The Vagabond Puppeteer Collection Video Digitization Project

Class: Video Preservation 1
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Introduction

Throughout the Fall of 2014, Jasmyn Castro, Carmel Curtis, Michael Grant, David Neary, Lorena Ramírez-López, and Allie Whalen, students in New York University's Moving Image Archiving and Preservation Master's Program, created a Digitization Plan for audiovisual materials in the Vagabond Puppeteer Collection (VPC), a collection of mixed video formats from artist Mona Jimenez. This plan was created as part of an assignment for the class Video Preservation, taught by Mona Jimenez and Erik Piil. This document should be read with the accompanying Excel spreadsheet (14f_3403_JC_CC_MG_DN_LRL_AW_a1).

The purpose of this document is to examine the activities involved in the digitization and preservation of the items in VPC. Through the preparation outlined in this plan, appropriate and accurate implementation of the outlined tasks will be able to be achieved. Additionally, the secondary purpose of this document is to provide the rationale behind the instructed steps of digitization; there is no singular approach or workflow for digitization. This document identifies and explains how and why decisions were made in the planning for digitization of materials in VPC.

Preservation of audiovisual materials is a broad topic that can encapsulate the care, handling, storage, access and digitization of assets. This plan will focus specifically on *digitization*. The decision to digitize is one that must be carefully considered. It is not always an appropriate action for preservation. In the case of VPC, we have decided to digitize based on the risks inherent to the original format as well as storage and access needs of the collection's owner.

Background on the Collection

The summer of 1939 was a time in New York State when there was major unrest and imbalance between dairy farmers and distributors. The federal, state and local governments were doing little to nothing to regulate the market prices between dairy farmers and dairy distributors. In New York State, milk distribution was primarily conducted by three major corporations, known as "The Big Three": United States Dairy Products Company, Borden's Condensed Milk Company, and Sheffield Farms Milk Company.

The low prices set by these corporations put many small-to-medium scale farmers in significant debt. Many farmers were dissatisfied with their situation but had limited alternatives if they did not sell their product to The Big Three. The situation was intensified in the summer of 1939 when a terrible drought struck New York State, thus making farmers all the more desperate for cash to buy supplies needed to maintain their farms and making distributors all the more powerful in their

control to set low market prices.[1]

In August of 1939, the Dairy Farmers Union (DFU) organized a large strike lasting several weeks, which involved halting the flow of milk to New York City and picketing milk plants in hopes of dissuading non-striking farmers from delivering their milk to the distributors in the milk plants. After several weeks of protests and a decrease of about 46% of milk brought into the city, DFU was able to negotiate a higher pay for dairy farmers in New York State.[2]

During this time, four students from New York, Mary Walton, Peter Seeger, Jerry Oberwager, and Harriet Holtzman, travelled across the state performing puppet shows in support of fair pay and treatment of dairy farmers. The four young people, calling themselves The Vagabond Puppeteers, traveled more than 4,000 miles in an acquired 1930s Oldsmobile with 22 handmade puppets. Through their storytelling and folk songs, the Vagabond Puppeteers collaborated with dairy farmers. An article published by the Dairy Farmers' Union on August 25, 1939 about the Vagabond Puppeteers stated: "The young people are combining entertainment with education, and are doing valuable work for the Union in cheering up strike weary farmers."[3]

In 1988, almost 50 years after the Vagabond Puppeteers were on the road, the group of four reunited to share memories of their trip. This reunion was documented by Mary Walton's daughter, Mona Jimenez. It was at this meeting that Ms. Jimenez was inspired to make a documentary about the Vagabond Puppeteers and the dairy farmers' struggle for which the Puppeteers were fighting. Through interviews with the four Puppeteers, as well as New York State dairy farmers, Ms. Jimenez recorded personal and collective stories from this under-documented aspect of New York State history.[4]

Project Scope

We have been provided with and will digitally reformat seven U-matic S cassettes containing interviews with folk legend/puppeteer Pete Seeger (three tapes) and dairy farmer Al Kuchler (four). In total, these tapes run to approximately 123 minutes. When the work is completed, we will deliver to Ms. Jimenez preservation masters with 10-bit uncompressed YUV video and 16-bit audio, ProRes 422 HQ mezzanine files with 10-bit *compressed* video and 16-bit audio, and 8-bit compressed MPEG-4 H.264 files for access. All of these files will be in QuickTime (.mov) format. They will be delivered on an external hard drive, and will be temporarily backed up on the Cinema Studies Center's network-attached storage (NAS) system.

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[1] Dyson, Lowell, 'The Milk Strike of 1939 And the Destruction of The Dairy Farmers Union', *New York History* 51. 5 (October 1970): 523-544. JSTOR. Web. 29. Oct. 2014.

[2] Kriger, Thomas, 'The 1939 Dairy Farmers Union Milk Strike in Heuvelton and Canton, New York: The Story in Words and Pictures', *The Journal for Multi Media History* 1.1 (Fall 1998). University at Albany. Web. 29. Oct. 2014.

