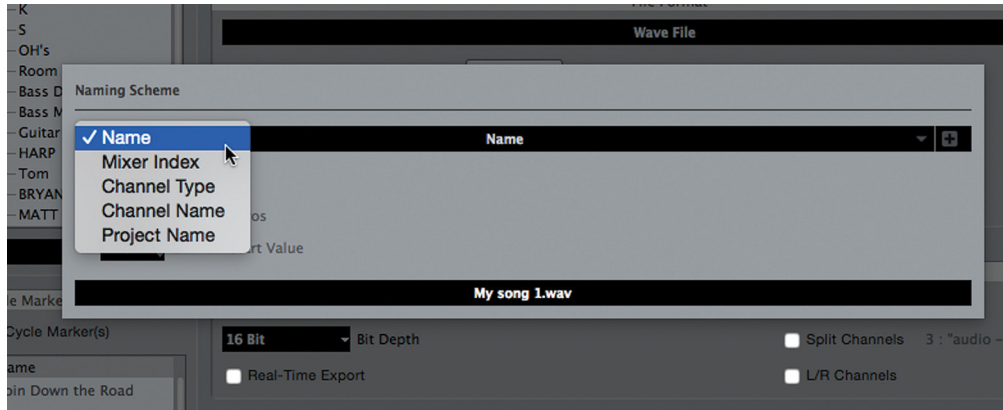


Figure 22.46
“Naming Scheme” options

6. Click on the “Path” field to set a directory where the rendered file will be placed.
7. Select the file format of your choice: WAV, mp3, AIFF, etc. The remaining options depend on the file type you choose here.

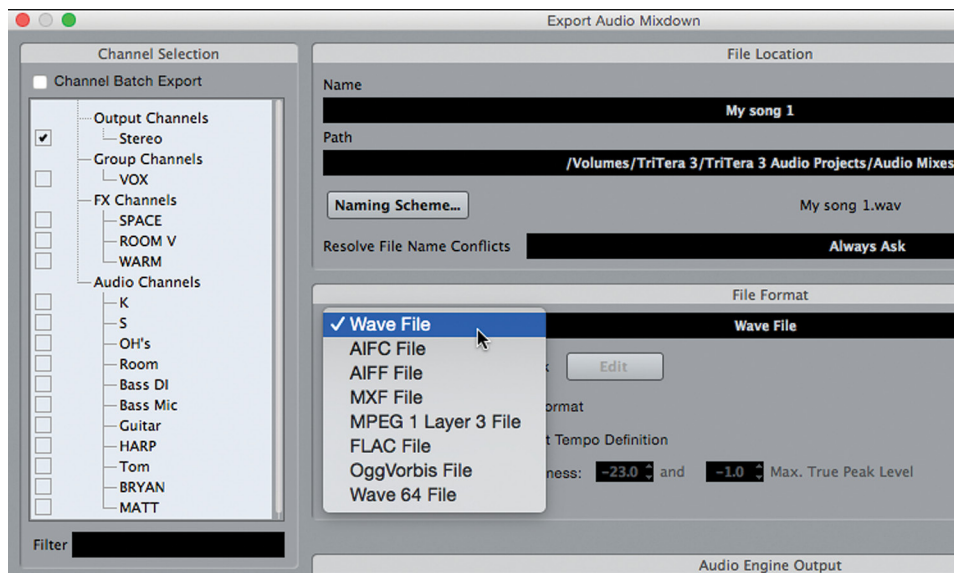


Figure 22.47
Choosing a file type

8. For a standard WAV file, choose the attributes such as bit depth and sample rate. Options such as creating a mono downmix are also possible. For a simple stereo file, leave those options unchecked.
9. If desired, select “Real-Time Export” if you wish to listen to the rendering of the file. Sometimes this option is mandatory when using items such as External Inserts, which require audio signals to loop through your converters in real time to be processed by external hardware. Nuendo will notify you if this is necessary.

FAST RENDERING

If Real-Time export is not chosen, Nuendo will render the audio file as fast as the processing power of your system will allow. No audio will be heard. For simpler renders, this can save a huge amount of time, as the process does not have to run in real-time. Rendering a simple voiceover with basic processing on a contemporary CPU can run many times faster than real-time, saving time/money in the process.

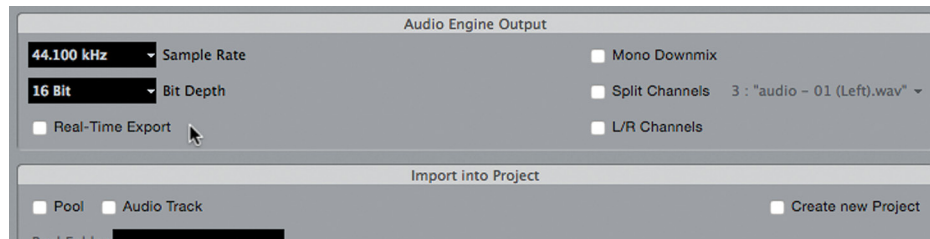


Figure 22.48
Options for a 16-bit stereo CD WAV file

10. Press Export and either listen to the real-time render or wait for the file to be completed.

Multiple Outputs to Console

Another method of mixing involves using an external analog console or summing device to blend multiple outputs from Nuendo for a final mix. This adds some of that analog goodness to the mix and is a great way to use analog outboard gear for additional processing in the mix.

Nuendo As Recorder

In the purist application of this technique, each track in Nuendo is routed to its own output directly to a channel on a console and all processing takes place in the analog domain. This requires a great deal of DA converters for a modern music mix, 24 or more channels to start.

Here's how you would set up Nuendo's mixer:

1. Disable Control Room in the VST Connections window. Since you will be using Nuendo simply as a tape deck, the Control Room features will not be needed and they can cause issues if Control Room channels are sharing device ports with the direct outputs you are about to create. It is possible to keep Control Room active in this scenario but you either need a great deal of hardware IO or you must understand the risks of sharing device ports with Control Room channels.

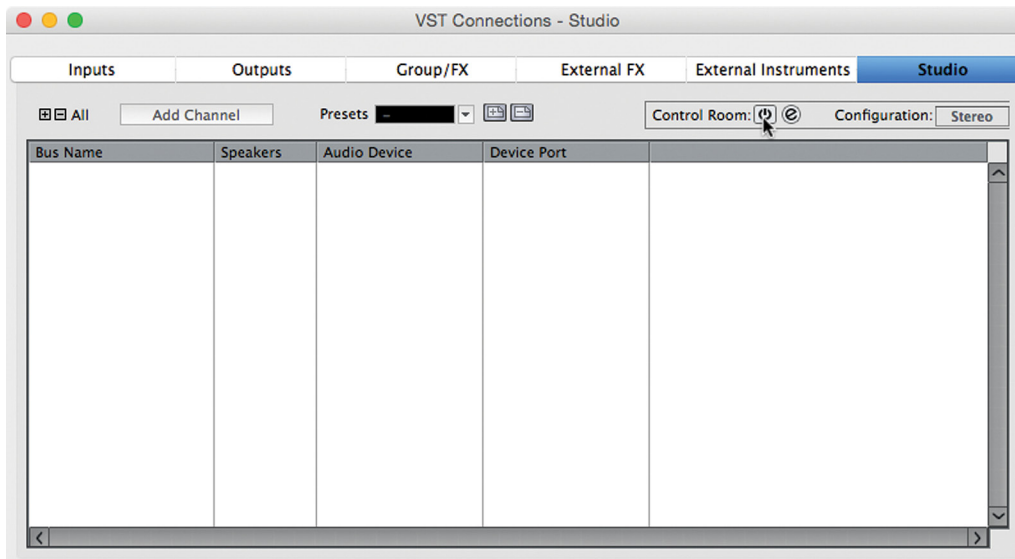


Figure 22.49
Disable Control Room in VST Connections

2. Add as many mono VST output buses as the console has inputs and your interface has outputs, in this case 48 outputs.

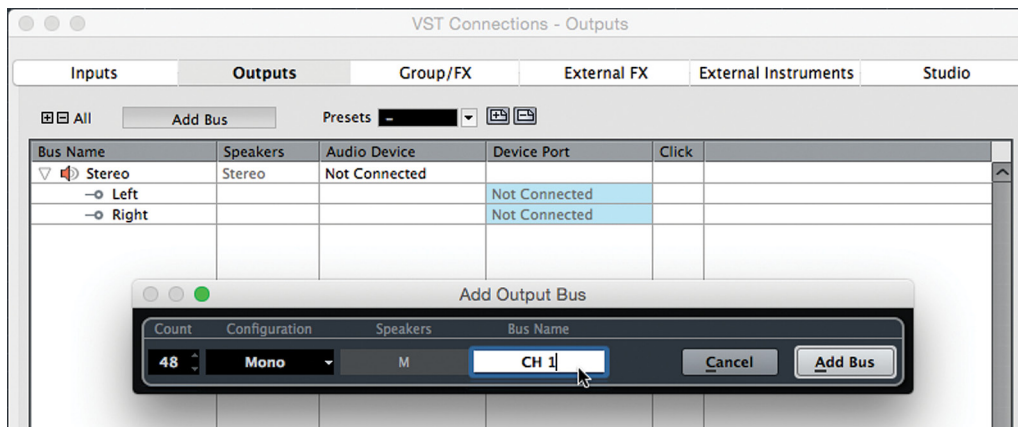


Figure 22.50
Adding multiple VST output buses

- Connect each VST Output bus to a hardware device port (DA converter). To do this quickly, select all the output buses and then, using Shift as a modifier, select the first device port for your analog converters. Nuendo will incrementally assign each successive output bus to the next device port in order.

ORDER OF OPERATIONS

Since the Shift modifier is also used for selection of multiple items in Nuendo, proceeding in the right order is important. When you have all the output buses selected, first click on the device port popup menu, next hold Shift and then select the first device port for the incremental assignment feature to work properly.

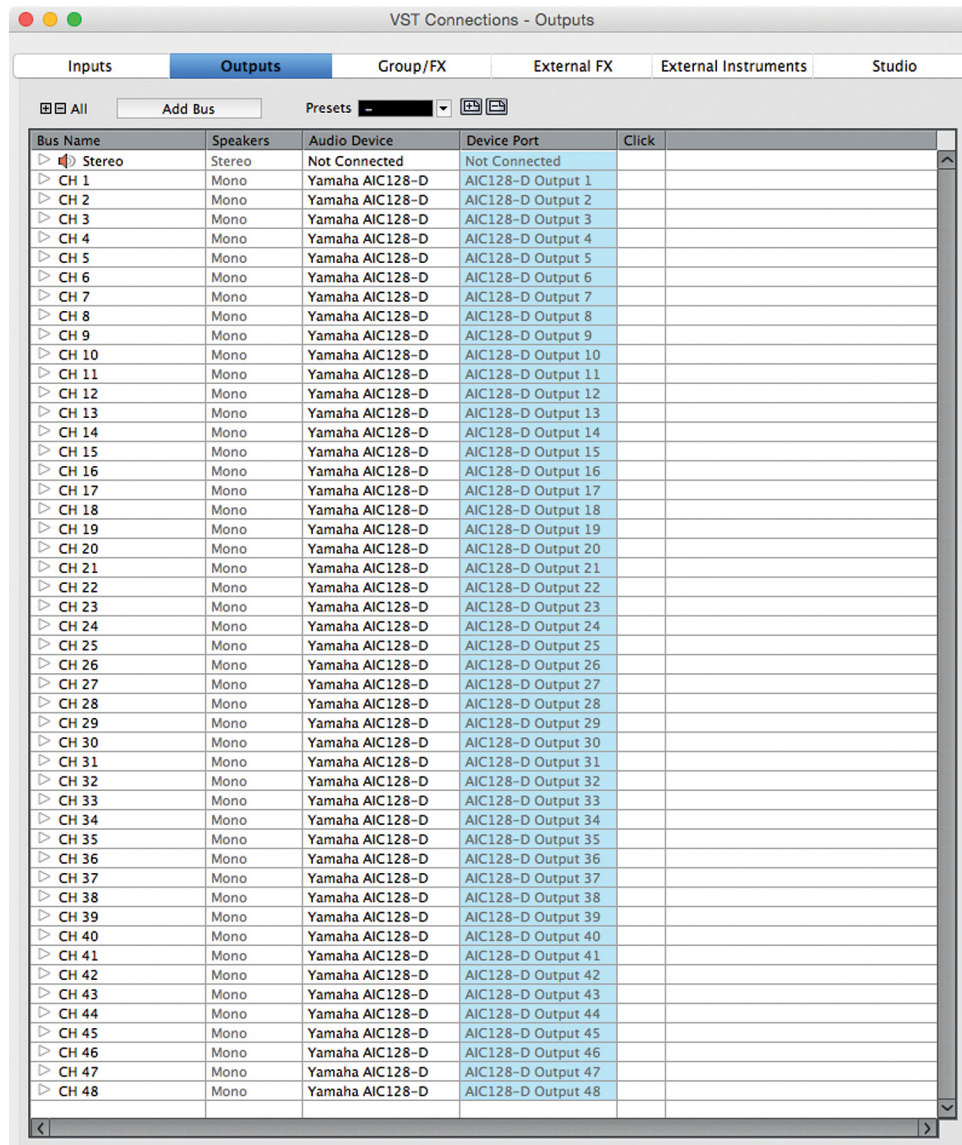


Figure 22.51
Routing each output bus to a device port

4. Convert any stereo tracks to mono using the “Convert Tracks” function found under the Project menu. Select “Multi-channel to Mono...” to convert each stereo track into two mono tracks. This speeds up the process by avoiding having to create stereo output buses. Once converted, each stereo track will now be two mono tracks that can be routed directly to mono output buses.
5. Select all audio tracks and route them individually to separate output buses. This can be done using the Shift modifier key in one step. With all tracks selected, press Shift while selecting the first output bus as the destination for the first audio track and all subsequent tracks will be assigned to incremental output buses.



Figure 22.52 Routing each audio track to sequential output buses in one step

6. Connect each DA converter output to an input of your console.
7. Now that each audio track is routed to a single channel on the analog console, you can start mixing everything together on the console, but remember that you can still take advantage of all the processing and automation features in Nuendo at the same time, getting the best of both worlds—hybrid mixing.

This example, using an analog console with Nuendo feeding individual channels similar to a traditional tape machine setup, is just one example of what has come to be known as “hybrid-mixing,” where both analog and digital technologies are used to create a final mix. In the next Chapter we will explore more complex mixing techniques, including variations on the hybrid approach and how you can use the best of analog and digital with Nuendo to create compelling mixes in a stereo environment.

Managing Settings

Mix settings for plug-ins, routing, level, EQ, panning, etc. are quite numerous. There can be hundreds, perhaps thousands of settings in a single mix project. It is helpful to be able to reuse some of these settings in other projects. You may want to reuse a complex group of settings including routing, plug-ins, channel levels, and panning, or you may want to save the settings for just one individual plug-in. Either way there are multiple methods for managing your settings in Nuendo.

Individual Plug-In Settings

Each plug-in can have its settings saved as a preset. In the plug-in GUI, there is a preset management icon found at the top, as shown in Figure 22.53. From the menu, you can save the current settings as a preset.

You need to name the preset and then you can save. When you wish to recall these settings, select Load Preset from the same menu and you will see your previously saved preset listed, as shown in Figure 22.54. You can also search by text for the preset name.

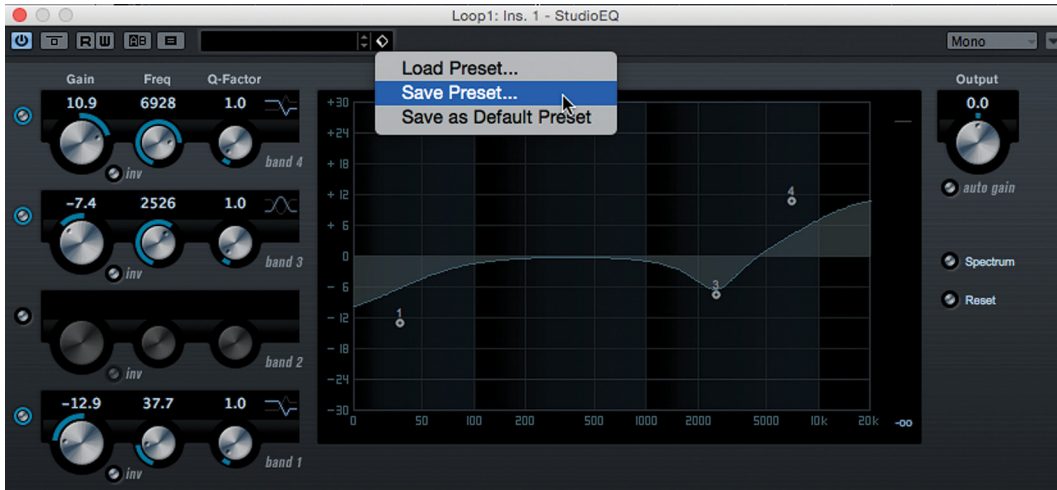


Figure 22.53
Saving the current settings as a preset



Figure 22.54
Loading a preset

Plug-In Chains

When you have more than one plug-in chained together on a channel and you wish to save the entire set of plug-ins together, you can save them as an FX Chain Preset from the menu found in the MixConsole Inserts rack, as seen in Figure 22.55. This menu is also found in the Inspector’s inserts pane and in the Edit Channel Settings window.

Once saved, the same chain of plug-ins can then be loaded into another channel in a different project.



Figure 22.55
FX Chain Preset
menu

Track Presets

The next level of preset involves all the settings for a single channel: plug-ins, EQ, dynamics, routing, sends, VSTi settings, MIDI, etc.—anything that defines the sound of that channel. All these settings can be saved as a track preset and loaded into another channel of the same type in the MixConsole. The primary distinction is between audio-based tracks and MIDI-based tracks.

Audio-Based Track Presets

For audio-based tracks (Audio, Group, FX, Input, and Output) the following settings are stored in a track preset:

- ❖ EQ
- ❖ Strip (Dynamics)
- ❖ Inserts (Plug-Ins)
- ❖ Pre (Filters, Phase, Gain)

MIDI-Based Track Presets

For MIDI tracks, different parameters must be saved to ensure the same sound:

- ❖ Input Transformer
- ❖ MIDI Modifiers
- ❖ MIDI Inserts
- ❖ Output Port
- ❖ Channel
- ❖ Program Change
- ❖ Volume
- ❖ Pan
- ❖ Color
- ❖ Staff Settings (for Score)
- ❖ Drum Maps

Instrument tracks combine elements from both MIDI and audio-based tracks so their track presets save both types of settings together. When recalling track presets, they can only be recalled into tracks of the same category.

Muti-Channel Track Presets

You can save a track preset that contains multiple tracks together. The only limitation is that these track presets can only be recalled into the same group and sequenced order of tracks.

Track Archives

Another method for saving settings is through the use of track archives. Track archives are designed to save not only the settings of tracks but also their content, such as audio events and MIDI events. They can be used to store settings by merely removing all the events on the tracks before creating the archive. Then the archive contains empty tracks and all their settings. This can be imported into other projects as needed.

When a track archive is imported, it creates new tracks in the project so some material may need to be moved to these new tracks to take advantage of their settings. However, in the case of group channels and FX channels, track archives are very effective for loading numerous channels and their settings all at once.

Creating a Track Archive (Save Selected Channels)

In order to save a track archive to use the settings in another project, follow these steps:

1. Remove any events (including automation events) from the tracks themselves. They should be empty.
2. Select all the tracks you wish to include in the archive.
3. Go to File>Export>Selected Tracks... and you will be prompted to name the track archive.

This will create a .XML file containing all the settings for the selected tracks. This includes such settings as send routings and levels, cues, input and output routing in addition to all the normal track settings.

Importing Track Archives

To import a track archive, first ensure that no other tracks are selected in the project. The newly imported tracks will be created at the bottom of the project window. Go to File>Import, Track Archive and choose the .XML file you created. The Import Track Archive dialog will open, as seen in Figure 22.56.

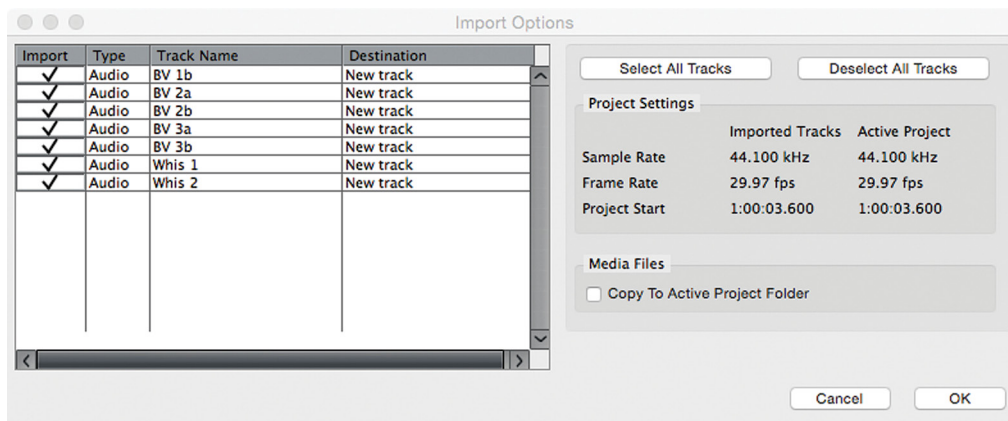


Figure 22.56

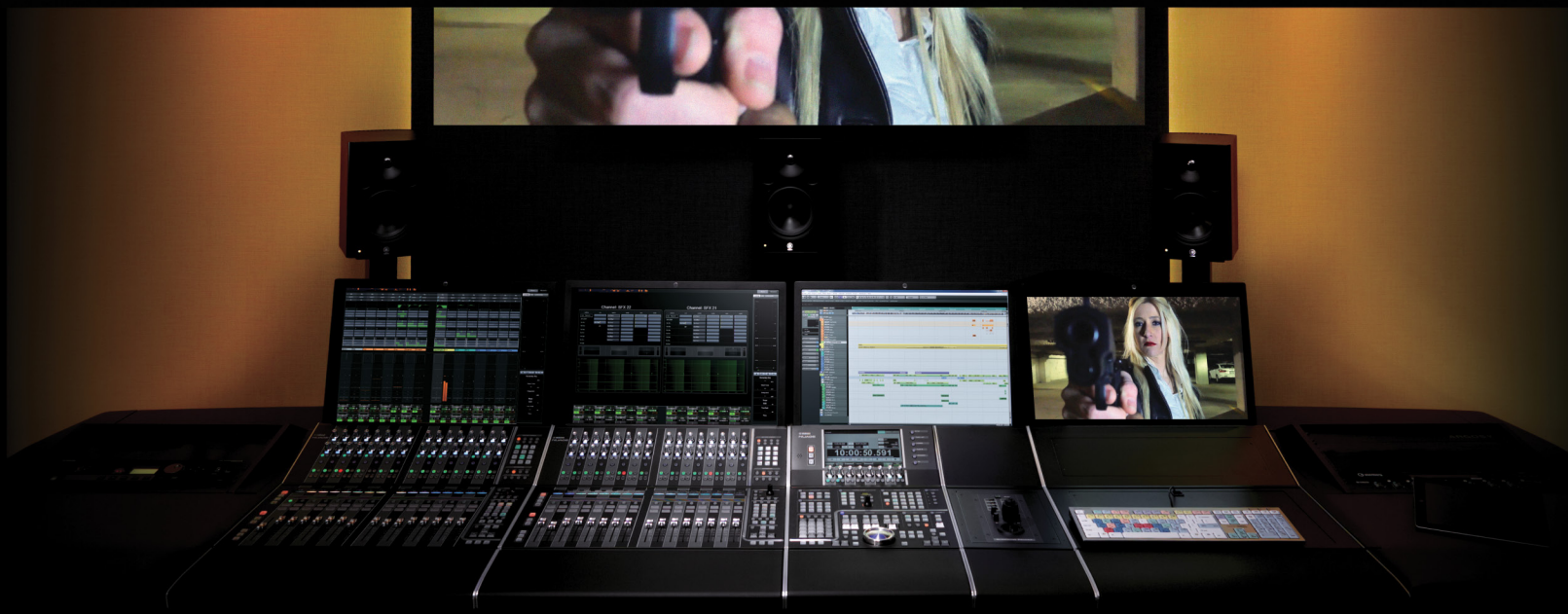
The Import Track Archive dialog

With all destinations set to “New Track,” the track archive will be imported and create new tracks with all the settings from the saved tracks. You can choose to import only selected tracks from the archive if desired. Since this includes routing and send destinations, complex groups of tracks can be imported with connected routings intact.

For example, with FX channels, entire groups of effects returns can be saved as track archives for use in other mix projects. If you have a delay return that you have also routed to a reverb FX channel using a send, this routing will be preserved in a track archive. This makes it easy to import an entire suite of effects with all settings and routings into a new mix project, giving you access to your favorite effect settings and templates.

NUAGE

COURSEWARE



PART IV: MIXING

by Ashley Shepherd

Chapter 23

Advanced Mix Routing



NUAGE

Advanced Mix Routing

- ❖ Advanced Stereo Routing
- ❖ Parallel Processing
- ❖ Multi-Bus Mixing
- ❖ M-S Mastering
- ❖ Side-chain Processing
- ❖ Feedback Loops
- ❖ Hybrid Mixing

Advanced Stereo Routing

Going beyond the simple stereo mix, there are a great many ways to route audio in Nuendo that can provide a more sophisticated mixing environment. This chapter is devoted to exploring some of the many possibilities.

Nuendo maintains the most advanced delay compensation engine, capable of dealing with just about any routing configuration invisibly and without timing errors. This ability includes resolving multiple parallel signal paths across the entire mix, giving you the freedom to be creative and not become a digital audio calculator every time you want to try something new and different.

Barring the impossible, such as a direct feedback loop, Nuendo is capable of dealing with any sort of signal flow scenario you can come up with. This chapter will explore some of the possibilities with useful techniques that can be applied to your mixes today.

Parallel Processing

Parallel audio paths are the basis for many advanced mixing and routing techniques. The ability for audio software to manage these paths and maintain sample-accurate timing is fundamental for this to work without destroying the phase relationships between the parallel signals.

When an audio signal diverts to two paths, each path may generate a differing amount of latency depending on what processing is being applied along that path. When the two signals are re-combined at the final mix stage, they *must* remain in sample-accurate sync with one another. Nuendo delivers on this.

Parallel Drum Bus Compression

A classic example of how parallel paths can be used in a mixing technique is the parallel drum compression trick. The idea is to have the pumping sound of highly compressed drums that bring energy and excitement to a mix without losing all the attack and punch of the uncompressed drum sounds.

Using two parallel signal paths, we can compress one of the signals and add it back to the original and get the best of both sounds. Often EQ will also be applied to the compressed signal to emphasize the character of the compressed drums.

Here's a step-by-step guide to setting up this classic mixing technique in Nuendo:

1. Create two Group Channels, one for the direct signal and another for the compressed signal. Usually these are both stereo group channels but they don't have to be.
2. Route all the drum tracks to the first group channel. Call this "Drums" or something similar.

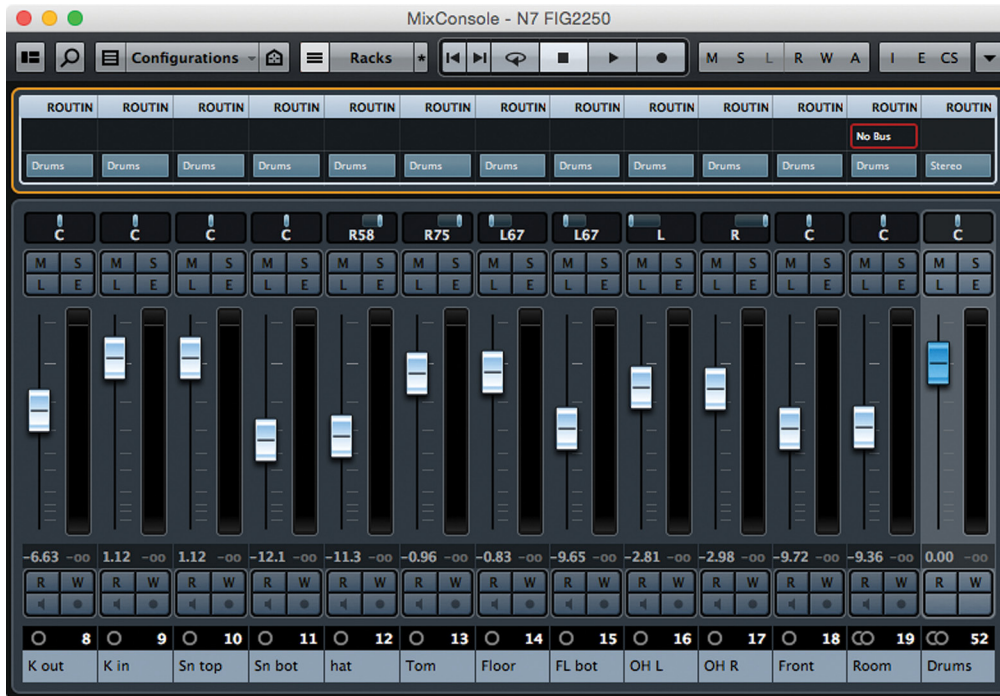


Figure 23.1
Drums tracks
routed to
"Drums" group
channel

3. Create a send from the "Drums" group channel routed to the second group channel. This could be called "Drum Comp." Make this a pre-fader send as you want the compression to remain the same even if you alter the group's fader level.
4. Turn the send up to unity gain (0 dB). Now you should have two group channels with the exact same signal in each, parallel paths. If you listen to the drums, they should simply be louder and not sound any different.



Figure 23.2
Pre-fader send to "Kit Comp" set to 0 dB

NULL TEST

To test the accuracy of the delay compensation engine, you can reverse the polarity on the second group channel and the signals should cancel each other out completely, a null. You should see signal level on both group channels but absolutely none on the Main Mix output bus. Once you change any settings on either channel, the sound will no longer cancel out in this phase test. Once your test is complete, do not forget to return the polarity back to normal.

5. Insert your favorite drum compressor on the second group channel. You can add other processing as well, including EQ and distortion if you like.
6. Make adjustments to your liking for compression. Remember, you do not need to be conservative on compression settings, as this signal will only be added back in with the unprocessed signal, adding a dimension to the drums, not replacing them. Try some aggressive compression, 4:1 with a fast release. The example is using the Vintage compressor in the strip with the punch button active.

7. Turn the compressed channel all the way down and start playback.
8. Gradually turn the compressed channel up till you reach a level where the original drums still retain their punch and transients but you can hear the effect of the compressed channel adding excitement and energy to the mix.



Figure 23.3 Compressor settings for parallel group channel



Figure 23.4 Mixing the parallel compressed track

EQ some more high and low frequencies of the compressed channel to increase the apparent size of the drum sound. Take this example as a starting point and apply it in other ways throughout a mix to see how parallel compression can work for you. Here are some other uses for parallel paths:

- ❖ **“Bass Amp” Channel:** When mixing a track where the only bass signal is from a direct input (DI), often the harmonics of the tone are not as present as they would be using a tube amp such as an Ampex SVT. Create a parallel channel that is fed from the bass DI track and insert VST Bass Amp modeling plug-in to create the amp sound you are missing. The DI track retains the low frequencies while the “amp” channel brings back more harmonics and “grind.”
- ❖ **Vocal Edge:** Create a parallel group channel for a lead vocal and insert a very aggressive compressor. You can EQ this signal to be very bright and edgy, perhaps even adding some distortion or tape saturation. Add a small amount of this channel into the mix to give the vocal a bright edge and clarity especially at lower volumes, when singing softly.
- ❖ **Parallel Vocal Compressors:** Try creating two or more parallel channels for a lead vocal and inserting different compressors on each channel and using them to create different tones for the vocal. These can then be blended and automated to sculpt the vocal sound in various sections of the song.
- ❖ **Send-Style Compression:** Popularized by top mixing engineer Michael Brauer, this technique involves creating a group channel with a compressor inserted and using sends to feed signals from different channels into the compressor to bring those sounds “up front” in the mix. A popular compressor for this application is the Universal Audio 1176 set to “all buttons in” mode.

Multi-Bus Mixing

This sophisticated mixing technique uses more than one mix bus for differing types of sounds. These multiple mix buses are then combined in a final stage to create the full mix. The concept stems from the common practice of inserting a compressor on the mix bus of a console. Gradually as you add channels to the mix, the compressor kicks in and starts compressing the whole mix.

The trouble starts when you've added too many signals and the compressor no longer is helping the sound glue together but rather starts shrinking the sound stage, making everything sound smaller. Also, when a mix is coming close to the end and various tweaks are being applied, these can upset the balance of the compressor operation, throwing the whole mix out of balance.

Most often this happens with the larger elements in a mix such as the lead vocal, bass, and drums. If at the end of a mix, it feels like the lead vocal needs to come up a bit, this can force the mix bus compressor to kick in more and hurt the sound of the bass and drums. Multi-Bus mixing overcomes this issue by keeping some key sounds isolated from each other in their own mix bus with their own compressor. Think of this as large scale sub-grouping.

MICHAEL BRAUER

Michael Brauer (www.mbrauer.com) has also popularized this mixing technique on Internet blogs and forums. He has been very generous in sharing his techniques with aspiring recording engineers. If you are interested in learning more about his techniques, please visit his website and peruse the Q&A section.

Here's one way it could work:

1. Create two or three VST Output buses. These will be your mix buses.
2. Name them as they relate to the sounds that will be routed to them. Think of the mix in terms of sonic types. Typically, the drums and bass will get a mix bus. You could make a second bus for midrange instruments and a third for vocals.
3. Create a fourth mix bus called "Final Mix" or something appropriate as this will be where everything combines into one final mix.
4. If you are using Control Room, make sure that the final mix bus is the "Main Mix" so that it will be routed to the control room mixer. Also none of the mix buses needs to be connected to any device ports. They are virtual mix buses.

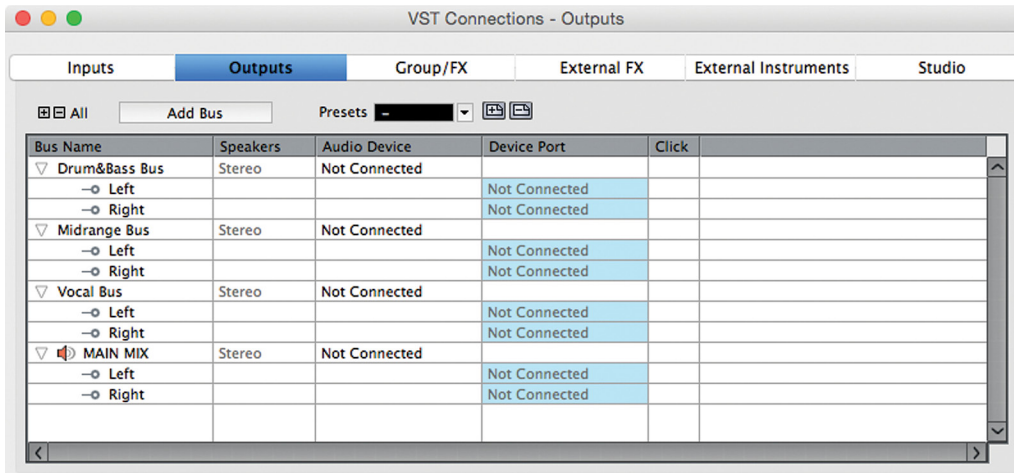


Figure 23.5
VST Outputs for
Multi-Bus
mixing

5. Create sends on each of the first three mix buses routed to the final mix, "THE MIX." You must use sends as VST Outputs cannot be directly routed to other VST Outputs. But using the sends allows you to combine them all together on the final mix bus.

A WORD OF CAUTION

Do not place any processing on this final mix bus as this will defeat the basic purpose of the multi-bus technique. When you are comfortable with the technique, you certainly can apply processing on the final bus but getting used to this scheme takes a bit of time at first. I will typically use a brick-wall limiter and dithering plug-in on this final mix when rendering client files, as it is necessary to output files for CD and mp3 properly dithered and at a decent level, but that's all.

6. Set the sends level to unity (0 dB). The three mix buses will be combined at the same level to the fourth and final mix bus.



Figure 23.6
Sends from each mix bus to the “Final Mix”

7. Insert compressors and even equalizers that have a tone that is complimentary to the group of sounds. For example, a Fairchild-type compressor and Pultec-style EQ can sound wonderful on bass and drums. The midrange elements might need a slightly faster compressor, such as an SSL-type. This is purely a matter of taste, and experimentation is the only way to find what works for you. The technique is what gives you the option to do this.
8. Route the various channels to the appropriate mix bus and blend the mix together, achieving some amount of compression on each mix bus.
9. Once you have a basic blend going on with some compression certainly in the bass and drum bus, try turning up the lead vocal a decent amount and notice how the balance changes. It is very different from the traditional single mix bus compressor approach. The drum and bass balance should not be disturbed, and the vocal can easily come up in level.

Once you have this multi-bus mixing technique running well, you will discover that you have more versatility to make changes as you move along through the mixing process. Making major changes will have less affect on other elements in the mix that are sounding good, giving you more elbow room to be flexible.

Triple Path Technique

One technique that this approach offers is the ability to have a triple path for a signal. In this example, let's use the snare drum. Toward the end of a complex music mix you might find that the snare drum has lost its presence in the mix after all the elements have been added. Simply turning up the snare might fix this, but with multiple compressors in various paths being affected by more snare level (Drum Comp, Drum & Bass Bus, etc.), other balances could be disrupted.

Another solution is to create a send from the snare channel routed to the final Main Mix bus of the project. This signal path avoids all of the other compressors and can add a punchy snare right to the final mix path without disrupting any other balances in the routing scheme. Now the snare drum has three paths in the mix:

- ❖ Drum group>Drum & Bass Bus>Main Mix
- ❖ Drum Comp group>Drum & Bass bus>Main Mix
- ❖ Snare send>Main Mix

The plug-in delay compensation engine in Nuendo will rectify the timing of these three paths so that they are sample accurate when combined at the Main Mix. Now adding just a little bit of the snare channel directly to the Main Mix will bring up the snare balance without affecting anything else.

Cubase Version Using Group Channels

In Cubase, VST outputs do not have sends. To work around this limitation, simply use group channels as a substitute for the multiple VST outputs in the example. The sound will be the same.

No Rules in Mixing

Note that although this technique is very versatile, it won't work on every mix. Sometimes the traditional approach is the way to go, and remember, there are no rules in mixing! The sophisticated routing that can be accomplished in Nuendo allows for flexibility. There are no rules, and Nuendo puts no reasonable limitations on complex routings such as these.

