Audio Recording/ Editing Kit

- MIDI Keyboard (Keystation 49)
- Reaper Audio Editing Software
- Focusrite Scarlett Solo
- Microphone and Stand

Please check with Library staff to confirm minimum age certification requirements to use this machine with supervision, and without supervision as provided on the Equipment Usage Chart

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Components and Capabilities of Music Kit

This is just one combination of many different types of equipment that could have been chosen. First, let's dive into what this particular music kit contains. Then there will be a brief overview of how each component can be used.

Components of Music Kit:

- MIDI Keyboard (Keystation 49)
- Reaper Audio Editing Software
- Focusrite Scarlett Solo
- Microphone and Stand

MIDI Keyboard (Keystation49)

How it can be used:

MIDI stands for *Musical Instrument Digital Interface*. A MIDI keyboard is not a regular keyboard. The MIDI must be connected to a computer and is used with third party music editing software. In this case, we will be using Reaper software.

You can load virtual instruments into Reaper to control which types of sounds happen when you press each key. With a MIDI controller, you have more flexibility over editing recorded media. Here are a few things you can do with the MIDI:

- Record songs from virtual instruments (you are not restricted to just piano sounds)
- Change the volume, octave, pitch, and a variety of other things on the MIDI itself
- By transmitting the sounds as data, you expand the ways the sound can be manipulated.
- MIDIs are used by professional DJs, producers and contemporary musicians.
- The MIDI is powered through the USB connected to the computer. No outside power supply is necessary.

Third-Party Software

In this case, third-party software means the software was not developed by the same people who created the hardware for the music kit. On the Library Innovation Studios laptop, we have two options for your third-party music editing software:

- **Audacity:** this is open-source, free software. It doesn't have as much versatility as Reaper, but it gets the job done. It also cannot be used with the MIDI, it only works with the microphone and pre-existing audio files.
- **Reaper:** this can do just about anything if you read the manual enough. It can be synced up with the MIDI keyboard and the microphone simultaneously.

During training, we will be using Reaper in the examples.

Focusrite Scarlett Solo

How it Can Be Used:
- Sound is routed through this device
- The MIDI and microphone are plugged into this box, then the box is plugged into the computer
- Reaper software is then set to route all audio through the Focusrite
- This is also USB powered and will remain plugged into the computer
- If you have an electric guitar, you can also route the guitar through the Focusrite

Microphone

How it Can Be Used:

- This is connected to the Focusrite and is used to record vocals or other outside equipment.

The vocals will be recorded as another track in the third-party editing software.

- Other sounds can be added with this audio.
- Recorded audio can be further manupulated and remixed using the third-party software

Resources to Learn Reaper

Beginner's Tutorial for Reaper
https://www.youtube.com/watch?v=0AXRerY1mf4

Tutorial: Mixing & Mastering
https://www.youtube.com/watch?v=sElvIdrPTwY

Intro. to MIDI and Virtual Instruments
https://www.youtube.com/watch?v=jirtZ2oZep4

Free VST (Virtual Studio Technology) Top 5 FREE Synth Plugins
https://www.youtube.com/watch?v=t8kccVWakjY

How to Install Virtual Instrument Plugins (software instruments) in Reaper
https://www.youtube.com/watch?v=jeYa__ATQDc

Reaper Tutorial: How to Record Audio and Insert Sound Effects

Library Innovation Studios' music kit has the following components:

- MIDI keyboard
- Microphone
- Focusrite Scarlett Solo
- Speakers and Headphones
- Laptop

The Focusrite is an audio interface that routes and helps control all audio. The MIDI keyboard, speakers and microphone all connect to the Focusrite. The Focusrite connects to a laptop. In order to function properly, all of these components must route through third-party audio production software on the laptop. This music kit uses Reaper software.

Reaper will allow you to record new audio, import existing audio to use in your audio projects, or otherwise manipulate your audio until it is to your liking. Not all audio production software has the same capabilities or user-friendliness.

If you want more information about what each item in the music kit is and how to use it all, please refer to the instruction manuals available in the binder, or on the Library Innovation Studios website.

For now, we are going to ignore the MIDI keyboard and focus on the microphone and audio production software. Please also assume that the system connected properly and audio is functioning. If this is not yet true, please pause here and refer to the instructions available in the binder in this kit.

The project we are going to be working on today is how to record a short audio book with added sound effects. In this example, we are going to use the first stanza of *The Raven* by Edgar Allen Poe. The tutorials will also cover how to re-record and replace a section of audio.

By the end of this tutorial, you will learn how to do the following:

1. Save a new project
2. Add and Delete Tracks
3. Prepare to Record Using Reaper
4. Tips for using the microphone
5. Record Audio Using Reaper
6. Trim (Delete) Audio
7. Merge Two Tracks together
8. Insert Pre-existing Audio Clips as a New Track
9. Adjust Volume Levels on All Tracks
10. Render the Completed Audio File

Start by opening Reaper. There should be a link on the desktop, and one in the toolbar.