[3] Dairy Farmers' Union, 'Puppeteers Amuse, Educate Farmers', *The Union Farmer*. 1.14 (August 1939). Print.

[4] Emery, Lawrence, 'Interesting Summer', *Daily Worker*, 2 Oct. 1939. Web. 29 Oct. 2014.

Selection

In preparation for this work, we consulted with the artist on overall priorities for the digitization of the Vagabond Puppeteers Collection, and what priorities we should set in digitizing a limited set from it. As to the first issue, beyond the 14 selected for the class project, there are 36 additional tapes:

- 12 additional U-matics containing further interviews, "flat art" (silent illustrative shots of art or printed matter), and rough edits
- 11 Hi8 camera originals of Ms. Jimenez's trip with her mother retracing the route of the Vagabond Puppeteers' 1939 tour
- 3 Hi8 copies, with burnt-in timecode, of a selection of the Hi8 originals above
- 5 U-matics containing duplicates of excerpts of the Hi8 originals above
- 5 VHS dubs (some with onscreen timecode, some without)

Thus, camera originals were prioritized over dubs,[5] and Ms. Jimenez felt that the interviews were of greater importance than the tapes containing "flat art", which are also camera originals. Among the 14 interviews, she set a hierarchy in which the tapes of her mother (which Group 2 is digitizing) were of paramount importance, followed by those of Pete Seeger, then the other puppeteers, and then the dairy farmer interviews. Among the fourteen tapes now up for digitization, the only dairy farmer interview is the one with Al Kuchler, seemingly because he was a particular friend of the artist's family.

The items in the VPC all relate to a documentary that Ms. Jimenez had set out to make, and were all shot between 1988 and 1991. While the project was never completed, the interviews and footage of the reunion and road trip are themselves important historical documents.

Metadata

After visually inspecting the U-matic tapes in our collection, we discussed ideas for a basic naming convention with Group 2. Because both groups had the same formats, and they were all related to the Vagabond Puppeteers, this naming convention would help distinguish the items from one another. We decided to use the abbreviation for Vagabond Puppeteer Collection, followed by the number of the tape (i.e. VPC_01). This would serve as the item number for each U-matic tape in our collection.

Before the initial setup and calibration of the video equipment for transfer, we created a spreadsheet (see attached Excel file VideoPreservation_1_FA2014_Vagabond_Puppeteers_Collection) and gathered metadata from U-matic tapes VPC_01 through VPC_07. The following fields are what we decided to capture for source metadata:

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[5] If digitization of the remaining original material is to be done later, it would be preferable to digitize the Hi8 camera originals. However, the small size and general instability of the 8mm video format family is conducive to degradation, and if these originals have indeed degraded significantly, it may be that the U-matic copies could provide superior transfers.

SOURCE METADATA		
Item Number (Unique ID)	**Media Type**	**Record Date** (yyyy/mm/dd)
Item Title	**Item Format**	**Physical Assessment**
Label Annotations	**Stock Brand**	**Target Format**
Container Annotations	**Running Time**	**Notes**

Destination Formats

After looking at the various options available for destination formats, we decided to use a 10-bit uncompressed YUV video file wrapped in a QuickTime container and 16-bit audio stream. This uncompressed 10-bit QuickTime file will serve as the preservation master, but we will also provide 10-bit compressed ProRes 422 HQ files for each tape to serve as mezzanine files. The video compression format for the access copy for each tape will be 8-bit compressed H.264 with libfaac audio encoding.

File Properties	
Data Format	• MOV (QuickTime multimedia file format)
Capture Information - Video Specifications	• Video Codec: Uncompressed • Video Frame Rate: 29.97 fps • Color Encoding: YUV • Chroma Format: 4:2:2 • Interlaced Scan
Capture Information - Audio Specifications	• Audio Sample Rate: 48 Khz • Audio Sample Size: 16 bit

We ultimately decided on MOV as our destination preservation format because it is one of the top recommendations for digital derivatives of video and easily accessible within a Mac OS X environment. The technical specifications for this chosen file format are as follows and are recommended when dealing with digitized files in a Mac OS X environment.

Storage

The seven files produced in the digitization process (and the seven produced by Group 2) are to be stored on the Cinema Studies NAS (network-attached storage) drive in the MIAP Lab at 665 Broadway. These files will be transferred to a G-Technology G-Drive 2TB external hard drive and put into the care of Ms. Jimenez. It is recommended that she further backup the files, ideally storing one copy in a separate location to the G-Drive.

Group 1's half of the project runs to a little over 2 hours of material. The preservation masters, being uncompressed .mov files, will each take up approximately 100GB while the mezzanine copies will each take up approximately 13GB. The entire size of all master and mezzanine files will be approximately 790GB; before adding

access copies, checksums and the metadata spreadsheets we will be creating. Group 2's collection of seven tapes should produce files of approximately the same size, meaning there should be adequate space on the 2TB storage device to handle this requirement.