M-S Mastering

Another field of audio that sometimes requires delicate and precise routing schemes is mastering. Modern mastering studios use a combination of analog and digital technologies to achieve their amazing results. Nuendo can be configured to provide everything a mastering engineer might need in a signal chain, including analog devices. Mastering engineers have had to find ways of manipulating the stereo audio signal to address specific issues in a mix without having direct access to the offending channel.

One way of getting “inside” a two-channel mix is through the use of M-S or mid-side processing, whereby the left-right signal is converted into a single center channel and a single side channel. These can now be processed independently to address issues in the mix only in the center or only on the sides of the stereo field.

M-S processing is most familiar as a recording technique utilizing two microphones, one in a cardioid pattern and the other in a bi-directional or figure 8 pattern. The cardioid microphone is aimed at the center of the sound field and the bi-directional microphone is placed coincidentally but facing 90 degrees off-axis.

To generate a stereo field in mixing, the bi-directional channel is duplicated and placed out of polarity. When the two bi-directional channels are hard panned left and right and the cardioid channel is panned to the center, a high-quality and focused stereo image is generated.

Nuendo’s mixer is capable of “reverse engineering” the M-S process to create a mid and side channel that may be processed in mastering to create powerful results not possible with standard stereo techniques.

Here’s how to set up a M-S mastering console in Nuendo:

1. Start with a single stereo audio track. This will be where the source material is placed and the origin of all the signals.
2. Create two mono and three stereo group channels. In order, they can be named Mono, Inverse, Side, Stereo Master, and Reference.
3. Open the channel settings for the Source audio track and route four sends to the groups Mono, Inverse, Side, and Reference. Make them pre-fader.

4. Turn the channel fader all the way down on the source track. It will not be necessary to hear the source track directly.
5. Reverse the polarity on the Inverse group and route it to the Side group. The combination of the source track and a mono, phase-reversed signal together will yield only the side channel information, hence the channel name. Processing applied to this channel will only affect audio heard on the left and right of the stereo image.
6. Route the Mono and Side channels to the Master group. The recombination of the mid (mono) and side signals together on the master group will return the stereo signal intact.



Figure 23.7
Source track with sends and five group channels, named and routed

- Listen to the unprocessed signal and then mute the Mono channel. All that will be left is the side information. This allows you to closely listen to only the sides to see if any issues are present there. Sometimes low frequency information in the side channel can cause unwanted interference in the low end “punch” of a mix. High-pass filtering just of the side channel can sometimes help tighten up a mix.



Figure 23.8
PostFilter
inserted on the
Side channel

- With all channels un-muted (besides Reference), gradually turn down the Mono channel and notice how the stereo image widens. This stereo manipulation is powerful and should be used judiciously, but sometimes a careful widening of the mix can be helpful. A small change (1-4dB) can drastically alter the stereo image.

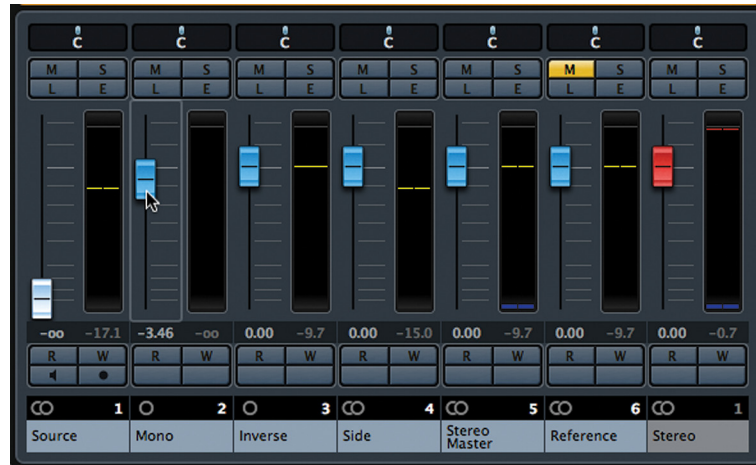


Figure 23.9
Widening the stereo image by lowering the center signal

MUTING THE REFERENCE CHANNEL

Always keep the Reference channel muted unless you are checking the unprocessed mix. It will interfere with hearing the proper stereo field if left un-muted. I have the polarity reversed on the Reference channel so that it is obvious when this channel is unmuted—the signal level will be greatly reduced.

9. Insert an EQ plug-in on the Mono channel. Manipulating the spectrum of the center channel alone can help bring out vocals and other main instruments without damaging the balance of the stereo signals. Sometimes even compressing the middle can really do the trick.
10. Standard processing can be applied to the Stereo Master channel with EQ, compression, limiting, and dither. This channel is the final master stage of the console setup.
11. The reference channel is muted while listening to the Master channel. When you wish to check the original mix to see if the processing is actually doing a good thing, simply solo the Reference channel and listen to the unprocessed mix. Pressing the solo button again will return the Reference channel to a muted state and the other channels to un-muted. The solo button can be used as a toggle between processed and unprocessed mixes, ideal for A/B comparisons.



Figure 23.10
Studio EQ on the Mono channel and basic processing on the Stereo Master

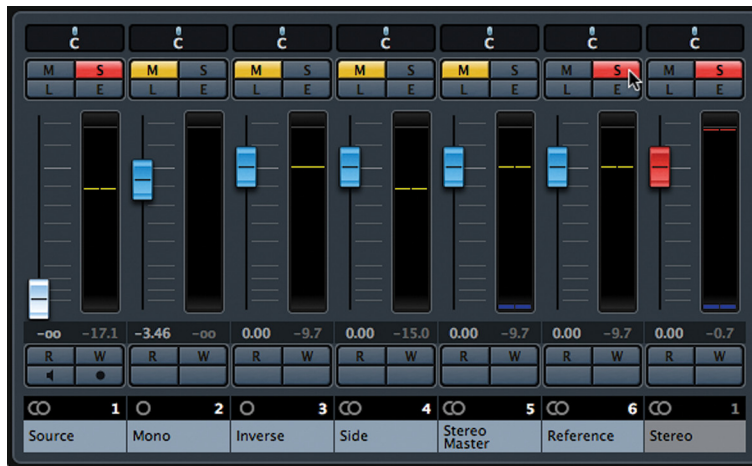


Figure 23.11
Using the solo on the Reference channel as an A/B toggle

This console setup provides many of the tools a mastering engineer might use in the pursuit of a great master. The ability to process mid and side signals independently is a powerful tool in the hands of a good set of ears. All of the signal paths are completely delay compensated so there are no phase issues or comb filtering as a result of plug-in latencies.

TESTING THE M-S CONSOLE SETUP

To ensure that the M-S console setup is working correctly, reverse the polarity on the Reference channel and un-mute it. If no processing is being applied to the other channels, the final signal should null completely. Plug-ins may be inserted on the various channels but if they are not altering the signal, everything should cancel perfectly and you should hear nothing even while the meters indicate signal present. The VST Output channel will show no level at all.

This type of M-S deconstruction can also be used during mixing. If there is a stereo channel that is not well balanced or you simply wish to dig in and do something weird to it, breaking it up into mid and side channels offers a unique way of tearing stereo apart.

Side-chain Processing

VST 3 plug-ins capable of having a side-chain input have a dedicated button in the GUI, as shown in Figure 23.12.



Figure 23.12
Side-chain
enable for the
tube compressor
plug-in

Enabling this button adds the side-chain input as another available destination in the output routings for channels and sends in the MixConsole, as shown in Figure 23.13. With the compressor plug-in inserted into an audio channel and the side-chain activated, a side-chain input is now available as a destination for other channels and sends.



Figure 23.13
Side-chain
input as routing
destination

SIDE-CHAIN INPUTS

Side-chain signals are primarily used by dynamics processors: compressors, gates, expanders, etc. They allow signals to trigger the action of the plug-in without that same signal running through the plug-in and being processed.

For example, let's say you insert a compressor on a bass track and activate its side-chain input. You can route a send from the kick drum channel to the side-chain input of that compressor. The result is that the bass will be compressed by the kick drum signal. In other words, when the kick attacks, it will cause the compressor to act upon the bass signal, pumping it along with the kick drum. The result can be a feeling of the bass and kick drum locking in more, tightening up.

Dance Music Pumping Effect

In this example, you will create the pumping beat effect common in much of today's EDM and pop music. This effect is characterized by a deep pumping of keyboard pads and sustained sounds, tied to the bass drum playing a straight quarter note dance beat. A side chain compressor is the tool to use for this.

Follow these steps:

1. Create a group channel for the pumping keyboard sounds.
2. Route all the sustained sounds from synthesizers or other audio tracks that you want to include in this pumping effect.
3. Insert a compressor that has side-chain function, such as the Vintage Compressor shown in Figure 23.14.
4. Create a send from the kick or bass drum channel routed to the side-chain input of the Vintage compressor, as shown in Figure 23.15.
5. Adjust the threshold of the compressor to get gain reduction on each bass drum hit. This will control how deep the pumping effect is.
6. Use the attack, release, and hold times to establish the speed of pulsing you desire from the Pump group.



Figure 23.14 The Compressor with active side-chain on the “Pump” group



Figure 23.15 Routing the bass drum signal to the side-chain input with a send

Now you have very precise control over how the pumping effect works, giving you greater creative freedom to pursue the sound you desire.

Feedback Loops

One thing Nuendo is not capable of doing is routing an instantaneous feedback loop inside the mixer. Delay compensation of this nature is not physically possible due to the nature of digital processing. If you try to route channels in such a fashion as to create a feedback loop, Nuendo will simply grey out destinations that are not accessible for this reason.

However, using external hardware, you can create a feedback loop with some amount of inherent delay. Since one of the primary uses of a feedback loop is in delay processing, this is not necessarily a problem.

Many delay plug-ins (including those from Steinberg) have feedback built in to their processing. Some even allow you to adjust the character of the feedback signal, such as ModMachine, shown in Figure 23.16.



Figure 23.16
The ModMachine delay plug-in with adjustable filters and drive control on the feedback circuit

While ModMachine and similar plug-ins are wonderful sounding, creating your own hardware feedback loop opens up possibilities that no single plug-in can offer. Here's how to create a hardware feedback loop in Nuendo. This example will be for a feedback loop that uses a delay line as the effect. This can be done with any type of effect plug-in for all sorts of wild results:

1. Create a mono VST Output bus named "Feedback Send" or similar.
2. Connect this bus to either a digital or analog output of your audio interface that is unused.

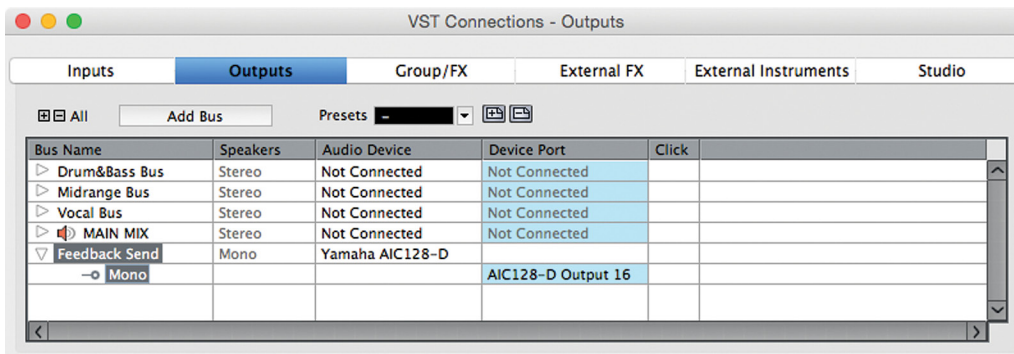


Figure 23.17
Mono VST
Output for
feedback send

3. Physically patch that hardware output back into a hardware input, whether digital or analog. This is the hardware part of the loop. You must create a physical loopback for the audio, since Nuendo won't allow that sort of routing. In this case, I've connected the analog output 16 to the analog input 16 of the NIO 16A Dante interface.
4. Create a mono External FX. This is where you trick Nuendo into giving us a live input back into the mixer. You could name this "Feedback Return" or similar.

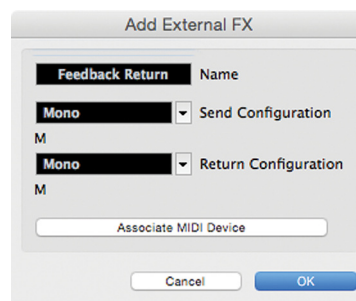


Figure 23.18
Creating a
mono External
FX

- Do not connect the send of the External FX to any device port. Connect the return of the External insert to the hardware input you patched in step 3.

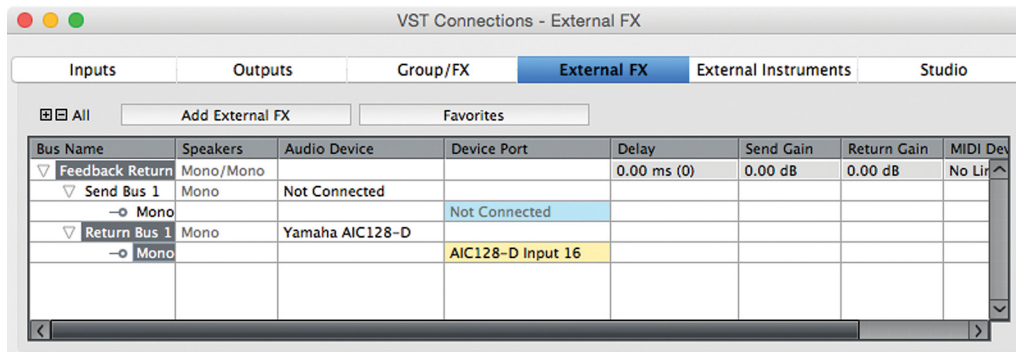


Figure 23.19
External FX for creating a hardware feedback loop

- Add an FX Channel with a delay plug-in such as the stock “Stereo Delay.” Set the delay time fairly long just to get a feel for how this works, 300-600 ms. Set the mix to 100% wet or effect and turn the feedback to 0.0 since we are creating another feedback loop.

MONO OF STEREO

This could also be a mono delay if you wish. The feedback loop will work with either mono or stereo FX. It is also possible to create a stereo feedback loop using two hardware channels. The steps would be the same except it would require two available interface channels.

- While the FX Channel is routed directly to the Main Mix, create a send routed to the VST Output “Feedback Send.” Set the level at unity (0 dB).

**Figure 23.20**

FX Channel with a mono delay and a send to the Feedback Send output

8. Create a mono Group Channel track. This will be the controlling channel for feedback. This could be named “Feedback Control” or similar.
9. Insert the External FX “Feedback Return” on the first insert of the group channel. This allows the feedback signal back into the Nuendo mixer. It will be delayed from the rest of the signals in Nuendo, but for a delay feedback line, this should not be a problem.
10. Route the output of this group channel to the FX channel that has the delay, “FX 1-Stereo Delay” in this example. Now the loop has been created. Depending on the gain structure, you might begin to develop feedback as soon as this routing is complete. If so, turn down this group channel to stop the feedback from growing out of control.



Figure 23.21
The Feedback channel is ready



Figure 23.22
Feedback channel with extra processing and distortion

11. Insert other plug-ins such as compressors, flangers, EQs, distortion—anything interesting that you think might work in the feedback loop. Just simple EQ on the feedback chain can create dramatic results. Compressors keep the feedback very dense. Experiment here to find new sounds.
12. Use automation to change the feedback amount over time, turning it up when you wish to hear longer echoes and down when you want the echoes to stop.

Simply turning up the feedback control channel can create an infinite repeat of the delay time. When you add EQ, compression and other processing, the feedback signal takes on a different dimension, pulsing and resonating as the loop feeds back upon itself. When you automate the fader level of this channel, you can create dynamic effects not possible with the conventional routing Nuendo provides by itself or in most delay plug-ins.

Hybrid Mixing

Many modern studios are using both analog and digital technologies during the mixing process. The use of digital plug-ins and analog outboard gear for processing offers the widest array of sounds and sonic manipulation ever possible. Signals may be combined using a digital mix bus or an analog summing device such as a console or dedicated summing box (Dangerous 2-Bus, Folcrom, Shadow Hills Equinox, etc.). The results depend on the people using the equipment, but the options with this approach are almost endless, with results that have been heard and enjoyed all over the world.

While the debate over whether analog summing or digital summing sounds better rages on in the forums and chat rooms of the Internet, the fact is they sound different enough that they may be treated as options in the palette of mixing tools available to us today. With that in mind, let's examine a possible hybrid-mixing approach using Nuendo and a 16-channel external summing device along with some choice analog outboard gear to see how to get the best of both worlds.

In this example, we will use a combination of sub-grouping, multi-bus mixing, parallel compression and external inserts to create the final mix, illustrating Nuendo's ability to encompass all the varied signal paths necessary to achieve this complex setup with ease.

Here's our list of gear:

Nuendo	24 channels of analog IO
Dangerous 2-Bus LT	16 channel summing device
Pultec EQP-1A	a pair of classic equalizers
Fairchild 660	World renowned stereo compressor
Distressors EL8	a pair of modern "fast" compressors
Teletronix LA-2A	a classic tube compressor/limiter

Setting Up

In order to make this all work together, we must first decide how the outboard gear will be utilized. Then we can setup Nuendo's VST Connections to accommodate all the signal paths. Finally, we will configure the mixer to route all of the tracks to make this work.

Figure 23.23 shows a diagram of how everything will be connected.

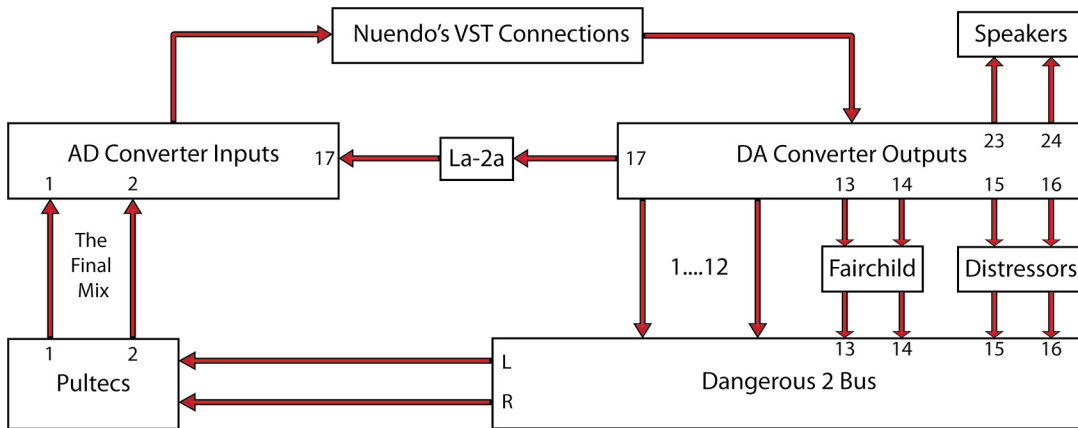


Figure 23.23
Hybrid-mixing
diagram

Outboard Gear

For this example, here's how we will use the outboard gear:

- ❖ **Pultec EQP-1A:** The Pultec equalizers will be used on the final mix bus to warm up the entire sound. Since the final mix will be combined on the Dangerous 2 Bus, the Pultecs will be inserted on its left and right outputs.
- ❖ **Fairchild 660:** The Fairchild compressor sounds amazing on drums and bass. This will be inserted on the drum and bass sub-group coming out of Nuendo and into the Dangerous 2 Bus.
- ❖ **Distressors EL8:** Distressors are versatile and sound great on most anything. In this case, we will use them as a parallel compression setup that we can route several sounds to in order to get that “up front” sound.
- ❖ **Teletronix LA-2A:** This compressor is famous as a vocal compressor. We will use it as an External FX insert for the lead vocal.
- ❖ **Dangerous 2-Bus LT:** This is the final mixing device for the whole thing. We will route signals from Nuendo's audio interface into all 16 inputs.

VST Connections for Hybrid Mixing

Since this Nuendo system has 24 analog inputs and outputs, we have plenty of I/O to connect all the gear with room to spare. First, let's set up the outputs that will be patched to the inputs of the Dangerous 2 Bus.

1. Create 8 stereo VST Outputs. These outputs can either be used in stereo pairs or as mono outputs. The Dangerous 2 Bus can switch each pair from stereo to dual-mono with a switch.

- Route these outputs to hardware device ports using the Shift modifier to increment the output port.
- Name each output descriptively. Here, I use the name of the musical items that will be routed to each output, as seen in Figure 23.24. Notice how the “Main Mix” is called “Digital Mix” and is not connected to an Audio Device. This bus can be used to hear a digital version of the summing if desired.

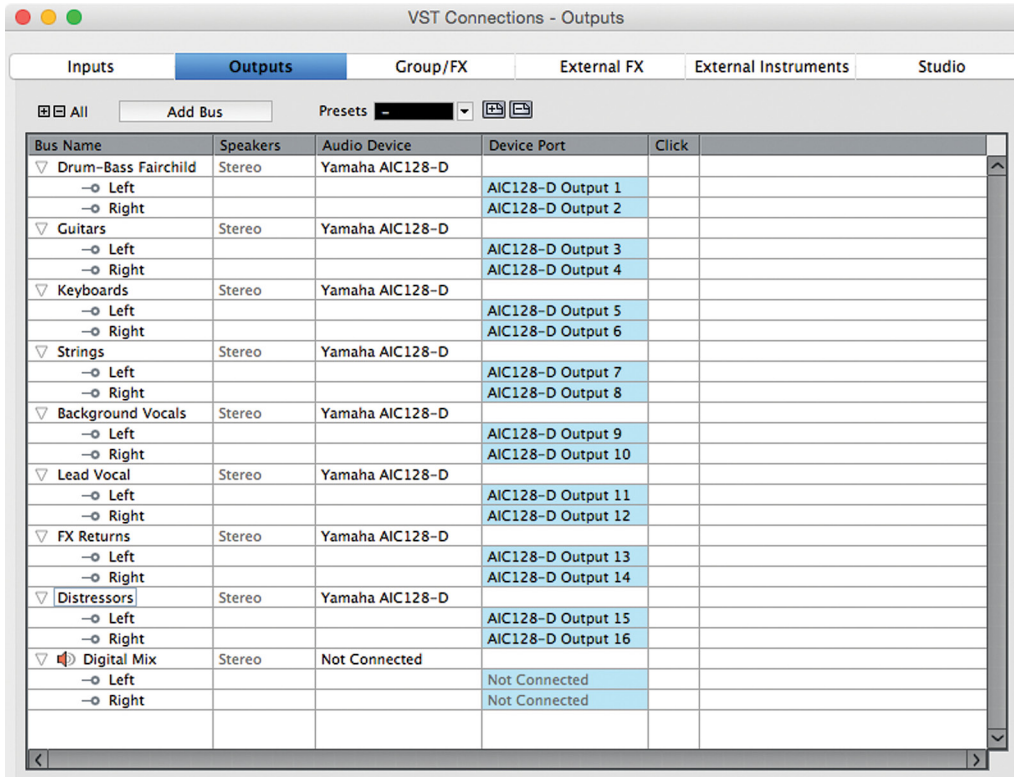


Figure 23.24
VST Outputs for
16 channel
hybrid mix

The LA-2A is going to be used as an External FX to be inserted on the lead vocal channel. This must be set up in the External FX tab of VST Connections. I’ve used output 17 and input 17 to connect the compressor to the audio interface, as shown in Figure 23.25.

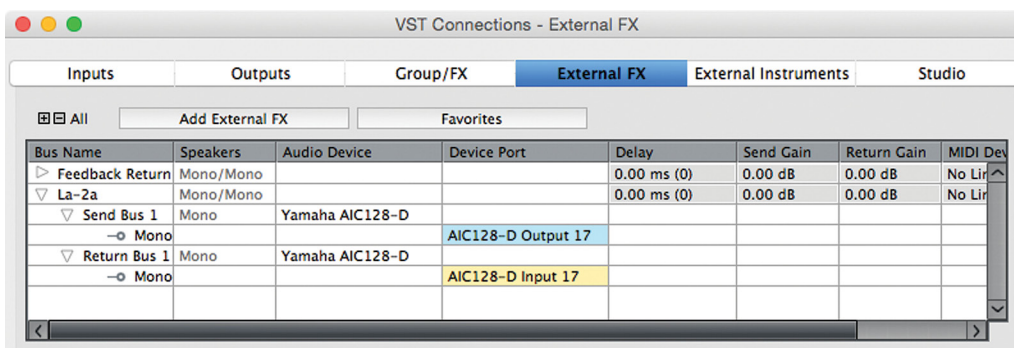


Figure 23.25
LA-2A External
FX

Next we will set up the Control Room to accommodate the hybrid system. While it is certainly possible to use external analog monitoring equipment, for this example, we will use all of the features in Nuendo for monitoring.

The Control Room will need an extra monitor source to be able to monitor the final mix coming out of the Dangerous 2-Bus LT through the Pultecs, as seen in Figure 23.26. In this case, you will create a Monitor Source that comes from a VST Input. This VST Input will also be used to record the final mix back into Nuendo on an audio track.

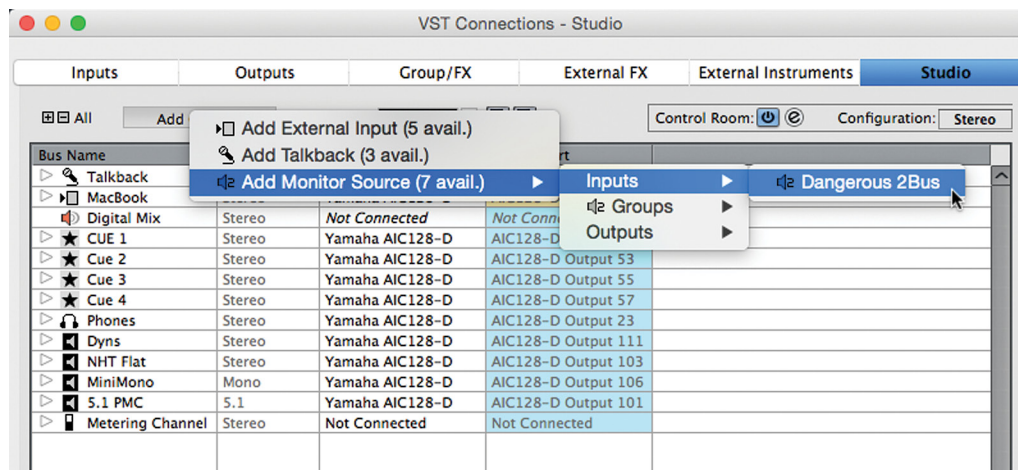


Figure 23.26
Control Room
for Hybrid
Mixing

Configuring Nuendo's Mixer

Now that we have all the IO sorted out, it's time to configure the mixer. In this example, we have a standard assortment of instruments that could be found in a pop or country song:

- | | |
|-----------------|--------------------------|
| 1. Tamb | 10. Floor tom bottom |
| 2. Shaker | 11. Overhead L |
| 3. Kick out | 12. Overhead R |
| 4. Kick in | 13. Front of Kit |
| 5. Snare top | 14. Stereo Room |
| 6. Snare bottom | 15. Bass DI |
| 7. Hi-hat | 16. Bass amp |
| 8. Rack tom | 17. RG 1 (Rhythm guitar) |
| 9. Floor tom | 18. RG 2 |

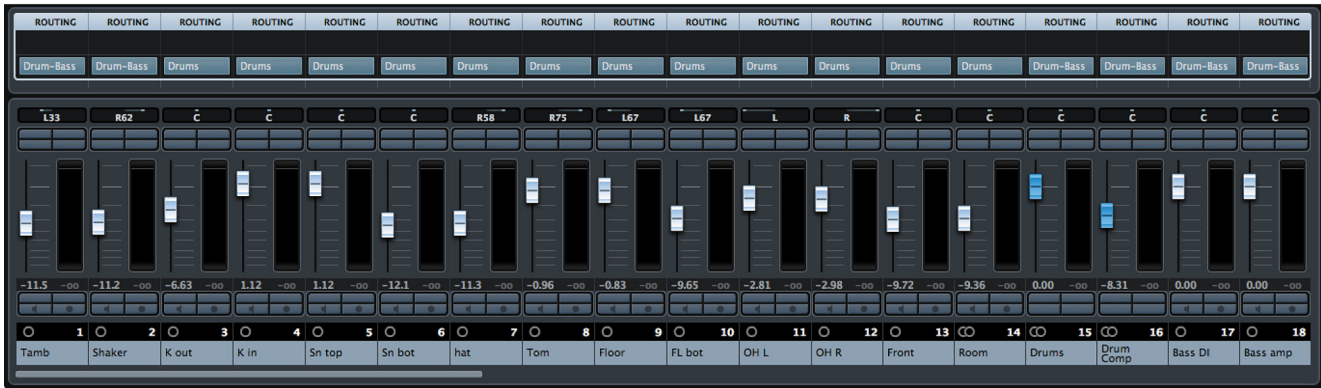
-
- | | |
|------------------------------------|-------------------------------|
| 19. CH Line 1 (Chorus guitar line) | 32. Viola |
| 20. CH Line 2 | 33. Cello 1 |
| 21. Clean Guitar | 34. Cello 2 |
| 22. Solo guitar | 35. BV 1a (background vocals) |
| 23. Tremolo guitar | 36. BV 1b |
| 24. Piano (stereo) | 37. BV 2a |
| 25. Synth Pad | 38. BV 2b |
| 26. Mini Moog line | 39. BV 3a |
| 27. Blip (synth sequenced beep) | 40. BV 3b |
| 28. Violin 1a | 41. Whis 1 (Whisper voice) |
| 29. Violin 1b | 42. Whis 2 |
| 30. Violin 2a | 43. Lead Vocal |
| 31. Violin 2b | |

Forty-three tracks might seem like a lot at first but by grouping channels together and bussing them to the Dangerous 2 Bus summing box, they will all be combined into a finished mix. The music could be completely different, but the same basic premise can apply to electronic music, world beat, bluegrass, you name it.

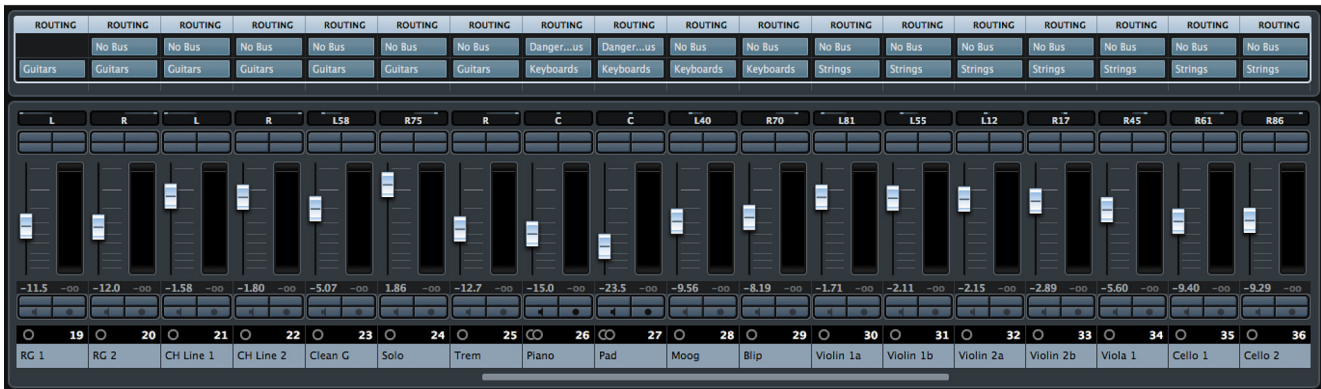
First, let's group similar instruments together as needed. The drums can all go to a group channel as can the background vocals and strings. The rest will be combined at the VST Outputs. Look closely at the routing of all the channels. The drum tracks first go to the Drums group channel and then to the Drum Comp channel for parallel compression. The Drum groups and the two bass tracks go to the Fairchild outputs so that they will be compressed together on their way to the Dangerous 2 Bus.

All of the guitars are routed to outputs 3 and 4. The Piano and other keys go to outputs 5 and 6. The strings group channel is routed to 7 and 8. Background vocal group channel goes to 9 and 10. The lead vocal goes to the mono channels 11 and 12 on the Dangerous 2 Bus. On the Dangerous 2 Bus we have enabled the Mono button on channels 11 and 12.

Drums and Bass channels



Guitars, Keyboards and Strings



Strings, Vocals and Effect Returns

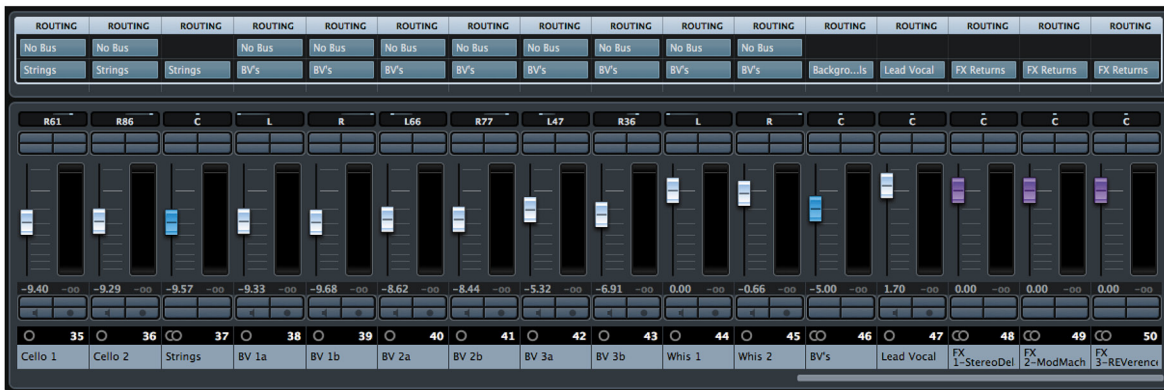


Figure 23.27 The basic Hybrid Mixer

Adding FX

As you are mixing, you will most likely add effects such as reverb, delays, etc. Each time you create an FX Channel, route it to “FX Returns.” All the effects will then have their own set of channels in the Dangerous 2 Bus and will be mixed into the final result.

On the lead vocal, we need to insert the LA-2A. Open the lead vocal channel settings window and choose the LA-2A from the External FX directory of the inserts menu.

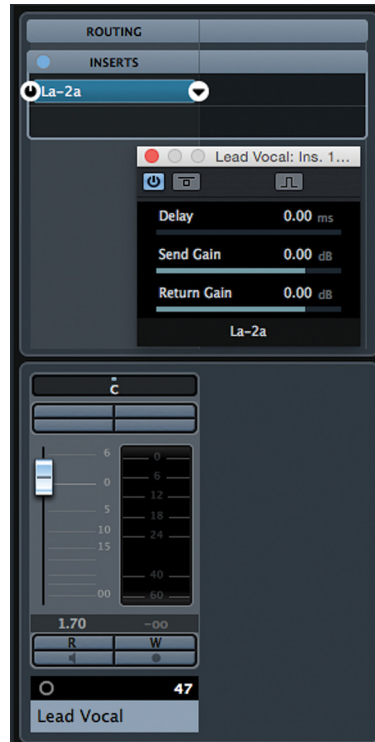


Figure 23.28

Inserting the LA-2A

Parallel Paths

Let's say that the guitar solo needs to be more “in your face.” Let's use the Distressors to bring it forward in the mix. Route a send to the Distressor output to create a parallel compression path for the solo.

**Figure 23.29**

Parallel compression with the Distressors

A NOTE ON SEND ROUTING

Since you are routing a single channel to a stereo destination, panning is involved. The sends can also pan between left and right channels. If the solo guitar is panned to the right in the mix, then the send to the Distressors bus should also be panned to the right by the same amount to maintain the stereo image. The Preference setting VST>'Send Routing Panners follow Channel Panner as Default' must be enabled for this to happen automatically. Otherwise you will have to access the send routing in the Channel Setting window and adjust the panning of the send, as shown in Figure 23.30. Also in the Channel Settings window, you can choose to display the "Control Strip," which contains a button to enable the follow panner preference right from there.

By the end of the mix, the feeling is that the snare has fallen back in the mix and needs to be turned up. Since it might disrupt the action of the Fairchild compressor on the drum and bass output, use another send from the Snare track to the FX 11 and 12 outputs, as shown in Figure 23.31.



Figure 23.30 Channel Settings with Control Strip and Send Routing

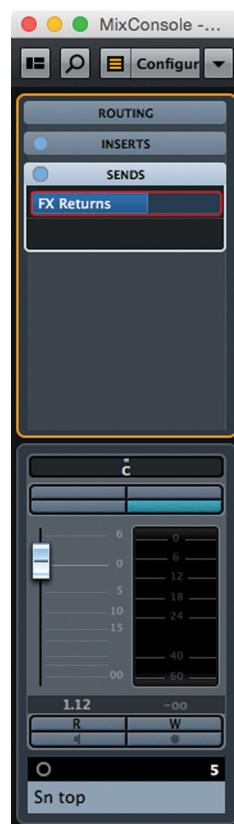


Figure 23.31
Snare to the FX
Returns output

The FX output has no other processing on it, so it's a good path for the snare to bypass the compression on the drum and bass outputs and go directly to the FX outputs which have no processing applied. Turning up the send to this output will increase the snare volume and punch without altering the compression action of the drums and bass together.

DELAY COMPENSATION

All of these parallel outputs will be perfectly phase-aligned due to Nuendo's delay compensation processing. Not only does it compensate for plug-in latency, but also the delays associated with these types of complex and parallel routing schemes.

Monitoring and Recording the Final Mix

In order to listen to this mix while working on it, you must Monitor Source 2 in the control room mixer, as seen in Figure 23.32. Set this to "Dangerous 2 Bus" and you will hear the output of the Dangerous through the Pultecs and back in to the audio interface of Nuendo.

When it comes time to record the final mix, you can do so right into Nuendo. Create a new Audio track named "My Final Mix" or similar. Select "Dangerous 2 Bus" as its input to record the output of the summing mixer through the Pultecs, as shown in Figure 23.33.

Notice how the output is set to "Digital Mix," the VST Output that is not connected to any audio device but is set as the "Main Mix." This means that when you want to hear playback of your recorded mix, all you have to do is switch the Control Room mixer to "Mix Source 1." Setting the source to "Mix Source 2" will monitor the output of the Dangerous 2 Bus directly.

Take a moment to consider this last step, as it can be quite confusing at first. We are using Nuendo not only as the playback device but also as the master recording device for the final mix. Once recorded, playback of the final mix occurs through the normal "in-the-box" mix path as opposed to the hybrid path even though the tracks are all in the same project.



