

MUS115 Fundamentals of Music and Sound Design

Week 3

DAW Basics, Building An Arrangement, Mixing, and Exporting Audio

- **DAW Basics**
- **Exploring the DAW's Production Software's Interface: Views**
- **Creating Music With Clips and Loops**
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DAW Basics

The Recording Studio

A **recording studio** is a facility for sound recording and mixing. Recording studios may be used to record musicians, voice-over artists, Foley, or to record music soundtrack accompaniments.

The typical recording studio consists of three or more rooms. The '**studio**' or '**live room**', is where instrumentalists and vocalists perform. The '**control room**' is the room where the sound engineers operate audio mixing consoles and computers with specialized software suites to manipulate and route the sound for analogue or digital recording.

Often, there will be smaller rooms called '**isolation booths**' that are available to accommodate loud instruments such as drums or electric guitar. Recording in these booths helps keep the sound from being transferred to the microphones that capture the sounds from other instruments. Additionally, the isolation booths provide acoustically 'dry' rooms for recording vocals or quieter acoustic instruments.

Live Room



Control Room



ISO (Isolation) Booths



Recording Studio Equipment, Hardware, and Software

All modern recording studios use specific types of equipment, hardware, and software. A variety of microphones (mics) are needed to capture the sound waves. Hardware such as preamps and direct boxes are used to convert the sound waves into an analog signal and increase (or enhance) its amplitude before reaching the mixing console. Signal processors are used to manipulate (or enhance) the audio signal in a variety of ways. Digital Audio Workstation (DAW) software serves as the control center from which all recording, arranging, editing, and mixing takes place.

Baffles and Acoustic Foam (Panels)



Microphones



Preamplifier, Direct Box, Compressor, Mixing Console, Equalizer, and Effects Processor



MIDI Controller



Cables and Connectors



Headphones



(Near Field) Monitors



DAW (Digital Audio Workstation) Software



For this course we will be using **Acoustica Mixcraft 7**. Mixcraft is a multi-track recording application for Windows. The software functions as a Digital Audio Workstation (DAW), a MIDI sequencer, a virtual instrument host, a non-linear video arranger, and a music loop remix program.

Setting Up a Project

Because of the probability of computer freezes and crashes, it is important to save your projects and files periodically (every 5-10 minutes) in **C:\My Documents\Mixcraft Projects**. (In general, it is best to save and import all your project files and assets to and from the project folder for any DAW software program.) When beginning a new project, always check your audio settings for hardware configuration (I/O devices), sample rate, bit depth, and buffer size. Optimizing your settings will give you the best sound quality possible and will minimize the impact on your computer's system performance.

- 1) Open **Mixcraft 7**
- 2) In the **New Project** pop-up window, use the default settings and click **OK**
- 3) Under **File>Save As...**, save your project in **C:\My Documents\Mixcraft Projects** as **mus115_your.user.name_wk03**
- 4) Click on **File>Preferences>Sound Device**
- 5) Because this lesson does not involve mic recording, set (or leave) the **Default**

Recording Device (Input) to Rec. Playback (IDT High Definition Audio CODEC) or your systems sound card.

- 6) Set (or leave) the **Default Playback Device (Output)** to your system's **Speakers/Headphones**.
- 7) Under the **Wave Options**, there are usually one or two common choices for sample rate: 44100 Hz (for standard CD quality) or 48000 Hz (for a higher sound quality). Using 48000 Hz will give you a higher sound quality but, at the same time, may dramatically slow down your system's performance. For now, choose the default of **44100 Hz**.
- 8) Also under **Wave Options**, there are usually one or two common choices for bit depth: **16 bit** (for standard dynamic range used for CD quality) or **24 bit** (for a wider dynamic). Again, a higher bit depth may dramatically slow down your system's performance. For now, choose the default of **16 Bit**.
- 9) **Number of Buffers** refers to the buffering of data that protects against audio dropout, pops, and clicks. Increasing buffer size will offer more protection but also will increase latency. Latency is the delay heard between the input (for example a guitar, keyboard, or voice) and the audio output you are monitoring as you record.
- 10) **Buffer Size** monitors affect the amount of latency. A smaller buffer size minimizes latency and a large buffer size increases latency.
- 11) Adjust the **Number of Buffers** and the **Buffer Size** to achieve a 'happy medium' between latency and audio dropout, pops, and clicks. The **Default Device Settings** will provide a good starting point.

Finishing the Setup:

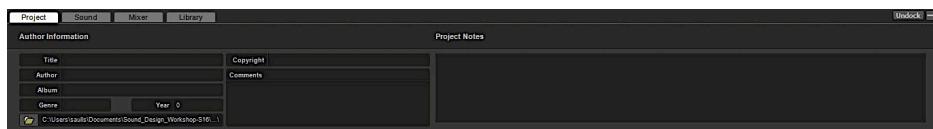
- 12) Click **OK**.
- 13) Be sure to save your project as ***mus115_ your.user.name.wk03***

Exploring the DAW's Production Software's Interface: Views

In the **Workspace**, audio and MIDI sound clips can be created and arranged.



In the **Project Tab**, project metadata and notes can be entered.



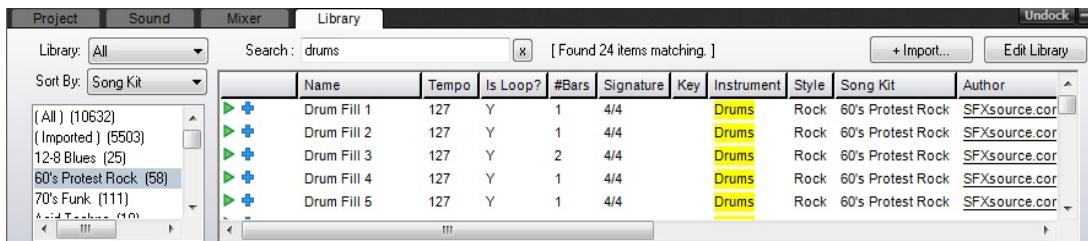
In the **Sound Tab**, audio and MIDI sound clips can be edited using a WAV, MIDI, or notation (staff or score) editor.