Finally, the U-matic tapes will be returned to Ms. Jimenez, who may then decide what she wishes to do with them. If she wishes to keep them as a tertiary storage format, it is recommended that they be kept in a low temperature, low relative humidity environment, standing on edge.

Timeline

The VPC preservation process was undertaken during Video Preservation 1 class, which was held on select Monday evenings throughout the Fall Semester of 2014. The following timeline represents the steps that were undertaken and the dates on which they were expected to be completed. Additional lab time would be arranged so that the project could be fully completed.

DUE DATE	ACTIONS TO BE UNDERTAKEN
November 3	A preliminary draft of this document detailing the processes of video preservation will be delivered to Mona Jimenez, acting as both instructor and artist, for feedback.
November 10	Complete a full inspection of the U-matic tapes and add collection metadata into an Excel spreadsheet. Finalize the signal path and setup process for test digitization. When test is successful, begin digitizing highest priority works.
November 17	Continue digitization project and complete if time allows. Create checksums for preservation, mezzanine and access copies and perform QC on all digital files.
December 1	Continue digitization as needed. All digital files will be stored in the NAS for retrieval by Mona Jimenez.
December 3	Additional lab time scheduled to complete creation of derivatives, addition of checksums and upload to the MIAP NAS. All finalized documents will be delivered accompanied by the Excel spreadsheet logging the metadata of all the digital files.

Workflow

This workflow was developed according to the resources and equipment available in the MIAP Lab as well as the project specifications set by the artist, Mona Jimenez. The overall steps to digitize the Vagabond Puppeteers Collection include discussion on content, physical assessment, source metadata collection, and devising a strategy for the digital transfer.

The group met with Ms. Jimenez to learn more about the content, background, and types of footage in order to determine what tapes were first priority versus secondary footage. We established that the interview tapes with Pete Seger, Al Kuchler, Harriet Lansky, and Mary Walton should be our primary focus for the project since the content offers direct accounts from the puppet group members involved. Additional footage such as outtakes, reunions, location shots, dubs, etc. were deemed secondary materials that may be digitized at a later time since they make up part of the overall collection.

The workflow below outlines the steps before, during, and after digitization. As noted above, seven videos will be transferred from 3/4" U-matic to 10-bit YUV uncompressed QuickTime (.mov) preservation files. Then, the preservation files will be transcoded using FFMPEG to 10-bit compressed Apple ProRes422 HQ QuickTime mezzanine files and 8-bit compressed MPEG-4 H.264 access files. All files will be stored on the Cinema Studies Center's network-attached storage (NAS) system as well as an additional external hard drive.

The following is a list of equipment used for the digitization project:

- Kramer Electronics LTD, VP-1608
- ¾" VTR U-matic Recorder SONY VO-9600
- Digital Processing DPS-290
- Rane Audio Mixer SM 26B
- Horita Black Sync Generator
- Horita Color Sync Generator
- TekTronix 1730 Waveform monitor
- TekTronix 1721 Vectorscope monitor
- Video Monitor JVC TM-H1750C
- Black Magic Media Express Capture card studio 2, Version 7.9.3
- Black Magic Media Express Video capture software, Version 3.3.1

- **Preparation for Digitization**

    - Collect source metadata using the above-named Excel spreadsheet to record titles, label and container annotations, media type, format, stock brand, running time, and notes.
    - Establish unique identifiers as VPC_01_p, VPC_01_m, VPC_01_a. Use this file naming convention for videos 1 through 7 so that each video will ultimately have 3 files.
    - Establish the target formats for preservation, mezzanine, and access files.
        - 10-bit uncompressed QuickTime (.mov) preservation files
        - 10-bit compressed Apple ProRes422 HQ QuickTime mezzanine files
        - 8-bit compressed MPEG-4 H.264 access files.
    - Conduct a physical assessment of the tapes checking for wind issues, contamination, odor, degradation, and dust or debris particles, and complete any necessary cleaning treatment prior to transfer.Clean tape heads and transport on U-matic deck.
    - Conduct brief playback check of the tapes at beginning, middle, and end to check audio (whether it is mono or stereo), audio and video levels, sound and image stability, and content.
    - Rewind each tape after playback check to prepare for transfer.
    - Add any additional metadata compiled during the playback check into the spreadsheet.