Figure 23.32
Control Room
Mixer to moni-
tor Dangerous
2 Bus



Figure 23.33
Set Dangerous
2 Bus as input

For creating multiple versions of the mix, I enable Lanes on this track and rename the track for each version, thereby creating unique file names in the Audio folder of the project. For example:

- ❖ Final Mix – The master mix.
- ❖ Final Mix Vocal Up – The same mix with the lead vocal turned up a tad.
- ❖ Final Mix Instrumental – The final mix without any vocals.
- ❖ Final Mix Lead Vocal – For remix purposes.
- ❖ Final Mix Background Vocals – Remixes.

You get the idea. Each one of these mix passes is recorded on a lane in the audio track. Any quasi-mastering processing you apply on this channel can be used to render files for every version of the mix you create (mp3s, etc.), all from one channel.

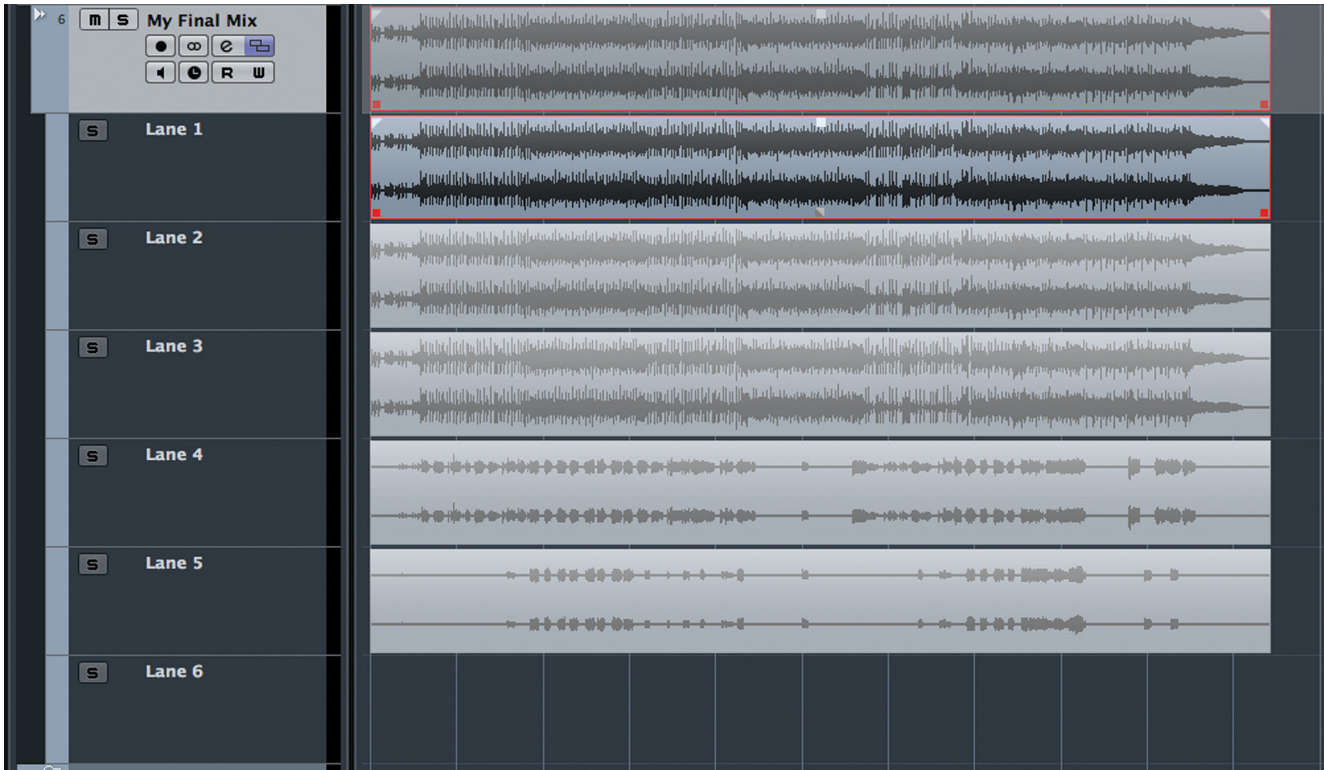
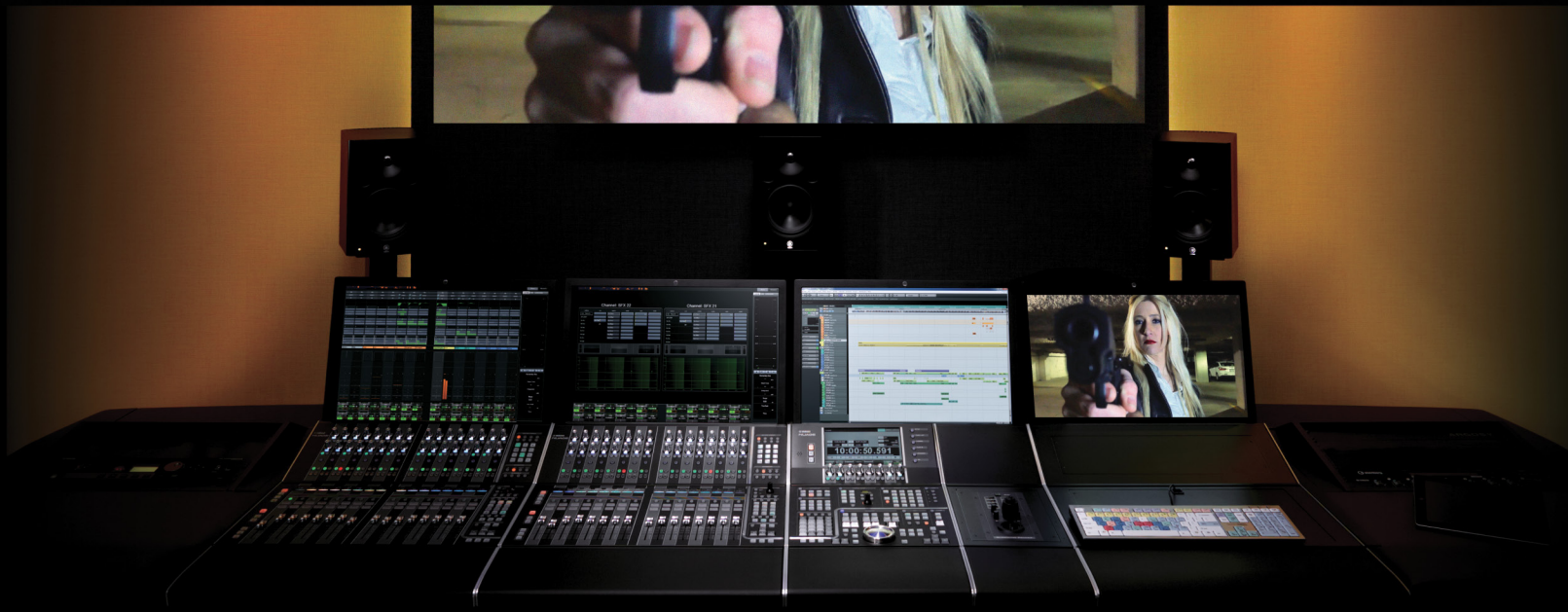


Figure 23.34 Final Mix audio track with several mix versions

NUAGE

COURSEWARE



PART IV: MIXING

by Ashley Shepherd

Chapter 24

Surround Basics



NUAGE

Surround Basics

- ❖ Surround Sound Setup
- ❖ Surround Panner
- ❖ Downmixing

In this chapter you will learn how multi-channel surround routing works in the MixConsole. Surround-specific features of the Control Room will also be explored. The Surround Panner and MixConvert tools will be explained so you'll know when they are used and how to operate them. Some basic concepts about mixing sound for picture will be discussed as you prepare a simple 5.1 mix project.

Surround Sound Setup

To begin with, a surround sound project needs to be created. Create an empty project you can use to explore the surround functions first before mixing a complete production. When you first create an empty project, the VST Connections will default to the last used set of inputs and outputs unless you have created default presets previously.

Main Mix and Control Room Configuration

The first difference in a surround project is the configuration of the Main Mix in VST Outputs. The Main Mix configuration determines the configuration of the Control Room. If the Main Mix is stereo, the Control Room is also stereo. To change this, add another VST Output with a 5.1 configuration, as shown in Figure 24.1.

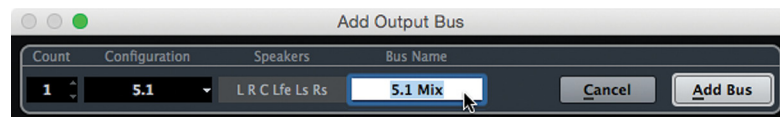


Figure 24.1
Adding a 5.1
VST Output

Now set that bus as the Main Mix using the context menu in VST Connections. Once the Main Mix is a surround output bus, the Control Room tab will show that it, too, is now configured in 5.1, as shown in Figure 24.2.

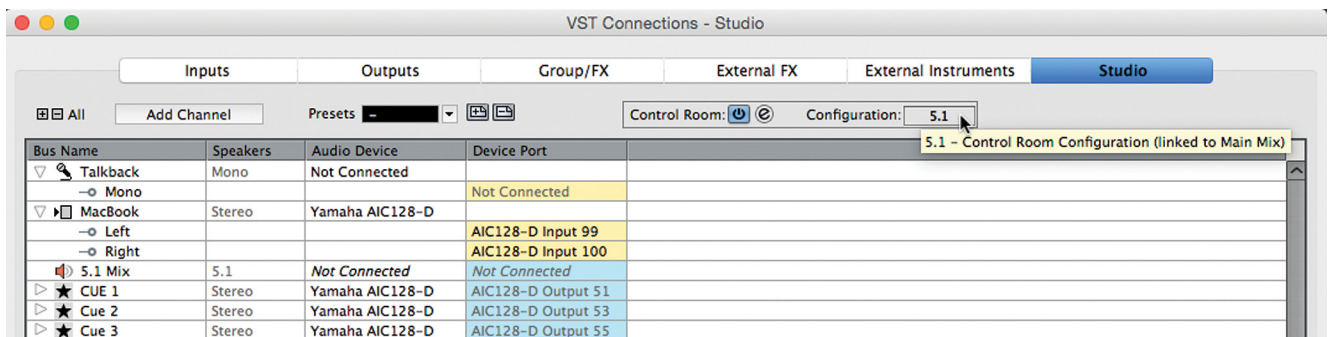


Figure 24.2 Control Room tab showing the 5.1 configuration

Remove the original stereo output bus from the VST Outputs tab. Add one mono audio track to the project. Figure 24.3 shows the mono audio track in the MixConsole showing a surround panner in place of the normal stereo pan control. You can see a small dot that represents the acoustic position of the signal within the soundfield. Also, the LFE (Low Frequency Effects) level is listed.



Figure 24.3
Surround panner

LOW FREQUENCY EFFECTS

The Low Frequency Effects (LFE) channel in a 5.1 surround configuration refers to a dedicated speaker channel that is routed to a subwoofer for use in special sonic effects such as explosions, earthquakes, giant robot warriors, etc. In a properly calibrated system, this channel has an extra 10dB of gain over the other channels in the system to provide a visceral sensation with low frequency sounds. This should not be confused with the low frequency content of other sounds in the mix that should be reproduced by the other speaker channels. The LFE channel is not designed to augment the low frequency extension of the other speakers, rather its use should be saved for truly explosive moments in the program. This is why the LFE has a dedicated level control in the surround panner.

5.1 Speaker System Calibration



(tutorial video: “Surround Speaker Calibration”)

It is important that the speaker system used for surround sound is properly calibrated. The concept is to use pink noise at a standard -20dBFS signal level to calibrate a specific loudness from each speaker channel using the SPL meter. Each speaker channel must output the same volume so that imaging in the surround listening area is correct. Also the overall loudness of the system should be set at a specific level determined by the type of mixing being performed. For example, in theatrical mixing environments, the overall loudness should be 85 dB SPL for each speaker channel. In television mixing rooms, the level is lower, falling somewhere in the range of 75-80 dB SPL due to the quieter listening conditions in many homes.

The idea is that you want to mix at roughly the same volume that the consumer will be viewing the material. In theaters, this is a standardized level and requires strict calibration based on the playback system, while in the home listening environment, conditions are more variable but tend to be quieter than theaters. Understand that theatrical playback systems calibrated to 85 dB SPL are actually quite loud (85 dB SPL per speaker x 5 speakers = LOUD). Care must be taken when calibrating any speaker system to protect your hearing in case of accidental high SPLs.

PINK NOISE AT -20DBFS

Pink noise is a type of random noise that has equal perceived loudness across the entire spectrum from 20Hz to 20kHz. It is a standard test signal used in calibration of speakers and other audio equipment. The level of -20dBFS is the standard reference operating level used in much of the film and television industry.

Follow these steps to perform an initial calibration of the speaker channels in the 5.1 system. This can be performed using an SPL meter and Nuendo's built in tools.

1. Create a 5.1 Monitor in Control Room and route the channels to interface ports that are connected to the speaker system.
2. Open the Control Room Mixer and go to the setup tab, as shown in Figure 24.4.
3. Click the Main bar to open the setup for the Main channel. You will see the eight insert slots available. Turn the level down to avoid any potential speaker damage or hearing loss.
4. Insert the "Test Generator" plug-in into any slot.
5. Set the Test Generator to -20 dB Pink Noise, as seen in Figure 24.5.
6. Select the surround sound monitor you created as the active speaker system.
7. Click on the Monitors button to open the setup functions. For each Monitor there are eight insert slots, and phase and gain controls, as seen in Figure 24.6.



Figure 24.4
Control Room
Mixer setup tab



Figure 24.5
Control Room
Setup with Test
Generator
settings

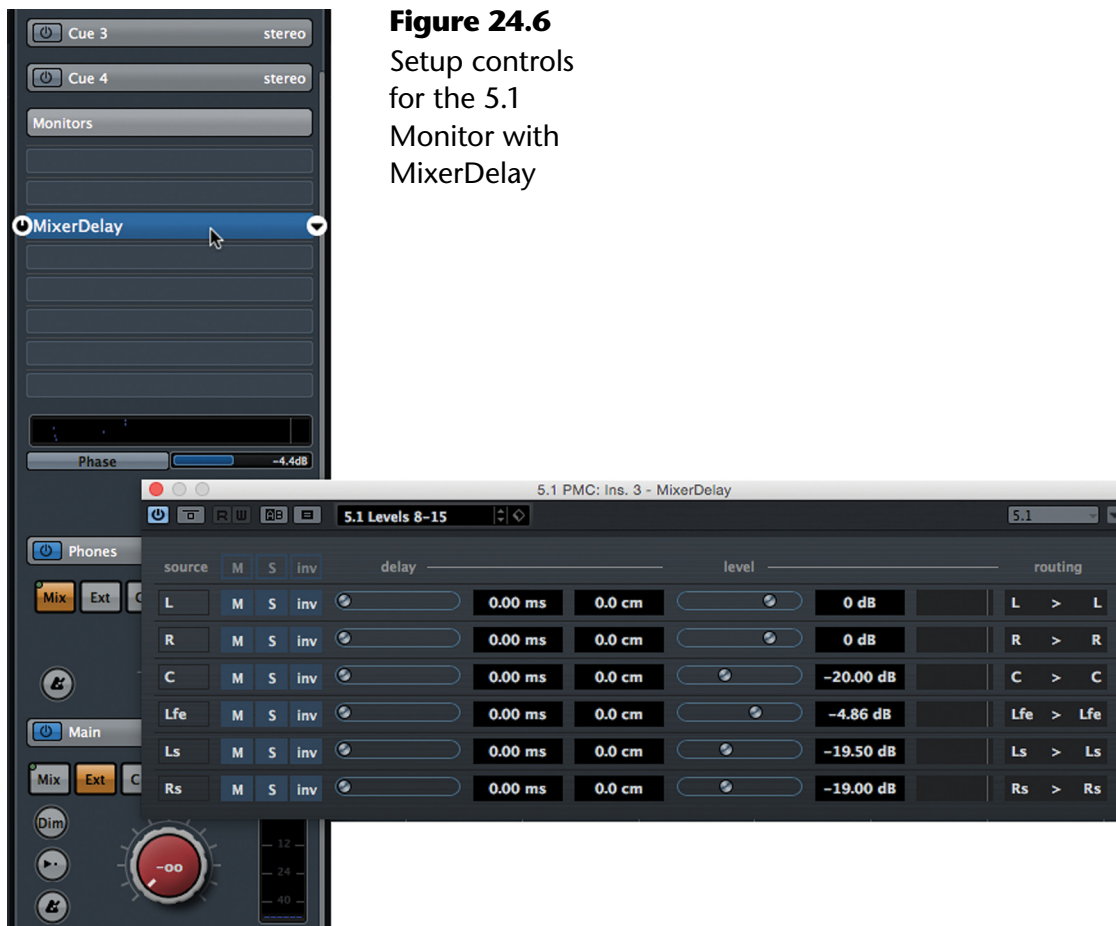


Figure 24.6
Setup controls
for the 5.1
Monitor with
MixerDelay

8. Insert the MixerDelay plug-in in the first slot for the Monitor and open the GUI, as seen in Figure 24.6. This will be used to tweak the level of the individual speaker channels.
9. Gradually turn the Control Room level up until you can hear the pink noise.
10. Return to the Mixer pane in the Control Room Mixer and click on the Channels bar, as shown in Figure 24.7. Here you will see representations of each speaker including the LFE subwoofer by the “+” sign.
11. Click the center channel icon to solo the center channel speaker. The red color indicates a soloed channel, while yellow indicates muted status, as seen in Figure 24.8.



Figure 24.7
The Channels section of the Control Room Mixer

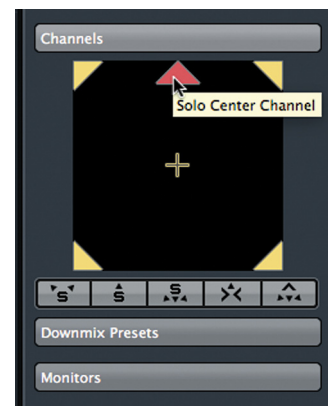


Figure 24.8
Soloing the center channel

12. Set the SPL meter to C weighted, slow response, and position it at head level in the listening position.
13. Turn up the Control Room level until the meter reads 80dB SPL. Depending on the input sensitivity of the speakers, the Control Room level could be at almost any setting, but hopefully in the range of -10dB to 0dB. If it is not, then you may need to adjust the input sensitivity of the speakers to get in this range.
14. Decide on a reference level setting to use when mixing in surround and set that as the Reference level in the Control Room preferences. This is the level setting that will be fine tuned to the calibrated pink noise level with the meter.
15. Using the center channel gain setting in MixerDelay, adjust the level to meet your chosen standard: 85dB SPL for theatrical mixing, 79dB SPL for home viewing or broadcast, on the SPL meter.
16. Clear the solo status on the center channel and solo the left channel to repeat the process of setting the SPL level to 85 or 79dB SPL.
17. Repeat this step for each speaker channel except the LFE.

Now the five regular channels of the system are calibrated to the same fixed loudness. As signals move in the surround soundfield, the volume should remain even as the signal is panned across the speaker channels.

The LFE is a special case since it reproduces just lower frequencies ($\llsim 120\text{Hz}$). You cannot simply use pink noise through the subwoofer and set the level for +10dB SPL above the calibrated level of the other speakers because the SPL meter will not be accurate due to the limited bandwidth of the subwoofer. For this reason, we will use a common rule of thumb that only provides an approximation of the correct subwoofer level.

If your main channels are calibrated to 85dB SPL, then the LFE channel should be set around 91dB SPL on the same meter, roughly +6dB. Beyond this workaround, you need a proper realtime spectrum analyzer to calibrate the subwoofer accurately. Even after that, the level of the LFE subwoofer can be adjusted to taste for the best results.

THEATRICAL MIXING STAGE VS. RECORDING STUDIO

The reference level of 85dB SPL C weighted for speakers is only intended for theatrical mixing stages where the listener is several meters away from the speakers. For mid-field and near-field speakers found in most recording studios, a lower calibrated loudness should be used. The closer you are to the speakers, the lower the loudness level should be.

MIXING FOR THEATRICAL RELEASE VS. HOME VIEWING

Another consideration is the ultimate destination for your mix. If you are mixing material that will be played back in a large theater, it is best to do this in a large mixing stage or dub theater. If you are limited to a smaller mixing room, use a lower loudness calibration level, 82 or even 80dB SPL for smaller rooms. If your mix is intended to be heard in a home listening environment, you should use a lower loudness level also. In large mixing rooms, a level of 79dB SPL is used while lower levels may be used in smaller mixing rooms. In the end, experimentation and tweaking the level will give you the best results.

Surround Panner



(tutorial video: “Surround Panner”)

When the mono audio channel was routed to the surround mix bus, a surround panner was added in order to balance the mono signal between all five speakers plus the LFE subwoofer. Whenever a channel is routed to a destination that has a wider channel configuration, such as in this example, then a surround panner is automatically inserted. Double click on the pan control to open the full surround pan GUI, as shown in Figure 24.9. There are slightly more controls with a stereo source, but for now let’s examine these controls in detail for a mono signal.

To best observe how they work, insert the “Test Generator” plug-in on the mono audio track to establish a signal source that you can see in the meters. The meter on the left of the pan GUI shows the source signal. The meter on the right shows the resulting 5.1 signal after the pan settings. The default setting pans the signal to the center-front of the soundfield. Notice the speaker icons placed around the pan area. They represent the speakers as they are positioned around the listener. The listening position is the center of this pan area.



Figure 24.9
The Surround
Panner GUI for
mono track

CHANNEL ORDER

In Nuendo, a 5.1 bus has a channel order as follows: Left, Right, Center, LFE, Left Surround, Right Surround. This is also the order in which you'll see the individual signals in a 5.1 signal meter.

X-Y Controls

The basic surround pan controls are the left-right (X) position and the front-back (Y) position. These controls are found on most surround panners and allow you to position the signal anywhere within the soundfield. If you connect the JL Cooper joystick control, shown in Figure 24.10, to the Nuage system, the joystick operates the X and Y controls together.

Adjust the left-right control and look at the right side meters to see how the levels change based on the left-right pan position. When the signal is in the center, only the center channel shows any level in the meter. As you move the signal to the left, the meter indicates increasing level in the left channel and then decreasing level in the center channel as the signal moves farther to the left.

If you grab the signal node in the pan area and move it around, you should hear the signal move accordingly in the speakers. Check to ensure that all the channels are properly connected so that when you place the signal node in the extreme corners of the pan area, you hear the signal discreetly in the corresponding speaker.

To the right of the left-right and front-rear controls are the orbit and radius parameters. These controls provide an alternate method of positioning the signal node. Adjust the orbit and watch the node move in a circular pattern around the listening position. Notice how the left-right and front-rear controls are updated to reflect the new position, as seen in Figure 24.11. The radius affects the distance the node is from the center listening position measured as a percentage of the distance to the edge of the soundfield.

NUAGE TOUCHSCREEN SURROUND PAN

The Nuage Master unit has a touchscreen control for the surround panner that operates much like a joystick.



Figure 24.10 JL Cooper Nuage Joystick Panner



Figure 24.11 Using the orbit and radius controls set to 90 degrees and 75%

LFE Level

The LFE level is an independent control that adjusts the level sent to the LFE channel.

Distribution

The second row of controls starts with Distribution, which affects how signals are balanced in the front three speakers, left, right, and center. With 0% distribution, signals panned across the front speakers will use all three channels. When panned center, only the center channel will have the signal.

With 100% distribution, the signal will not use the center channel at all, effectively distributing the center image to the left and right channels like a standard stereo system. Signals panned to the center will have equal levels in the left and right channels and none in the center channel. Figure 24.12 shows both possibilities for center pan: 0% and 100% distribution.

Center Panning Distribution



Figure 24.12 Center panning with 0% and 100% distribution

Using percentages in between will vary the amount of center channel utilized in panning. The difference between the center channel and the phantom center image created by the left and right speakers working together is interesting. Sound coming from the center channel will always be localized to the screen regardless of the listening position in the room since it is a single point source. The phantom image created by the left and right speakers can tend to float in front of the screen image and will shift depending on the listener's position in the room.

For these reasons it is common practice to have principal dialogue and Foley sounds directed to the center channel, where they remain tied to the screen image. Ambience, backgrounds, and to a certain extent music may take advantage of the phantom center image with more distribution but this is also a matter of taste. The way the center channel and phantom imaging is handled in a mix is very important in film and television audio.

Divergence

There are three divergence controls in the panner: front, front-rear, and rear. As you increase divergence, the signal bleeds over into the adjacent channels. For example, as the front divergence is increased, signals panned to the center will also be fed to the left and right channels. When front divergence is 100%, the signal is the same level in the left, right and center channels. Panning will no longer have any effect.

Figure 24.13 shows the same signal panned center with 0%, 50% and 100% front divergence. Notice the signal meters on the right side indicating the signal bleed to the left and right channels.

The rear divergence works in the same fashion between the left and right surrounds. The front-rear divergence affects the distribution of signals panned on the Y axis, bleeding signal to both the front and rear sets of channels.

If all three divergence controls are set to 100%, the signal will be equal in all 5 channels and the normal pan controls will have no effect at all.

One purpose for front divergence is to allow audience members sitting on either the extreme left or right side of theater to still hear sounds panned to the opposite side. Front-rear divergence is helpful for creating a sense of envelopment for music and ambience, spreading the sound out to all the speakers.

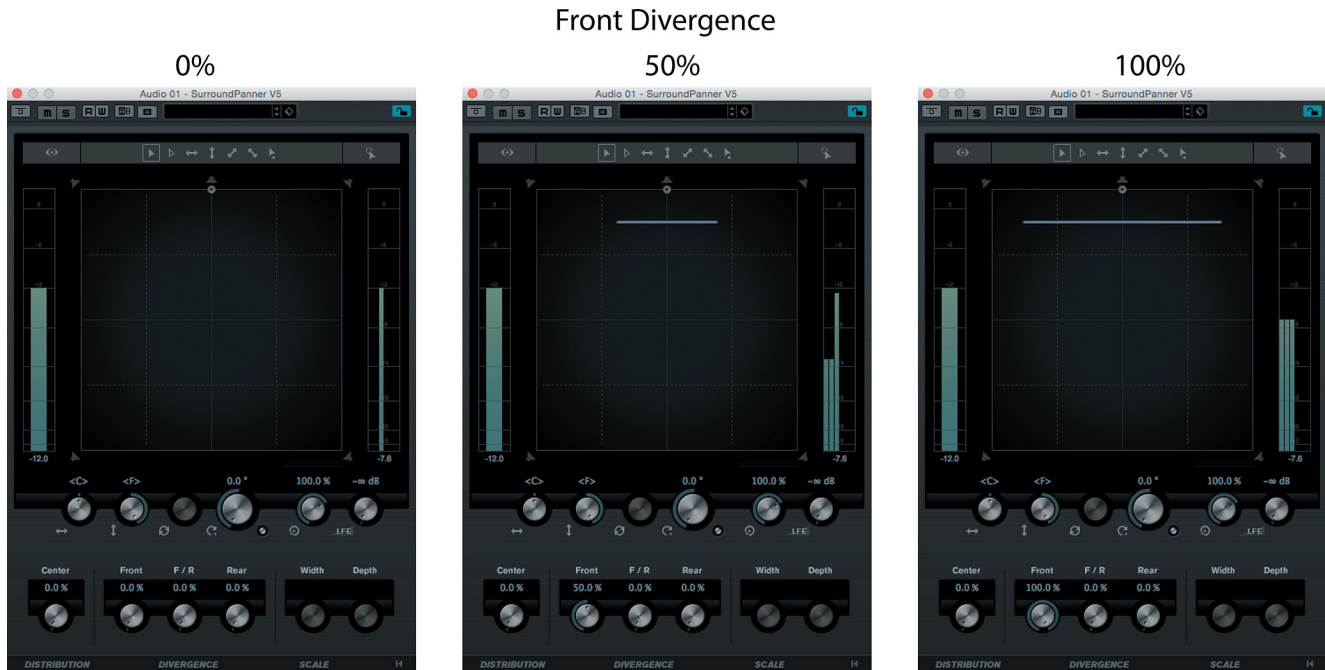


Figure 24.13 Percentages of front divergence

Stereo Controls

When a stereo audio channel is routed to a surround bus, there are two more parameters: rotate signal and width, as seen in Figure 24.14. Rotate signal orbits the left and right signals from the stereo source around their center node. The width adjusts the distance from the center node to each source. The yellow dot indicates the left channel and the red dot is the right channel.

When the free positioning function is activated, you can use the mouse to move each channel node independent of the other, as shown in Figure 24.15.

Multi-Channel Surround Pan

When a 5.1 channel is routed to another 5.1 channel or output, the surround panner adds one more parameter: depth. Depth controls the distance the front channel set and rear pair are from the center node. This functions just like the width control, only for the Y axis.

Figure 24.16 shows a 5.1 signal rotated with reduced width and depth to illustrate the controls.

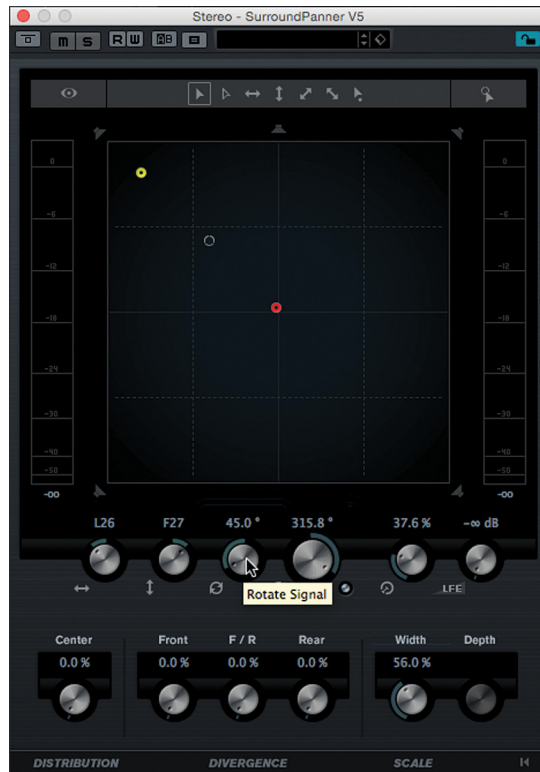


Figure 24.14
A stereo signal rotated 45 degrees off axis

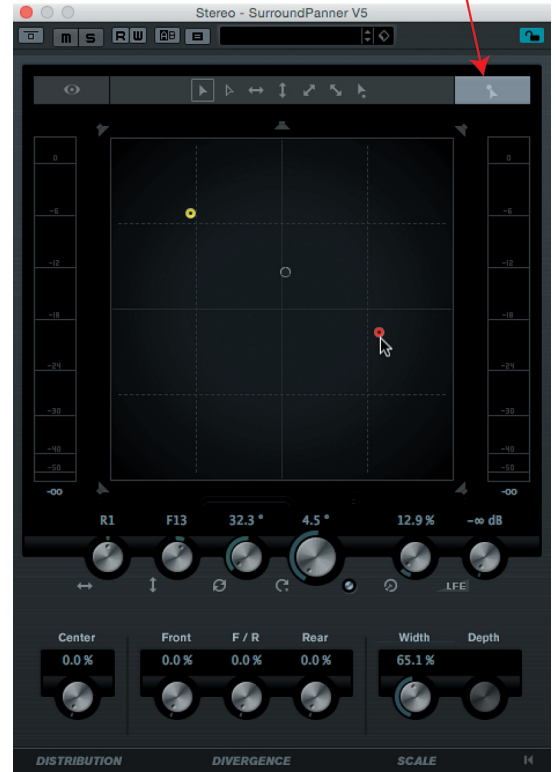


Figure 24.15
Free positioning of left and right channels



Figure 24.16
5.1 Signal panning

Panner Bypass

It is possible to turn off the panner entirely. In this case, channels will be routed directly to their corresponding destination channel.

- ❖ Mono signals to the center channel
- ❖ Stereo signals to the left and right channels
- ❖ Surround signals to all channels

If you hover the mouse over the pan display in the MixConsole, you can access the pan bypass button, as shown in Figure 24.17. If the panner GUI is open, the bypass is also available there.

Alternate Panners

Nuendo supports multiple pan plug-ins that may be used in the MixConsole. These are accessed by the context menu found in the pan display of the MixConsole, as shown in Figure 24.18.



Figure 24.17 Pan bypass in the MixConsole

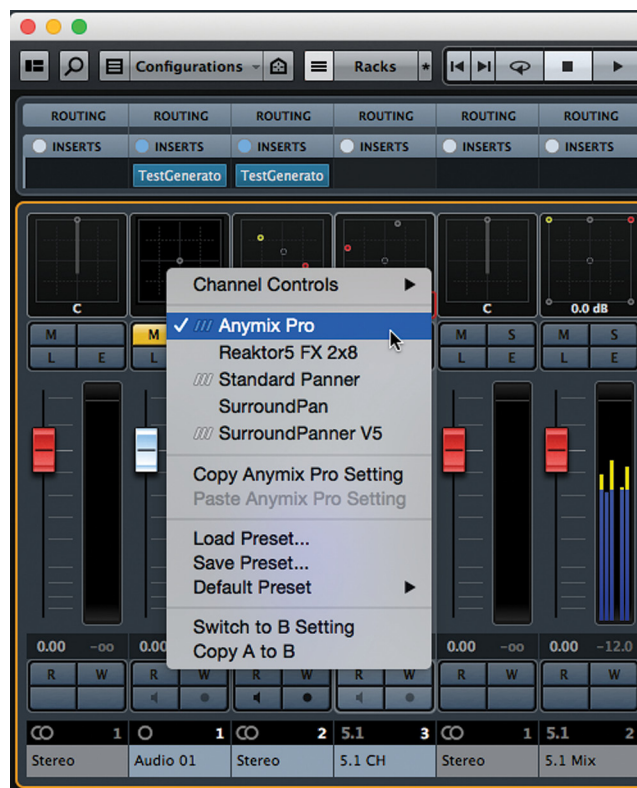


Figure 24.18 Alternate panner plug-ins

The IOSONO Anymix Pro panning plug-in (Figure 24.19) is a full-featured surround panner plus an up-mixing tool to create added depth and envelopment to signals in the surround environment. It will be covered in the next chapter, Advanced Surround Mixing.



Figure 24.19
IOSONO
Anymix Pro

Downmixing



(tutorial video: “Surround to Stereo Downmix”)

When routing surround signals to destinations that have a smaller channel configuration, some form of mixing must occur to combine channels together in order to hear the complete mix via fewer speaker channels. This process is called downmixing and Nuendo can automatically do this whenever this routing occurs.

Instead of a surround panner, the MixConsole will insert the MixConvert plug-in when a multi-channel track is routed to a group, FX channel, or VST output that has fewer channels,



Figure 24.20
MixConvert display in the MixConsole pan position showing 5.1 > 2.0



Figure 24.21
MixConvert 5.1 > 2.0

as shown in Figure 24.20. The MixConvert plug-in displays the input configuration in the top left square and the output configuration in the lower right square.

If you double click the display, the MixConvert GUI will open, as shown in Figure 24.21. While the default settings should work in most cases, you can customize the downmix parameters to achieve the best result.

MixConvert gives you control over the level of the extra channels and a low pass filter for the LFE signal. You can also solo channels from the source and destination to closely examine the downmix results.

If you click on the left and right arrows, the GUI will expand to reveal individual channel solos for both source and destination, as shown in Figure 24.22. This provides an easy way to closely examine the downmix results.

MixConvert can be used anywhere there is a pan control in the MixConsole. This includes sends. If you route a send from a 5.1 channel to a stereo destination, a MixConvert will be inserted where the send pan would normally be found, as seen in the Edit Channel Settings window shown in Figure 24.23.

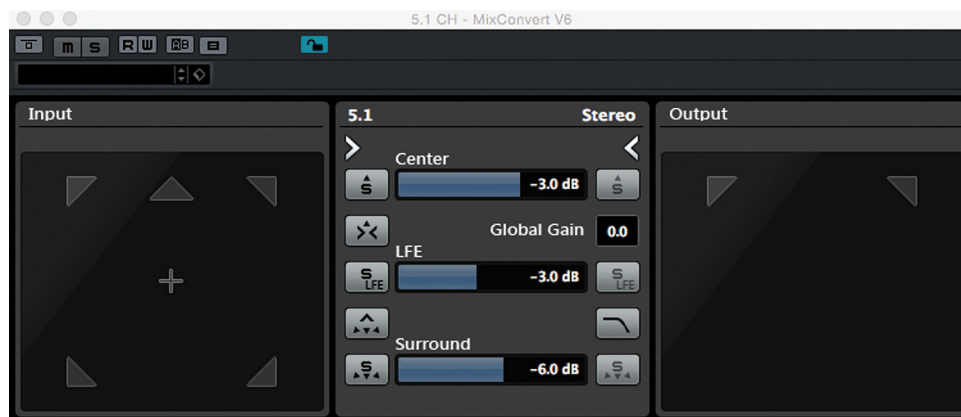


Figure 24.22
Channel Solos
in MixConvert



Figure 24.23 MixConvert used in a Send

Deriving A Stereo Mix

When mixing material in surround, it is often required that a stereo version of the mix must be created for certain broadcast or online deliverables. This is very simple in Nuendo and does not require anything more than another VST output bus to be created.

Start with the Main Mix: a 5.1 VST output. This channel in the MixConsole has all the same functions as other channels, including Sends. These sends can be routed to other VST outputs (Nuendo only).

Follow these steps to create a second mix bus for the stereo version of the mix.

1. Create a stereo VST output called “Stereo Mix” or similar.
2. Leave the 5.1 VST output as the Main Mix, as shown in Figure 24.24.

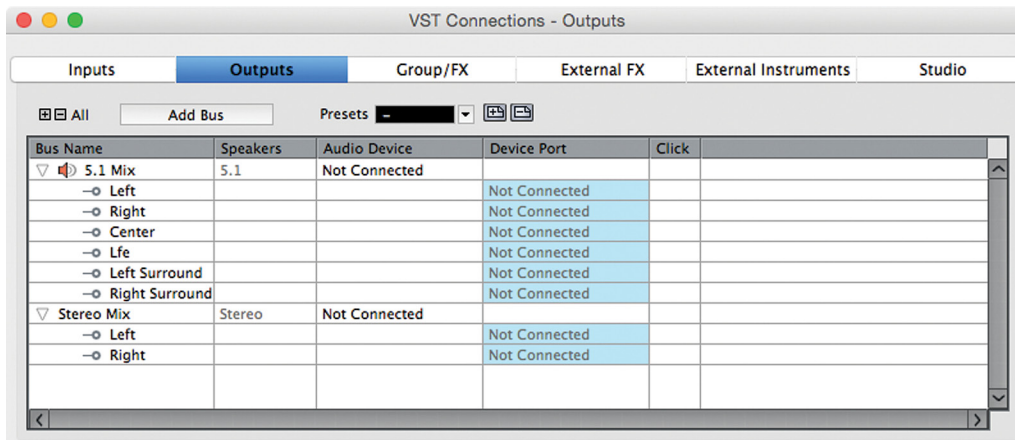


Figure 24.24
VST Outputs,
5.1 and Stereo

3. Route a send from the 5.1 VST output to the Stereo output, as seen in Figure 24.25. This will insert a MixConvert plug-in in the send panner position.