In the **Mixer Tab**, volume levels, panning, equalization, and effects can be adjusted to achieve a perfect sonic balance.



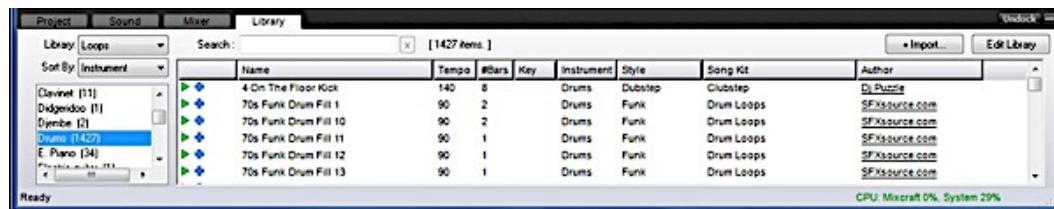
In the **Library Area**, a selection of over 6,000 royalty free music loops and SFX are available to use within your own projects.



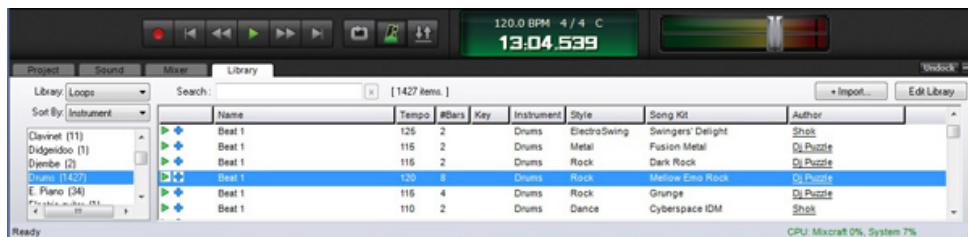
Creating Music With Clips and Loops

A **clip** is a segment of music consisting of one or more bars (or measures) that can be repeated continuously (**looped**) throughout a musical composition. Music clips and loops are a great way to start the creative process in music composition and provide a quick and easy way to add instrumental parts to large-scale musical works. Clips can either be recorded audio samples of real instruments or written MIDI control data (**virtual Instruments**). All clips may be accessed through the **Library Area**.

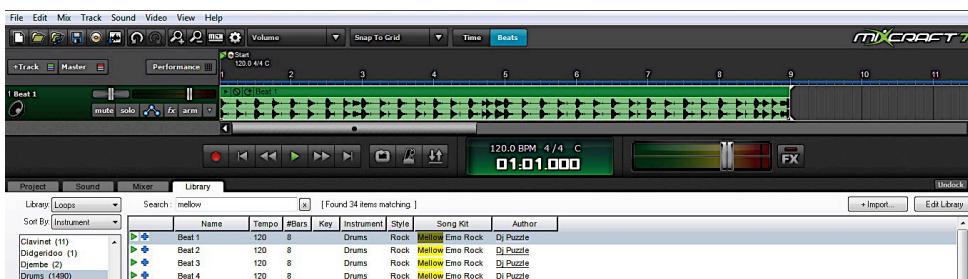
- 1) To access the **Library Area**, click on the **Library** tab.
- 2) In this lesson, we will be creating a short musical composition using a drum kit, a bass guitar, and a keyboard.
- 3) In the loop **Library** drop down menu, select **Loops**. In the **Sort By** menu, select **Instrument**. In the instrument list select **Drums**.



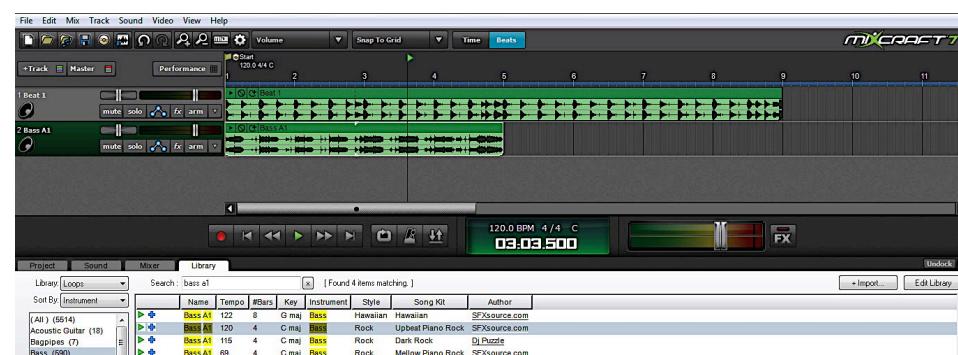
- 4) Scroll down the selection of **Song Kit** names and locate the **Name** and **Song Kit**: **Beat 1 - Mellow Emo Rock**. Notice the clip/loop and kit's information in the highlighted blue bar. Each clip/loop includes valuable information such as tempo, length in bars (measures), key, instrument type, style, etc. You may preview the loop by clicking on the green triangular play button on the right hand side of the preview screen.