- **Digitization Process**

    - Turn on all equipment 20 minutes prior to digitizing.
    - Set up the signal path using the Kramer Electronics LTD, Switcher. (See visual signal path diagram at the end of this report).
        - The VTR U-matic VO-9600 deck should already be connected Kramer Switcher.
    - Calibration of the monitor
        - Route the SMPTE bars to the monitor using the switcher.
        - Adjust the hue and chroma by switching the monitor to blue screen mode. To properly set the colors, each vertical column should be the same color from top to bottom.
        - Adjust the brightness and contrast by switching the monitor out of blue screen. To properly set the brightness, the white box should be at the brightest bright. To properly set the contrast, the first 2 of the 3 chips should blend together.
    - Calibration of the CTR monitor through the Digital Processing Systems DPS-290 Component TBC/Synchronizer
        - Route the signal from the U-matic through the Component TBC/Synchronizer. Route the TBC to the monitor.
        - The TBC will automatically distribute the signal to the CTR monitor, the TekTronix 1730 Waveform Monitor and the TekTronix 1721 Vectorscope Monitor.
        - Use the U-matic reference tape to calibrate the SMPTE bars for the black, luminance, chrominance, and yellow signals on the waveform monitor and the vectorscope.
        - Adjust the black level to 7.5 IRE and the luminance level to 100 IRE. Then aim the chrominance and luminance signals at the targets on the vectorscope.
    - Audio
        - Route the audio using the Kramer Switcher by pressing the audio button on the switcher box.
        - Using the analog RANE equalizer, adjust the audio levels so that the line on scale above the monitor is at 0.

- **Digitization**

    - Decide if any signal changes are necessary for playback and document all changes. For example, audio levels, number of audio channels, video RF levels, time code type and placement, sound and image stability, etc.
    - Route the Kramer Switcher to Black Magic Media Express on the Apple Desktop.
    - Set the preferences in Black Magic according to pre-determined capture preferences.
    - Digitize the U-matic tapes using Black Magic Media Express on the Apple Desktop
        - Check the quality of each digital file including audio and image. Depending on running time listen to entire file or sections from beginning to end.

    - Record all new metadata about the videos into the spreadsheet.

- **Post-Digitization Process**

    - Using FFMPEG, transcode mezzanine and access derivative files from the preservation files (using the pre-determined target file formats).
    - Rename all files using the pre-determined file naming convention:
        - ***VPC_01_p***
            - ***VPC*** represents Vagabond Puppeteers Collection.
            - ***01*** represents the tape number (tape 1 of 7).
            - ***p*** represents preservation file.
        - ***VPC_01_m***
            - ***VP*** represents Vagabond Puppeteers Collection.
            - ***01*** represents the tape number (tape 1 of 7).
            - ***m*** represents mezzanine file.
        - ***VPC_01_a_***
            - ***VP*** represents Vagabond Puppeteers Collection.
            - ***01*** represents the tape number (tape 1 of 7).
            - ***a*** represents access file.
    - Using BagIt, create a bag from the file folder containing the preservation, mezzanine, and access files.
    - Using BagIt, validate the newly created bags.
    - Transfer all files to the NAS and external hard drive.
    - Using BagIt, validate bags on both the NAS and the external hard drive.

Setup and Calibration

Monitor Setup: First, we will prepare the U-matic SP VO-9600 deck so that it is optimized for playback and capture by gently cleaning the video head with isopropyl alcohol. Once the deck is ready, we will route the color bars to Monitor A. After routing the colors bars to the monitor, we will use blue screen mode to calibrate the color bars by adjusting the chroma and phase, before adjusting brightness and contrast.

Waveform Monitor and Vectorscope Setup: The system is internally wired so that when bars are routed to the monitor, they are also displayed on the waveform monitor and the vectorscope. Next, we will route the signal through the DPS-290 time based corrector. Settings for the DPS-290 time based corrector are as follows:

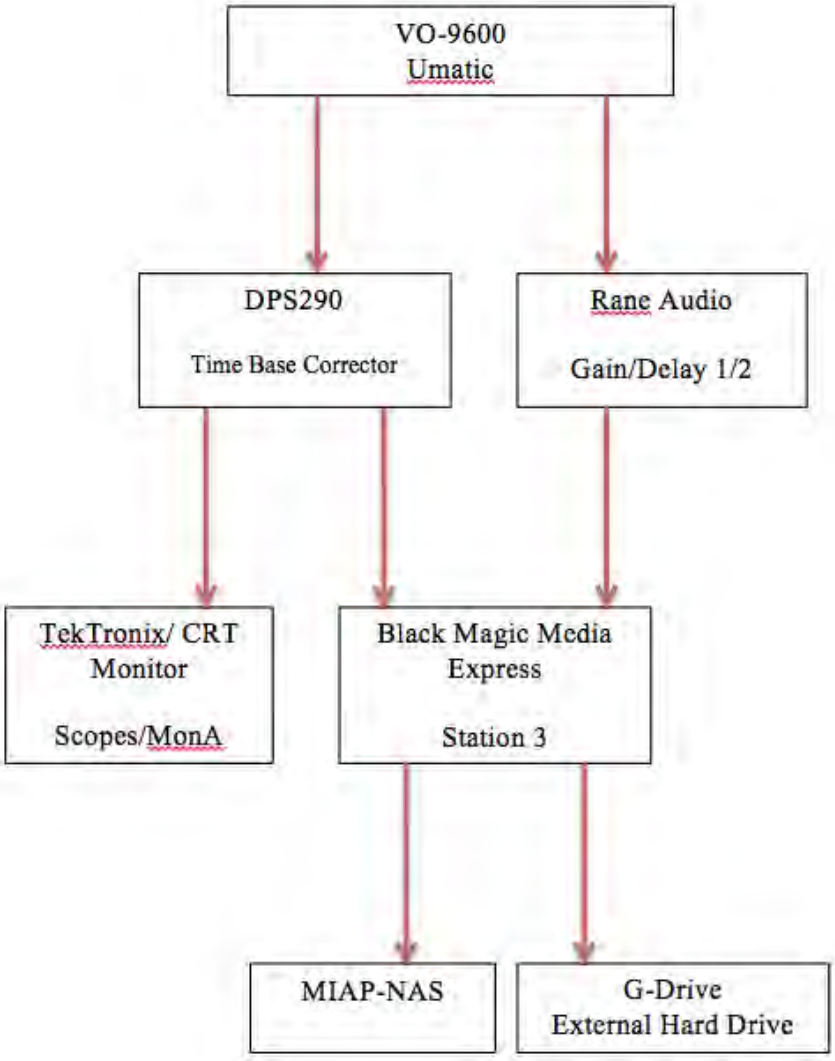
DPS-290 SETTINGS	
Function	TBC (time base corrector)
Format	NTSC-1 (analog television standard)
Mode	HET (heterodyne color system)