Figure 24.25
Send routed
from 5.1 to ste-
reio mix bus

4. Add the stereo output as a mix source in Control Room, as shown in Figure 24.26. This will allow you to listen to the downmix version.

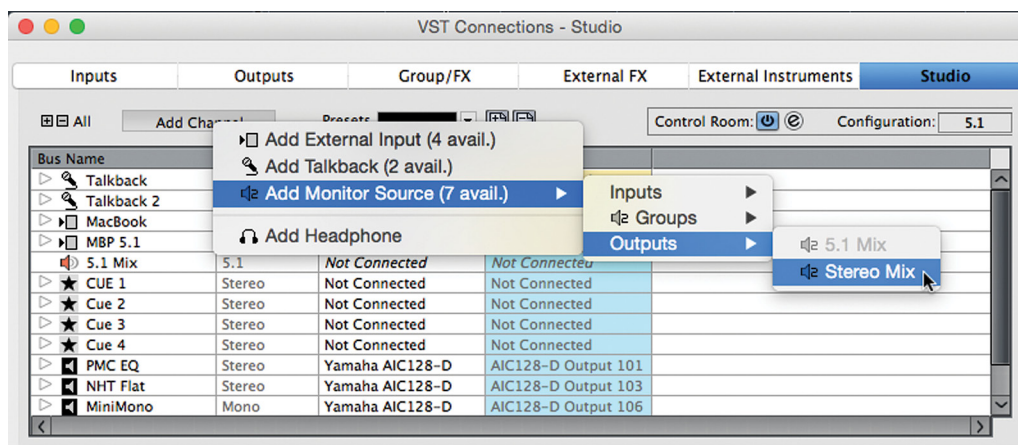


Figure 24.26
Adding the stereo mix as a Mix Source in Control Room

5. Open the MixConvert for this send from the Channel Settings window of the 5.1 VST output.
6. While listening to the second mix source, the stereo mix, adjust MixConvert to achieve the optimal stereo downmix version of the project.
7. When it is time to export mix files for delivery, use the Export Audio Mixdown window Channel Batch Export function to automatically create mixdown files for both the 5.1 and stereo outputs automatically. The naming options provide multiple ways to create unique file names automatically during the export process, as shown in Figure 24.27.

When you execute the mixdown export, Nuendo will render the output of the 5.1 bus and add the text “5.1 Mix” to the file name. Then it will render the output of the stereo bus and add the text “Stereo Mix” to the file name. This eliminates the need to sit and wait for this process to happen as it may take some time with a feature film, depending on the plug-in usage and CPU load of the project.

Now that you have a basic working understanding of surround routing, panning and downmixing, you can apply these methods in creating a final mix for the 50/50 film project. The next chapter will explore the actual mix project for 50/50 in detail, breaking down the routing and processing decisions in the mix.

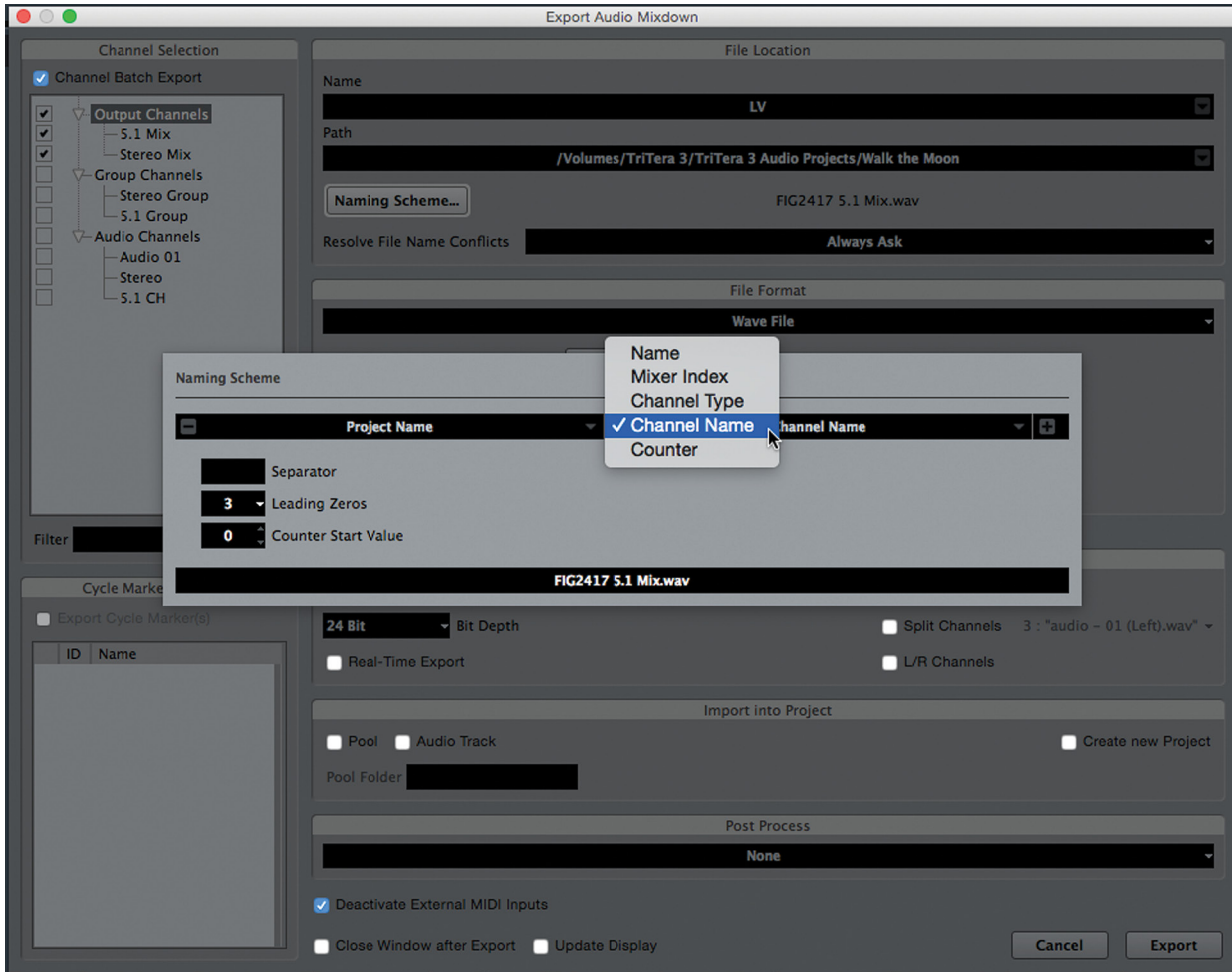
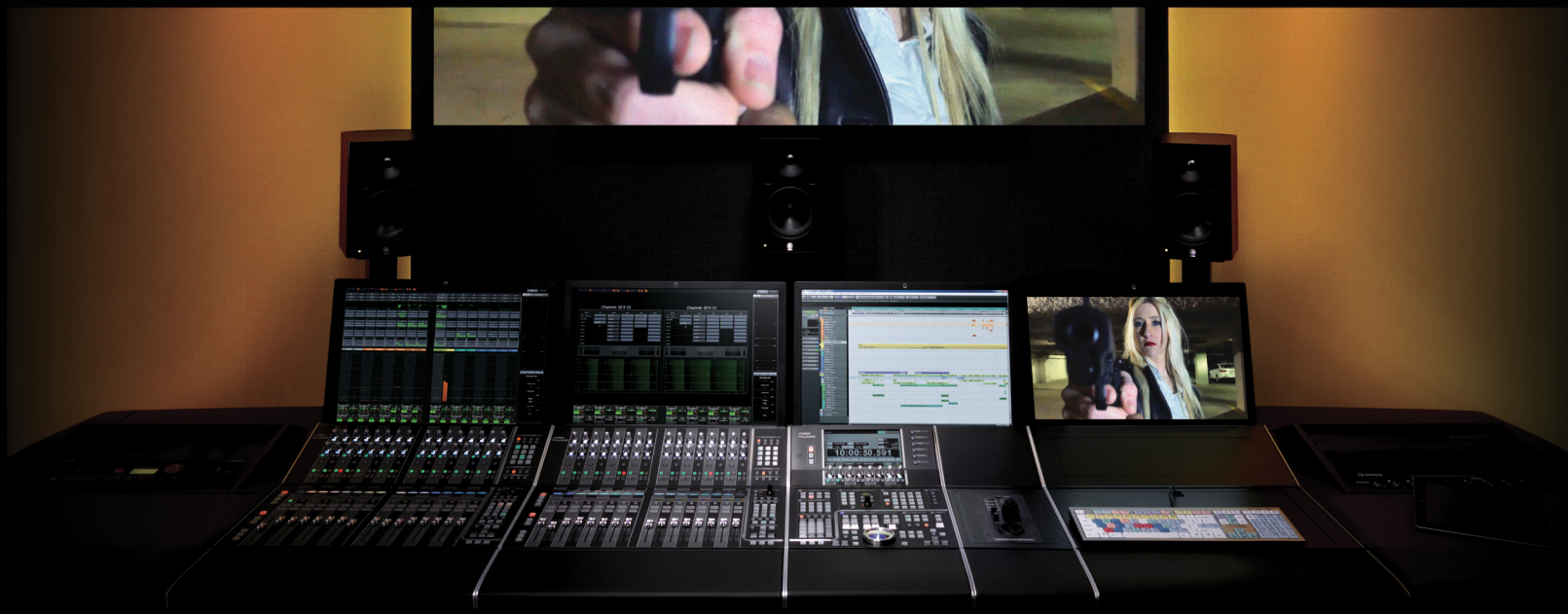


Figure 24.27 Naming options for Channel Batch Export

NUAGE

COURSEWARE



PART IV: MIXING

by Ashley Shepherd

Chapter 25

Advanced Surround – 50/50 Mix



NUAGE

Advanced Surround – 50/50 Mix

- ❖ Stems
- ❖ Rough Mix
- ❖ The Dialogue Mix
- ❖ The Sound Effects Mix
- ❖ The Foley Mix
- ❖ The Ambience Mix
- ❖ The Music Mix
- ❖ Mix Output

In this chapter we will apply the surround routing techniques in detail by using the 50/50 film project and setting up the entire mix. Each channel will be examined, and the routing and processing explained, so that you can recreate the mix on your own. This will prepare you for your own projects in film, broadcast, and internet mediums.

If you have been using the 50/50 film as a test project, creating your own sound effects, Foley, and music for the film, now is the time to put it all together and create a 5.1 surround mix with all the elements together, coalescing all the disparate sounds into a believable and enveloping experience for the audience.

Stems



(tutorial video: “Film Stem Routing”)

The concept of stems in film mixing is a very practical approach to a complex task. Basically, it requires breaking down all the individual sound elements of a film into several categories. The most common breakdown is into five distinct categories:

- ❖ Dialogue
- ❖ Foley
- ❖ Sound Effects
- ❖ Ambience
- ❖ Music

The signal routing in Nuendo will mirror the function of each sound category. For example, an audio track containing dialogue will be routed together with other dialogue tracks into a group channel. This group channel becomes the “Dialogue Stem,” meaning the stem of the mix that contains all the dialogue of the movie.

By routing signals to groups for each category, you create stems of the mix that are then combined to create the final delivery mix that will be heard by the audience. Also, each stem is exported as a mix file for use later in create other versions of the film or to make small changes in the main mix.

Foreign Language Versions

For example, the dialogue stem can be replaced with foreign-language versions of the film and then recombined with the remaining stems to create a final mix for another language. This save a great deal of time and effort in creating these alternate language versions since the entire mix does not need to be done again, only the dialogue stem.

Music Licensing

Often, the music stem might be edited at the last minute before a film debuts due to licensing issues for a specific song or recording being used in the film. If the song is replaced by another song, the music stem can be updated and then recombined with the other stems to create the new version of the final mix.

Stem Setup

Create five group channels with a 5.1 configuration and name them with the sound categories, as shown in Figure 25.1. These five group channels should then be routed to the 5.1 Main Mix. The faders should remain at unity gain (0dB) as much as possible. Most of the mixing moves will be done by the audio tracks and other groups that are routed to the stems.



Figure 25.1

Five stem group channels routed to the 5.1 Main Mix

In the demo project, each track is colored to identify the stem group that it belongs to. The stem group channels can also be colored the same way. In the example project the colors are these:

- ❖ Dialogue (DIA) = Yellow
- ❖ Sound Effects (SFX) = Blue
- ❖ Foley (FOL) = Green
- ❖ Ambiences (AMB) = Pink
- ❖ Music (MX) = Red

Route each audio track in the project to a stem group channel according to the type of sound it is. Avoid tracks having more than one type of sound on them such as a Foley track with a bit of dialogue also on it. If you find this sort of issues, move the event to a new track or existing track that is in the correct category.

FOLDERS

In the example project, the audio tracks are placed into folders for each category of sound. This helps visually organize the project window. Also, if you change the color of the folder track, all of the enclosed tracks will take on this new color unless they had been set to a specific color previously. This is a very fast way of coloring many tracks at once.

Monitor Sources for Stems

Next, set up each stem as a monitor source in Control Room, as shown in Figure 25.2, allowing you to listen to each stem by itself or combined with others just using Control Room. The Nuage Master unit really takes advantage of this feature with dedicated buttons for each monitor source.

Eventually, the Control Room Mixer should have seven total monitor sources, as seen in Figure 25.3:

- ❖ 5.1 Mix – The Main Mix
- ❖ Lt Rt – The Stereo Downmix
- ❖ DIA STe – Dialogue Stem
- ❖ SFX STe – Sound Effects Stem
- ❖ FOL STe – Foley Stem
- ❖ AMB STe – Ambience Stem
- ❖ MX STe – Music Stem

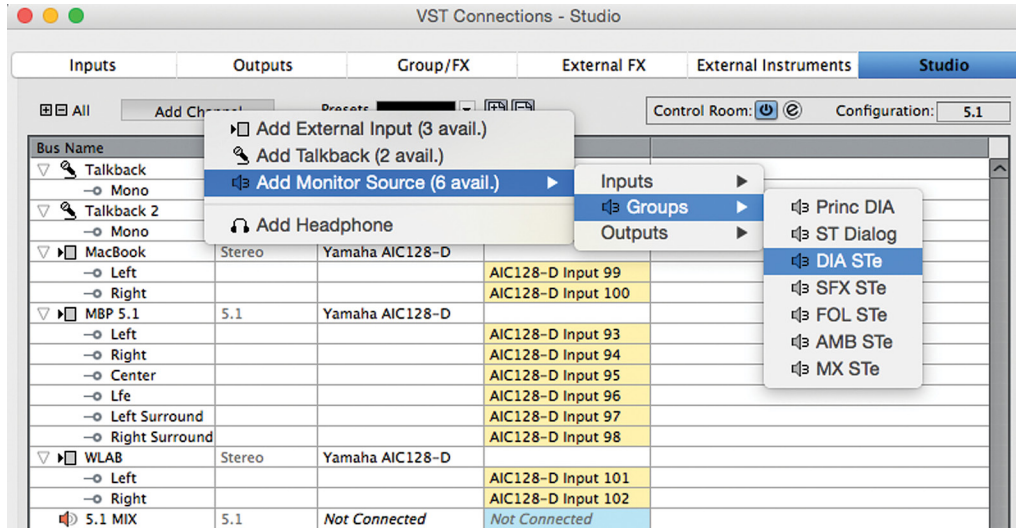


Figure 25.2
Adding the Dialogue stem as a monitor source



Figure 25.3
Control Room Mixer with seven sources

ALL CAPS ABBREVIATIONS

The abbreviations used here are to make the text more pronounced on the Nuage Fader unit OLEDs above each channel fader.

Rough Mix

Now that all the tracks have been routed to the correct stems and the project is organized using folders, it's time to start mixing. To begin with, work on the dialogue tracks to make sure they're at a decent level and then work with the rest of the tracks to get a rough mix of everything in the first scene, the coffee shop. There's no automation yet. This is just to get things roughly blended together.

Loudness Setting

Use the built-in loudness metering to establish the dialogue levels. The default settings have an integrated loudness of -23 LUFS, which conforms to the European standards. Use this level as a basis for setting the relative dialogue levels throughout the film. They should average at this level. Of course quiet sections will be lower, and when characters scream or yell, the levels will be higher, but the idea is that normal conversations fall around the -23LUFS level.

Supporting Audio

Turn up the Foley and sound effects tracks to create a reasonable blend with the dialogue. Just set a static level for each channel and do not worry about specific details for the moment. That will come later as you add automation to the project.

Since the score was composed while listening to the rough audio, it should sit reasonably well at a fixed level for the rough mix. Turn up all five score tracks to the same level to hear the blend as the composer intended it. Later, this blend can be changed to suit the story and the mix, but for now, just set a basic level for the score.

Output Limiter

Set an output limiter on the 5.1 Main Mix channel. This will prevent signals from exceeding 0dBFS. In fact, for anything other than a theatrical release, a lower output ceiling might be appropriate. In the demo project mix, the Main Mix has a Brick Wall limiter set for -4dBFS, preventing any signals from exceeding -4dB. This setting is more for in-home viewing.

As you mix, periodically look at this limiter to see that you are not getting too much gain reduction and that the limiter is active only during truly loud sections of the project, such as during the abduction outside the coffee house or at the end of the warehouse scene when the music becomes very intense. In those sections, the limiter will become active but if it is constantly causing gain reduction, the mix might be getting too loud. If you are paying attention to the loudness meter, you should have no problems maintaining a good mix level.

The Dialogue Mix

Let's examine each channel in the dialogue mix and see how they are routed and processed.

Character Tracks

To begin with, there is an audio track for each character, as shown in Figure 25.4. Jamie has two tracks, one for the main dialogue and another for reverse shots looking over his shoulder, etc. There is a special track for phone dialogue that will be processed to sound like it is coming out of a phone. The kidnappers share one track as do the lawyers. Lastly there is the Vocalizations track, which contains extra breaths, grunts, and non-verbal sounds that were needed in the mix.

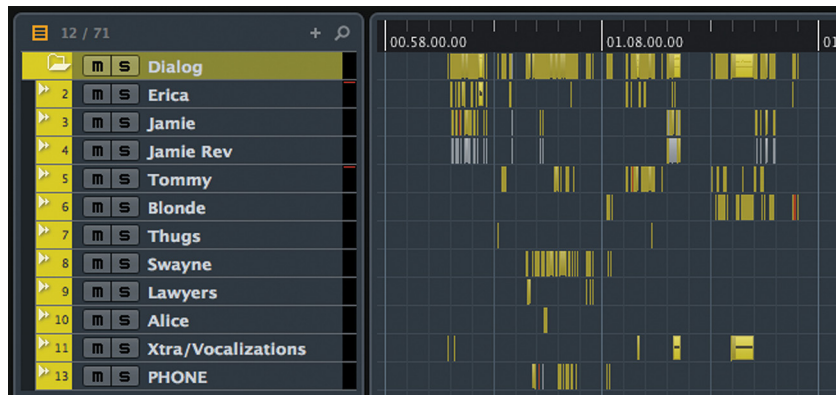


Figure 25.4
Character dialogue tracks

Principal Dialogue

Most dialogue is heard in the center channel, not panned to either sides or the rears. This helps keep the focus on the content of the dialogue and not its position. The camera tends to point at the person speaking and so it makes good sense to keep the audio focused in the center.

With that in mind, there is a mono group channel called “Princ DIA” which is short for “Principal Dialogue.” This group is routed straight to the center channel in the mix, as seen in Figure 25.5. Most of the dialogue tracks are routed to this group, with certain exceptions.

The “Princ DIA” group contains processing that is being applied to all the tracks that are routed there, which is most of the dialogue in the film. The EQ is boosting high frequencies for added clarity, as seen in Figure 25.6. There is a low pass filter to remove unwanted noise and “air” from the dialogue, again for clarity.

In the Strip of this group, the standard compressor is active. It has a relatively low threshold of -27.5dB , since dialogue levels are not that loud to begin with. The attack is very fast, as we do not want to hear any odd pumping sounds. The release is a bit more modest at 160ms . The makeup gain is set to automatic, as shown in Figure 25.7. With a ratio of $3.75:1$, a fair amount of gain reduction will happen very quickly when the threshold is surpassed.



Figure 25.5 Principal Dialogue group panned to the center channel



Figure 25.6 Principal Dialogue equalizer settings



Figure 25.7
Compressor
settings for
Principal
Dialogue

The purpose of this compressor is to give the dialogue some density, consistency of level. This is not to remove all large dynamics between loud yelling and soft conversation, but rather to even out the intelligibility of words and reduce the quick dynamics between consonants and vowel sounds. This smashing of transients in the dialogue helps listeners hear details in the speech, especially at low levels.

Dialogue tells the story, and that is the most important thing in any film. Dialogue processing should serve that interest, making things clear and intelligible. Of course when the story is better served by not understanding some lines, then the mix should do that. But for the majority of this film, we need to understand what they are saying. Plus, with increased intelligibility, the music and sound effects can be larger and have more impact without obscuring the dialogue.

Stereo Dialogue

The “ST Dialog” group was set up to handle any other dialogue that might move around the screen. In the end, it is only used for Jamie’s reverse shots, such as the one shown in Figure 25.8. In this shot, the camera is just behind Jamie’s head and it was necessary for the sound to reflect this close but obscured position. This is a subtle difference from the normal dialogue sound, but if you listen closely, you can hear the perspective change as the shot changes in this scene.



Figure 25.8
Reverse angle
of Jamie

The Lawyers track is a composite of both lawyers' dialogue in the office scene. As shown in Figure 25.9, lawyer one is listening to lawyer two talking off the right side of the screen. This dialogue is panned to the right to reflect his position to the camera.



Figure 25.9
Lawyer one lis-
tening to law-
yer two
off-screen to
the right side

There are only a few examples of stereo-panned dialogue in the film. The majority of the dialogue remains in the center channel of the mix.

Dialogue Effects

In addition to the EQ and compression for the dialogue, there are also a couple of effects that are added at times. This amounts to reverb that helps place the actor in the acoustic environment that you see on screen. The "Princ DIA" has two sends that are routed to the "DIA Garage" and "DIA Room" FX Channels, as seen in Figure 25.10.



Figure 25.10
Sends to reverb from dialogue group

After the dialogue tracks have been edited to remove noise and other talking, they can get quite chopped up. This can sound unnatural in the context of a conversation. Adding reverb to the dialogue helps meld the sound into the space that you see.

For example, in the office scene, the actual location was a reasonably dead-sounding space. After editing the dialogue, each line sounded dull and lifeless, no ambience. The solution is to add some room reverb to the dialogue at that point in the film to help place the characters into the scene. Figure 25.11 shows the REVERence plug-in, which is designed to emulate real acoustic spaces, in this case a furnished room.

In the garage scene at the end, the characters are all in a large concrete space. However, their lavalier microphones are placed so close to their mouths that some of the character of the space is lost. Using REVERence with the garage impulse (Figure 25.12) helps add the sense of space to dialogue in that scene.

These impulse responses are taken in actual real locations and using surround microphones so that the resulting reverb is also created in surround. The sound of room reflections coming from the rear speakers helps give a sense of envelopment in the scene, but only subtly.

The sends are then automated to turn on only during the scene where the reverb is needed. The amount and panning of the reverb can also be controlled, turning up the reverb as the character moves away from the camera, for example.

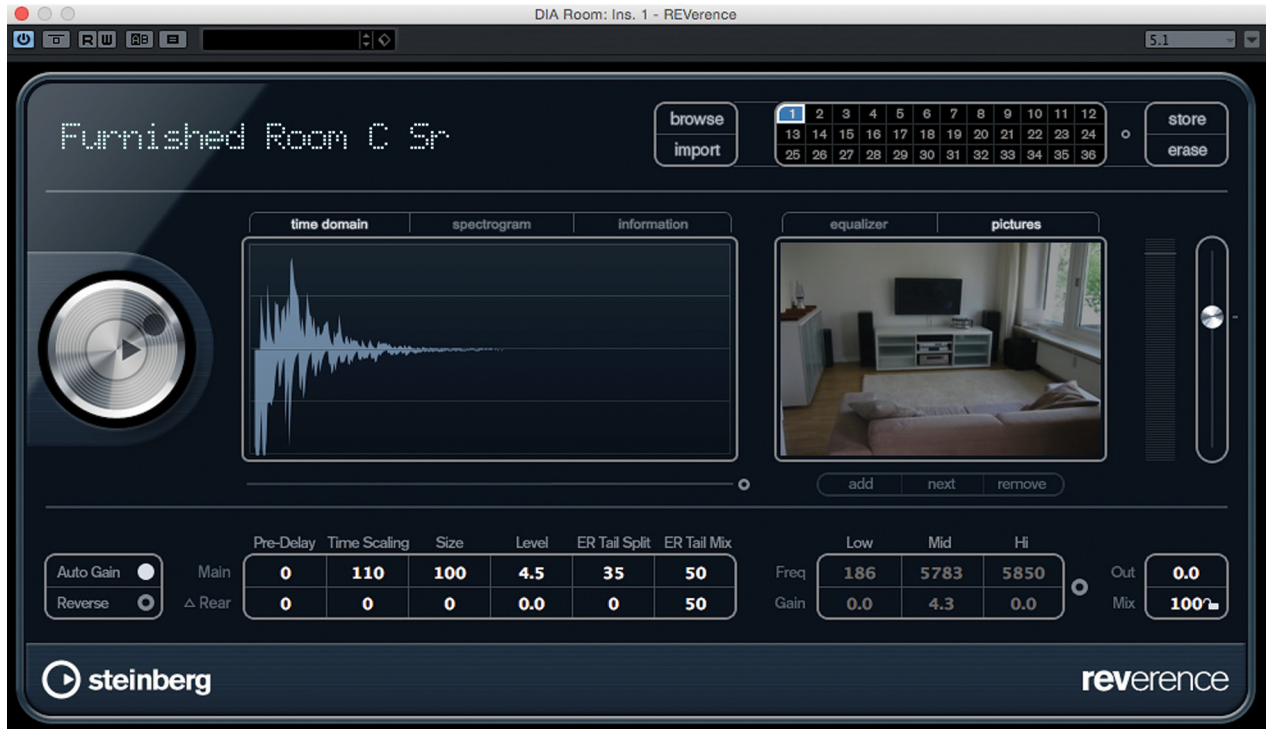


Figure 25.11 REVerence using Furnished Room impulse

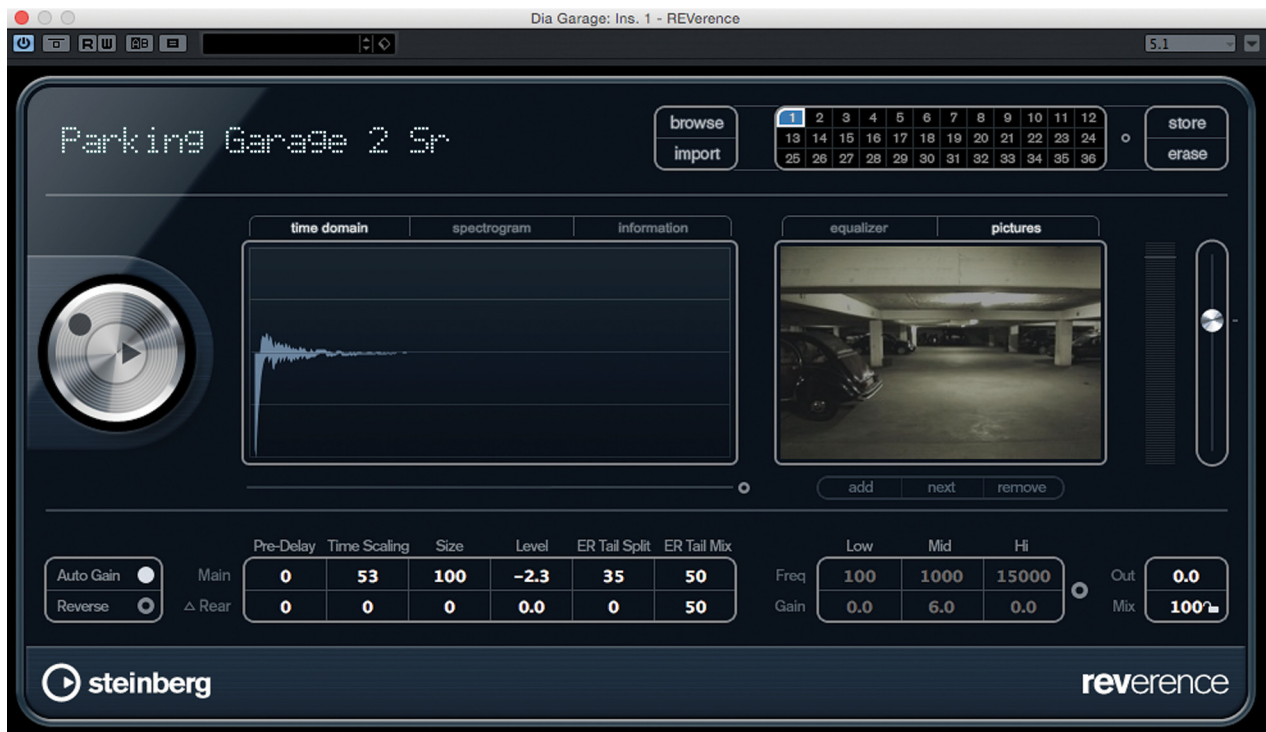


Figure 25.12 REVerence using the Parking Garage impulse

FX CHANNELS FOR STEMS

When working with the stem structure in this mix, it is important that all elements of the stem are routed through the stem group channel. This includes FX Channels like reverb returns. The dialogue reverb must also be routed to the DIA STe group so that stays with the dialogue and does not get mixed up with other sounds. You should not use the same reverb for any other category of sound. If you need the same reverb for Foley sounds, you should create a duplicate FX Channel just for Foley and route it to the FOL STe group channel.

Phone Sound

The Phone channel contains dialogue lines that are heard through a telephone. These have to be precisely edited to picture in order for the effect to work without being distracting. When the character is seen, as in Figure 25.13, the sound is normal. When the character is still talking, but we see the listener on the other line, as in Figure 25.14, then the audio is edited to the Phone track where the processing makes it sound like it is coming out of a phone.

The Phone track uses a combination of high- and low-pass filters to thin the sound out like it is coming out of a small speaker, as shown in Figure 25.15. Then some distortion is added since most telephones do not have terribly clear amplifiers in them. Distortion helps the realism of the phone sound. In this case, the Tube Saturation in the Strip adds distortion.

By editing the bits and pieces of audio to the phone track, it is much easier to control the phone sound and make the edits between phone and normal sound more accurate. Trying to do this on one channel is challenging at best.



Figure 25.13 Character is seen = normal sound



Figure 25.14 Character is heard = phone sound

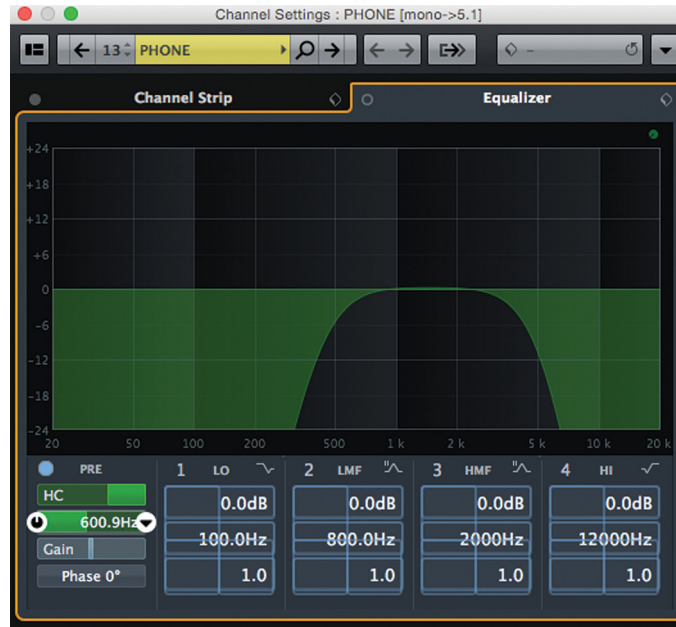


Figure 25.15
The Phone track EQ settings

The Sound Effects Mix

In this film, the sound effects come from several sources:

- ❖ Production Audio
- ❖ Sound Effects Libraries
- ❖ Video Editorial Temp Sounds
- ❖ Original Field Recordings

Production Audio Sound Effects

Production audio sound effects are all of the real sounds that were recorded during the filming of the movie, on location as the action was happening. They can be recorded by all the microphones used during filming—the lavaliers, the boom mics, anything. While editing the dialogue tracks, sound effects, Foley, and any other sounds that are not part of the dialogue should be moved to this other track and routed to the sound effects stem.

The reason for this is so that when a foreign-language version of the film is made, all of these sounds won't be lost with the original dialogue. Certainly some sound effects that actually happen while dialogue is happening will have to be replaced in a new version. But sounds that do not overlap any dialogue can be saved on this production audio sound effects track.

The best example in 50/50 is the sliding of the chair in the warehouse scene, as shown in Figure 25.16. As Tommy drags the chair across the room, its legs are heard scraping across the floor. This is what it sounded like on the set. No other sound has been added to it. It's simply a production sound effect.



Figure 25.16
Tommy dragging the chair across the warehouse in 50/50

Temp Sound FX

During the video editing process, the editor and director might add sounds to help them get the feeling of a scene. These tracks can then be imported with the dialogue tracks in the AAF file. They can be helpful to sound designers as it gives the general idea of what the director is intending to hear for sound effects.

In some cases, these sound effects can be retained and used in the final mix. These tracks were part of the original AAF import from the video editor:

- ❖ A7
- ❖ A9
- ❖ Shells 1
- ❖ Shells 2
- ❖ A16
- ❖ A19
- ❖ A22

The A7, A9, etc. tracks are the names given by the video editing software for the exported tracks in the AAF file. They contain maybe just a few sound effects that were kept as a part of the final mix. Shells 1 and 2 were renamed but were still part of the AAF file.

Sound Effect Libraries

When you cannot find a certain sound and do not have the ability to create it yourself, sound effect libraries can help supplement your original recordings. In *50/50*, there are several sounds from libraries placed in the mix. The filenames usually have a CD track ID number as part of the name, since they originated on audio CDs.

Original Field Recordings

The best sounds effects are the ones you create yourself. Grabbing a field recorder and going out into the world will always yield interesting recordings that can be used in often unnatural ways in a film. It can be a great exercise in sound design simply to get out of the studio and listen carefully to the world around you, searching for fascinating new sounds to use in a film.

The getaway van in *50/50*, shown in Figure 25.17, is a composite of some production audio and then a great deal of an old pickup truck that was recorded in multiple locations, including the parking garage used in the film. The signature low growl of the engine is a bad connection of the muffler on this pickup truck. While recording the truck, I did not know if it would work well for the van until I placed it in the project and edited the sound together with the picture to see if it sounded right. The low engine noise helped bring some drama to the approaching van in the final scene.



Figure 25.17
The *50/50* getaway van

Sound Effects Processing

Since many of the sound effects were placed on their own tracks, there is some EQ on some channels and none on others. Reverb was used to bring out the ambience and environment for each sound. These reverb returns are routed to the SFX STe stem so all of the sound effects are heard only on that stem.

Much of the work of mixing the sound effects involves automating panning and level changes to reflect the action in the movie. Also, many of the volume changes are achieved by adjusting the volume handles of each audio event. Doing this frees up the channel fader to adjust the overall level instead of each individual sound.

There are two FX Channels for the sound effects stem:

- ❖ SFX Garage
- ❖ SFX Room

The Foley Mix

Foley sounds are subtle. They should not be obvious in most films. They add dramatically to the story but do not attract attention to themselves. Foley tracks fall into three categories:

- ❖ Feet – footsteps, etc.
- ❖ Moves – clothing rustling, hand on skin, etc.
- ❖ Specifics – things the hands touch and operate, such as guns, doors, keys, etc.

The tracks in the 50/50 project are labeled to indicate what types of sounds are found on that track. There are feet tracks for some characters specifically. With moves, the first track is the primary one while the rest are used for overlaps and other characters.

For FX Channels, there are the normal two plus one extra:

- ❖ FOL Garage
- ❖ FOL Room
- ❖ SFX Verb FOL

The last one is a special reverb that is used on the Blonde's slow motion footsteps, shown in Figure 25.18, in the garage scene. This bit of sound design blurs the line between Foley and sound effects, but since its function is clearly footsteps, it is placed in the Foley stem.



Figure 25.18
Slow motion
footsteps with
special reverb

The Ambience Mix

The ambience mix in 50/50 is fairly simple. There are seven tracks with various ambient sounds on them that act as background fill sound for the dialogue and effects to blend into. It helps provide continuity in a scene that may have a great deal of editing in the dialogue.

There are no FX Channels associated with the ambience stem. By their nature, ambience recordings have space. The one interesting mixing option is in the panning. Figure 25.19 shows the pan positions for all seven ambience tracks.

Notice how the Bridge track is rotated almost 90 degrees. The ambience recording was taken underneath the actual bridge in that scene. However, the direction of traffic in the microphones was right to left. In the image shown in Figure 25.20, the traffic is passing overhead. By rotating the ambience track, the traffic is heard moving from the front speakers to the back speakers, creating the desired effect.