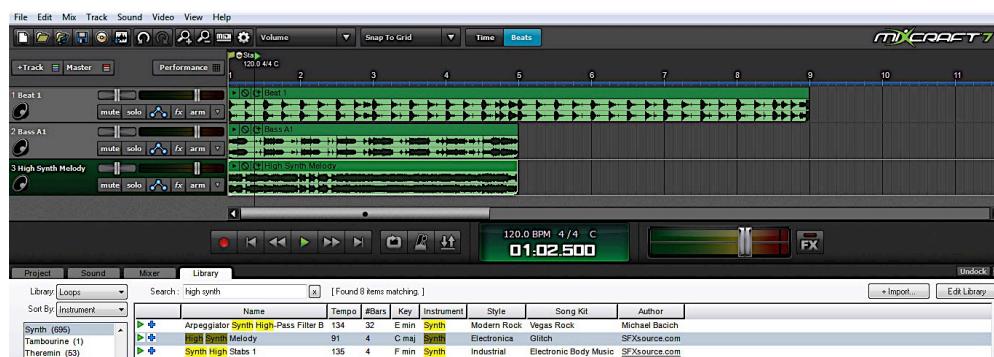
- 5)** We need to add this drum loop to our composition to provide a good, solid rhythmic background. Click on the + sign to add this loop to Track 1 in your **Workspace**. Click on the tool bar's **Zoom In** button until you see a full, eight bars displayed in Track 1 (now renamed as **Beat 1**). Click on the **Rewind To Beginning** button in the transport controls to move the green, triangular **Playback Indicator** to the beginning of the track. Click on the green **Play** button in the transport controls to listen to the drum loop. Then, click on the **Rewind To Beginning** button.



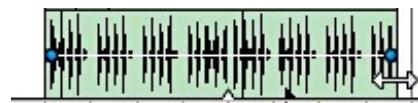
- 6)** Next, we will add a bass guitar to give the music a harmonic/rhythmic foundation. Under the **Sort By: Instrument** list, click on **Bass**. Scroll down the selection of bass names and locate the **Name** and **Song Kit**: **Bass A1 Upbeat Piano Rock**. Click on the **Sound Library's Play** button to listen to the bass loop. Click on Track 2 (**2 Audio Track**) until it is highlighted. Click on the + sign of the **Bass A1 - Upbeat Piano Rock** loop to add to Track 2 (**2 Audio Track**) in the **Track/Clip Window**. Click on the **Rewind To Beginning** button. Click on the green **Play** button in the transport controls to listen to the bass and drum loops together.



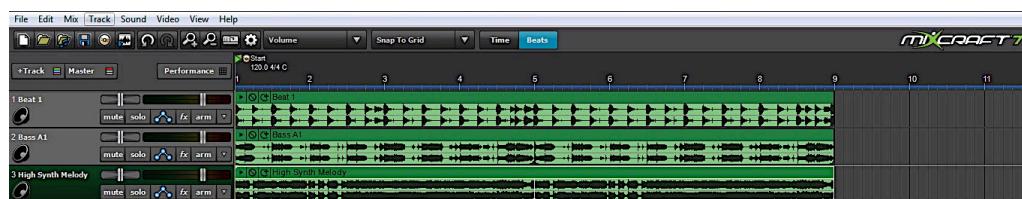
- 7)** Next, we will add a keyboard instrument to provide melodic and harmonic interest. Under the **Sort By: Instrument** list, click on **Synth**. Scroll down the selection of synth names and locate the **Name** and **Song Kit: High Synth Melody - Glitch**. Click on the **Sound Library's Play** button to listen to the synth loop. Click on Track 3 (**3 Audio Track**) until it is highlighted. Click on the + sign of the **High Synth Melody - Glitch** loop to add to Track 3 (**3 Audio Track**) in the **Workspace**. Click on the **Rewind To Beginning** button. Click on the green **Play** button in the transport controls to listen to the keyboard, bass, and drum loops together.



- 8)** Notice in our composition that the drum track plays four bars longer than the bass and synth. We need to lengthen the bass and synth loops so that they play for a full, eight bars. To loop an audio track, mouse over below the audio clip's central axis until you see a double-sided arrow appear. Click and drag the end of the audio clip to the desired number of bars.



Because our drum track lasts a full, eight bars, we must drag the bass clip to a full, eight bars as well. Repeat this same process for the synth track.



- 9)** Click on the **Rewind To Beginning** button. Click on the green **Play** button in the transport controls to listen to the keyboard, bass, and drum loops together.
- 10)** Save your project as ***mus115_ your.user.name.wk03***.

Navigating a Project

The **transport controls** are of a set of buttons that allow you to navigate quickly through the audio or MIDI tracks in the **Track/Clip Window**. Below is a list of the basic functions of the **transport controls**:



-  **Record:** Click the recording button to start recording. Alternatively, press ***Ctrl+R*** or **R**.
-  **Rewind To Start:** Resets the playback indicator to the start of the project. Alternatively, press **[Home]**.
-  **Rewind:** Rewinds the playback indicator by a bar or so. Alternatively, press ***Ctrl+***,
-  **Play / Stop:** Starts and stops playback at the current playback indicator position. Alternatively, press **[Space]**.
-  **Fast Forward:** Fast-forwards the playback indicator by a bar or so. Alternatively, press ***Ctrl+***.
-  **Fast Forward To End:** Resets the playback indicator to the end of the project. Alternatively, press **[End]**.
-  **Loop Mode:** Click this to toggle, on and off, the loop mode for recording or playback. Alternatively, press ***Ctrl+Shift+8***.
-  **Metronome:** Toggle the playback, recording or count-in metronomes. Press ***Alt+P*** to toggle the playback metronome or ***Alt+O*** to toggle the recording metronome.
-  **Punch In/Out:** Click this to toggle punch in/out recording.

Building An Arrangement

Song Arranging

Every song, instrumental composition, game/film soundtrack has memorable melodies, harmonies, and rhythms. Additionally, they have a coherent and organized structure. The order and combinations of melodies, harmonies, rhythms and instruments that appear in a composition is known as its ***formal structure***, or ***form***. It is the task of the composer, arranger, and often, the engineer/producer to arrange the music's form to produce satisfying musical results.

Standard Song Form

Most popular music follows a ***standard song form***. A standard song form's core components are: the ***Intro*** (or ***introduction***), the ***Verse***, the ***Chorus***, the ***Bridge***, the ***Solo*** (optional), and the ***Outro*** (or ***ending***).