When you first open Reaper, it will be a clean slate. There will be no audio tracks and all screens will be blank. If they are not, go to "**File"** in the top menu and choose "**New Project**" (or press "**Control + N**")**.**

1. Saving the new project
   a. Go to **File** (in the upper left hand corner)
   b. Choose "**Save Project AS**" from the dropdown (Shortcut is **Control + Alt + S**)
   c. Navigate to the location you want to save
   d. Type in your preferred **File Name.** For "The Raven" tutorial, use "The Raven"
   e. Click Save

2. Adding and Deleting Tracks
   a. New Tracks will appear in the dark grey section, to the left of the lighter grey section.
   b. Go to "**Track**" in the menu across the top
   c. Choose "**Insert New Track**" (You can also use the shortcut "**Control + T**")
   d. The new track menu will appear in that dark, grey section.
   e. If you accidentally make too many tracks, you can right click on the extra track and choose "**Remove Track**".

3. Preparing to Record Audio
   a. In the new track menu, check these settings:
      i. There should be a grey box in the lower right corner that says "**Input 1**". Click in this box. Make sure "**Input Mono- Input 1**" is selected for single-track recording.
      ii. To the left of "Input 1" is an icon that looks like a megaphone. When you hover over the microphone, it will say "Record Monitoring: OFF". Click this icon. It should switch to "**Record Monitoring: ON**". This will allow the listener to hear the audio when you play it back after recording.
      iii. To the left of the megaphone, click the box that says "**IN**". In the menu that appears, "**Record: input (audio of MIDI)**" should be pre-selected.
      iv. Give the track a title. In the upper left hand corner of the menu, double-click the dark, grey box. The box should turn light grey and a cursor will appear. For this tutorial, title it "Raven Audio". Click outside of the box when done typing.
      v. Arm the Track: click on the red circle to the left of the track title. It should turn bright red. Arming the track will make the microphone live and ready to record.

4. Tips for Using the Microphone

a. Tap the microphone to make sure it is picking up audio. You should hear the tapping through your speakers.

b. Make sure the microphone is about a palm's width away from your mouth.

c. Turn the microphone at about a 45 degree angle, rather than speaking into it directly. This will reduce distortion and make for a clearer audio recording.

d. If you are reading from a separate piece of paper, try not to move your head while you're reading. If you turn your head to look at the paper while speaking, it can make the audio levels go quiet, then loud.

e. Say a few test phrases into the microphone to check sound levels.

    i. To check sound, look at the mixer panel at the bottom of the screen. In the bottom left hand corner of the screen, there will be a panel labelled "**MASTER**". To the right will be a panel called "The Raven". This is the track you just created.
(*Note:* if this panel does not appear, go to "**View"** and select "**Mixer**")

    ii. As you say your test phrases, a yellow bar will appear to show the decibel level of your voice.

    iii. Your goal is for the yellow bar to reach the number "6" on the gauge. This is not a hard and fast rule, just a recommendation for better sound quality. It doesn't have to be perfect.

    iv. To adjust your sound levels higher or lower, move the grey slider bar up and down on the mixing panel.

    v. If the audio goes too high, it will show a red bar across the top of the mixer. Click the red section to reset the warning light, then lower the slider bar level.

    vi. If you need to adjust the volume level higher or lower than the slider in Reaper will allow, use the control on the Focusrite Scarlett Solo. The knob you want to adjust is labelled #1. Adjust in small increments because a little goes a long way.

    vii. When the audio level is to your liking, you are ready to record in Reaper.

5. Recording Using Reaper

a. To record, make sure the track is still armed (there should be a red dot lit up next to the track title).
b. Below the tracks, and above the mixer, there should be a panel of buttons with the standard symbols for "rewind", "fast forward", "stop", "play", "pause", and a red circle with a smaller white circle around it.
c. Click the red circle to record.
d. For this tutorial, record this phrase:

"Once upon a midnight dreary, while I pondered, weak and weary,
Over many a quaint and curious volume of forgotten lore—
    While I nodded, nearly napping, suddenly there came a tapping,
As of someone gently rapping, rapping at my chamber door.
"'Tis some visitor," I muttered, "tapping at my chamber door—
        Only this and nothing more."

e. When you're done recording, press "**stop**".
f. The audio waves should appear in the light grey box to the right of the track.
g. Press the play button to listen to the recording you just made.

6. Trimming (Deleting) Audio

a. When you're done recording, you might have a short section of empty air at the beginning of the track. You can trim (delete) this audio.
b. To trim a section at the start or end of your audio, hover your mouse over the start or end of the audio clip.
c. A little symbol will appear on the outer edge of the audio wave. It will look like an open box with an arrow. Click on this icon and drag it until you have erased all empty space.
(*Note:* the program will only erase in the increments where there is a horizontal line)
d. If you want to erase anything in the middle of the track, hover your mouse below the audio track. Make sure your mouse is not over the track. Click and drag your mouse until the section you want to delete is highlighted.
e. Right click in the highlighted section and choose "**Remove selection**". This will merge the two sides of audio together into one piece.