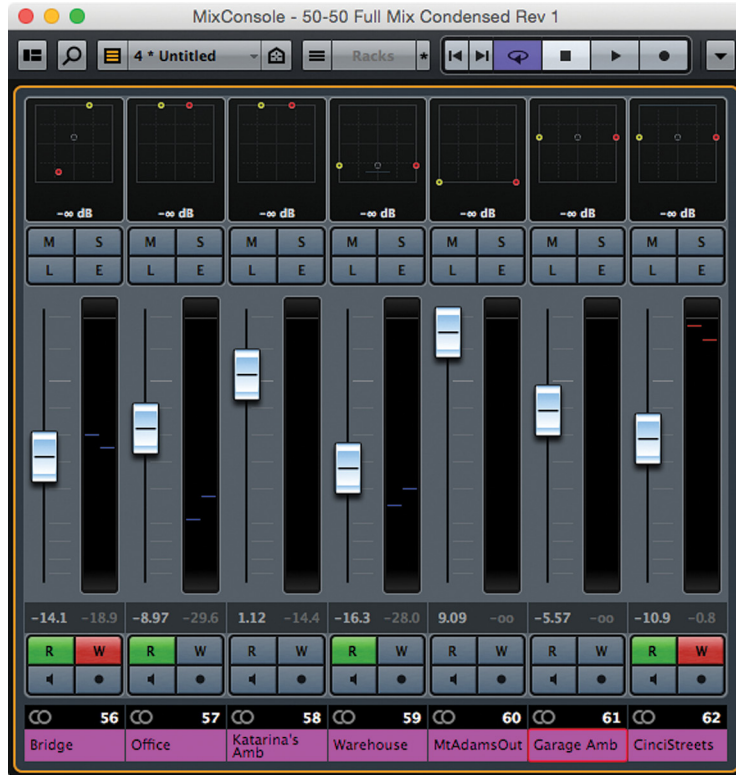


Figure 25.19
Mix levels and pan for the ambience tracks



Figure 25.20
The bridge scene

The Music Mix

The music mix is a bit more complex. This is not just a simple stereo mix of music; rather it is a multi-channel mix of elements that is woven into the story.

Score Stems

To begin with, the composer has provided the music as a series of stems, groups of instruments in each stem that, when combined, create the finished piece of music, as shown in Figure 25.21. This is a common technique as it allows the mixer to carefully use the dynamics of the music and still be able to serve the story when necessary. If more drums are needed to overcome loud special effects, you can turn them up without bringing up other instruments to achieve the effect.

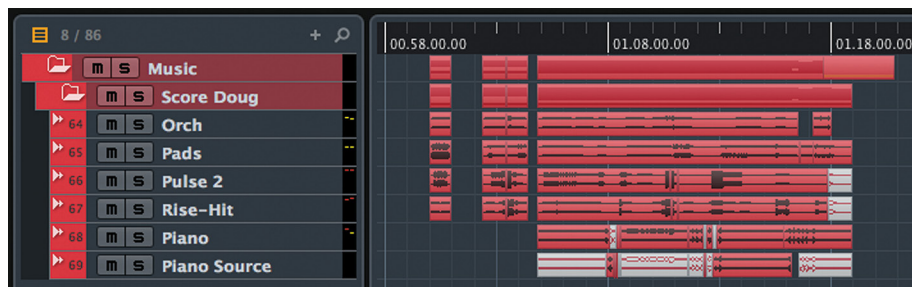


Figure 25.21
The score in stem tracks

The stems are broken down like this:

- ❖ Orch – The strings and classical elements
- ❖ Pads – Smooth synth elements, non-percussive
- ❖ Pulse 2 – Cyclical sounds and percussion
- ❖ Rise-Hits – Swells and low frequency booms
- ❖ Piano – Piano themes
- ❖ Piano Source – Piano themes used as environmental sound

Cues

Each piece of music in a film is referred to as a cue. 50/50 has two small cues in the first part followed by a very long cue that takes us to the end of the film.

Source Music

At the end, there is a song that runs during the credits. Songs that appear in the movie like this are called source music. Since source music must often be licensed from artists not necessarily working on the film, it can change on short notice. At the last minute, the rights to a particular piece of music may not be granted, and the director will need to choose another.

For this reason, source music is often placed on its own stem in the mix so it may be replaced easily even after the mix is complete. In this case, there is only one piece of source music, so it is also routed to the same music stem as the score.

Source music is often heard as a part of the film: a band playing in a bar, music on the car radio, etc. *50/50* does have some music that plays in the environment, but in this case it has been incorporated into the score music.

The piano theme echoes throughout the movie and is almost another character. It helps frame the character of the assassin and her need to control the situation; it is organized much like the classical piano theme. She listens to this in her apartment when Mr. Swayne first calls her. When the music exists within the environment of the scene, it is treated in the mix differently than when it is a part of the score.

Figure 25.22 shows the two piano tracks, one for the score and the other for environmental sound, and how they are edited back and forth depending on how they function in the mix. The top track fades out as we open on the apartment scene, transitioning to the second track, which is processed to sound like a home stereo within the apartment.

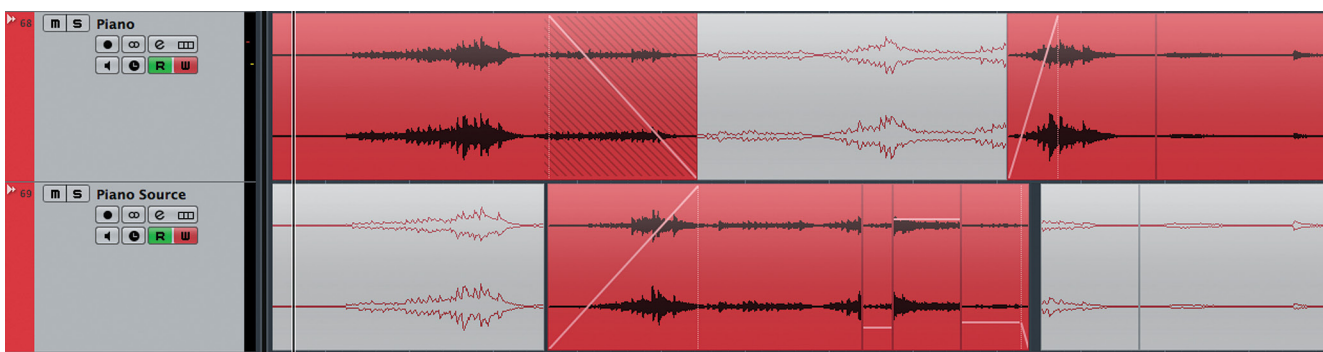


Figure 25.22 Transitioning between score and source music tracks

Later, when the assassin is listening to the same theme in her car, we transition back to the full score as the slow motion sequence begins, moving the music from the real world to the internal imagination. Figure 25.23 shows the settings for the Piano Source track, with high- and low-pass filters to make the sound smaller, along with a send feeding a room reverb to place the music in the apartment room.

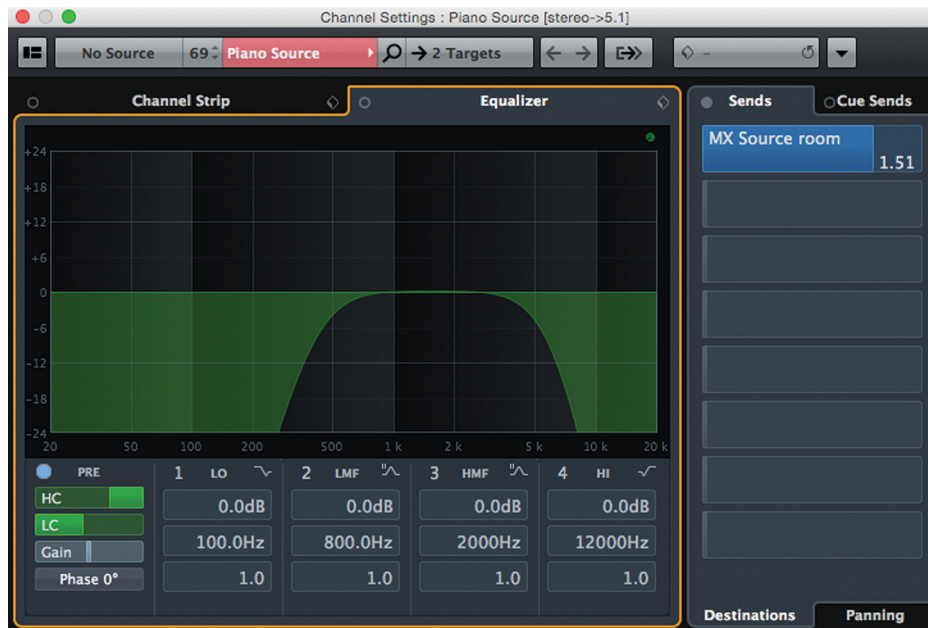


Figure 25.23
EQ and Send level for Piano Source track

Mix Output

There are two mix outputs:

- ❖ 5.1 Main Mix
- ❖ Lt Rt – Stereo Downmix

The Lt Rt Stereo mix is created by routing a send from the 5.1 Main Mix to the Lt Rt output, which inserts a MixConvert plug-in, reducing the channels from 6 to 2.

The only channels that are routed directly to the 5.1 Main Mix are the stem group channels. If any other channel is routed to the 5.1 Mix, it will not be a part of the stems and would be lost in the future if the stems were used to create a new version of the mix.

A quick way to check this is to use the Expand feature (Show Channels that are Connected to the First Selected Channel).

1. Select the 5.1 Main Mix channel.
2. From the channel agents menu in the MixConsole, choose Show Channels that are Connected to the First Selected Channel, as shown in Figure 25.24.
3. Look to see what channels are visible.

NUAGE EXPAND BUTTON

On the Nuage Fader unit, this channel agent is operated by the Expand button found in the channel view control section. It is very quick and simple to check this routing on Nuage.

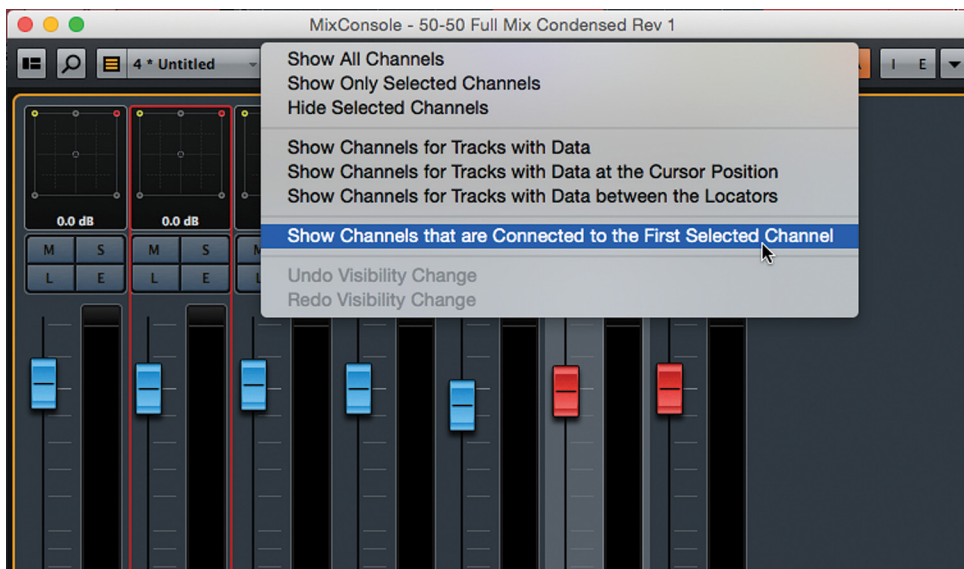


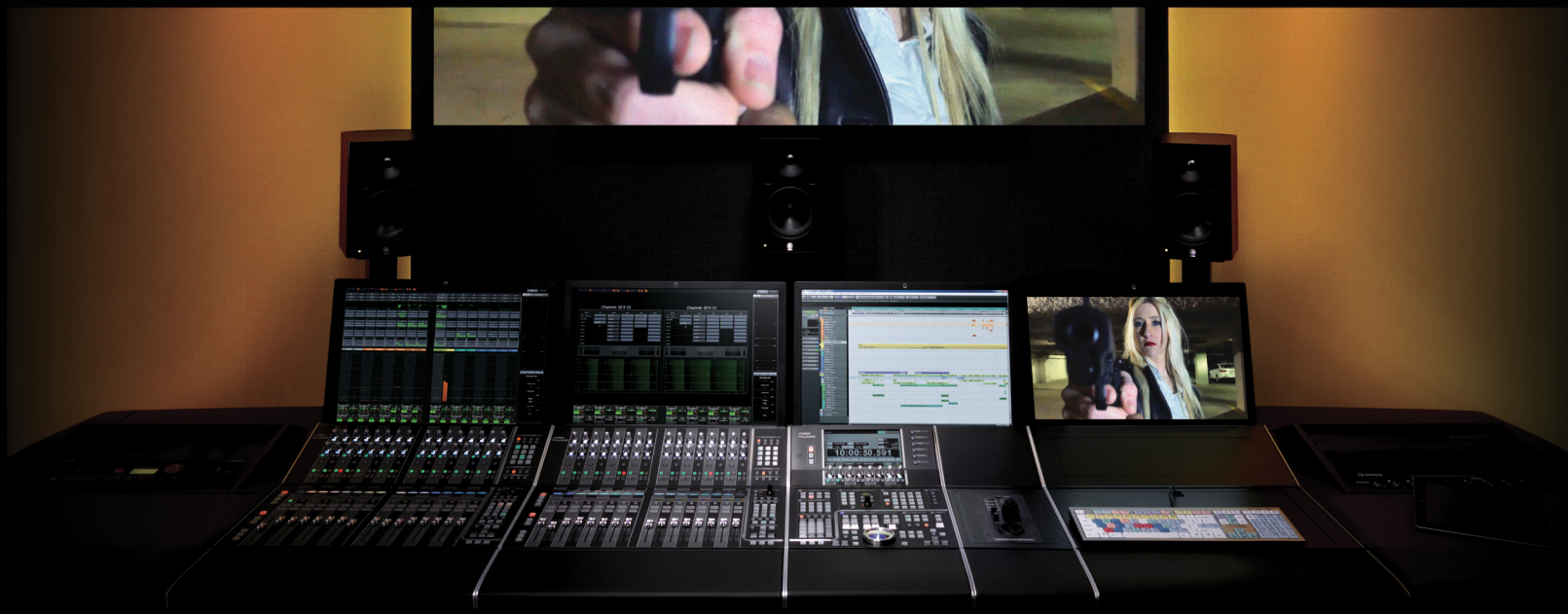
Figure 25.24
Channel Agents
menu

You should only see the five stem group channels, the 5.1 Main Mix, and the Lt Rt Stereo Mix channels. Any other visible channels need to be routed to the appropriate stem group channel.

The stem group channels may have their levels adjusted if necessary. The music stem in this mix was automated to ride the music level overall. The thing that should not be adjusted is the panning. The panning should remain static for the stem channels so that they can be combined later to reach an accurate version of the mix. Panning introduces level changes to the various speaker channels, resulting in a different balance in the final mix.

NUAGE

COURSEWARE



PART IV: MIXING

by Ashley Shepherd

Chapter 26

Automation



NUAGE

Automation

- ❖ Read and Write
- ❖ Punching Out
- ❖ Fill Modes
- ❖ Virgin Territories
- ❖ Trim
- ❖ Automation Passes
- ❖ Undo Branches
- ❖ Preview Mode
- ❖ Individual Automation Settings Per Channel
- ❖ VCAs

The automation system in Nuendo is derived from large-format consoles used in film mixing, such as the AMS Neve DFC and Harrison Series 10, 12 and MPC5. Features that film mixers have enjoyed for many years had yet to be integrated into DAWs before the latest generation of Nuendo's automation system.

In addition to standard features such as Touch, Latch, Cross-Over, and Trim modes, you have the ability to control which types of automation data are written, read, and displayed. Instead of one undo history, the automation has a passes function, which supports multiple branches of undo, giving you options for auditioning various automation versions before committing to one.

Virgin territory allows you to write only the automation you need without filling in areas that do not need it. This is helpful when combining sections of a film together to create the complete, feature-length piece.

The Preview workflow offers powerful features such as AutoPunch and Touch Assist for post-production where a large number of controls can be written for whole sections (such as scenes) quickly.

Read and Write



(tutorial video: "Nuage Automation Basics")

Automation is very easy to create. Put a channel into Write mode, play the project, and move the channel fader. Under default settings, this will create volume automation for that channel. The automation lane will automatically open to show the volume curve of automation data, as seen in Figure 26.1.



Figure 26.1
Volume auto-
mation curve
from Nuendo
initial pass

Putting a channel in Write mode automatically enables Read mode so that automation data will be played back on that channel. Play the same section of the project and watch the fader move. This is the initial write pass for this channel.

Initial Pass: Cubase Versus Nuendo

Nuendo and Cubase handle the initial pass of automation differently. Figure 26.1 shows what happens on the initial pass in Nuendo. Figure 26.2 shows the same basic initial pass in Cubase. The difference lies in what happens at the end of the pass, when the fader is released and the write pass ended.

- ❖ Nuendo – The automation curve returns to the initial value.
- ❖ Cubase – The automation curve stays at the last value.

This is an important distinction as it affects the initial mix workflow. There are workarounds to make Nuendo behave like Cubase and Cubase behave like Nuendo if that workflow style is preferred. This will be discussed later, in the section on Fill modes. For now, understand that in Nuendo, the initial value is placed throughout the project, while in Cubase, the last value written is placed from that point until the end of the project. The rest of these examples will follow the Nuendo behavior unless otherwise noted.



Figure 26.2 Cubase initial volume pass

Multiple Parameters at Once



(tutorial video: “Automation Lane Display”)

Next, open the equalizer and while playing the project, enable and adjust several bands of EQ. Notice the large number of automation lanes that are created, as shown in Figure 26.3. Every button, switch, rotary control, slider, etc. within the MixConsole may be automated.

During the course of a mix, hundreds if not thousands of parameters may be adjusted. If automation is enabled for these channels, there will be a great number of automation lanes in the project window.

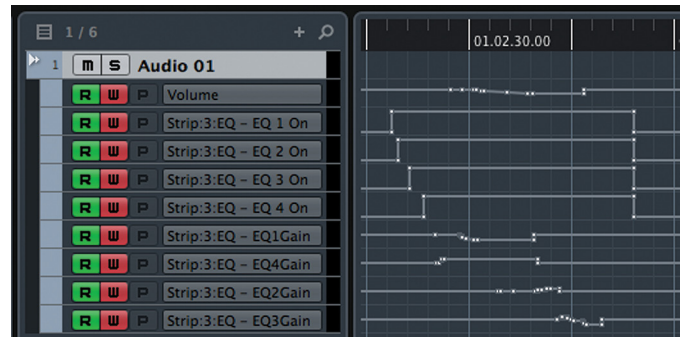


Figure 26.3 Multiple automation lanes for the equalizer

Suspend Write



(tutorial video: “Automation Suspend Modes”)

In order to prevent huge amounts of automation data being created by adjusting many parameters in the MixConsole, the automation system is segmented into groups of parameters that can selectively be suspended from writing automation:

- | | | | |
|----------|------------|-----------|----------|
| ❖ Volume | ❖ EQ | ❖ Sends | ❖ Mute |
| ❖ Pan | ❖ Dynamics | ❖ Inserts | ❖ Others |

One possible workflow strategy may be to start with volume automation only. In order to do this, open the Automation Panel by selecting it from the Project menu, pressing the button in the toolbar of the Project window, or by key command. Figure 26.4 shows the Automation Panel from Nuendo. The Cubase version has fewer functions than Nuendo.

The Suspend Write column has buttons for each automation category that will disable write for those groups of parameters. Start with all categories except Volume suspended, as seen in Figure 26.4. This will allow volume automation to be written but nothing else. Adjusting the EQ on a channel that is write-enabled will not result in automation lanes being created for the EQ.

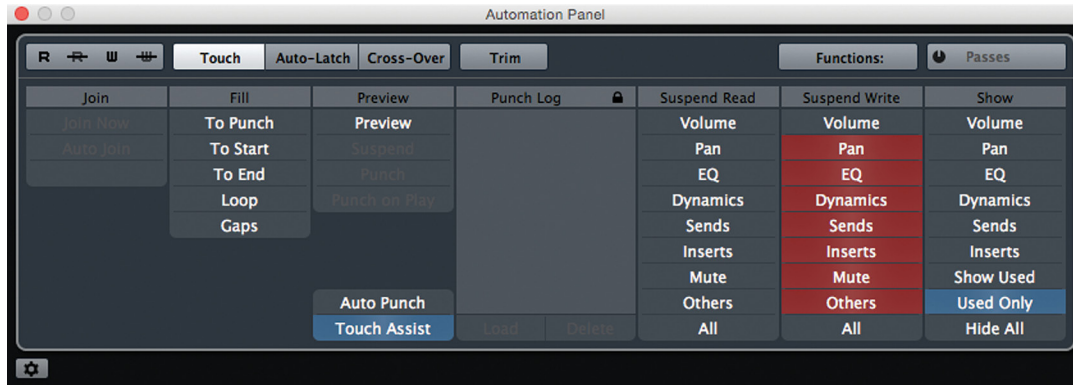


Figure 26.4
The Nuendo
Automation
Panel

Suspend Read

In the same fashion, reading of automation data can be suspended for the same categories. Automation data previously written will be ignored during playback for those categories.

Punching Out



(tutorial video: “Automation Write Modes”)

The start of an automation pass is usually initiated by touching a write-enabled parameter in the MixConsole. That part is fairly straightforward. The end of the automation pass is a bit more complex. The first way to exit the automation pass is to stop the transport. The second is to take a channel out of write. The other methods depend on the punch-out mode.

There are four punch-out modes:

- ❖ Touch (default)
- ❖ Auto-Latch
- ❖ Cross-Over
- ❖ Auto Punch

The punch-out mode is set using the automation mode menu found in the toolbar of the project window, as seen in Figure 26.5.

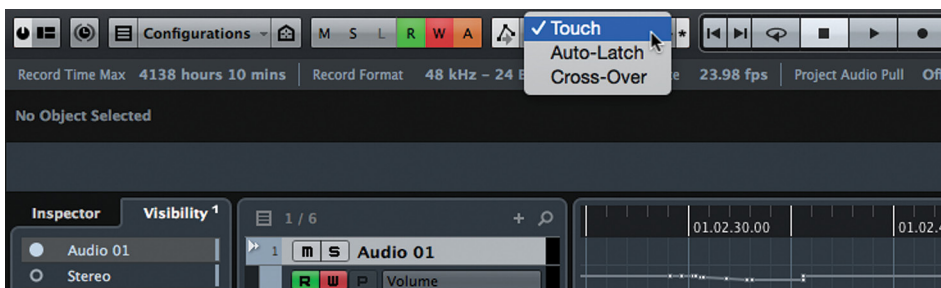


Figure 26.5
Automation
punch-out
mode setting

Touch

The first is Touch mode, the default setting. Automation passes end when releasing the control (fader, knob, etc.). When the control is released, the parameter will return to the previous setting by ramping from one value to the other.

Figure 26.6 shows a volume automation curve that was written using touch mode. The second to last automation event is where the control was released. The ramp occurs between that point and the next point, back at the original value.

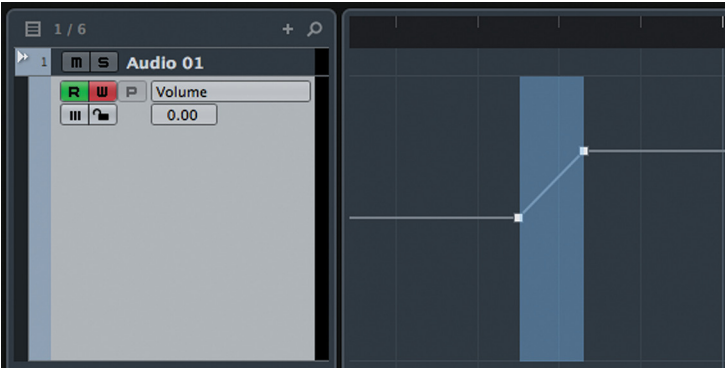


Figure 26.6
Automation ramp after release of control

The slope of this ramp is determined by the Return Time setting found in the Automation Settings, as seen in Figure 26.7. Click the settings icon in the lower left corner of the Automation Panel to access these settings. The time (in milliseconds) determines how long the parameter will take to return to the previous value.

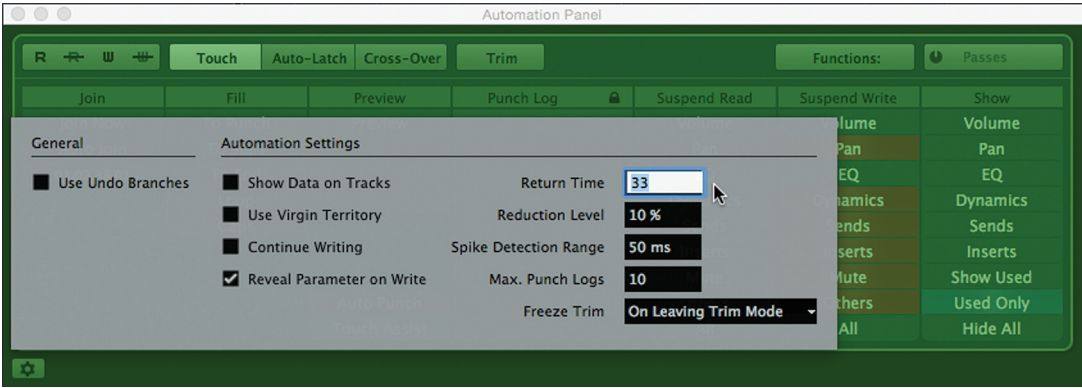


Figure 26.7
Automation Settings

Touch mode is very useful for making quick changes and then returning to the previous setting. However, the control needs to be continually touched to write automation data. If you want to continuously write automation without having to keep touching the control, one of the other modes may be used.

Auto-Latch

The next mode is Auto-Latch. When a control is first touched, it will enter write. The control will stay in write until the transport is stopped or the channel is taken out of write mode. With Auto-Latch, many controls may be touched and put in write without continuously touching each control.

Cross-Over

The cross-over mode is used to make a seamless transition back to the original value for continuous passages. It operates in two stages:

1. When the control is first touched, it will enter write. The control does not need to be held. It will stay in write until stage two occurs.
2. Touching the control a second time begins the second stage. When the control reaches the previous value of the automation curve (crosses over), it will exit write mode. (It is necessary to release the control once in order to enter this second stage.)

The resulting automation curve smoothly transitions from the new values to the original ones without any ramp or jump. It operates much like auto-latch except the second stage exits write when the new value and old value are equal.

Fill Modes



(tutorial video: “Automation Fill Modes”)

Automation Fill modes will use the last value of an automation pass and paste it into a range of the automation lane according to the fill mode. This can save time when the value for a control will stay the same for a period of time. There is no need to run through the project in real time. The value can simply be filled in for that period. There are five fill modes in Nuendo:

- ❖ **To Punch.** This fill mode will take the last value of an automation pass and fill it from the start to the end of the pass, from where the control was first touched to the punch out position.
- ❖ **To Start.** The last value of the pass will be written from the endpoint of the pass all the way to the start of the project.

- ❖ **To End.** The last value will be written from the punch out point till the end of the project.
- ❖ **Loop.** The last value will be written in the space between the left and right locators. Note that the last written value itself does not need to be within the left and right locators for this mode to function. You could be writing data at the end of a project with the locators set somewhere toward the beginning and the Fill to Loop mode will affect the cycle area in addition to where you are actually recording the data.
- ❖ **Gaps.** The last value will be set for all the gaps on that track if you have been using virgin territories (explained later).

TO START AND TO END VALUES

Both To Start and To End ignore the positions of the locators and use values for the start and duration found in the Project Setup dialogue box.

Each fill mode has three states (see Figure 26.8):

- ❖ **Off** No fill.
- ❖ **One-Shot** Fill mode will occur only on the next automation pass.
- ❖ **Locked** Fill mode will occur until the user changes the state to off.

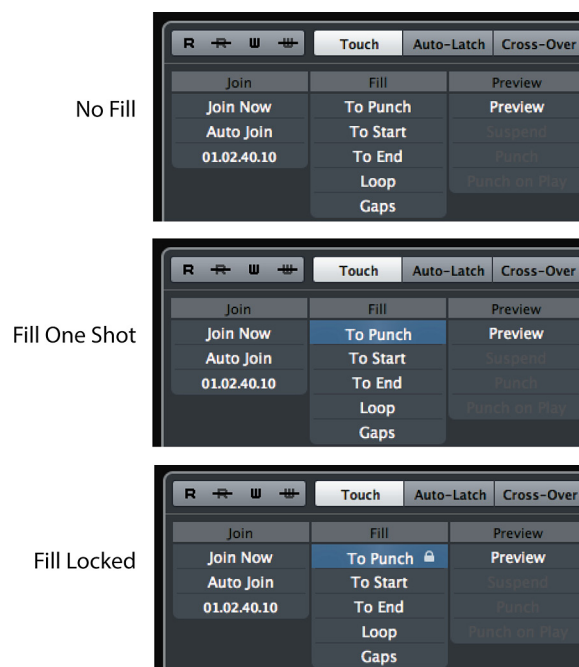


Figure 26.8
Three fill states

The fill modes can be changed on the fly, while in play. For example, you may find yourself automating a fader in touch mode and decide that this is a good level to remain at until the end of the song or scene. If you are using a control surface to actually move the fader, you can still use the mouse or key command to turn on Fill to End mode, and when you let go of the fader, that last level will be filled to the end of the project, as shown in Figure 26.9.

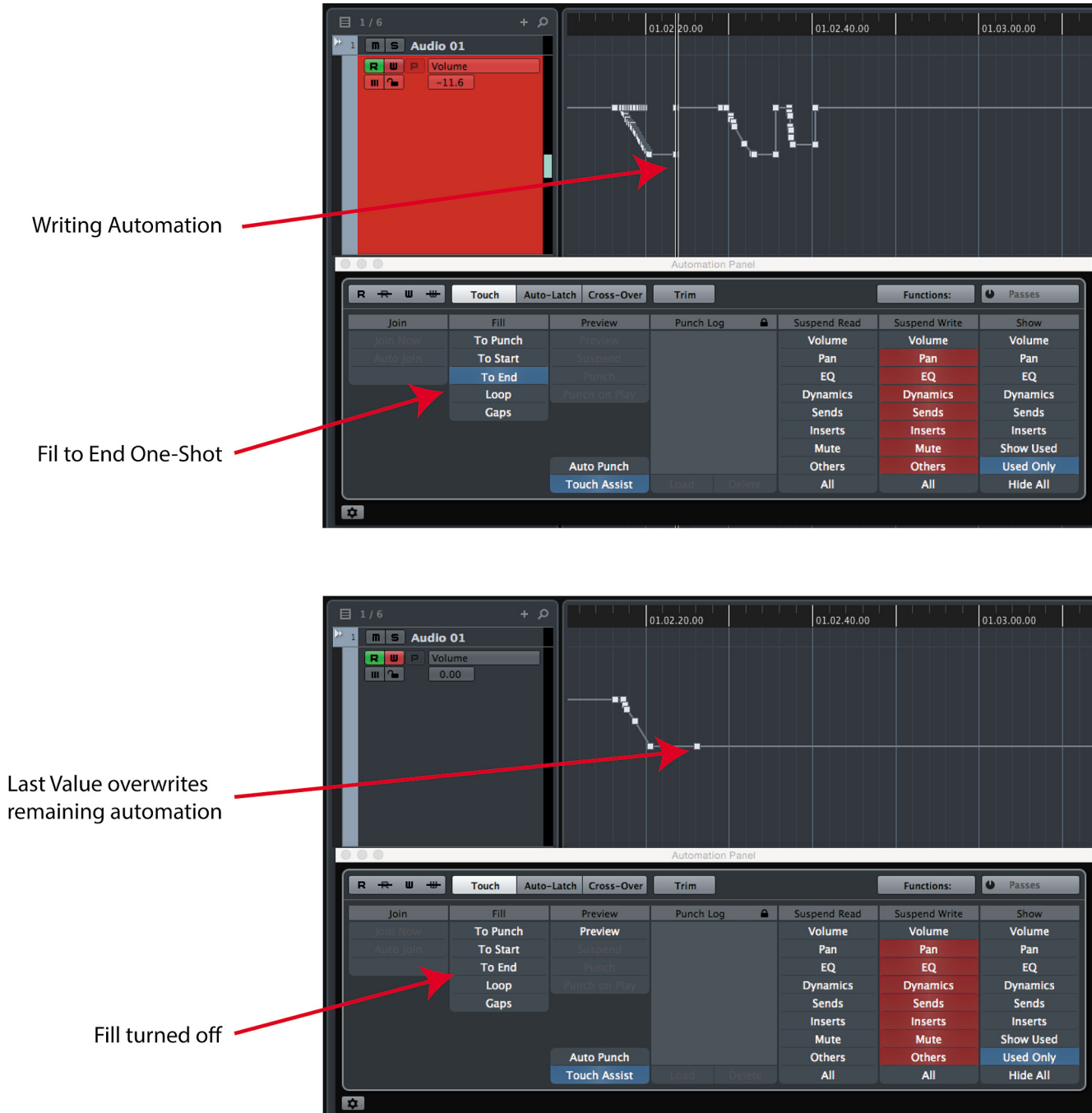


Figure 26.9 Fill to End

Fill modes may also be used in conjunction with one another. If Fill to Start and to End are both enabled, the last fader position will be written for the entire project. This can be handy if you need to reset the initial values for your mix. Simply run with both fill modes active and adjust all write-enabled tracks until a basic mix is set. This will create initial values for all those tracks from the start to the end.

Fill Manually with Pencil Tool

Sometimes manually writing in automation data is the easiest thing to do. With the pencil tool, automation data can be directly written into the lane. When you combine that with the fill modes, it can be an efficient way of working with automation. Figure 26.10 shows the

Drawing in automation

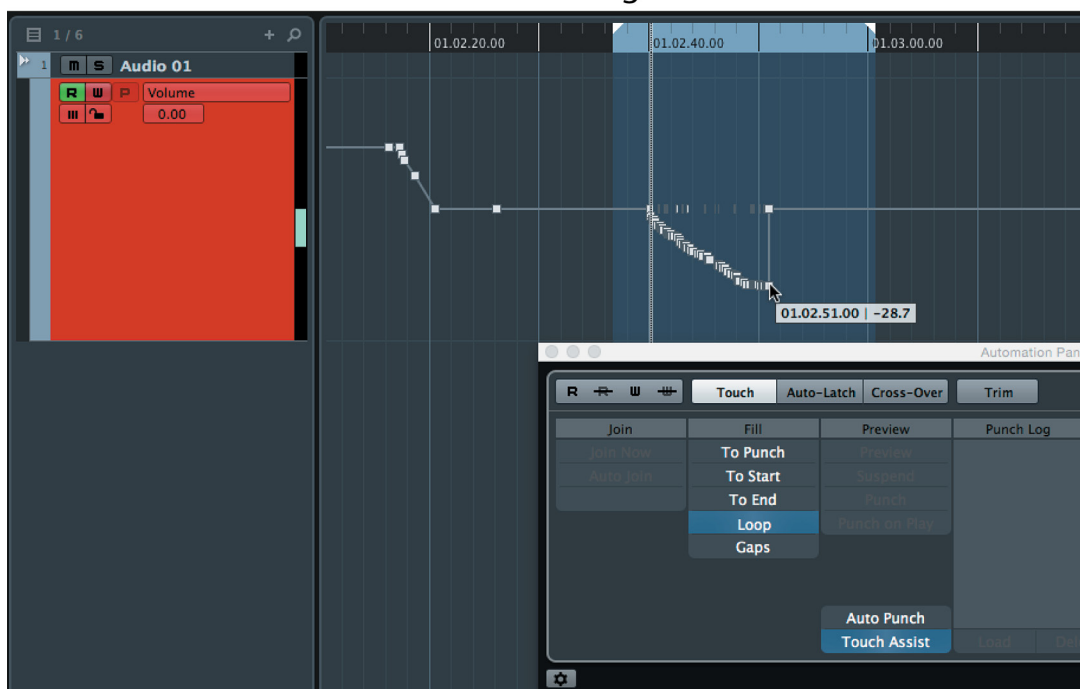
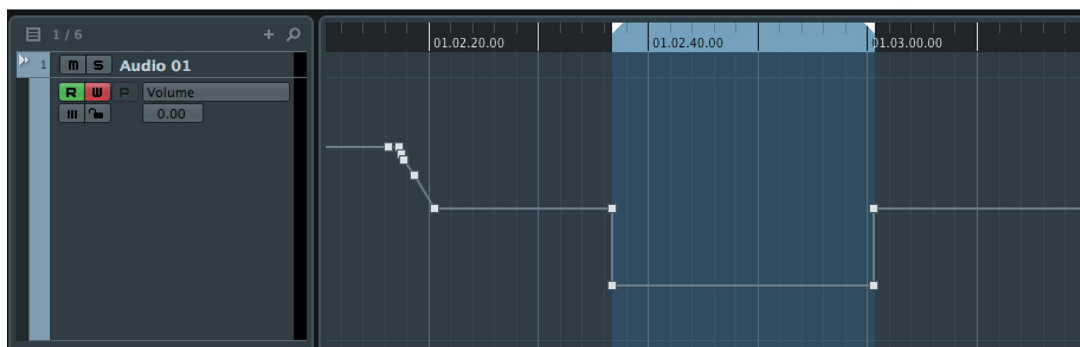


Figure 26.10
Using the pencil tool with Fill to Loop mode

Last value filled to the loop



pencil tool drawing in a value between the left and right locators with the Fill to Loop mode on. Once you let go of the pencil tool, the last value is placed between the left and right locators, filled to the loop.

PENCIL TOOL FILL RESET

Notice that when using the pencil tool with fill modes, the fill mode remains active even if it is only a one-shot. Since the transport does not have to be in playback to write automation this way, the one-shot mode will not reset after using the pencil tool.

Fill to End for Cubase Initial Values

Cubase operates differently when it comes to the initial value on the first pass of automation. This may work well for some workflow styles. However, if you want the initial value on the first pass of automation to be written to the entire project, as in Nuendo, you can use the Fill to End in Cubase to do the same thing.

On the initial pass for each automated control, enable Fill to End. Start playback and tap each write-enabled control to create initial values for the entire project. This mimics the workflow of Nuendo and will allow you to use Touch mode more effectively after the initial pass.

Virgin Territories

Another workflow style involves the use of virgin territories. This feature writes automation only in the area where the control was actively in write mode. Nuendo will write automation data only in those locations where the control was in write. Other areas are left blank, as seen in Figure 26.11.

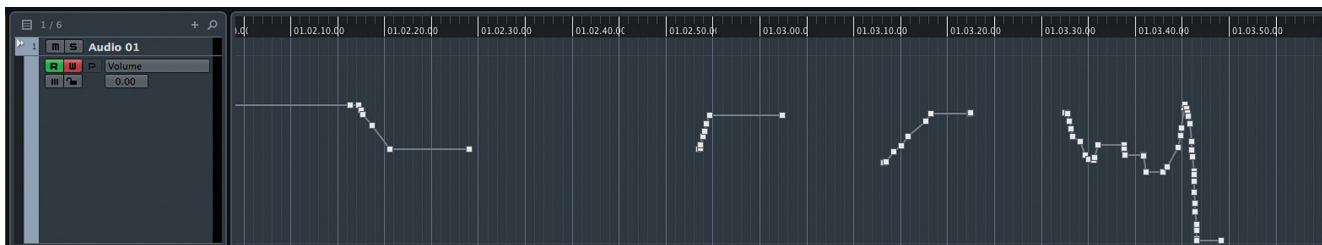


Figure 26.11 Automation using Virgin Territories

In the gaps there is simply no automation data. The control will be left at the last point in the previous pass. If the control is touched again later, a new automation pass will be recorded there.