To ensure they are properly displaying the video signal, we will use the reference signals provided on the source tape to calibrate the waveform monitor and vectorscope. On the waveform monitor, black should be set to 7.5 IRE and luma should be set to 100 IRE. On the vectorscope, we will adjust the chroma so that all points are centered within the specified parameters.

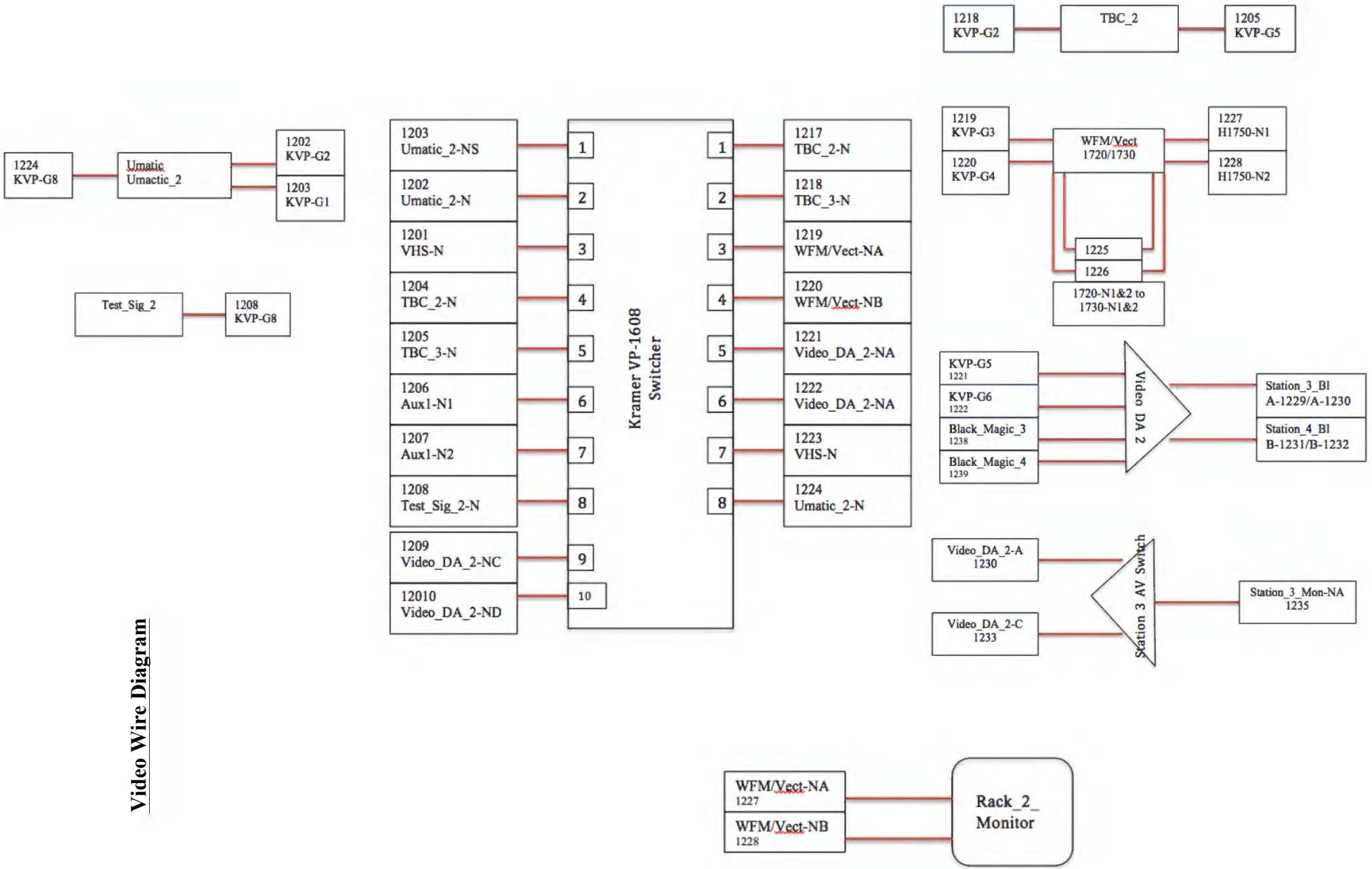
By setting up and calibrating the video playback equipment, the main goal is to capture the most robust video signal possible. The U-matic VO-9600 is now optimized for playback and ready for live capture.