No Such Thing – John Mayer



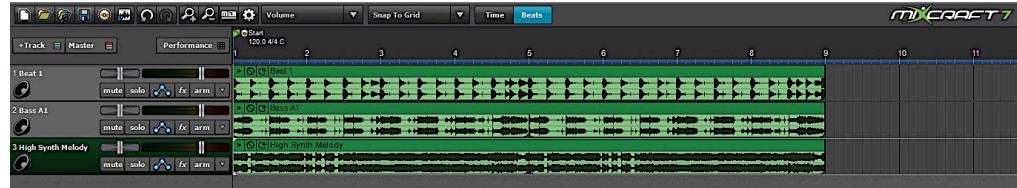
Intro. – Verse (A) – Chorus (B) - Verse (A) – Chorus (B) – Bridge – Solo - Chorus (B) – Outro

Looping and Positioning Clips and Loops

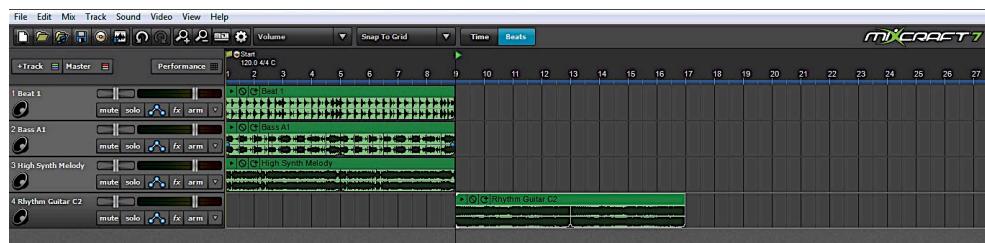
As we learned earlier, we were able to create an interesting eight-bar section of music using a minimal amount of musical material. The challenge in music composition and arranging is to keep the listener interested and engaged by gradually adding new material while, at the same time, stretching out the original material. One technique used to create variety in a composition is to reposition, shorten, or lengthen the audio clips and loops along the musical timeline.

In this section, we will use our music project, ***mus115_ your.user.name.wk03***, to create a new, full-scale arrangement that will include the original eight bars of music as well as a few new ideas from the DAW's ***Library***.

- 1)** Open ***mus115_ your.user.name.wk03***.
- 2)** So far, the arrangement consists of eight bars of three instruments.



- 3) The next step in filling out the arrangement is to add a new musical phrase that will provide contrast against the **High Synth Melody** in **Track 3**.
- 4) To add a new musical phrase, go to the loop **Library's** drop down menu, and select **Loops**. In the **Sort By:** menu, select **Instrument**. In the instrument list select **Guitar**. Locate, select, click, and drag the **Song Kit - Rhythm Guitar C2** into **Audio Track 4** at bar 9. Once you have placed the clip at bar 9, click-drag the end of the audio clip (loop) an additional eight bars (loop to bar 17).



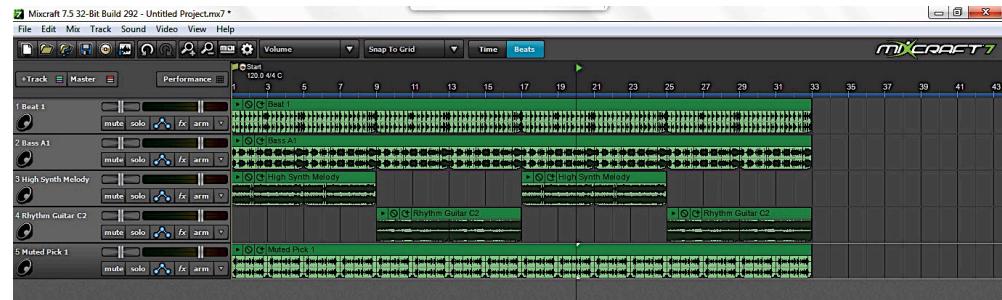
- 5) The new musical material will need the drums (**Beat 1**) and bass tracks (**Bass A1**) as an accompaniment. So, loop these tracks to bar 17 as well. Rewind and preview the arrangement.



- 6) Returning to musical material heard previously is a great way to provide contrast and give the arrangement coherency. Select, copy and paste the **High Synth Melody** clip at bar 17. Loop the drums (**Beat 1**) and bass tracks (**Bass A1**) to bar 25. Rewind and preview the arrangement.
- 7) Next, repeat the new material (**Song Kit - Rhythm Guitar C2**), in **Audio Track 4** one more time by selecting, copying, and pasting the clip at bar 25. Again, loop the drums (**Beat 1**) and bass tracks (**Bass A1**) to bar 33. Rewind and preview the arrangement.



- 8)** To give the arrangement a little more rhythmic drive, we will add another guitar clip to our arrangement. Go to the loop **Library's** drop down menu, and select **Loops**. In the **Sort By:** menu, select **Instrument**. In the instrument list select **Guitar**. Locate, select, click, and drag the **Song Kit – Muted Pick 1** into **Audio Track 5** at bar 1. Once you have placed the clip at bar 1, click and drag the end of the audio clip (loop) an additional eight bars (loop to bar 33).



- 9)** To provide fresh contrast between the first section featuring the **High Synth Melody** (*Verse or section A*) and the second section featuring the **Rhythm Guitar C2** (*Chorus or section B*), a new section (a *Bridge*) will be added. To add a bridge, go to the loop **Library's** drop down menu, and select **Loops**. In the **Sort By:** menu, select **Instrument**. In the instrument list select **Strings**. Locate, select, click, and drag the **Song Kit – String Hit – Top 40 R&B** into **Audio Track 6** at bar 33. Once you have placed the clip at bar 33, click and drag the end of the audio clip (loop) to bar 49. To build tension in this new section, we will add an additional clip half way through the string section. Locate, select, click, and drag the **Song Kit – Strings – Top 40 R&B** into **Audio Track 7** at bar 41. Once you have placed the clip at bar 41, click and drag the end of the audio clip (loop) to bar 49.