In the gaps, the control may be adjusted freely. Once another pass is reached, the value will jump to the new automation point. This provides flexibility for certain workflow styles.

Terminator Points

At the end of each pass when using virgin territories, there is a terminator point. Terminator points mark the beginning of a gap. When a terminator point is selected, the info line shows the terminator value set to yes, as seen in Figure 26.12.

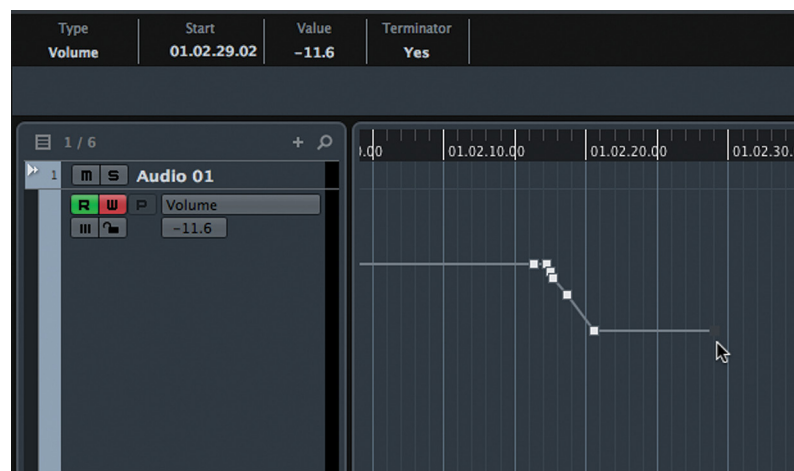


Figure 26.12
Terminator point with info line

Filling in the Gaps

Once a mix gets closer to completion, the gaps can be filled in with the corresponding values. This can be done several ways:

Automation Functions Menu

In the Automation Panel, there is a functions menu, shown in Figure 26.13. There are two options for filling in the gaps from virgin territories.

- ❖ Fill Gaps on Selected Tracks uses the terminator point value for each pass to fill the next gap, as shown in Figure 26.14.
- ❖ Fill Gaps with Current Value (Selected Tracks) uses the current value of the control to fill in all the gaps, as seen in Figure 26.15.

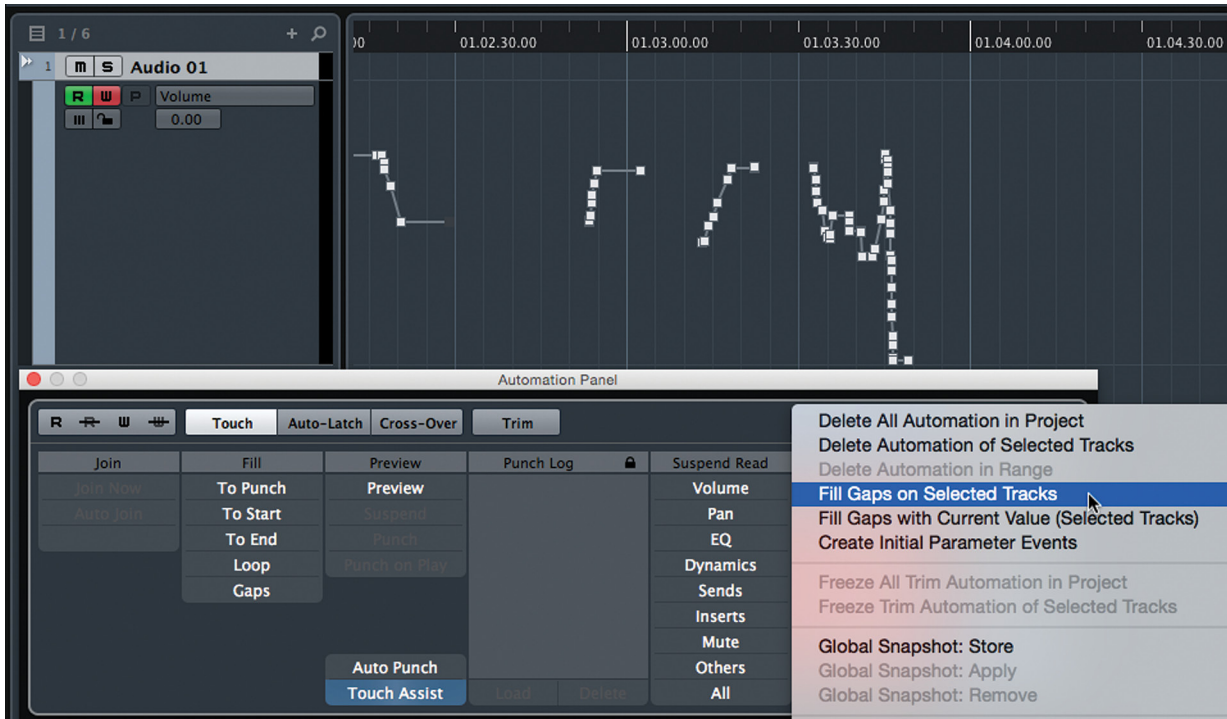


Figure 26.13 Functions menu in the Automation Panel

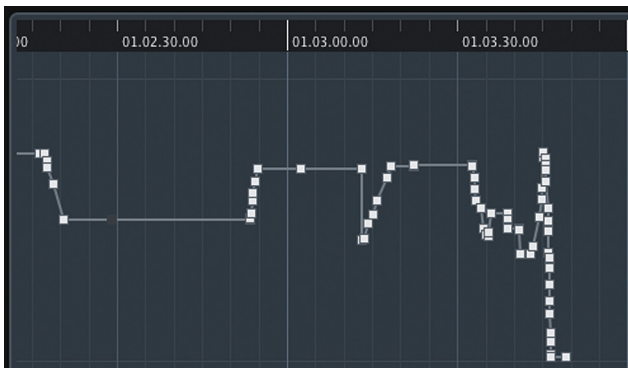


Figure 26.14 Fill Gaps on Selected Tracks

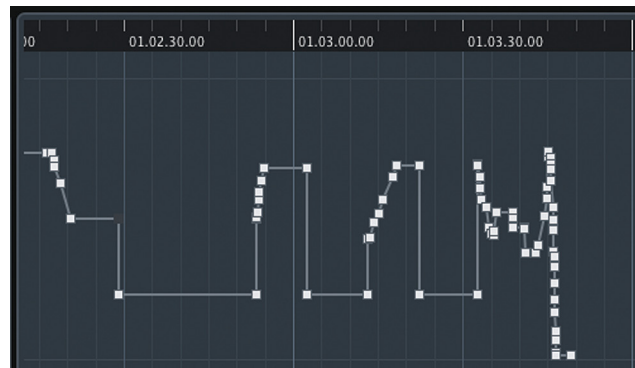


Figure 26.15 Fill Gaps with Current Value (Selected Tracks)

Trim



(tutorial video: “Automation Trim Mode”)

Trim is a very useful mode that allows you to add or subtract from an existing automation event, effectively shifting the automation line up or down. When channels are in Trim mode, faders move to the middle and no longer move with the automation data. Another

automation line appears in the lane to indicate either additions or reductions to the control value. Figure 26.16 shows volume automation with the flat trim line superimposed on top with the fader in the middle, which is now unity gain (no change from automation line).



Figure 26.16
Channel in Trim mode showing trim line and fader in the middle unity position

As you move the fader during playback, the trim line will show the deviation from unity while the automation line also shows the change in absolute level that is the result of the trim adjustment, as seen in Figure 26.17. In this example, 7.2dB is being subtracted from the original fader level but all of the moves remain intact.



Figure 26.17
Volume automation curves while trimming

In order to trim, simply engage the Trim button on either the automation panel or by the pulldown menu in the project window. All faders will snap to a middle position, indicating a zero deviation from existing values. As you move the fader up or down, a corresponding value will be added or subtracted from the existing automation line. This will be reflected visually in the lane. Note that values for the fader are now positive or negative dBs, reflecting the value that will be added or subtracted from the current automation.

TRIM ANY CONTROL

For this entire discussion of automation, the use of “fader” and “volume” can be interchanged with any other automation parameter. The only items that cannot be trimmed are on/off states such as EQ band enable switches because they only have two states.

Trim values can be applied in several ways:

- ❖ **Real-time.** Trim can be written on the fly, as you go, using all the automation modes, touch, auto-latch, and cross-over.
- ❖ **Throughout a Section.** A single trim value can be added to an entire section of automation. The same value will be added or subtracted from every event within the cycle range (left and right locators) using the fill to loop mode.
- ❖ **Offline.** Trim can be applied offline without entering play. Think, “Adding a dB for a vocal-up” mix of a song. This uses the fill modes but not during playback.

Trim Freeze

One thing to consider before writing trim automation is the Trim Freeze mode. By default, trim values will be “frozen” after each pass. In other words, the trim values you encode to add or subtract from the automation line will be committed to the automation data. The trim value will be added to the existing value and then stored as a new value.

It is also possible to retain the trim values for a time in order to update, edit, or rewrite them before freezing or committing them as permanent changes. In essence, you can have two automation lines, one superimposed on the other. Combining the two equals freezing the trim. (See Figure 26.18.)



Figure 26.18
Trim automation superimposed on previous automation

When Trim values have not been frozen, they remain displayed in the lane. They can be moved and edited manually just like other types of automation. Once you are satisfied with the trim values and wish to freeze them, there are three methods to combine the trim and automation (freezing).

The trim freeze options are accessed from the Automation Panel's Preferences tab. There are three options available, as shown in Figure 26.19. These Trim freeze options let you control how and when to commit the trim changes. Of course, as with all operations in Nuendo, you may always use the undo function to step backward from any unintended operation.

- ❖ **Manually.** Manual Trim freezing can be performed for all tracks or just those selected.
- ❖ **On Pass End.** The Trim data will be merged with existing automation after each write pass. This depends on the automation punch out mode described above.
- ❖ **On Leaving Trim.** Trim values will be frozen only when the Trim button is turned off.

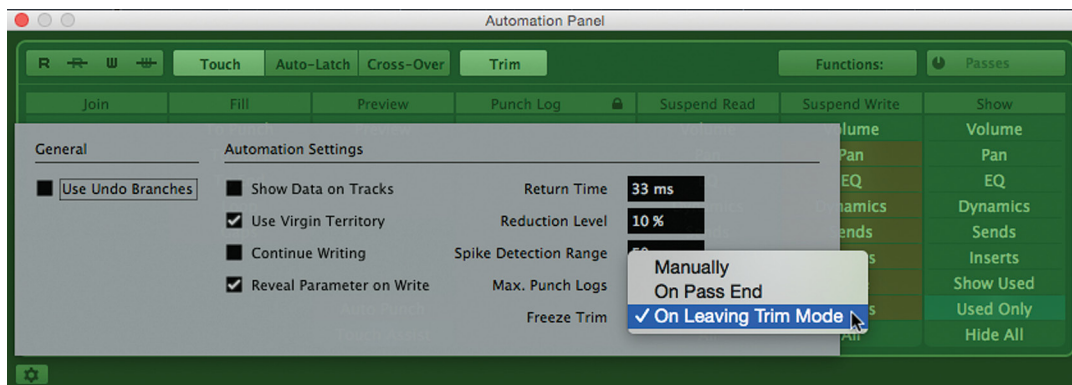


Figure 26.19
Trim Freeze Preferences

“Lead Vocal Up” Version Using Trim

It can be quite helpful to be able to trim a section of automation without playing that section all the way through. Nuendo allows you to adjust trim automation while the transport is stopped.

Let’s use an example from music mixing. Once a mix has been completed, it is common practice to record or export a version of the mix that has the lead vocal turned up a small amount, perhaps a dB or two. This is known as a “vocal up” version and can be useful when mastering an album or simply as a safeguard in case more lead vocal is desired later.

In this example, we will adjust the entire lead vocal for the song upward by +1 dB. This assumes that you have already automated the vocal level throughout the song.

1. Set the left and right locators to the start and end of the entire song. Trim values will be added only to the section between the left and right locators. This same technique can be used for any section of a project.
2. Put the automation into Trim mode. You will now see a flat line superimposed over your existing automation line. (See Figure 26.20.)

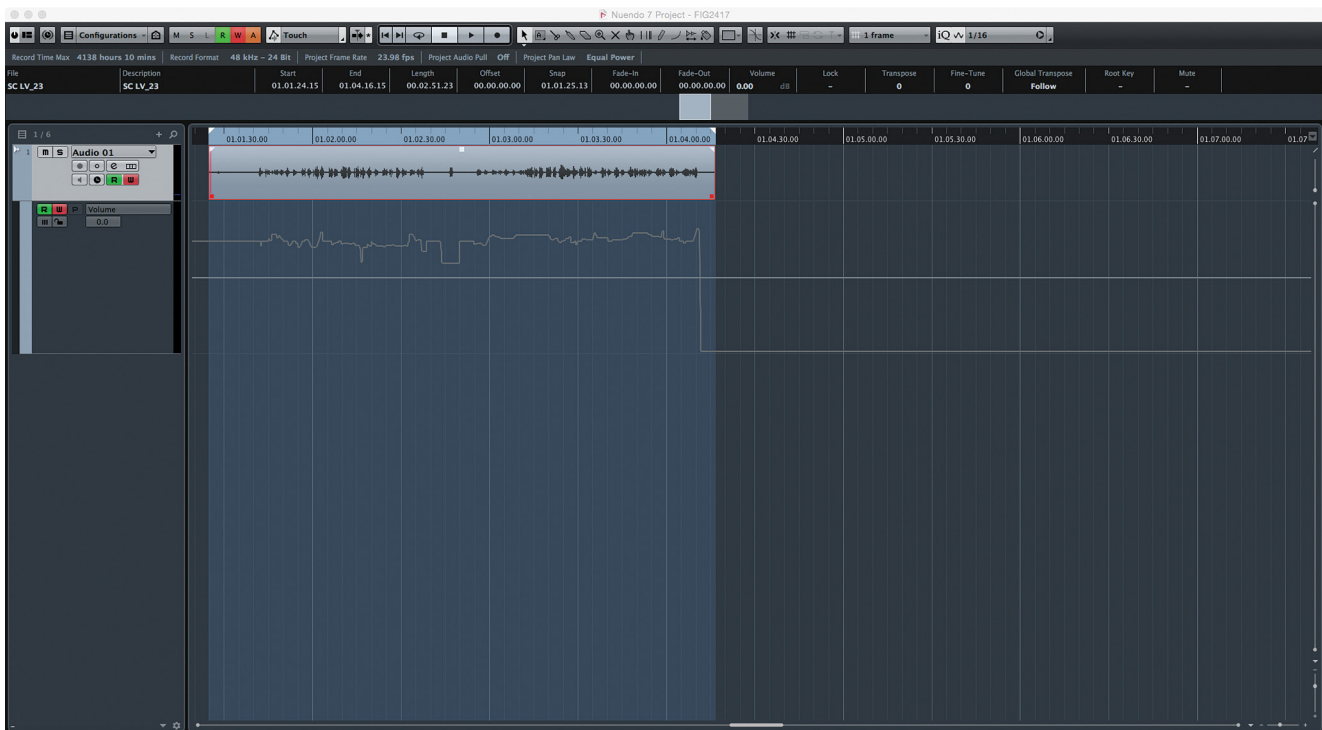


Figure 26.20 Trim automation line superimposed over existing volume data

3. In the Automation Panel, activate the Fill to Loop mode. This will apply the trim value everywhere between the left and right locators that define the loop. (See Figure 26.21.)
4. Without going into play, move the channel fader up until the deviation value is +1.0 dB. Notice how the track list area turns red, indicating that data is being written even though the transport is in stop, as shown in Figure 26.21.
5. Breakpoint automation events are placed at both the left and right locators so that the trim value is only applied to the area between the locators. Look closely and you will see the original automation line below the trimmed one in a lighter shade. (See Figure 26.22.)
6. From the Automation Panel, choose Freeze Trim Automation of Selected Tracks in order to combine the trim and volume. The updated automation line reflects the added trim value.

You can now export or record the new vocal up version, simple and precise. If a vocal down version is desired, follow the same procedure with a negative trim value. This method can be used to trim anything, be it a guitar solo, strings in the bridge, or the ambience of a single scene in a movie.



Figure 26.21 Fill to Loop activated, trimming +1dB

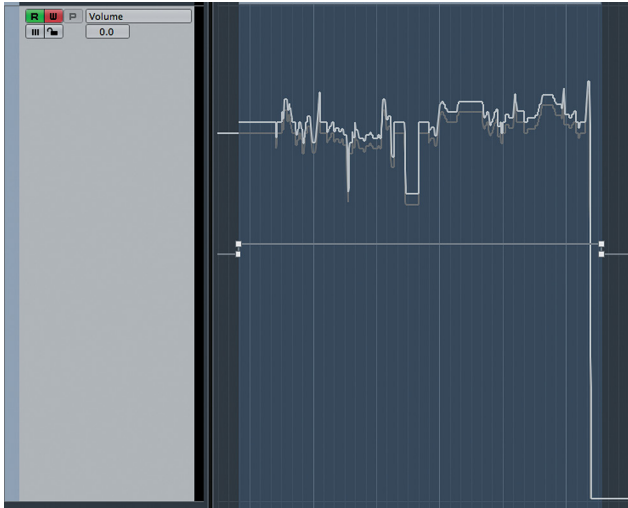


Figure 26.22 Loop area trimmed up +1 dB

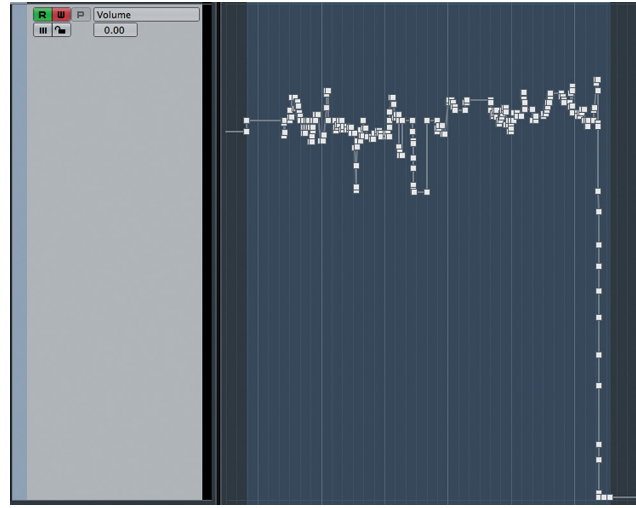


Figure 26.23 Updated automation line with added trim

Automation Passes

Passes are the name Nuendo uses for each time you perform real-time automation. A pass begins when you start writing automation and ends when playback is stopped. Manual editing of automation events is not considered a pass.

When you enable Passes on the Automation Panel, you can change the panel’s view to show a history of the automation passes you have performed. This is basically another view of Nuendo’s edit history that is restricted to automation writing, as shown in Figure 26.24. Each step shows details of what happened during the automation pass. The status is either executed or undone.

If you wish to return to a previous automation pass, you can move the horizontal line up to a point where the desired pass is the last executed one. Other passes will remain in memory

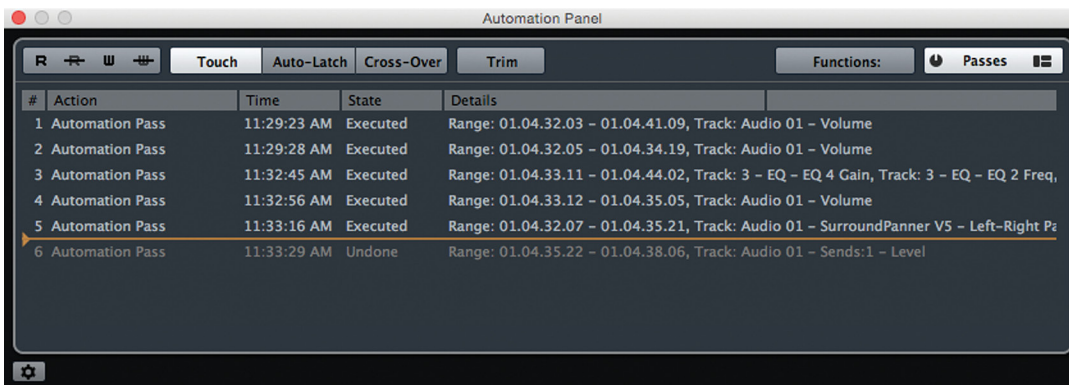


Figure 26.24 Passes enabled showing history

but are not active and will be shown grayed out (undone) in the list. Passes above the line are active (executed) while passes below the line are deactivated (undone).

AUTOMATION PASSES AND GLOBAL HISTORY

The Passes history is tied to Nuendo's global history. When you move the horizontal line to go back to a previous pass, any other edits performed to audio events or any other data in Nuendo between the two passes will also be undone. The passes history is just a convenient way of visualizing the history of automation writing.

Undo Branches

Undo Branches are an extension of automation passes. Instead of a linear undo history for automation, branches allow multiple versions of automation to be kept in memory and auditioned at will.

To enable branches, you must have passes enabled. Then choose Use Undo Branches from the Automation Panel settings. Each automation pass is now represented by a block on the right side of the Automation Panel. Figure 26.25 shows a linear single branch of automation passes.

In order to create a new branch, undo one or more passes and then perform more automation passes that will extend onto the new branch, as shown in Figure 26.26. This process can be repeated many times to create multiple undo branches.

The first branch is retained in memory and can be activated later. Double click on any pass, and all necessary branch passes will become executed. In this fashion, you can try several variations of automation pass combinations and choose the best without losing the alternates.

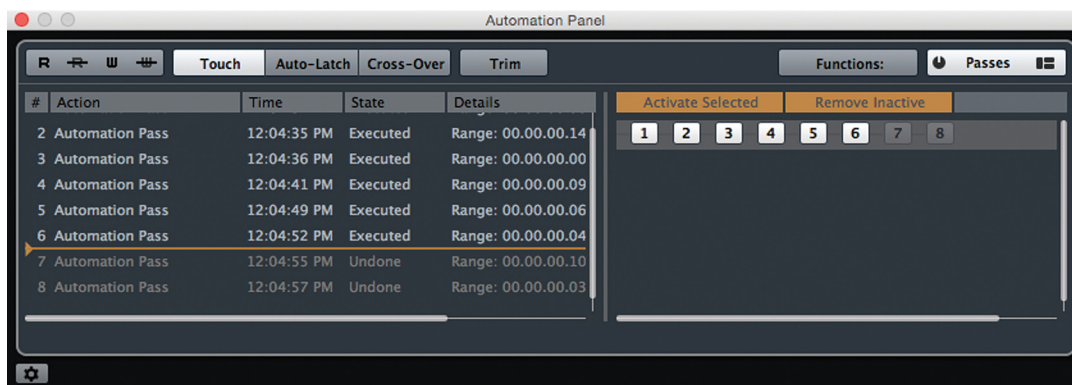


Figure 26.25
Single branch
of automation
passes

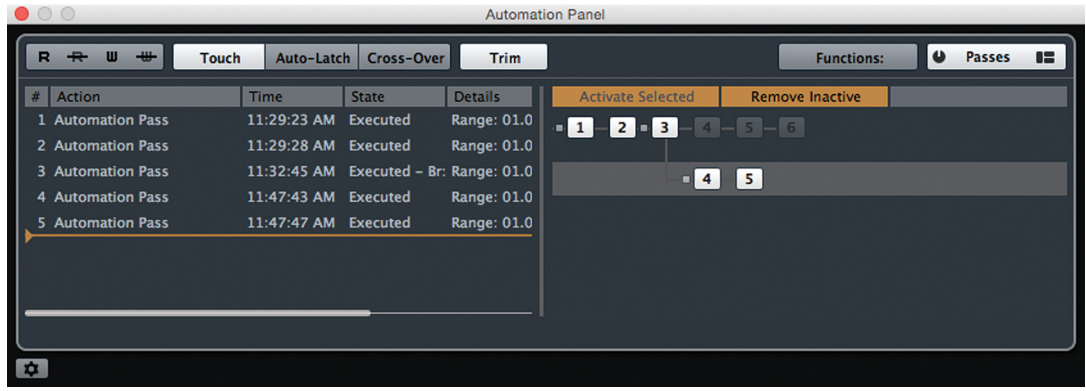


Figure 26.26
Two automa-
tion branches

UNDO BRANCHES FOR ALL EDIT HISTORY

Undo Branches apply to both the automation passes and to the general undo history of Nuendo. Once enabled, undo branches are also visible in the Edit History window. They work in the same fashion but include all editing steps performed, from automation to event editing. This is a very powerful feature and can empower you to explore editing opportunities that might otherwise be difficult or risky to explore. (See Figure 26.27.)

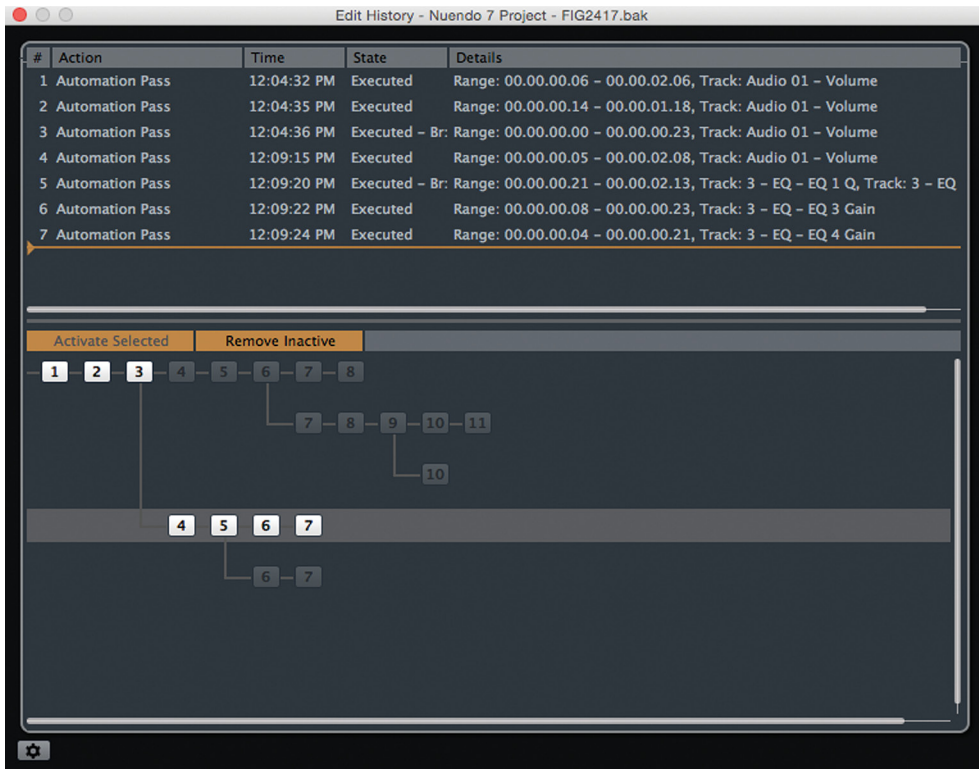


Figure 26.27
Undo Branches
in the Edit
History

Preview Mode



(tutorial video: “Automation Preview Mode”)

Preview mode is used to suspend automation reading for controls so that you may audition new settings without disturbing existing automation data. Any parameter that is in Preview mode can be freely adjusted without altering the existing automation data. Multiple parameters can be placed in Preview together across multiple channels. This step is called “touch-collecting” parameters into the Preview group.

To enable the Preview workflow, press the Preview button on the Automation Panel. Once any parameter is touched, it enters Preview mode and the Suspend, Punch, and Punch on Play options become available, as seen in Figure 26.28.

This is how the preview workflow works:

1. Enable Preview on the Automation Panel. Preview works like the fill modes, either as a one-shot or locked on. Pressing Preview again will lock it on.
2. Touch any parameter. That parameter is put in Preview mode. The automation lane will show a lit P button. Each automation lane can be set to preview using this button or by touching the parameter, as shown in Figure 26.29. Touch-collect as many controls as you wish across multiple channels.
3. Adjust the controls freely: EQs, faders, sends, dynamics, etc. None of the adjustments will be written as automation. This is the previewing stage where you can try various settings until you reach the desired sound.

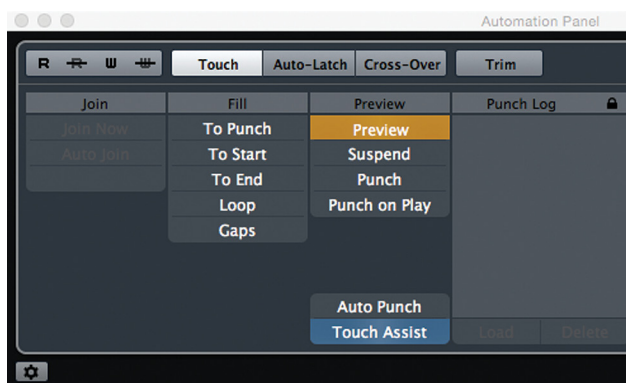


Figure 26.28 Preview enabled

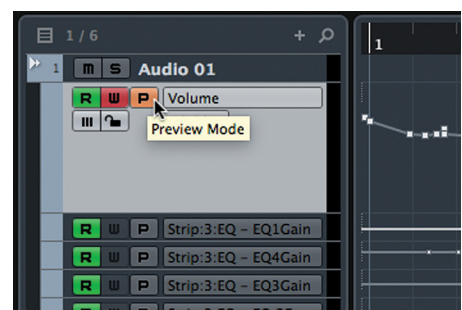


Figure 26.29 Preview buttons in the track list

4. Compare the new settings with the previous automation by pressing the Suspend button in the Automation Panel. This will return all previewed parameters to their previous state, suspending the preview. You can do an A/B test between the old and new settings to ensure that improvements are being made. These changes will be reflected in the automation lines seen in the project window.

PREVIEW FOR EMPTY PARAMETERS

Parameters that do not have any previously written automation data will still function in Preview, with Suspend reverting their settings back to their previous static settings. This is great for punching in EQ settings that change only for one section of a project. Even if you have no initial values for the EQs, Preview and Suspend work as if you have those initial values.

5. Punch in all the previewed parameters to write new automation data by pressing the Punch button in the Automation Panel.
6. All of the touch-collected parameters will be recorded until you stop the transport.

This is the manual method of punching in with Preview. There are a couple other methods you can use to do this automatically.

Punch On Play

The Punch On Play function simply puts touch-collected parameters into record when you enter play. Since preview works while stopped, you can set up parameters and then enter play and those parameters will immediately start recording data. This is most helpful when the starting point of a preview punch is in an exact position, such as a specific frame number in a film.

Auto Punch

Auto Punch uses the left and right locators to punch in and out with preview. It is similar to using the locators to punch in to an audio or MIDI track. When Auto Punch is enabled, previewed automation tracks will start recording at the left locator and stop recording at the right locator.

You can use just the punch in or punch out functions by setting one of the locators way out of range of the work area. In other words, if you start playback after the left locator and manually punch in, Preview will punch out automatically at the right locator.

PREVIEW IGNORES TRANSPORT AUTO-PUNCH

Unlike the transport's Auto Punch features, Preview's Auto Punch does not need the punch in and out buttons on the transport to be activated in order to work. Those states are ignored by Preview. Ensure that the left locator falls before the right in time because neither auto punch function will work if the locators are inverted in time, right before left.

Preview and Fill Modes

Just as in normal automation writing, Preview will work with all the fill modes. The Fill to Loop is very useful in film mixing with Preview and scene cycle markers. By setting the left and right locators around a scene using a cycle marker, automation can be previewed and then punched in to fill the entire scene quickly.

Preview Punch will also work while the transport is stopped but only in conjunction with a fill mode. Pressing Punch will write all touch-collected parameters from the cursor position and fill in the values according to the fill mode without playback of the project.

Touch Assist



(tutorial video: “Automation Touch Assist”)

Touch Assist is a helper to the Preview workflow. Because so many parameters are available, it is quite easy to overlook all that are necessary to ensure the desired outcome.

Touch Assist groups parameters into categories so that touch collecting one parameter in a category will collect all of them at once. That way, when you want to change an EQ setting, all EQ parameters will be punched in together, overwriting any other automation at the punch in point. Touch Assist groups parameters into these categories:

- ❖ Channel EQ
- ❖ Aux Sends
- ❖ Stereo Panner
- ❖ Surround Panner (Left-Right, Front-Rear, LFE)
- ❖ Insert Plug-Ins (for plug-ins with 32 or fewer parameters!)

With Touch Assist on, touching any parameter will touch-collect all of the controls for that group.

For example, when automating the equalizer, there are 21 parameters available. If on the previous automation pass, only band 4 was automated (three parameters), that would leave the rest of EQ without automation. If at some point later you make some static adjustment to band 1, those settings would also affect the area where band 4 was automated. In this situation, it makes sense to apply automation to all the EQ parameters at once to make sure the sound stays consistent in each section of the project and that further changes do not corrupt previous settings.

Touch-collecting all 21 controls of the equalizer is time consuming and prone to errors. Touch Assist eliminates this issue by enabling all the parameters of the EQ when you touch any single one.

Punch Log



(tutorial video: “Automation Punch Log”)

In the preview workflow, you can touch collect parameters and settings from anywhere in the timeline and then punch them in to another location, effectively copying automation from one place to another quickly. The Punch Log offers another method to store groups of settings that may be applied to another section of the project.

Each time you punch in any touch collected parameters using preview, a Punch Log is created. Each log entry contains a list of all the touch-collected parameters and their settings. Each log entry can be renamed to indicate what is stored in the preset, as shown in Figure 26.30.

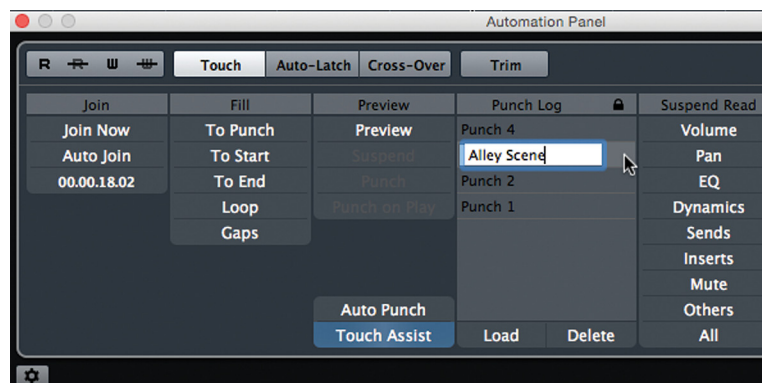


Figure 26.30
Renaming a
punch log entry

This preset or log entry can be reloaded into Preview to be punched in at multiple locations. When you load a log entry, all parameters in the log are put into preview mode with the settings as they were when the log was made. Once loaded, you can punch those settings in as you would if you had touch-collected them and set each one to the desired value. This greatly speeds up your workflow in situations where matching settings from one location to another is critical.

Copying Dialogue EQ Using Punch Logs

In this example, follow the step-by-step process of copying dialogue EQ between multiple scenes in a movie. Let's suppose that the main character spends time in her bedroom talking to herself in the mirror. This happens multiple times in the film and since, in this case, her dialogue remains on one track, we would like to adjust the EQ just for those scenes and have them sound identical, with the same EQ settings.

1. Enable Preview.
2. Enable Touch Assist. When we set the EQ, we want all the controls to be automated so each EQ setting is accurate. (See Figure 26.31.)
3. It is helpful if there are cycle markers for each scene in question. This will make setting the locators quick and precise. Set the left and right locators on the exact start and end frames of each scene. Use Snap set to one timecode frame to make this easier. (See Figure 26.32.)
4. Play through the first scene and adjust the EQ settings as needed. Touch Assist will collect all EQ parameters so that when punched in, everything in the EQ section will be written to automation. (See Figure 26.33.)

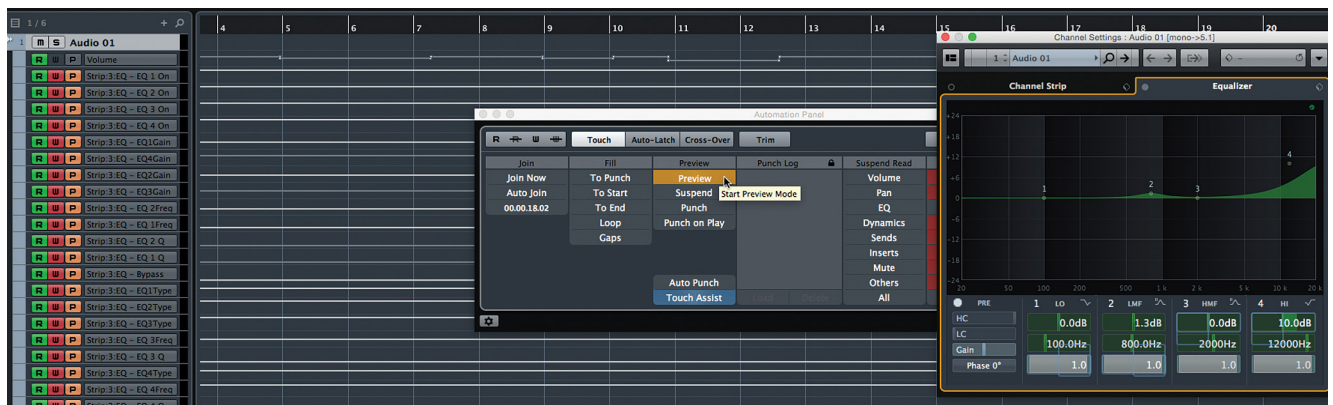


Figure 26.31 Automation Panel set to Preview EQ settings



Figure 26.32
Several scene cycle markers set



Figure 26.33
Bedroom dialogue EQ settings

5. You can use either Auto Punch or Fill to Loop in order to precisely punch in the EQ settings for the entire scene and nothing else. Ensure that the left and right locators are set to this scene. Double clicking on the cycle marker in the marker track will automatically set the left and right locators to the start and end of the cycle marker.
6. If you are using Auto Punch, start playback from prior to the left locator and watch as all the EQ parameters go into record, setting the EQ for that scene. Continue playing until the end of the scene, and the automation will punch out of record at the right locator. The first scene is now set. (See Figure 26.34.)