Signal Path for Digitization

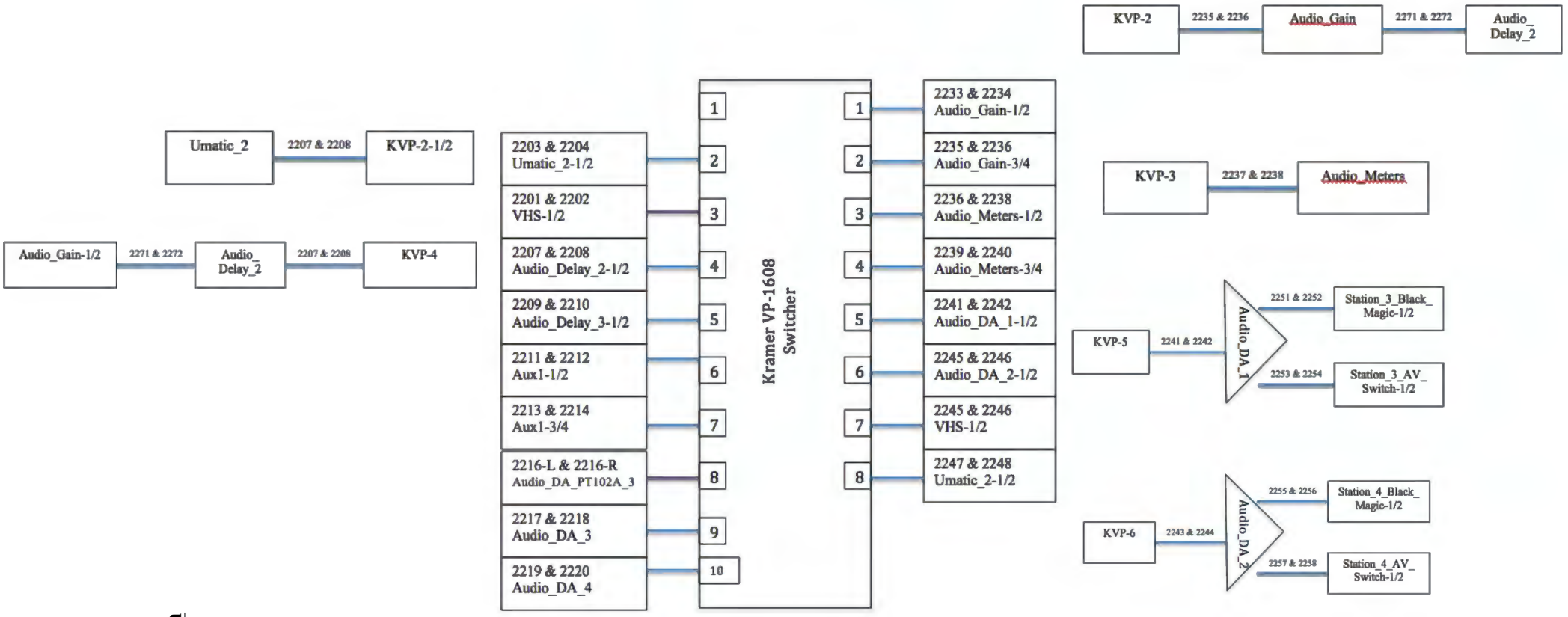
The following diagram represents the signal path using the equipment related to Rack 2 [Switcher] within the MIAP Lab. The source signals (video and audio) will come for the u-matic. The video signal will route through the DPS-290 where it will simultaneously be distributed to the waveform monitor, vectorscope, and CRT monitor. The audio signal will go to the Rane. Both signals will be captured onto the MAC desktop with Black Magic Media express where it will be uploaded to the NAS and G-Drive.



Video Wire Diagram



Audio Wire Diagram



Digital Conversion Parameters

As outlined in our explanation of setup and calibration, we plan to adjust the audio and video signals *prior* to digitization according to audio and video signals from a known reference tape. By adjusting the signal on the TBC in accordance to reference signals, it is our intention to optimize playback of our source tapes by calibrating our equipment prior to capture.