- 10)** To end our arrangement, an **Outro** is needed. For the **Outro**, we'll reintroduce musical material from the **Verse** and add the rhythmic

background of the drums, bass, and muted guitar.

a) Let's add the drums (**Beat 1**) to the final eight bars of the arrangement. Select, copy and paste the drums (**Beat 1**) at bar 49.

b) Trim the drum loop from the end to bar 57. Next, we'll reintroduce the bass track (**Bass A1**). Select, copy and paste the bass track at bar 45.

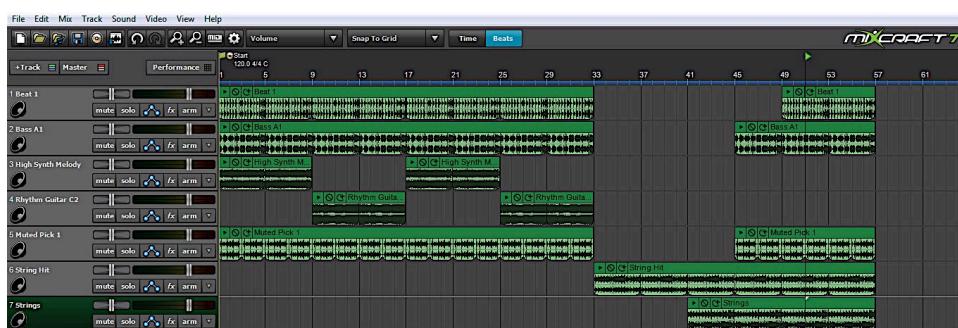
c) Trim the bass track loop from the end to bar 57. Finally, we'll reintroduce the muted guitar track (**Muted Pick 1**).

d) Select, copy and paste the muted guitar track at bar 45.

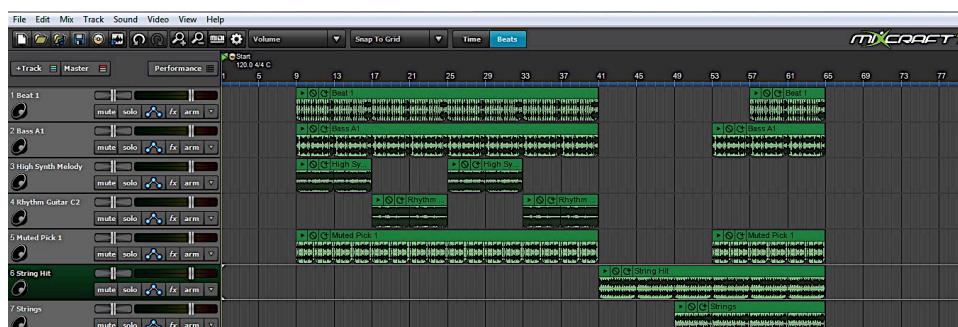
e) Trim the muted guitar track loop from the end to bar 57.

f) Loop tracks 6 and 7 to bar 57.

g) Rewind and preview the arrangement.



11) Notice that the beginning of the arrangement starts quite unexpectedly. Adding an **Intro** will ease the listener into the music in a more subtle way. Let's create an eight bar **Intro** that allows the arrangement to develop a little more gradually. To begin, select all of the audio tracks (**Control+A**). While selected, click and drag all of the tracks to the right until the drum, bass, synth, and muted guitar tracks begin at bar 9.



12) Next, deselect all of the tracks by clicking on bar 1. Our **Intro** will begin with a solo bass. Click and drag the bass clip to bar 1. Now, we will bring in the drums and the muted guitar. Click and drag the drum and muted guitar tracks to bar 5.

13) Because we shifted the drum, bass, and muted guitar tracks to the left, we must re-loop the drum, bass, and muted guitar tracks to bar 40 to fill in the empty space. Rewind and preview the arrangement.

14) To add finishing touches to our arrangement we will use a few cymbal crashes at various points along the timeline to highlight or accentuate the different sections. Also, we will need to create a fade out in the **Outro**.

a) Go to the loop **Library's** drop down menu, and select **Loops**.

b) In the **Sort By:** menu, select **Instrument**. In the instrument list select **Drums**.

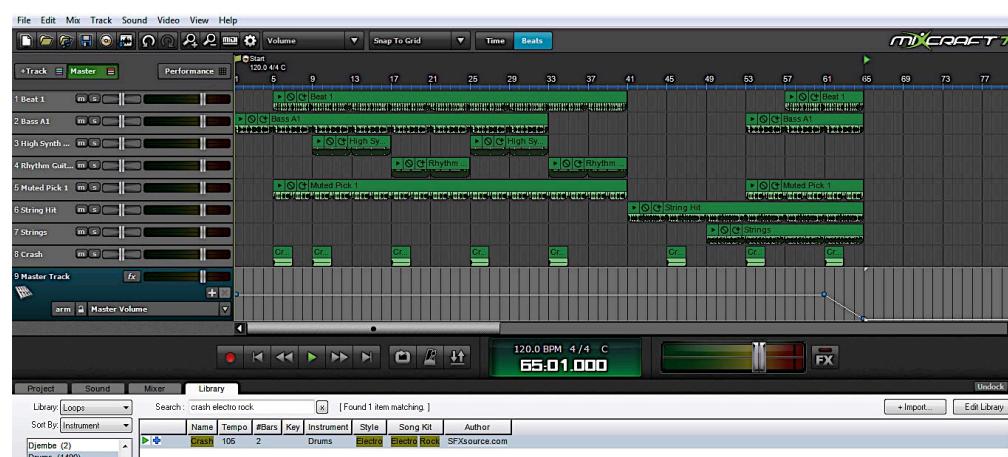
c) Locate, select, click, and drag the **Song Kit – Crash – Electro Rock** onto **Audio Track 8** at bars 5, 9, 17, 25, 33, 45, 49, 53, 57, and 61.

d) To create a fade out in the **Outro**, click on **Track>>Show Master Track**.

e) Click on bar 61 on the **Master Track's Volume Automation Line**. This will create a blue control point.

f) Create another control point at bar 65 and drag the control point to the bottom of the **Master Track**. This will create a fade out on all of the tracks simultaneously.

g) Rewind and preview the completed arrangement.