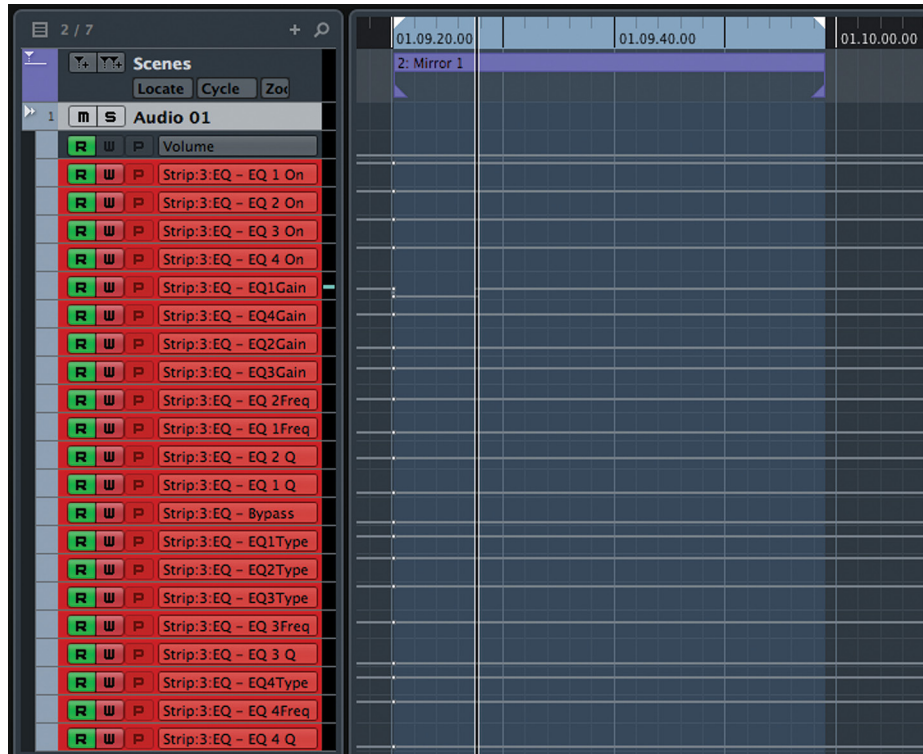


Figure 26.34
EQ parameters punched in and writing

7. If you are using the Fill to Loop method, simply press Punch while stopped to have all values written to the cycle marker. The end result is the same.
8. Notice that there is now an entry in the Punch Log window. Rename this entry something informative such as “Mirror Scene.” (See Figure 26.35.)
9. Move the locators to the next scene by double clicking on the cycle marker.

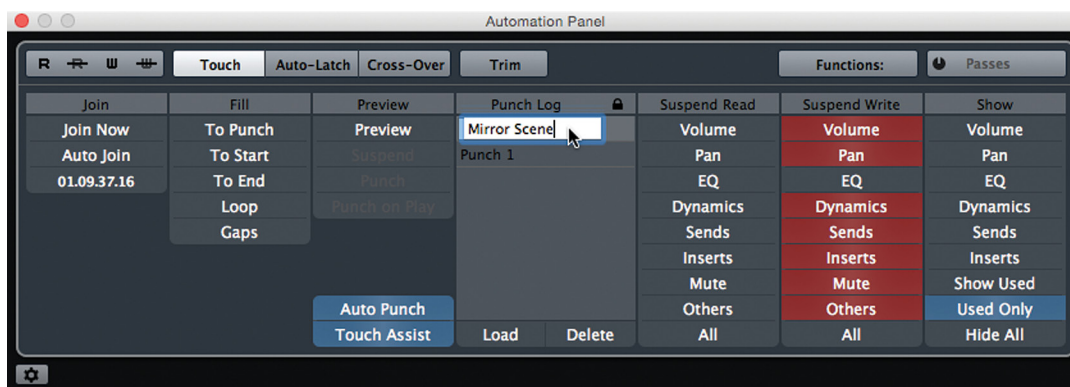


Figure 26.35
Punch Log entry

10. With the punch log entry selected, press the Load button just below the Punch Log. This will do two things: preview-enable all parameters that were punched in during that log entry (in this case, all EQ parameters) and set those values to the ones from the initial punch.
11. Repeat either step 6 or 7, depending on your workflow, to punch in the EQ settings for the second scene. Now that scene will have the exact same EQ settings as the first bedroom scene. (See Figure 26.36.)
12. Repeat steps 9, 10, and 11 for each subsequent scene that requires the same EQ settings.

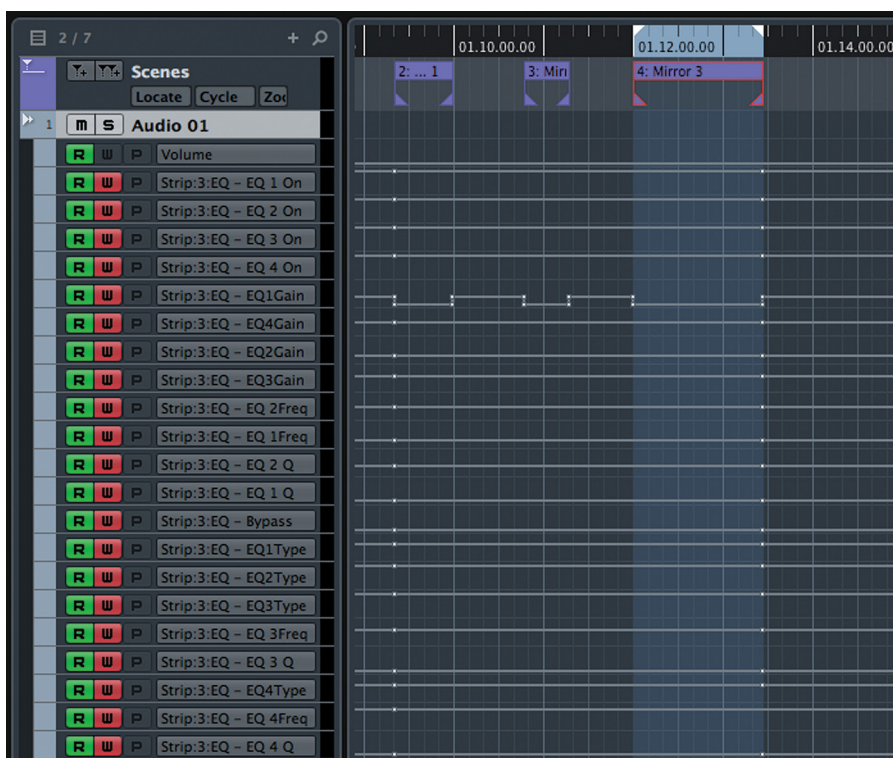


Figure 26.36
EQ settings
punched into
the second and
third scene

Using this method with any set of parameters, it becomes quick and easy to copy settings to various locations within a project. For long-form video projects, keeping settings consistent across many scene changes is a critical task once handled by costly large-format consoles. Preview brings that powerful feature set to Nuendo.

Individual Automation Settings Per Channel

As you get more comfortable with the automation system, you might find the need to have multiple channels in write but using different auto-punch out modes. For example, you could have a vocal channel in Trim while all the drum tracks are in Latch mode. Nuendo allows you to choose individual automation modes per channel.

To access this ability, choose an option from the Inspectors top tab, as shown in Figure 26.37. The automation mode pull-down menu has five choices:

- ❖ Global - The channel will follow the global automation mode
- ❖ Touch - Individual Touch
- ❖ Auto-Latch - Individual Latch
- ❖ Cross-Over - Individual Cross-Over
- ❖ Trim - Individual Trim

There is a Key Command that will toggle selected channels through each individual mode to make switching easier. The one caveat with this is that there is no other indication anywhere in the interface of these individual modes other than the top tab of the Inspector. Working with many channels in individual automation modes can become complex but provides a great deal of flexibility that can speed up large-format workflows.

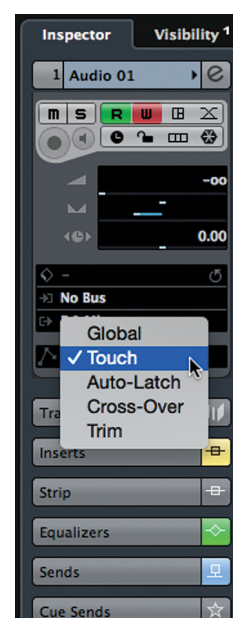


Figure 26.37
Individual Channel Automation Punch-Out Mode Menu

VCAs



(tutorial video: “Nuage VCA Channels”)

VCA channels are used to control groups of channel faders together. This is not the same as combining the audio signals from multiple channels together like a group channel does. VCAs do not have any audio signal in them, rather they have control over multiple channel faders together.

VCA's operate much more like linked channels. Moving the VCA causes all of the linked channels to move together. However, linked channels have equal control over one another. Moving any linked channel moves them all. VCA's have a master/slave relationship, where the VCA is the master fader that controls all its connected slaves.

Creating A VCA Group

In order to create a VCA group, follow these steps:

1. Add a VCA fader to the project. It will have a green fader head and no pan controls, as shown in Figure 26.38.
2. In the VCA rack of the MixConsole, click on the top slot to assign channels to the VCA fader. The menu will list available VCA faders. Select the VCA to attach the channel to, as seen in Figure 26.39.
3. Repeat this for each channel that is to be a part of the VCA group.



Figure 26.38
A new VCA fader

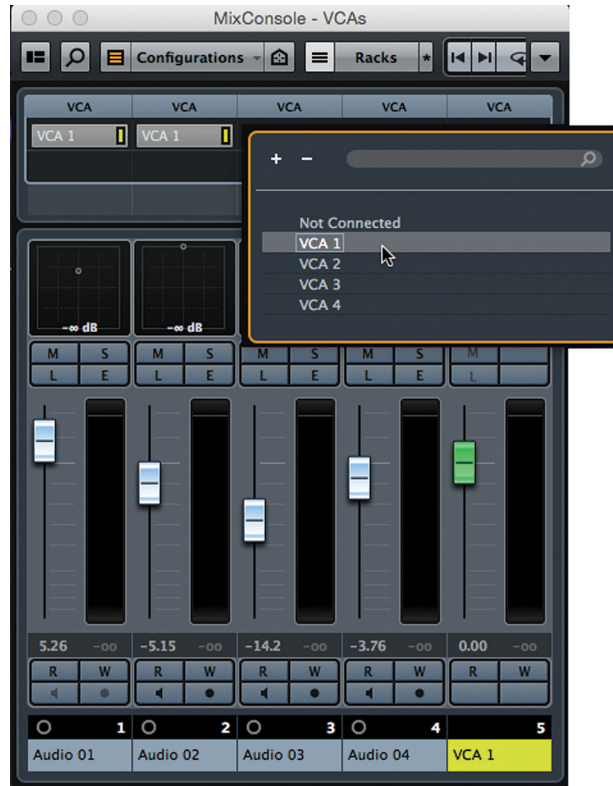


Figure 26.39
Attaching channels to a VCA fader

Now when you adjust the VCA fader, all of the connected channel faders will move proportionally together. Figure 26.40 shows four channels connected to VCA 1. Figure 26.41 shows the same channels after the VCA fader is moved -10dB. Notice the connected channels have all moved the same amount relative to their starting level.



Figure 26.40 Four channels connected to VCA 1

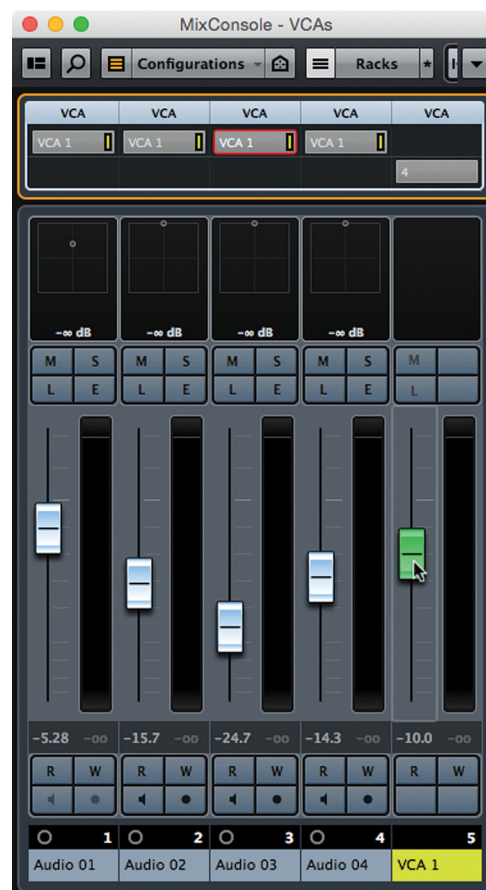


Figure 26.41 VCA 1 adjusted -10dB

Nesting VCAs

Any channel fader that is audio-related can be added to a VCA fader, including other VCA faders. By connecting VCA faders to other VCA faders and channels, you can create complex hierarchies of connected channels. This is often referred to as “nesting” VCA faders, one inside the other.

A good example of how this may be used in mixing is with a string orchestra. In this orchestra there are the following instruments:

- ❖ 1st Violins – 8
- ❖ 2nd Violins – 6
- ❖ Violas – 4
- ❖ Cellos – 3
- ❖ Basses – 3

That’s a total of 24 instruments. If there is one microphone per instrument, that is 24 channel faders to operate during a mix. With only ten fingers this might be difficult. Assigning the instruments to nested VCA faders will greatly reduce the number of faders needed to mix the orchestra.

If each section has its own VCA and then those VCAs are connected to another master VCA, it will make mixing a breeze.

❖ 1 VCA – *Symphony*

■ 2 VCA	■ 3 VCA	■ 4 VCA	■ 5 VCA	■ 6 VCA
<i>1st Violins</i>	<i>2nd Violins</i>	<i>Violas</i>	<i>Cellos</i>	<i>Basses</i>
• 1	• 1	• 1	• 1	• 1
• 2	• 2	• 2	• 2	• 2
• 3	• 3	• 3	• 3	• 3
• 4	• 4	• 4		
• 5	• 5			
• 6	• 6			
• 7				
• 8				

By mixing just with VCA faders, there are only six, including the overall master VCA. This will be much easier. Figure 26.42 shows the 6 Symphony VCAs in the MixConsole.

Notice how in the VCA rack the top slot indicates which VCA that channel is connected to and the bottom slot shows how many channels are connect to that VCA. Figure 26.43 shows the top VCA rack slot of another audio channel with the menu open and all possible VCA connections.



Figure 26.42 Symphony VCA Faders

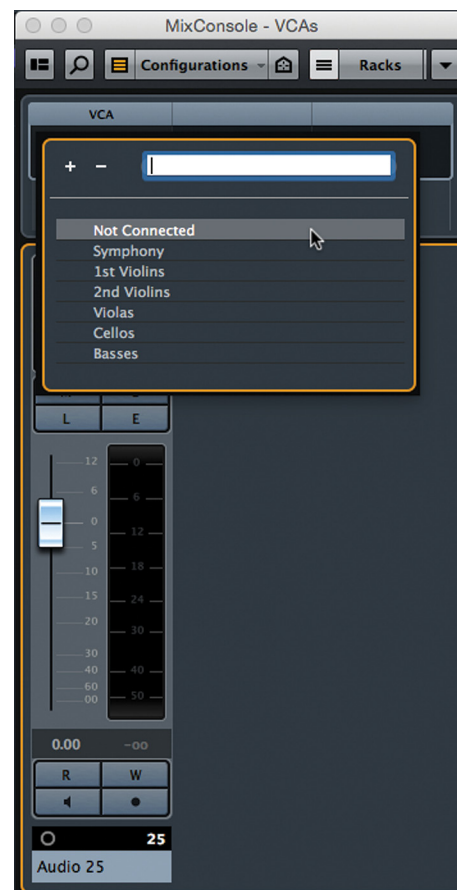


Figure 26.43 VCA connection menu

VCA Automation

VCAs can be automated. There is only one parameter: fader level. Figure 26.44 shows fader automation written for the Cello VCA. When played back, the cello audio channels will follow the automation curve of the VCA relative to their current values. If those starting levels change, the VCA automation will still affect the cello tracks but with the different relative values.

To make the automation permanent on the cello tracks, open the second VCA slot menu from the MixConsole, as shown in Figure 26.45. Choose “Combine Automation of VCA and Connected Channels.” The VCA automation is added to the fader level of each connected channel and the automation curve is calculated for each channel.

Notice how the VCA automation is cleared, a straight line. This works in a similar fashion to Trim mode, where the trim value is added to the channel level and then combined together when Freeze Trim has been performed. Combining VCA and channel automation is like freezing the VCA values.

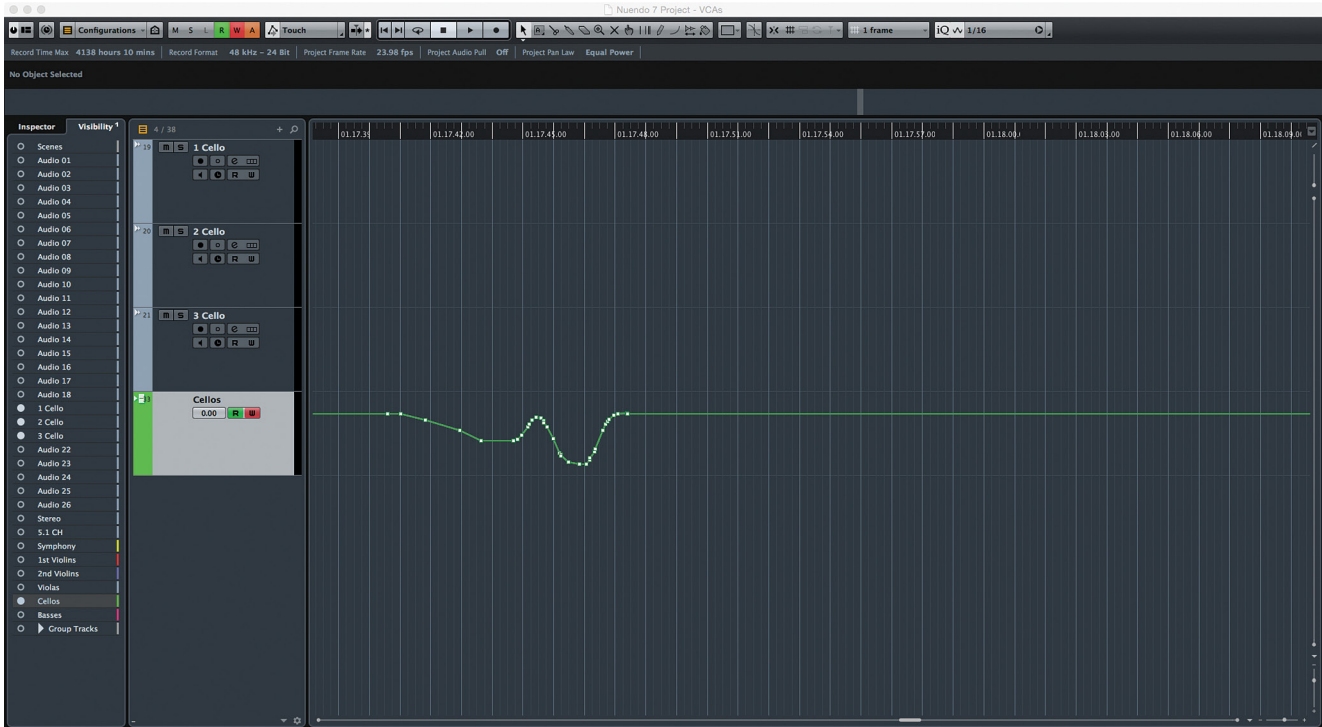


Figure 26.44 Fader automation on VCA track

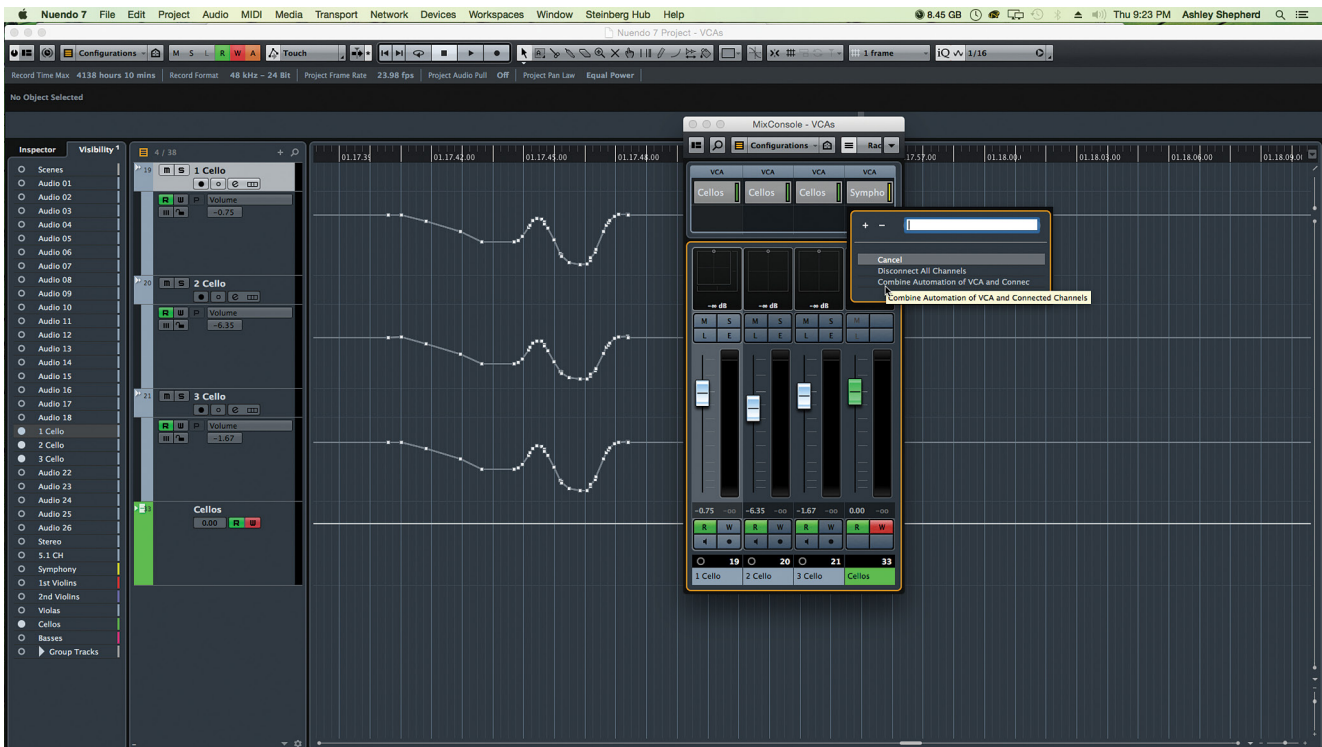


Figure 26.45 Combining VCA Automation and Connected Channels

If volume automation exists on the connected channel, the process still works the same. VCA fader values are added to the existing channel volume to render the updated automation curve. Figure 26.46 shows added VCA automation to the already existing channel level curves. The solid line indicates the composite level of both channel and VCA together.

If the new VCA automation and channel automation are combined, the VCA automation is cleared again and the channels each have updated automation curves, as shown in Figure 26.47.

VCAs offer a powerful set of tools for mixing large numbers of tracks with minimal effort. With the automation coalescing process, complex dynamic moves can be reduced to the most simple automation curves possible. The ability to nest VCAs within other VCAs offers mixing flexibility that once only large-format film dubbing consoles provided.

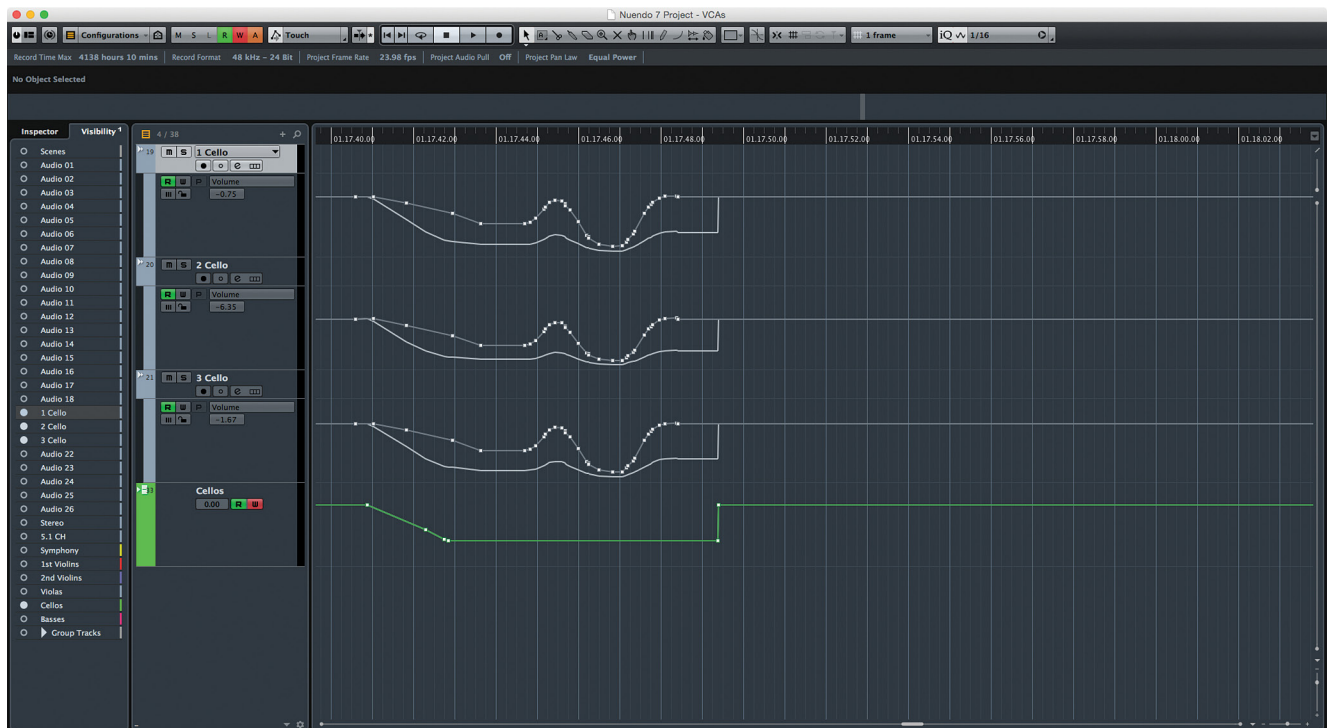


Figure 26.46 Additional VCA automation with existing channel level automation

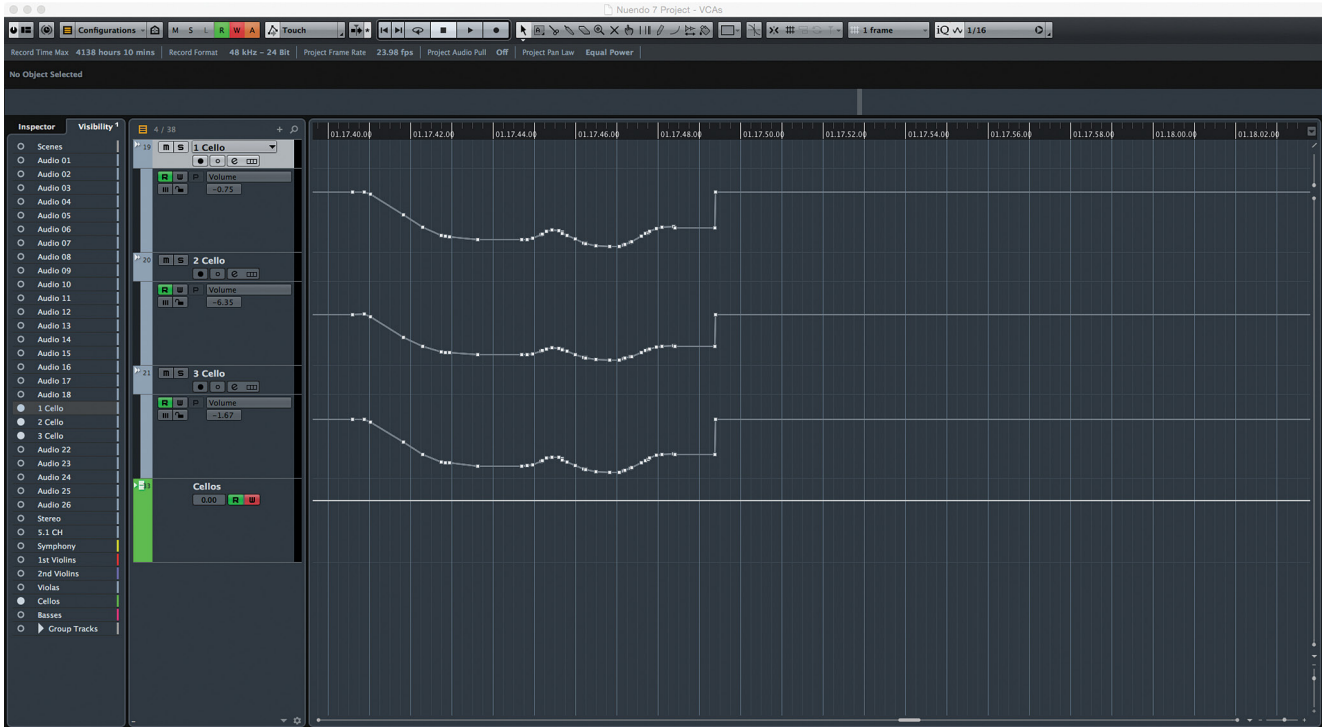
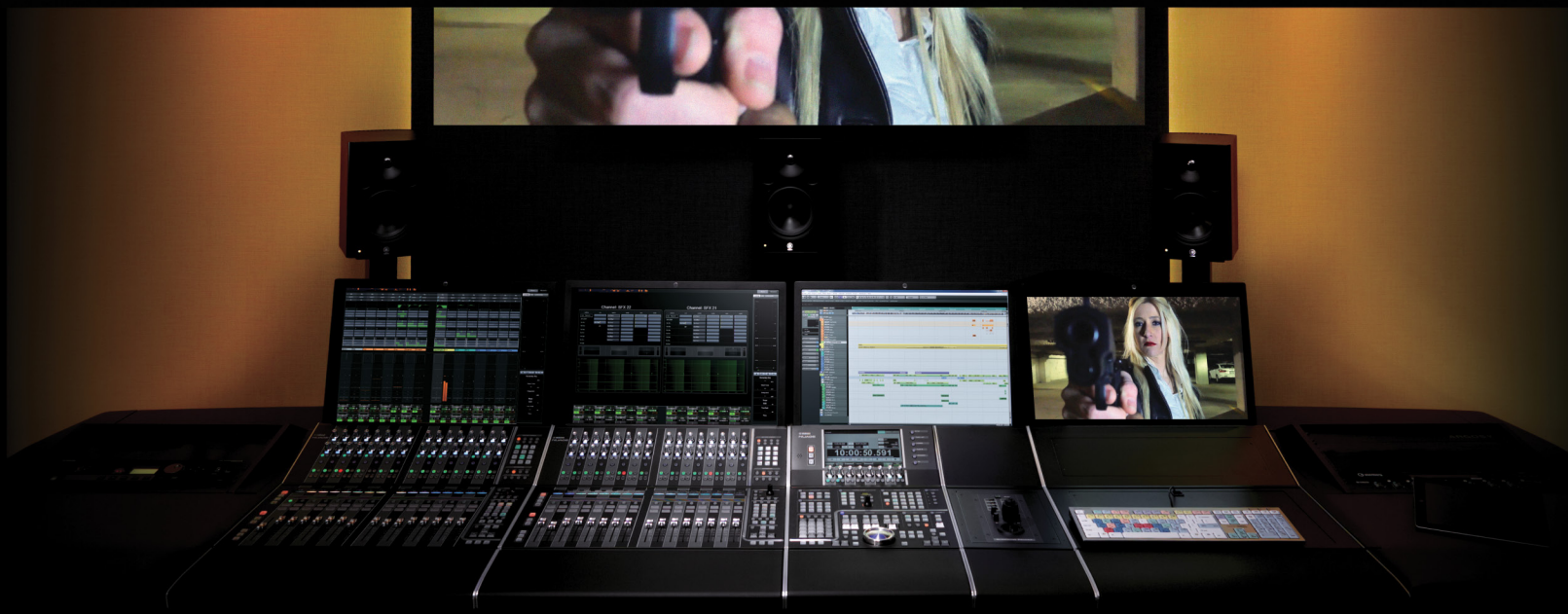


Figure 26.47 Combined VCA and Channel automation curves

Nuendo’s automation tools give you the freedom to pursue creative goals without some of the technical limitations that consoles and other DAWs have. Once mastered, the automation system will allow you to use your ears more and worry less about the technical possibilities of the system. So go mix!

NUAGE

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PART IV: MIXING

by Ashley Shepherd

Chapter 27

Exporting Files



NUAGE

Exporting Files

- ❖ File Location
- ❖ Naming Scheme
- ❖ Batch Exporting
- ❖ File Format
- ❖ Importing Into the Project
- ❖ Post Process
- ❖ Render In Place
- ❖ Bounce Selection
- ❖ Exporting Consolidated Wave Files

Once a project is complete and the mix is finished, it's time to deliver the final product: the mix file. In the case of feature films, the final product may be a whole series of files including the surround mix, stereo mix, stem tracks, and alternate versions. In the case of gaming audio, delivery might require thousands of files to be exported into other software, such as Audiokinetic's Wwise for integration into the gaming engine. For advertising, there are often multiple versions of a commercial for multiple markets that require special name coding.

Nuage is prepared to handle all of these contingencies with unique, automated, time-saving features to make these mundane tasks effortless. It begins with the Export Audio Mixdown window, as shown in Figure 27.1.

The Export Audio Mixdown window is found under the File>Export menu. Once open, this window can stay open during multiple file exports so that you do not need to reopen it for each file. It is often necessary to export multiple versions of a project such as both a WAV and mp3 version of a song so that clients can review it on mobile devices, etc.

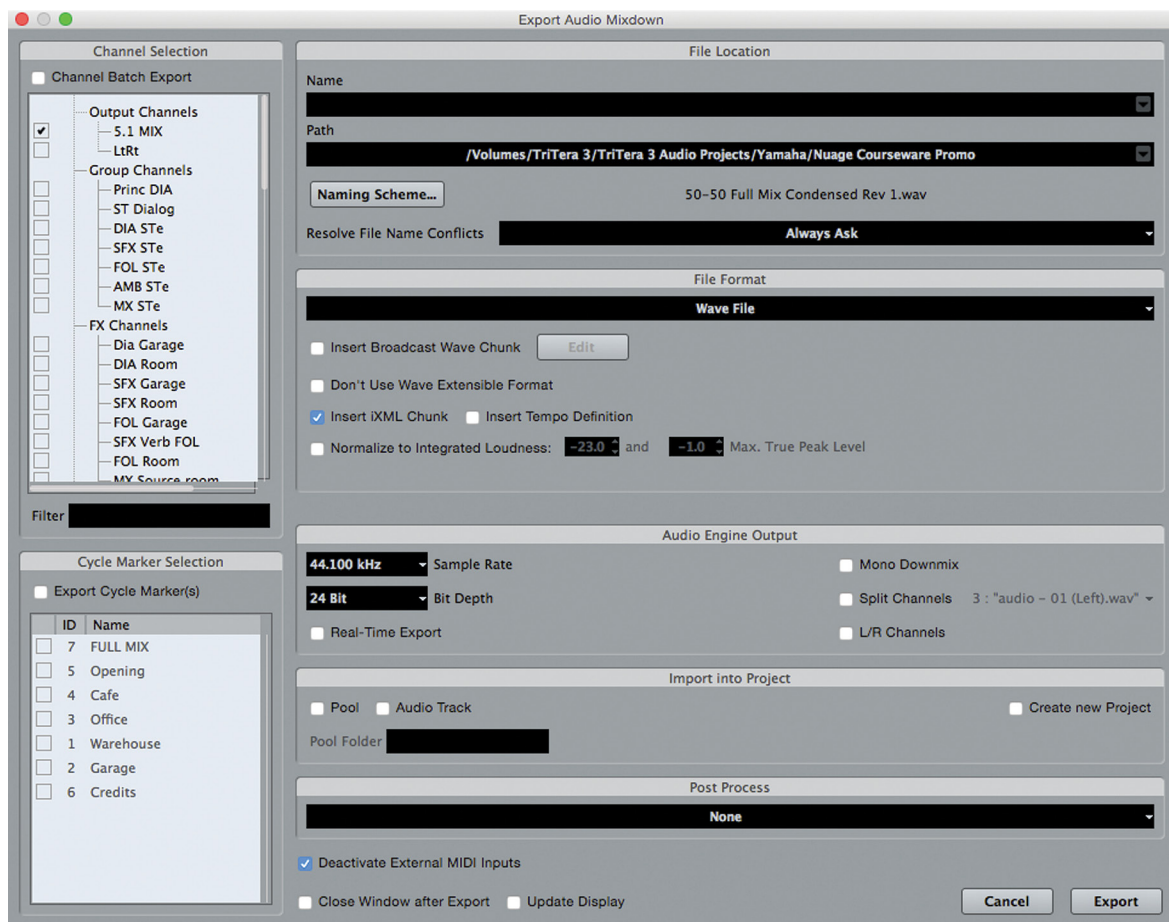


Figure 27.1 The Export Audio Mixdown window for 50/50 Export Audio Mixdown

File Location

The first thing to decide is where to put the exported file or files. This is handled by the “path” field. Clicking on the path field will open the menu where you can choose from previous locations or browse your system to set the proper path for the current export, as seen in Figure 27.2.

There is a default choice to use the Project’s audio files folder and the option to choose a new destination. Files can be exported to any available drive that is mounted in the operating system. This may included networked drives, removable storage, or mounted drives from other computers on the network.