At this point in our process, we have found that none of the 3/4" U-matics in the section of VPC that we are working with appear to have recorded-in test bars or tones. Since there is no reference point *within* the tapes, this is why we are relying on the test bars of our test tape as a reference. We know that the equipment is properly calibrated and consequently believe it is important to limit any other signal adjustments that could be made to the source tape. We do not plan on relying on what we think "looks good".

Our general approach to digital conversion of items in VPC is to make a faithful reproduction of the original videotape where signal adjustment is limited after initial modifications are made during the process of set-up and calibration. We will only make deliberate and well-documented decisions about signal adjustment when absolutely essential. For example, it may be necessary to adjust luminance levels down to a maximum of 100 IRE in order to maintain the full luminance range of the original signal. If the luminance of the analog source significantly exceeds 100 IRE, the capture software will 'clip' that information, resulting in loss of the tonal range in the white areas. The greater the range of values in the signal, the more will be available post-digitization if adjustments to access copies are needed. Other adjustments may be made and documented to bring the signal into broadcast 'legal' standards. Similarly, if the audio levels are exceeding recommended levels, causing distortion, or so low as to be inaudible, adjustments may be made to bring the audio signal within the recommended range. Group members monitoring digitization will accurately document all adjustments. Since Ms. Jimenez will be present, signal adjustments can be made in consultation with her.

Quality Assurance and Quality Control

At the end of the digitization process, each tape should have a 10-bit YUV uncompressed QuickTime file. This will serve as the preservation master and source for the derivatives. It is during this post-digitization process that quality control should be done on each of these video files created. This requires a playback of the file; however, because time is an issue, an efficient one-minute inspection will be done at the beginning, middle, and end of the video file to make sure that the content was not only transferred completely, but also transferred correctly. Any errors such as dropouts not from the original tape, incorrect audio levels, or failure to capture, will require the tape to be transferred again.

Since these files will be transferred to not only the NAS, but also an external hard drive, it is important to set up quality assurance by creating checksums in order to ensure that the files remained the same throughout the migration.

Generating checksums: Checksums can be generated using the BagIt command line tool.[6]

To create a bag, use the following command on Terminal:

./bagit/bin/bag/bag baginplace <VPC_01>

The tool generates "bags" with metadata information about the technical aspects of the files while creating MD5 checksums. These text files: bag-info.txt, bagit.txt, manifest-md5.txt, and tagmanifest-md5.txt, contain checksums and metadata that can be cross-referenced from the different storage locations.

Technical and Content: Even though the majority of these tapes range from 8 to 20 minutes long, it is neither necessary nor possible to do real-time spot-checking. Instead we will determine whether the file's completeness corresponds to the original work and perform quality control by looking at a few seconds in the beginning, middle, and end of the video file to determine its legibility. If any errors are found, the U-matic tape should be transferred again.

What do we mean by errors? Some errors such as drop out may have originally been part of the video recording. It also may be due to head clogging within the deck. Any errors will be cross-referenced to determine if the error came from digitization or from the original source tape. A good reference to use during inspection is BAVC's Artifact Atlas, which can be found here: http://avaa.bavc.org/artifactatlas/index.php/A/V_Artifact_Atlas. This is just a reference and further inspection should be done for more serious errors.

Fixity: Once the files have been created we will generate checksums using the MD5 algorithm. Since the files are not yet transferred to the external hard drive, we will generate these checksums using Bagger, which is a desktop software tool developed at the Library of Congress. The tool generates "bags" with metadata information about the technical aspects of the files while creating MD5 checksums. When the files are stored in their final storage destinations on both the NAS and hard drive, these checksums will be used to validate that the files remained intact during the transfer.

Transfer to Storage

After the digitization of these seven U-matic videotapes, the following deliverables should be stored on both the Cinema Studies Center's network attached storage (NAS) for short-term storage and a G-technology 2TB external hard drive for long-term preservation:

- 7 – Preservation masters: 10-bit YUV uncompressed with 16-bit audio
- 7 – Mezzanine derivatives: 10-bit compressed Apple ProRes422 HQ Quicktime with 16-bit audio
- 7 – Access copies: 8-bit compressed MPEG-4 H.264
- 7 – Data folder with BagIt bags: bag-info.txt, bagit.txt, manifest-md5.txt, tagmanifest-md5.txt

