

AUDIO CASSETTE DIGITIZATION WORKFLOW

INTRODUCTION

This document provides a workflow for audio cassette digitization projects, including information about equipment set up, digitization, and metadata creation.

This workflow provides a high-level overview. For more detailed information about equipment selection, each of the steps mentioned here, and more on audio digitization, view related items connected to this resource on the Sustainable Heritage Network in the “[Audio Recordings](#)” category.

- Audio File Types for Preservation and Access: Resource Guide
- Audio Cassette Digitization: Equipment Purchasing Guide
- Basic Audio Editing Using Audacity: Instructions
- Digitizing Analog Audio Sources Using Audacity: Instructions

1. CONFIGURE AND TEST EQUIPMENT

Equipment should always be configured and tested before beginning any digitization work. If any equipment needs replacement, repair, cleaning, or other maintenance, see to that before digitizing, as damaged equipment could harm the materials. Specific equipment choices will vary with funds, project needs, equipment availability, and other factors.

Hardware

- Audio Cassette Deck: There are very few manufacturers that produce new tape decks, and they may need to be special ordered through distributors. Good quality refurbished or second hand tape decks are viable alternatives, provided they are inspected, cleaned, and serviced prior to use.
 - Clean and inspect your deck for signs of wear or damage. Ensure that it is in good working order before using.
 - It is good practice to have a maintenance log for any equipment, and a record of service.

- **Audio Interface:** Audio interfaces convert analog audio output from the cassette deck into a digital format that can be captured and stored on a computer. Audio interfaces come in two form factors: PCIe cards that are installed in a computer, and external devices that connect to a computer via USB or another standard.
 - Ensure that your audio interface is properly connected to the cassette deck and computer. If the audio interface has output adjustment control, familiarize yourself with them.
- **Computer:** A computer is required to capture, edit, and store the audio files output by the audio interface.
- **Headphones or speakers** that will allow you to accurately monitor whether the sound is being received clearly by the workstation.
- **Supplies in case of repair** (empty cases, screwdrivers, and gloves).
- **Digitization logs or spreadsheets** (or any other tracking documentation) to track the work completed and capture metadata.

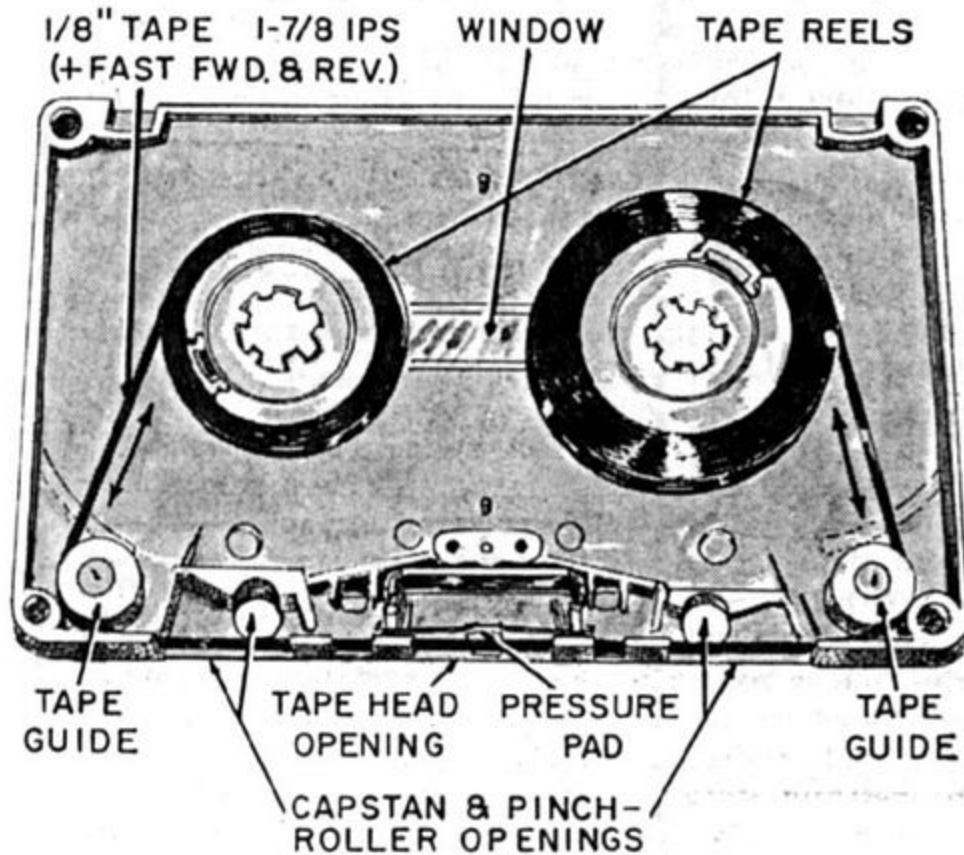
Software

- **Audio Capture and Editing Software:** *Audacity* is a free, open-source audio capture and editing software that has been used by audio professionals and amateurs for nearly two decades, and has extensive support resources available online.
 - Check recording settings, especially:
 - Recording and Playback Device settings
 - Channel (Mono/Stereo)
 - Bit Depth and Sampling Rate as identified in your project plan
- **Digitization logs or spreadsheets** (or any other tracking documentation) to track the work completed and capture metadata.