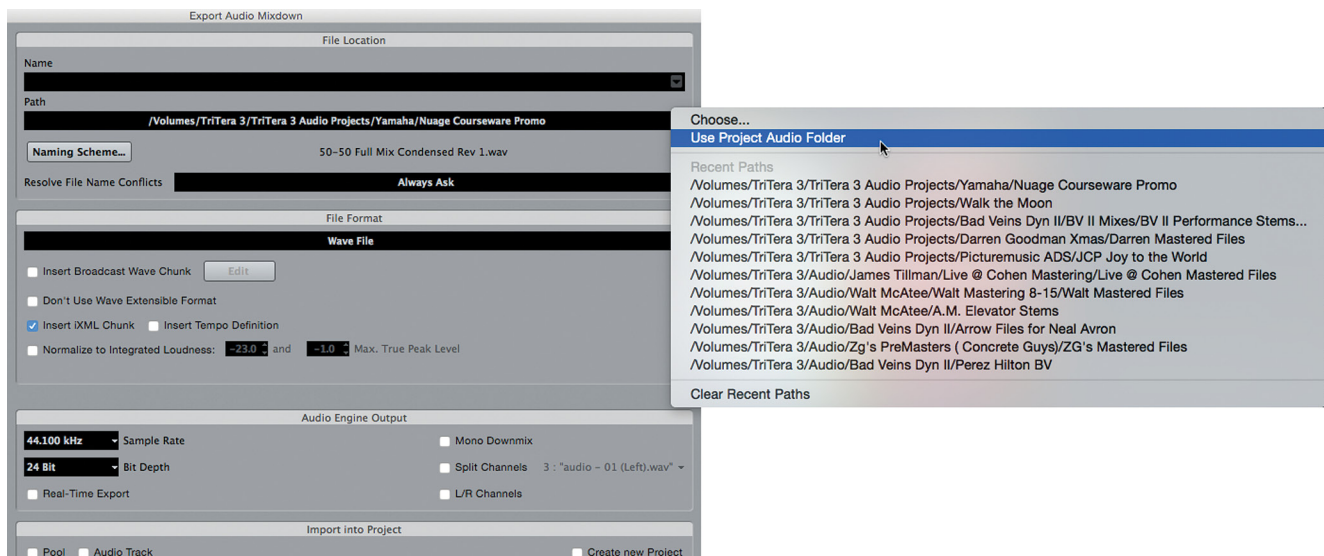


Figure 27.2 The path menu

Naming Scheme

Nuendo has a very flexible naming scheme tool that can automatically name each file or a series of files based on how the scheme is set. Clicking the name scheme button opens the naming setup window. Figure 27.3 shows the default setup that will name the file using the project name.

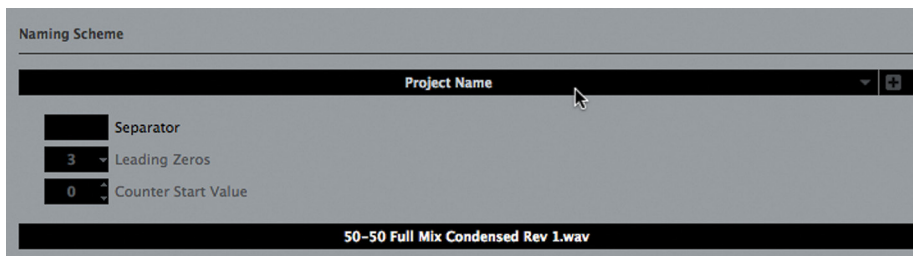


Figure 27.3
Naming
Scheme setup

Name Elements

Clicking on the name opens the name element option menu, with the choices for how this element of the name may be derived. There are five choices:

- ❖ **Name:** The Name field is at the top of the export window and can be any set of characters you desire: letters, numbers, punctuation, etc. This is how you create a custom name for a file.
- ❖ **Mixer Index:** During a batch export, this will add the channel number from the MixConsole to the name.
- ❖ **Channel Type:** This will add the type of audio channel that is being exported: audio, group, FX, Output, etc.
- ❖ **Channel Name:** This will add the name of the channel being exported.
- ❖ **Project Name:** This will be the name of the project file itself.

When either a channel or cycle marker batch export is being performed, this list will include the following options, as seen in Figure 27.4:

- ❖ **Counter:** An incrementing number will be added to the name.
- ❖ **Cycle Marker Name:** Will add the name of the currently exporting cycle marker.
- ❖ **Cycle Marker ID:** Will add the ID number of the currently exporting cycle marker.

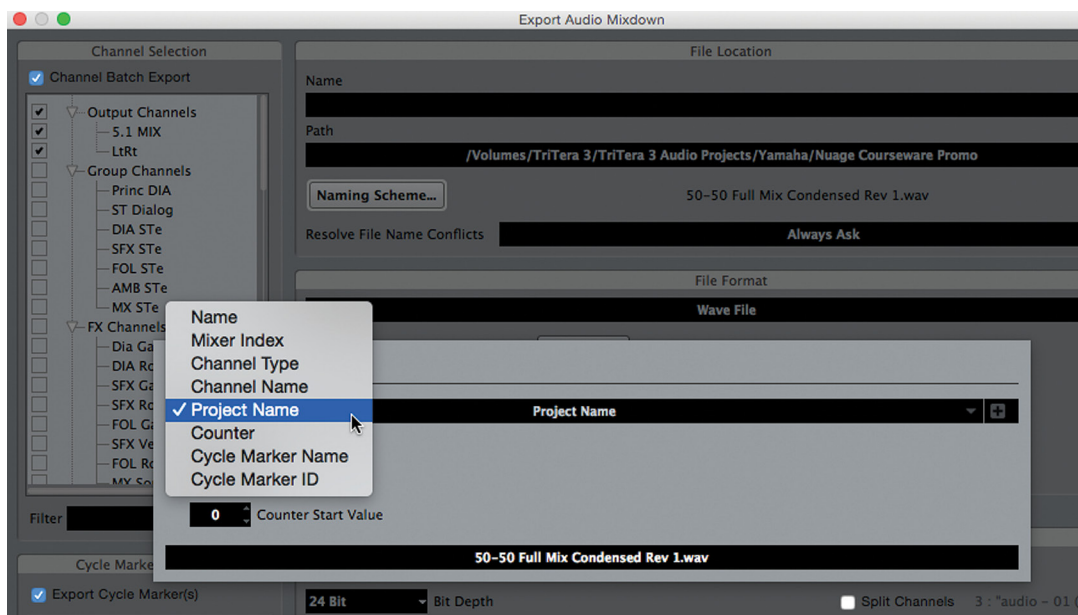


Figure 27.4
Name options
for batch
exporting

Multi-Part Naming

You can create elaborate naming schemes by adding multiple parts to the name. Press the “+” button to the right of the name to add another part. Figure 27.5 shows a scheme that will add the channel name to the end of the project name to create unique file names for each channel selected in a batch export. The line at the bottom shows an example of the first file name.

You can continue to add parts to customize the name, even adding a counter number with a defined number of digits for easy file sorting later. Figure 27.6 shows a complex naming scheme.

This ability helps reduce human errors when exporting a large number of files. Plus, once configured, the export process will proceed without any need for you to be present to name each file.

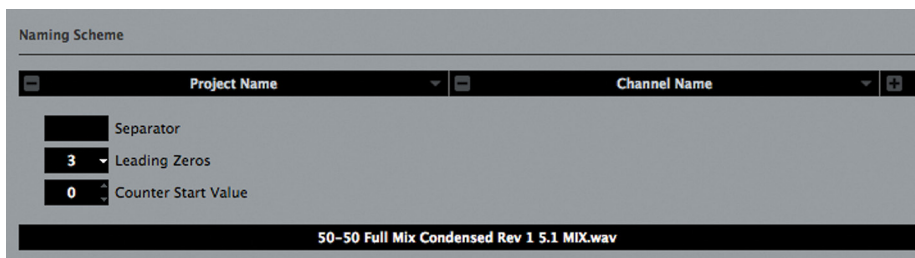


Figure 27.5
Multi-part naming scheme

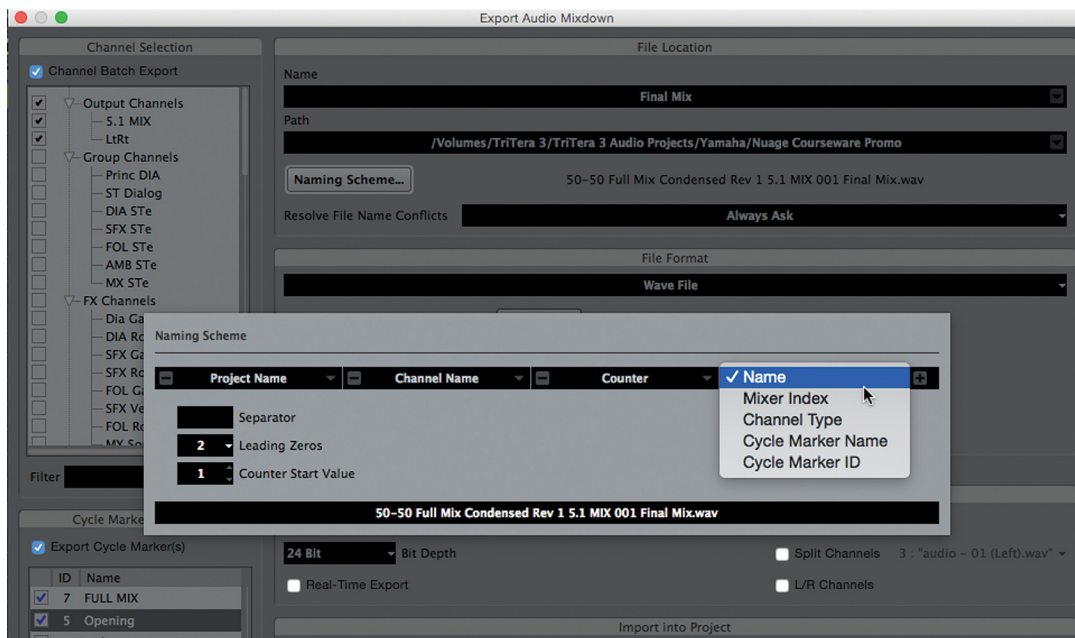


Figure 27.6
Complex naming scheme

Batch Exporting

In the case of game audio, this is no small consideration. For example, when exporting dialogue to the Wwise game engine, there may be hundreds of individual files that need to be exported and precisely named. Cycle markers can be used to define each dialogue file and the name of the Cycle marker can then be used to name the file. In this fashion, hundreds of files can be exported in one process, properly naming each one automatically.

Cycle Marker Batch

Figure 27.7 shows a possible export window configuration for game audio exporting. When there are a great many cycle markers, as in this case, they can be selected using the shift modifier and the checking one will check all selected markers for export. With hundreds of cycle markers, this is a time saver.

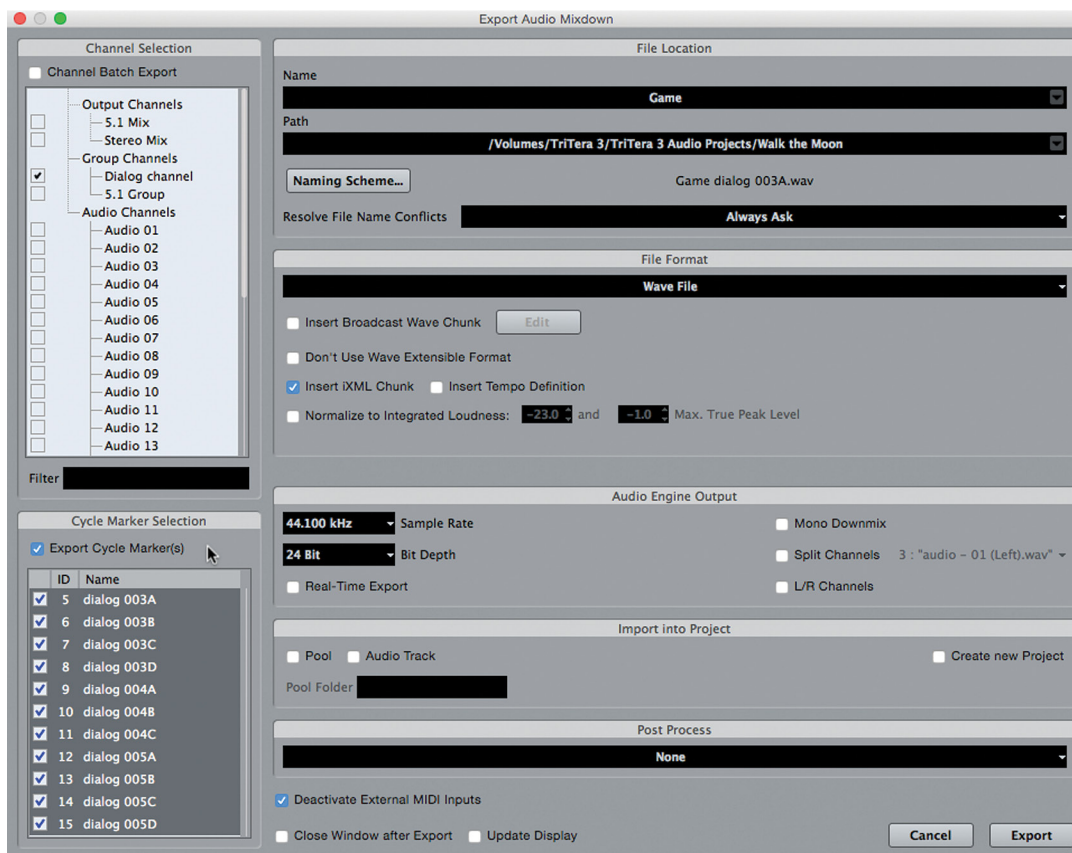


Figure 27.7
Batch Cycle
Marker export
settings

Channel Batch

You may also export multiple files in a batch by selecting multiple channels. In the case of a feature film, not only does the 5.1 Main Mix need to be exported, but the stereo downmix and all the stems must also be exported. Figure 27.8 shows the Export Audio Mixdown window configured to export the 50/50 mixes in surround, stereo, and all stem tracks.

The naming scheme can then use the channel name to append each file name and automatically create unique names for each file, as seen in Figure 27.9.

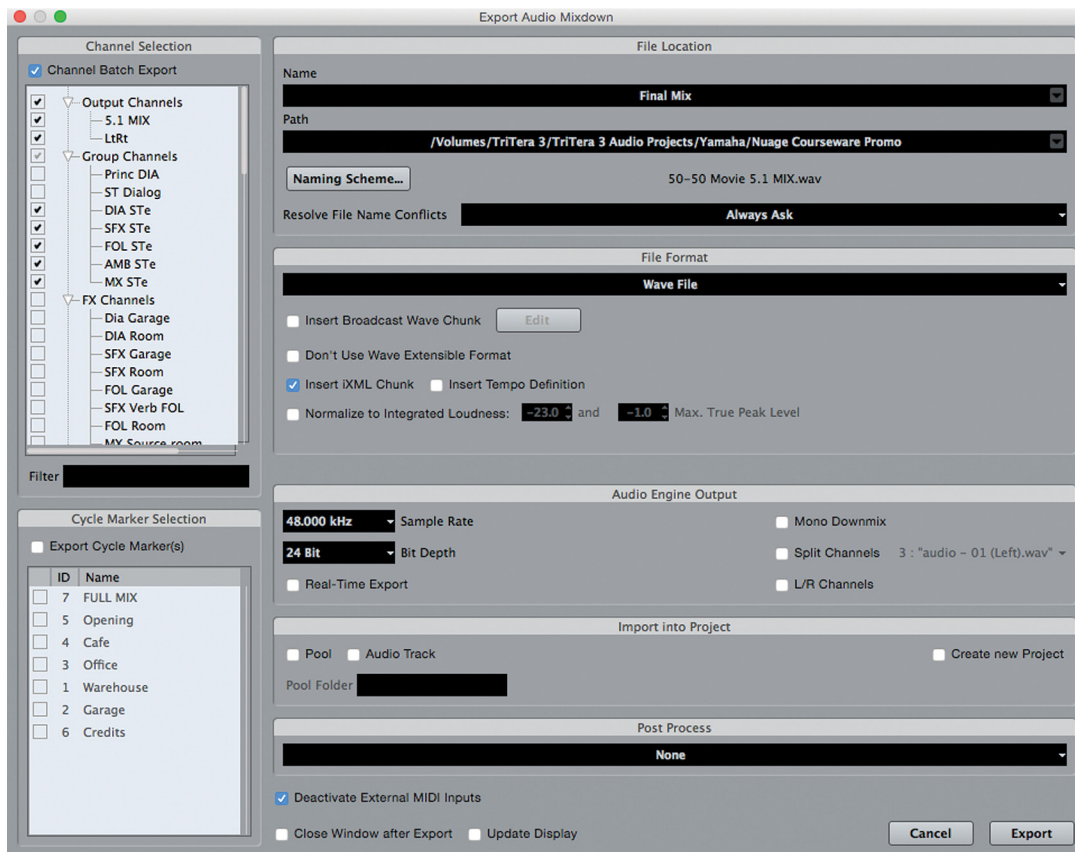


Figure 27.8
Channel Batch
Export of 50/50

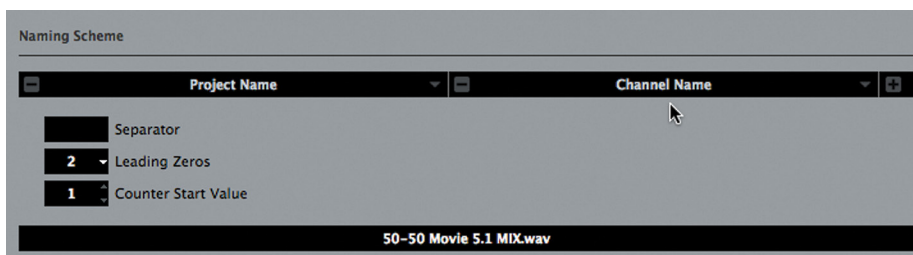


Figure 27.9
Naming
scheme for
channel batch
export

With the above settings, the following files will be automatically created:

- ❖ 50-50 Movie 5.1 MIX.wav - The surround sound mix of the movie
- ❖ 50-50 Movie LtRt.wav - The stereo downmix of the movie
- ❖ 50-50 Movie DIA STe.wav - The dialogue stem
- ❖ 50-50 Movie SFX STe.wav – The sound effects stem
- ❖ 50-50 Movie FOL STe.wav – The Foley stem
- ❖ 50-50 Movie AMB STe.wav – The ambience stem
- ❖ 50-50 Movie MX STe.wav – The music stem

Since the runtime of the movie is about 20 minutes, even if the rendering speed is greater than real time, this process might take a while. Thankfully it is automated and does not need to be attended so your time is freed.

File Format

Nuendo supports exporting to the following audio file formats:

- ❖ Wave
- ❖ AIFC
- ❖ AIFF
- ❖ MXF
- ❖ MP3
- ❖ FLAC
- ❖ Ogg/Vorbis
- ❖ Wave 64 (for +>2Gb files)

Each file format has its own variables and settings. Figure 27.10 shows the options for Wave files. You can edit and insert the Broadcast Wave Chunk to add metadata to the file along with the iXML standard if desired.

If the tempo definition is inserted, the file will respond to tempo changes when imported into Nuendo/Cubase or other DAWs that support tempo adjusting of audio files.

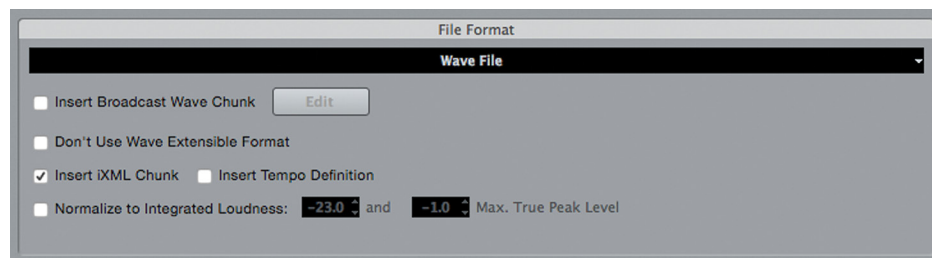


Figure 27.10
Wave file format options

Normalize to Integrated Loudness

Common to all the hi-res PCM formats is the ability to set a standardized loudness for the resulting file. If this option is checked, the resulting file will be analyzed for integrated loudness, adjusted if necessary and then a peak limiter will process the file to meet the peak level setting, as shown in Figure 27.11.



Figure 27.11

Normalize
Loudness settings

This can be used as a quick substitute for proper loudness adjustments made during the mix. When deadlines are short and time is running out, this feature will prevent audio from being rejected by a broadcaster for not meeting their audio level standards. In the end, that in and of itself is a huge potential time saver.

Sample Rate

Nuendo can export files at any standard sample rate from 8kHz to 384kHz.

Bit Depth

Nuendo supports four bit depths for exported files:

- ❖ 8
- ❖ 16
- ❖ 24
- ❖ 32 bit floating point

While 24 bits may be the most common, 16 bits is still necessary for audio CD compatibility. If 16 bit depth is required, you should place a dithering plug-in on the exporting channel or bus. Nuendo does not automatically dither to 16 bits. The UV22 plug-in may be used to properly dither the output to 16 or 8 bits. This plug-in should be inserted in the last slot of the exporting channel, as seen in Figure 27.12.

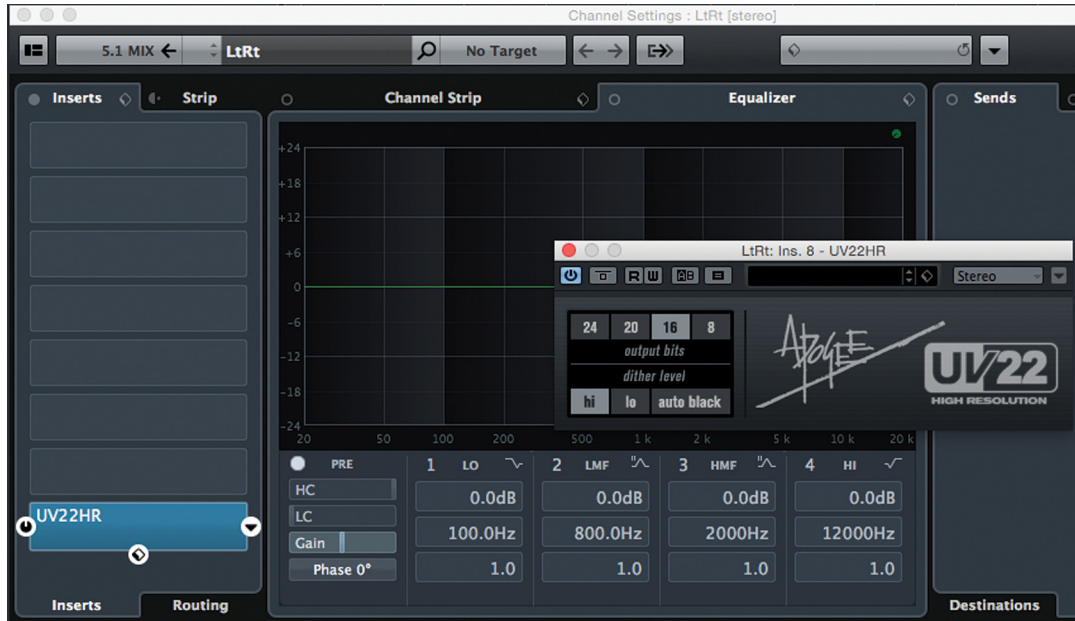


Figure 27.12
UV22 dither
plug-in inserted
and set to
16 bits

Importing Into the Project

After all the settings are made, you can choose to import these files right back into the current project either in the Pool or on a new audio track. You can even create a new project with the exported files.

Post Process

The exported files can then be opened by Wavelab or even uploaded to SoundCloud.

Render In Place

Render in Place is designed to create audio files from an individual track's MIDI and audio events within a project. Sometimes the reason for this is to simplify the project by consolidating complex editing and processing channels, reducing CPU load. Other times it could be for the purpose of transferring files to another system that may not share the same processing tools. The reasons can be many. That is why the Render in Place tool is flexible enough to meet these various needs.

Render Selection

First, you must decide what to render. There are three options for choosing what gets rendered in place.

Render Tracks

If there are no events selected, nor a range selection, you can render entire tracks in place. Select one or more tracks and then select Edit>Render In Place>Render Settings... This will open the Render Tracks dialog, as shown in Figure 27.13.

You can choose any tracks that contain audio or MIDI events. MIDI events render through the instrument they are connected to.

The one unique setting for rendering tracks is the options for the source tracks once the render is complete. Figure 27.14 shows the choices available from that menu. For example, disabling or removing the source tracks will reduce the CPU load of the project.

Render Selected Events

By selecting events on one or more tracks and then opening the render settings, the window changes to the Render Selection dialog, as shown in Figure 27.15. Now, only the selected events will be rendered instead of the entire track or tracks.

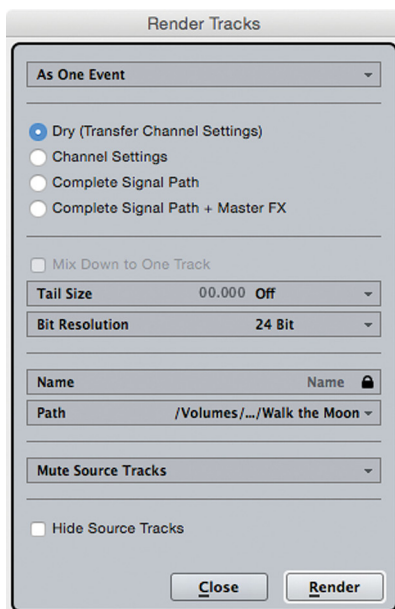


Figure 27.13
Render Tracks

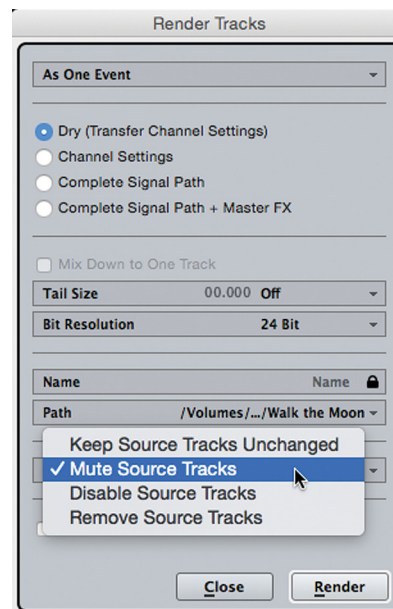


Figure 27.14
Source tracks options

Render Range

If you use the Range tool to make a selection that contains MIDI or audio events, then open the Render Settings dialog, only those events that fall within the range selection will be rendered.

Render Output

Once you have made a selection to be rendered, there are three choices for how the files will be handled in the output, as shown in Figure 27.16.

As Separate Events

If you choose to render as separate events, each selected event will have a unique render file once complete. These rendered events will be placed on a new track in the same position as the originals.

As Block Events

When events are adjacent to one another, they will be combined into one audio file when rendered. These blocks of audio will appear on the new rendered tracks.

As One Event

When rendering as one event, the entire selection on a track will be rendered as one audio file regardless of how many individual events or parts are in the selection.

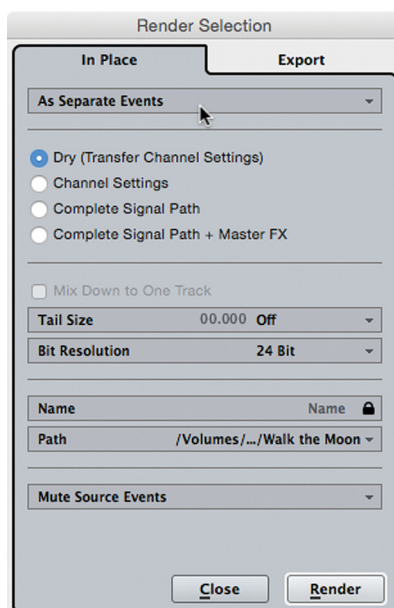


Figure 27.15
Render Selection dialog

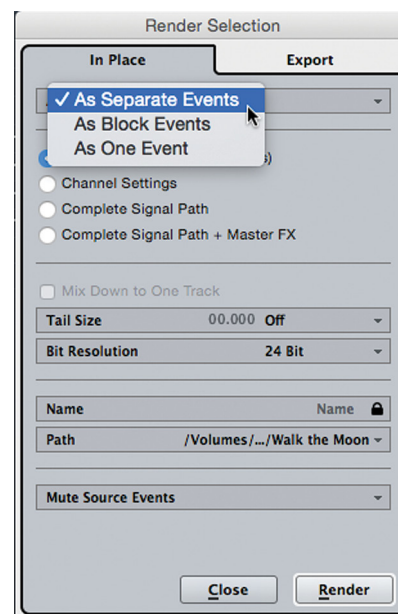


Figure 27.16
Choices for render output

Render Processing

Next, there are four choices for the processing signal flow of the rendered audio. This determines where in the MixConsole the signal is sourced from when creating the new audio file.

Dry (Transfer Channel Settings)

This setting will only capture the audio as it is before the channel processing in the MixConsole. The only processing that will be captured are the event handles: volume, fade in/out and any audio warping or pitch shifting that has been applied. The settings of the channel in the MixConsole will be transferred to the newly created channel.

Channel Settings

This setting will render all the processing within the channel alone: filters, EQ, dynamics, plugins, fader level. Anything after the channel in the signal flow will not be captured in the render.

Complete Signal Path

This setting captures everything from the channel but also other channels that the signal is routed to such as subgroups, send FX (reverb, delay), anything up until the final mix bus.

Complete Signal Path + Master FX

This setting takes everything in the MixConsole that applies to the channel being rendered and will create the audio file. When the process happens, each channel involved in the render gets soloed in order to create the audio file. Everything involved in that channel's processing is soloed along with it to create the rendered audio file.

Rendered File Settings

There are several settings that affect the rendered file itself.

Mix Down to One Track

If the signal source has more than one channel involved, such as guitar and guitar delay return, then you may choose to combine these together into one track when rendered. If only one channel is to be rendered, this option is grayed out.

Tail Size

If the effects processing of the selection results in trailing signals after the end of an audio event, then you can increase the margin time at the end of the file to accommodate this: For example, if there is 1.5 seconds of reverb decay after the last note is cut off. In this case, the tail size should be set to at least 1.5 seconds long to capture the reverb tail clearly.

Bit Depth

You can choose three possible bit depths for the rendered files: 16, 24, or 32 bit floating point, as shown in Figure 27.17.

Name

You can either use the existing name of the event being rendered or unlock this field and enter your own custom name.

Path

As with the Export Audio Mixdown window, you may choose the location for the rendered files

Render Export

In Nuendo, there is a second tab that allows the Render in Place dialog to export the resulting files instead of placing them back in the project. Figure 27.18 shows the Render in Place window set to the Export tab.

File Naming

Many of the settings are the same as the In Place tab with the exception of the name settings. The Export tab uses naming schemes that are set up by opening the Naming Scheme window shown in Figure 27.19.

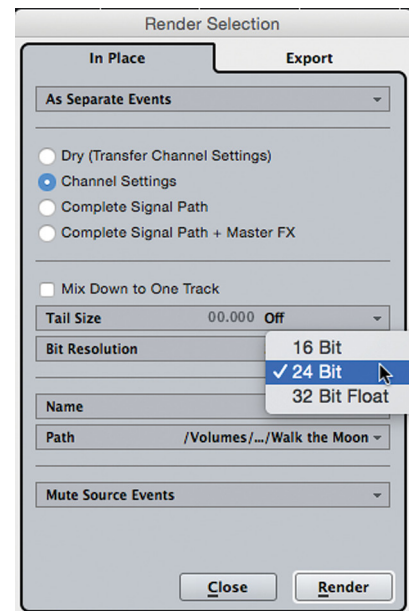


Figure 27.17 Bit depth setting for rendered files

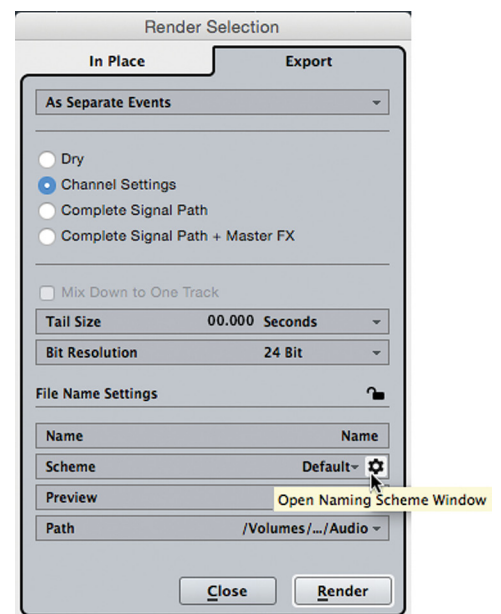


Figure 27.18 Render in Place Export tab

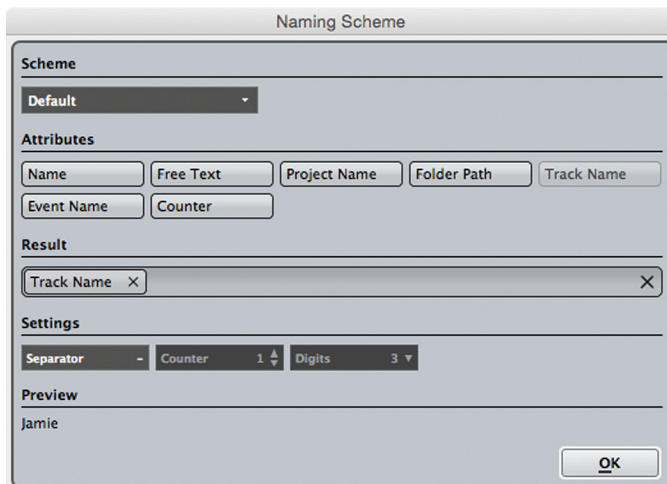


Figure 27.19
The Naming
Scheme
Window

In this window you can create many variations of naming schemes using many of the same tools as the Export Audio Mixdown window. With the addition of “Event Name,” you can create file names that reflect the source material accurately.

Once you have configured a particular scheme, it can be saved and recalled later for quick application. The Export dialog will show an example of how the current naming scheme is working in the Preview field.

Rendering

The other difference with exporting versus rendering in place is that the source events will remain active and unchanged after the files have been rendered and exported.

Bounce Selection

The last method of rendering new audio files is the Bounce Selection command. This is similar to Render In Place as one event but without any channel or MixConsole processing. The only parameters that affect the render are the crossfades, fade handles, and volume handles.

Select one or more events on one or more tracks and choose Audio>Bounce Selection. The selection will be rendered as one event per track and then you will be prompted to choose whether to replace the existing events with the new ones or not. This can be used as a quick way to consolidate tracks with a large number of edits or create audio files that all start at the same time in the project.

Exporting Consolidated Wave Files

In the course of working with other people in other studios using different software for collaborations, you may find that consolidating an entire project into WAV files that all start at the same time will prove to be the most compatible method of sharing projects across platforms. WAV files are industry standard and if they all start at the same time, it is very easy to import them into other audio software.

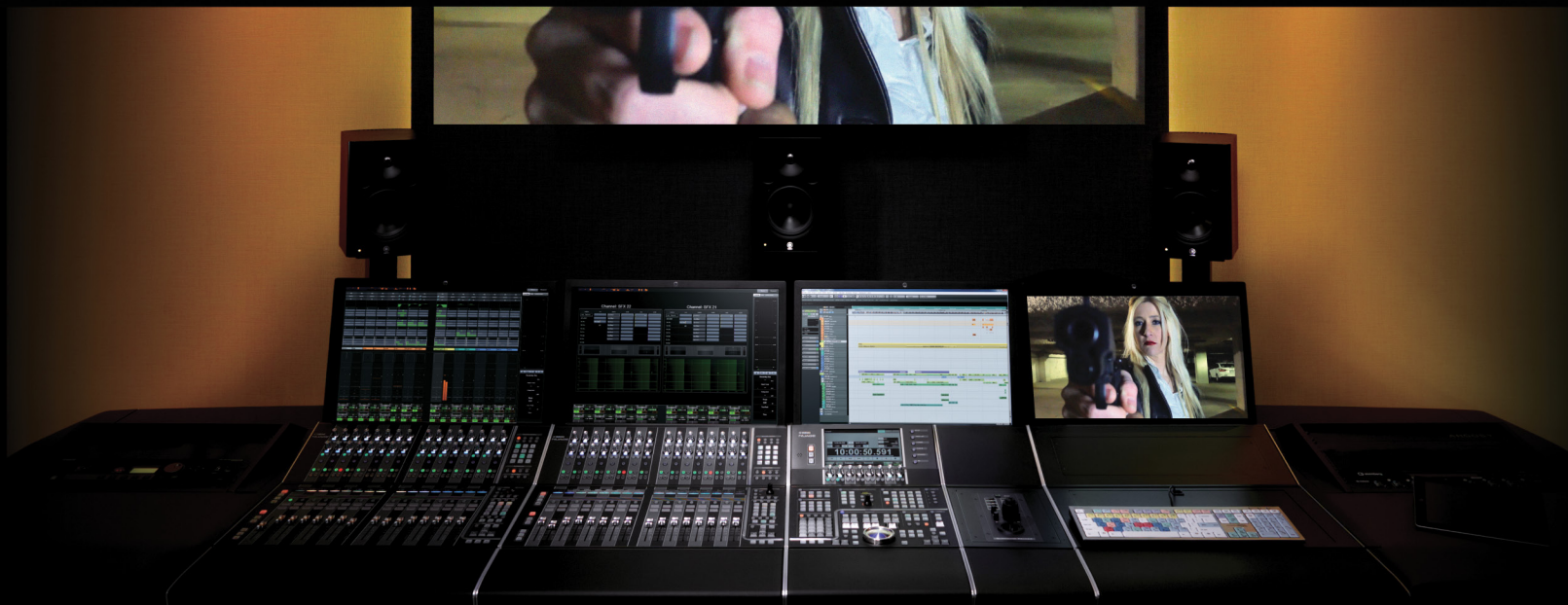
With a project of medium to large size, this could be a time consuming process. Using the Render In Place dialog, Nuendo turns this into a few simple steps.

1. Using the Range tool, select everything in the project across all tracks and over the entire time range necessary. If there are certain tracks you do not want to include in the consolidation, move them to either the top or bottom of the project so it is easier to select everything else. Using the Range tool is the only way to ensure that all of the audio files will start at the same time.
2. Open the Render In Place dialog and make any changes necessary to the settings.
3. Set a path to a new, empty folder for the audio files.
4. Render the new audio files.
5. Listen to the new audio tracks to make sure everything is there and playing correctly.
6. Copy the folder with the new audio files to removable media or upload the files to your collaborators.

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CONCLUSION



by Ashley Shepherd

Once you have delivered all the audio assets required for the project, you may feel that your job is complete. It is not! Ensure that your product maintains its quality even after it leaves your studio. Always quality check the final product before its release.

Errors can be made in transferring audio between Nuendo and the video editing workstation when assembling the final video output. Be responsible for the great work you have done recording, editing, mixing, and delivering the final mix for a movie, television show, webisode, or video game.

I hope you have found the information, tutorials, and suggestions in this book helpful as they guide you through multi-media projects. Some of the material can be used as reference later on, especially when moving into surround sound mixing.

Nuendo is a powerful tool with some of the most advanced editing features of any DAW available today. Together with Nuage control surfaces, this makes an unbeatable system to create sound design and music for any type of media with complete control and creative freedom.

I wish you all the best in your journey as an audio professional and look forward to hearing your contributions to the media of the world!