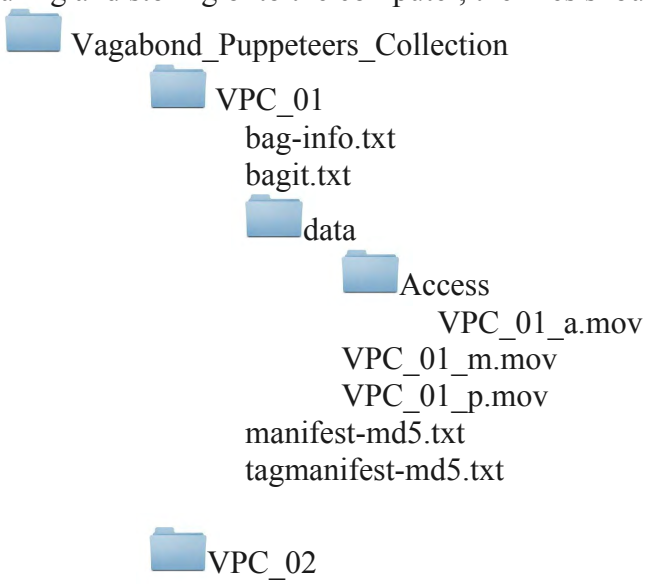
Our entire project has a little over two hours of content (roughly 20 minutes

[6] BagIt is a free open-source software that must be installed onto the computer beforehand.

per tape). Understanding that one 20-minute U-matic tape will be roughly a 100GB 10-bit uncompressed file and a 13GB ProRes 422 HQ mezzanine file, the amount of storage required on the computer, hard drive, and NAS for these files is an estimated total of 790GB.[7] The amount of GBs for both the access files and the checksum texts will not greatly impact the storage compared to the preservation and mezzanine files. Nevertheless, 200GB should be set aside for these files and any additional information.

Directory structure within the NAS and hard drives

When capturing and storing onto the computer, the files should be saved as such:



The collection manager Mona Jimenez requested this arrangement where each tape will have its own folder to house its corresponding video files from digitization. It is necessary to put the preservation file and the derivative files (VPC_01_p.mov, VPC_01_m.mov, and Access folder with VPC_01_a.mov) within the data folder in order to generate bags with BagIt.

Creating Derivatives: Transcoding

After the calibration and signal routing, the videos should capture onto the desktop as 10-bit YUV uncompressed QuickTime digital files with 16-bit audio stream. These are the predetermined settings established by the collection manager. It was decided that a 10-bit YUV uncompressed QuickTime file would be an appropriate preservation master as it is one of the highest qualities that can be captured on Black Magic Media Express. While we would have preferred a 24-bit audio stream, Black Magic can only accommodate 16-bit audio at present.

Once the master has been created and named VPC_01_p, mezzanine and access derivatives can be generated using this preservation file on Terminal with

[7] This figure comes from using the Video Space Calculator (www.digitalrebellion.com/webapps/video_calc.html), calculating the mezzanine file as Format: ProRes 422 HQ 720 at 24 fps and the preservation file as Format: Uncompressed 720 10-bit at 24 fps.

FFMPEG. [8]

To create an Apple ProRes422 HQ mezzanine file, use the following command on Terminal:

ffmpeg –i <preservationmaster_p.mov> –c:v prores –profile:v 3 –c:a copy <mezzaninefile_m.mov>

This command states that the video codec (–c:v) will be a Prores file with a 422 HQ flavor (–profile:v 3) while the audio codec (–c:a) will be the same as the preservation master.

To create an H.264 MPEG-4 access file, use the following command on Terminal:

ffmpeg –i <preservationmaster_p.mov> –c:v h264 –c:a libfaac <accessfile_a.mov>

Similarly as stated above, this command states that the video codec (–c:v) will be a H.264 file while the audio codec (–c:a) will be using the libfaac standards.

Creating Bags: Fixity

The BagIt process was explained in the Quality Assurance and Quality Control section of this paper. Even though the bags are created during this transfer phase, it is important to understand that creating a fixity plan is an important step for quality assurance and quality control of the files.

Conclusion

When all of the above stages have been completed, so too will this project. We hope that this document will serve as a useful explanation as to the steps taken in digitizing this section of the VPC, and the reasoning behind those steps.

[8] Like BagIt, FFMPEG is free open-source software that must be installed onto the desktop beforehand.

APPENDIX 1: Diagram of Switcher inputs and outputs

Video	1	2	3	4	5	6	7	8	9	10
Output	DPS295	DPS290	Scopes/Mon A	Scopes/Mon B	St 3 BlkM	St 4 BlkM	VHS	Umatic		
Input	Umatic Super	Umatic	VHS	DPS295	DPS290	Aux 1	Aux 2	Bars	St 3 BlkM	St 4 BlkM
	1	2	3	4	5	6	7	8		

Audio	1	2	3	4	5	6	7	8		
Output	Gain/Delay 1/2	Gain/Delay 3/4	Meters 1/2	Meters 3/4	St 3 BlkM	St 4 BlkM	VHS	Umatic		
Input		Umatic	VHS	Delay 2	Delay 3	Aux 1/2	Aux 3/4	Tone	St 3 BlkM	St 4 BlkM
	1	2	3	4	5	6	7	8		

APPENDIX 2: Kramer VP-1608 switcher