Mixing

Once your arrangement is complete, it's time to begin the process known as **mixing**. Mixing is one of the final stages of the recording-studio production process. Mixing adds a final polish to an arrangement and, can bring new life and vitality to a musical composition. Mixing is the technical and creative process of combining all the individual tracks into one stereo track for final exportation. In the process of mixing, an audio engineer must take important factors into consideration:

1) Volume – How loud is each track in relation to the others?

Volume mixing determines the balance of audio levels between the tracks. In mixing for volume, the goal is to give the most important instrument(s) more volume than the background instrument(s). If a proper balance is achieved, the musical material will be presented in the most artistically pleasing manner possible.

2) Panning – How can each instrument be placed within the stereo field to achieve maximum clarity and presence?

Panning determines where an instrument is placed in the stereo field. Any instrument can be placed in varying degrees towards the right or left channel. Placing all of the instruments in the center of the stereo field could make it difficult to discern one from another. Also, placing all of the instruments in the center of the stereo field makes the mix cluttered and ‘muddy’ sounding. Spreading out the instruments within the stereo field can add clarity and definition to each individual instrument.

3) Equalization – How is the sound quality or timbre (bright, dull, clear, distorted, fat, thin, etc.) of each instrument in relation to the other instruments?

Equalization emphasizes (increases) or de-emphasizes (decreases) certain frequencies of an instrument or vocal track. For example, boosting the low frequencies of a bass guitar track can make it sound thick and dense. Boosting the high frequencies on a vocal track can give the voice a light, airy, or vibrant quality. **EQ (Equalization)** can also be used to define instruments from one another as an alternative to simply increasing volume levels.

4) Effects plugins – How can each track be manipulated with special DSP effects to create a unique sound?

Effects plugins are used to change the original sound of an instrument so that it

stands out in the mix or create excitement in the mix. **Dynamic effects** (**amplitude effects**) modify the volume of an instrument. These effects include **compressors** (which increase the loudness of a signal or stabilize volume), **limiters** (which limit the volume), and **noise gates** (which eliminate artifacts like hum, hiss, and vocal pops.) **Time-based effects** alter the timing of a signal. These effects include **reverb**, **delay**, and **echo**. These are among the most popular effects in electronic music. **Reverb** effects re-create the sound of an acoustic space and the way in which sound waves reflect off of an environment's surface. **Filter effects** alter the frequency content of an audio signal by boosting or cutting specific frequencies. Popular filter effects include the **low-pass filters**, **hi-pass filters**, and **equalizers**. **Modulation effects** create unique tonal properties by multiplying and altering a signal. Some of these effects use a 'carrier wave' as a modulator to change an audio signal. Others will multiply the audio signal and then alter one of those versions to create unique tone quality. Modulation effects include **chorus**, **flanger**, **phaser**, **ring modulator**, **tremolo**, and **vibrato**.

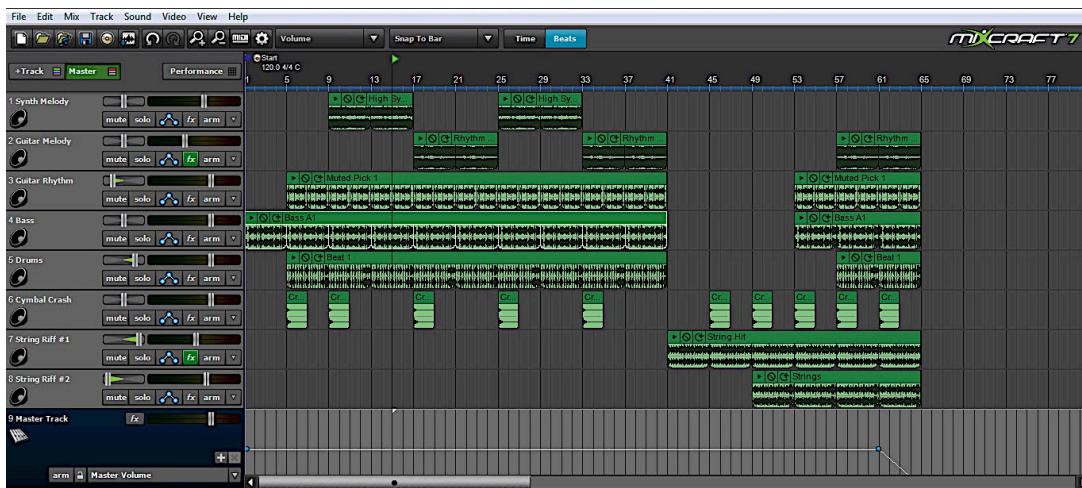
Preparing for the Mix

Before beginning the mixing process, the track order needs to be arranged according to recording studio standards. Open the file: ***mus115_your.user.name.arrangement_wk03***. Click, drag, and arrange the track order as follows:

Track 1: ***High Synth Melody***
Track 2: ***Rhythm Guitar C2***
Track 3: ***Muted Pick 1***
Track 4: ***Bass A1***
Track 5: ***Beat 1***
Track 6: ***Crash***
Track 7: ***String Hit***
Track 8: ***Strings***

- For clarifying and simplifying the track navigation, rename the tracks as follows (click on the **Track Title** and retype the new track name):

Track 1: ***Synth Melody***
Track 2: ***Guitar Melody***
Track 3: ***Guitar Rhythm***
Track 4: ***Bass***
Track 5: ***Drums***
Track 6: ***Cymbal Crash***
Track 7: ***String Riff #1***
Track 8: ***String Riff #2***



- Rename the new layout of your project as **Mixing**.

Adjusting Levels

- Now that the tracks are organized in a more logic manner, it's time to begin mixing.
- Listen to **Mixing**. Notice that Track 1: **Synth Melody** and Track 2: **Guitar Melody** are too loud and over power all of the other instruments. To correct this imbalance in volume levels, click and drag the **Synth Melody**'s fader to the left at around -3.2 dB and the **Guitar Melody**'s fader to the left at around -8.2 dB. Rewind and preview the new mix from bars 8-26.