2. PREPARE AND INSPECT AUDIO CASSETTE

Each audio cassette should be inspected to ensure it will not be damaged during playback and will not leave residue or damaging substances, like mold, on the tape deck. This inspection may be part of an initial condition assessment conducted before any digitization begins, or may take place item by item while digitizing.

1. Remove write protection tabs to make sure the tape is not accidentally recorded over.
2. Test movement of reels by turning slowly with a pencil or finger.
3. Check for damage to casing, and repair or rehouse in new casing if necessary. See the [“Preservation Self-Assessment Program”](#) for more information.



- a. Broken case
 - b. Broken reel teeth
 - c. Immobile reels
 - d. Other missing pieces especially the foam pressure pad
 - e. Mold inside case
4. Check for damage to tape and repair if possible.
 - a. "Sticky shed" (metal flakes coming off the tape)
 - b. Bunching or tape sticking to itself
 - c. Mold on tape
 - d. Tape incorrectly wound through cassette
 - e. Folds, creases, or breaks in tape
 5. If damaged tapes are found, document the damage, set aside to repair or send out, then proceed with digitization of tapes that are in good condition. Be especially cautious with mold, and immediately quarantine affected items before taking other repair steps. Most outsourcing vendors will not handle moldy tapes.

3. CAPTURE AUDIO

Digitizing audio cassettes takes place in real time. If a tape is 45 minutes per side, it will take at least 90 minutes (plus set up time) to digitize, and then additional time to edit and export. Plan accordingly.

1. Load tape in tape deck
2. Begin recording in your audio capture software
3. Wait a few moments, then begin playback on cassette deck
 - a. It's better to capture a few seconds of silence in front of the recording and edit that out later, rather than risk missing a portion of the recording.
4. Check input signal level during the first portion of the recording.
 - a. Compare the audio quality directly out of the cassette deck and that being recorded on the computer.
 - b. Adjust input signal level (maximum peak around -6.0dB) as needed, and avoiding clipping.
 - c. If levels need to be adjusted, stop the recording, rewind, and start again with the adjustments.
5. Continuously monitor the audio stream during recording
 - a. If there is tape damage or something unexpected happens, you will hear it immediately and can stop the tape deck to minimize damage.
 - b. If your workflow includes taking brief notes or identifying content on unknown tapes, you may want to do this while digitizing, rather than having to playback the audio file later.
 - c. You can either monitor over speakers or with headphones as appropriate
 - d. This may not be appropriate with all tapes, especially if there is potentially culturally sensitive material on them.
6. When the tape stops, end the recording
7. If there is a second side to the tape, export the file as noted below, then record the second side.
8. Rewind if needed best to flip the tape over and play at normal speed to minimize stress on the tape.
9. Listen to selections of the recording and spot check quality of recording.

4. EXPORTING FILES

In most cases, a preservation master and an access copy of each file will be generated, following the specifications laid out in your project plan (see the “[Digitization Planning](#)” resource on the Sustainable Heritage Network). Ensure that files adhere to your file naming system and file structure established prior to starting your project..

1. Export a lossless archival master (most likely a WAV file)
 - a. If edits are needed, do not directly edit the archival master - work from a copy.
2. Export a compressed access copy (most likely an MP3 file) of the edited master
 - a. If any further derivatives need to be made, work from the access copy if possible

5. METADATA AND DOCUMENTATION

Metadata and documentation is necessary to manage and provide access to digitized files. Some descriptive metadata may be recorded before digitization (from records, or the physical items), and some may be capture during digitization (see above). Technical metadata about the items, equipment, digitization, and workflow records are often captured at this time in relevant external spreadsheets, digitization logs, or management systems.

When working with WAV files, limited metadata can also be embedded directly in the file, using software such as BWF MetaEdit. This metadata will travel with the file as it is copied or transferred to other locations.

ADDITIONAL RESOURCES

- Indigitization Toolkit:
<http://www.indigitization.ca/indigitization-toolkit/audio-digitization/>
- Preservation Self-Assessment Program -- Audiocassettes:
<https://psap.library.illinois.edu/advanced-help/av-audiocassette>