7. Merging Two Tracks Together

If you find that one section of your audio recorded very well, but another section did not go quite as planned, you can re-record the bad section then merge the tracks together.

    a. Listen through the track and delete the section or sections you want to re-record. Delete these sections by highlighting them, then right click and choose "**Remove Contents of Section (moving later items)**". This will make it so you still have a gap to put in the replacement contents later on.

    b. A dotted line will appear where the audio was removed. Click on that line. A black, vertical line will appear. We want to add a place marker here.

    c. To add a marker, right click on the line and choose "**Insert Marker**". In the popup, title the marker.

    d. The marker will appear with a small red circle and a label above the deleted audio.

    e. Press "**Control + T**" to add a new track. Since you are merging this track with an existing track, you do not need to name this track. Make sure to click the megaphone icon to switch the setting to "**Record Monitoring: ON**". Arm the track by clicking on the red circle icon.

    f. The audio levels should already be set to record. Press record and record the line you want to redo.

    g. When you have the recording stopped, count the sections in the new recording. A section will be marked by vertical, dotted lines behind the audio.

    h. Click on the marker you just placed. Highlight an equal number of section to the right of the marker. (Ex.: if the new audio is 8 sections, highlight 8 sections after the marker).

    i. Right click over the highlighted section and choose "**Insert Empty Space in Selection**".

    j. Drag the new audio to line up with the now empty space.

    k. Play the audio from start to finish. If the audio sounds okay as a whole, drag and drop the new audio onto the same line as the original audio. It will now look like a solid piece of audio.

    l. The now empty track can either be removed or used to add sound effects.

8. Inserting Pre-existing Audio Clips as a New Track

  a. Press "**Control + T**" to add a new track
  b. Click on an area inside the new track (it should turn a slightly lighter shade of grey)
  c. In the light grey editing area, click the approximate time you want the audio to start
  d. Go to "**Insert**" in the menu across the top.
  e. Choose "**Media File**"
  f. Select the file you want to add.
  g. The track should automatically have the same title as your chosen audio file.
  h. Click at the start of the new file and press play to check audio quality.
  i. You can drag and drop this new audio where you want it to line up with the initial track
  j. If you overlap the two tracks, they will play simultaneously. If you want audio to overlap, adjust the sound levels so the background is quieter than the main audio. It should complement the audio, not distract the listener.

9. Adjusting Volume Levels on All Tracks

  a. When you have added all audio tracks, play the whole thing again.
  b. Adjust the volume levels of each individual track so it flows together as a whole.
  c. The sliders will likely be at different levels, but the yellow bar that measures decibel level will likely register at around level 6 for each track. Lower for overlapping tracks.
  d. Feel free to pause and rewind as often as necessary to adjust levels.

10. Rendering the Completed Audio File

  a. When everything is to your liking, it is recommend that you save the project with the tracks separate, just in case.
  b. Then go to the "**File**" menu and choose "**Render**"
  c. Choose "**Browse**" (on the right after the "**Directory**" field) and select the location you want to save the file
  d. Enter a "**File Name**" in the empty field.
  e. Leave the sample rate at around 44100
  f. When rendering multiple tracks into one (as we are in this tutorial), leave "**Channels**" at Stereo. When recording single track audio, change it to "**Mono**". This is just a general rule of thumb, there are definitely exceptions!
  g. Choose your desired "**Output Format**". The most common file types are "WAV" and "MP3"
  h. Click "**Render 1 File**"
  i. Recommendation: Launch the file as a test to make sure the audio saved correctly.

How to Add Your Own Audio to a Movie

1. Open Avidemux Video Editor
2. Go to "File" in the menu across the top.
3. Choose "Open" and select the video to which you would like to replace/ add audio
4. The first frame of the video should appear on the screen.
5. Go to "Audio" in the menu across the top. Choose "Select Track".
6. If your video already has audio there will be a checkmark next to "Enabled" on Track 1. Leave this box checked. If there is no audio, check the "Enabled" box on Track 1.
7. Open the first dropdown box (it will likely say "Track 0 from video…"). Choose "Add Audio Track"
8. Open the new audio you would like to use.
9. The next dropdown menu will either say "Unknown" or "English". For spoken audio, make sure it says "English". For sound effects or music, leave it as "Unknown".
10. Open the dropdown labelled "Copy".
    a. For MP4 and most common videos, change this to "AAC (lav)"
    b. For non-MP4 videos to be used on a DVD or Blu-Ray player, choose AC3 (lav).
11. Click OK. The popup should close and your original video will appear.
12. Pressing "play" now will likely give an error with the audio.
13. Click the "Save" disc below the top menu. Title and save it in your preferred location.
14. To hear the video with the new audio, open the newly saved file in your preferred player. Make sure the audio update took effect.
15. If the audio is out of sync from where you want it, close the old project in Avidemux.
16. Open the new video.
17. Look for the word "Shift" in the "Audio Output" section on the left side of the screen.
18. You can adjust the start point of the audio track using the up and down arrows. Pressing "Up" will move the audio later in the track. If you press "down" until it reaches a negative number, the audio will start before the video.
19. When you have your audio in place, click save again.