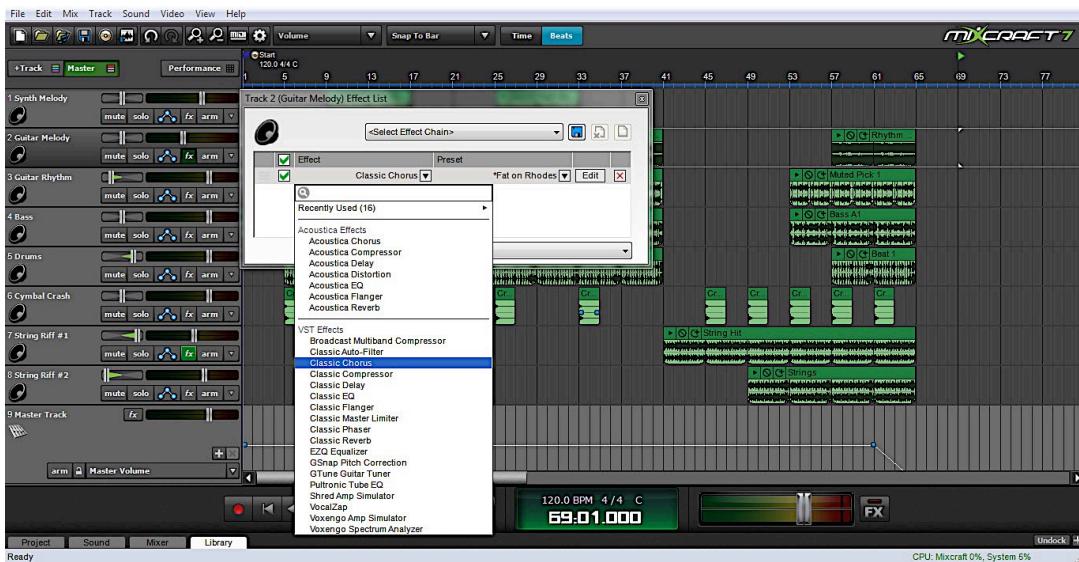
- Listen to bars 41-65. Notice that Track 7: **String Riff #1** is much louder than track 8: **String Riff #2**. Also, both tracks 7 and 8 are, overall, too loud and over power

all of the other instruments. To correct, click and drag the **String Riff #1** fader to the left at around -5.3 dB and the **String Riff #2** fader to the left at around -2.5 dB. Rewind and preview the new mix from bars 41-65.



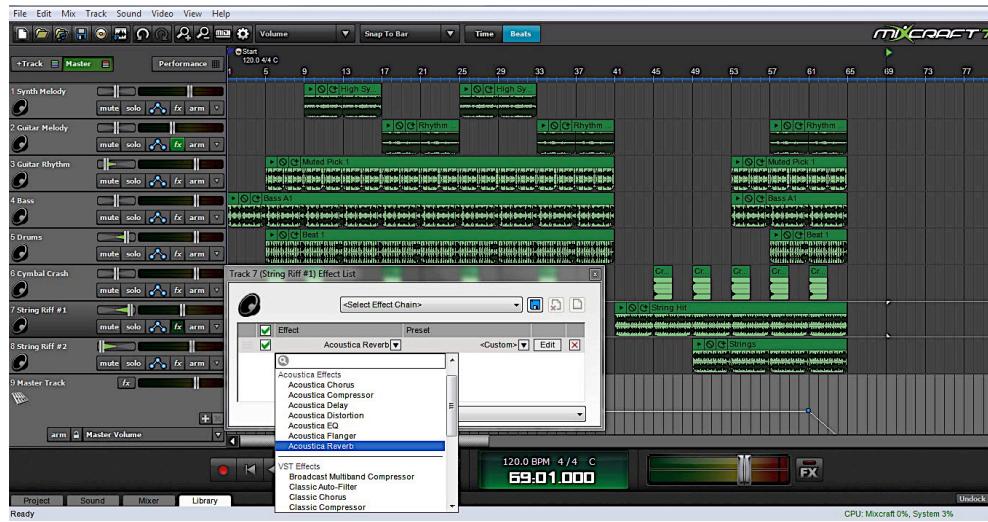
Using Processor or Effects Plugins

As you listen through the mix, you may notice that the **Guitar Melody** is a little bland. Using plugins can vitalize an instrument or vocal sound quality. To liven up the sound of the **Guitar Melody**, we will add a common effect (**fx**) called **stereo chorus**. The stereo chorus plugin adds a shimmering quality to any instrument. Click on the **Guitar Melody** track's **fx** button. From the **Track 2 (Guitar Melody) Effect List**, choose **Classic Chorus** from the drop-down menu. Close the **Track 2 (Guitar Melody) Effect List**. Rewind and preview the new mix from bars 16-26. (Often times there will be a loss in volume when applying an effect. If this is the case, then simply boost the track's level by about 1-2 dB).



- Towards the end of the arrangement, you may notice that **String Riff #1** is a little

dry sounding. To warm up the sound of the **String Riff #1**, we will add an effect called **reverb**. The reverb plugin will add the depth and dimension of an acoustic environment. Click on the **String Riff #1** track's **fx** button. From the **Track 2 (String Riff #1) Effect List**, choose **Acoustica Reverb** from the drop-down menu. Close the **Track 2 (String Riff #1) Effect List**. Rewind and preview the new mix from bars 41-65.



Panning

- To give each instrument its proper placement within the stereo field, we will use the process of **panning**. Listen to bars 41-65. Notice that the instruments sound a little cluttered. To remedy this, we will first pan the most percussive sounding tracks, Track 3: **Guitar Rhythm** and Track 5: **Drums**. To begin, click and drag the **Guitar Rhythm's Pan Control** to the left 60% and the **Drums Pan Control** to the right 60%.



- Next, we will pan the two string tracks, Track 7: **String Riff #1** and Track 8: **String Riff #2**. Click and drag the **String Riff #1's Pan Control** to the right 85% and the **String Riff #2's Pan Control** to the left 85%. Rewind and preview the mix. Resave your new mix.



Exporting Audio

Description of Digital Audio and the Process of Audio Exportation

Now that you have arranged and mixed your audio production, it is time to export your final mix as specific file type. There are a variety of file types to choose from depending on the usage of the final audio. The two most common choices are WAV files (**Waveform Audio File Format**) and MP3s (**Moving Picture Experts Group Layer-3 Audio**).

When exporting your final mix, you must consider the desired quality, the purpose or usage of the audio file, and the device on which the file is to be stored. Greater audio quality means a greater file size and the need for a larger storage space. So, you must make a choice between different sizes of bit depths (16 bit or 24 bit) and sample rates (44.1 kHz or 48kHz) for your final audio.

- **Bit depth** is directly related to the audio's dynamic range resolution. The greater the bit depth, the more accurate the conversion of the wave form's amplitude.
- **Sample rate** is the number of audio 'snapshots' that are sampled every second. The continuous audio stream is digitally encoded many times per second. Therefore, the higher the sample rate, the more accurately frequencies can be represented.

Many people use the MP3 file type for digital music because they use smaller file sizes than those created using CD-quality audio WAV files. An MP3 takes up about 10% of the space of a CD-quality audio WAV file. MP3s achieve this space savings by compressing the data that makes up the file. This is accomplished by removing some of the redundant frequencies from the original audio. However, because some data has been removed from the file, an MP3 does not have as high a quality as a WAV file.

The audio quality of an MP3 is measured by its bit rate (rendered as ***kbps – kilo bytes per second***). The higher the bit rate, the better the sound quality. The most common bit rates are 128 kbps, 192 kbps, and 256 kbps.

Bit Depth and Sample Rate

The default bit depth and sample rate for WAV export from *Mixcraft* is 16bit - 44.1 kHz. The bitrate for MP3 export is 128kps.

Choosing File Types

There are a variety of file types to export your final audio mix to:

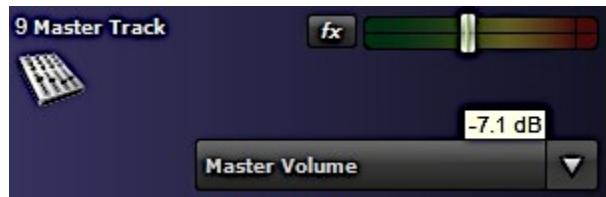
- **MP3 – (Moving Picture Experts Group Layer-3 Audio)**. This is the best file type for hand held devices and limited storage devices.
- **OGG** – An **OGG** audio file is a file that contains audio samples compressed with the Vorbis audio encoding algorithm.
- **WMA - WMA (Windows Media Audio)** is a file extension used with Windows Media Player. WMA is an older audio format and an audio codec that was intended to be a competitor for the MP3 and *RealAudio* audio formats.
- **WAV - A WAV (Waveform Audio File Format)** file, also known as a **wave** file, is the most common type of sound file. This is the best format when storage space is not a consideration.

Final Exportation of the Mix

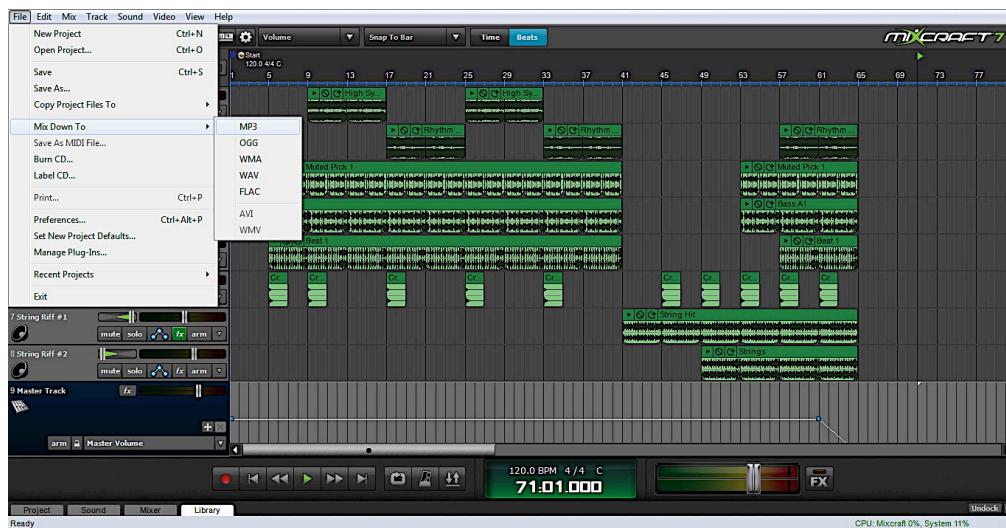
Before exporting the final mix, the final output levels must be checked. Play ***Mix***. Notice that the levels on the **Master Track** fader are peaking into and staying in the ‘red’. This tells us that the output of the overall mix or an individual instrument is too ‘hot’. The output is clipping the signal and causing distortion. Therefore, the levels of one or more of the tracks must be lowered.



- Before we export our final mix, we will lower the output on the Master Track. Click and drag the **Master Track** fader to the left down to about -7.1 dB.



- Listen to the final mix a few more times as you adjust the levels of the different tracks that you feel are too soft or too loud.
- Once you are ready to export the final mix, click on **File\Mix Down To\MP3**. Listen to the MP3 mix. Also export the mix as WMA and WAV files and compare the sound quality.



- Copy and listen to your MP3 and WAV mixes on different audio systems (car stereos, MP3 players, CD players, home entertainment centers, etc.).
- Make extensive notes on what you like and do not like about your mix and correct it during your next mixing session.