

# Expectations during the Digital Archive Migration Process

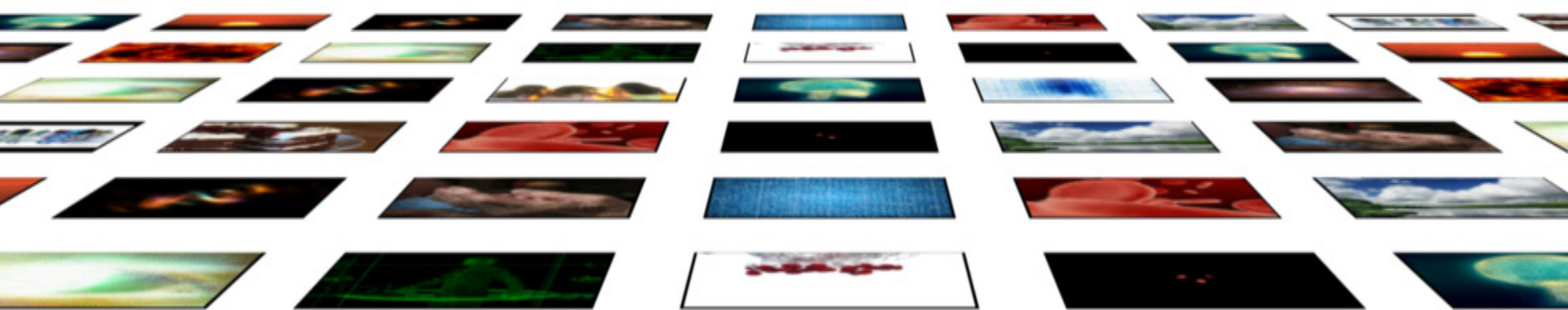


Front Porch Digital has long been synonymous with video archival and preservation. This document is the first in a series of white papers aimed at helping the archivist understand the process we have evolved and patented in migrating videotape and film based media to digital archive. This approach has been tried and tested in many of the world's most important archives, and as such is an important part in successfully migrating any collection.

# INTRODUCTION

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Migration of videotape to digital files can be a process which at times appears to be cumbersome. However, if the archivist is well prepared for the Migration Process and has realistic expectations based on a broad understanding of both the archive and process, migration can be a successful venture with profound results. Archive type, collection health, migration plan, and quality control are all considerations which an archivist may face when formulating a migration project. However, following a phased migration plan, segregating workflows, conducting restoration as needed, and utilizing a Content Storage Management System; any videotape library can be successfully migrated into a modern Digital Archive.



# ARCHIVE TYPES

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If you've been evaluating video management system vendors, you know that you have a lot of options. How do you select the right one? Is a one-size-fits-all solution right for you? Or do you need one that adapts to your requirements and doesn't make you change your business model just to get your content online? In today's world, flexibility is key, and for online video, flexibility is determined by adaptable technologies that serve you for the long term. Here's why DIVApublish *mpx* fits the bill.

## Broadcast Quality Archives

Broadcast Quality Archives are those archives which have had one major source of video production such as a production house, and each Archival Master is part of a consistent and extensive collection which has been well maintained during its life cycle. The existing Archival Masters have not been previously migrated, or if so the migration did not result in a generational loss. Stringent recording standards were followed during the production of the Archival Masters, and there is no expectation for migrating low quality footage. In Broadcast Quality Archives, the Archival Masters were sequestered from the Use Copies, and never used or repeatedly played. The Broadcast Quality Archive is most often seen in the broadcast industry or other video production industries.

## Aggregate Archives

An Aggregate Archive is one which has had a multitude of video production sources, and tracing an original back to the production team may be impossible. In these archives, it is largely unknown how the existing Masters were maintained prior to the current archive. Much of the content is at risk, but the condition of the Masters is not fully known, and therefore presents a potential problem in migration. These Masters may not have been full Archival Quality prior to absorption into the collection or archive, and therefore present further risks due to potential low quality of recording standards. These Archival Masters may have potentially been used or played many times adding to their distress. This archive is seen mostly in 501 (c) (3) organizations and University settings, where the quality of the Archival Master is not a direct result of a failure of the archive, but rather the aggregate nature of the sources and the inconsistent nature of the recordings. These archives have usually grown out of an effort to save historic artifacts, and therefore represent a large investment by the organization.

## Institutional Archives

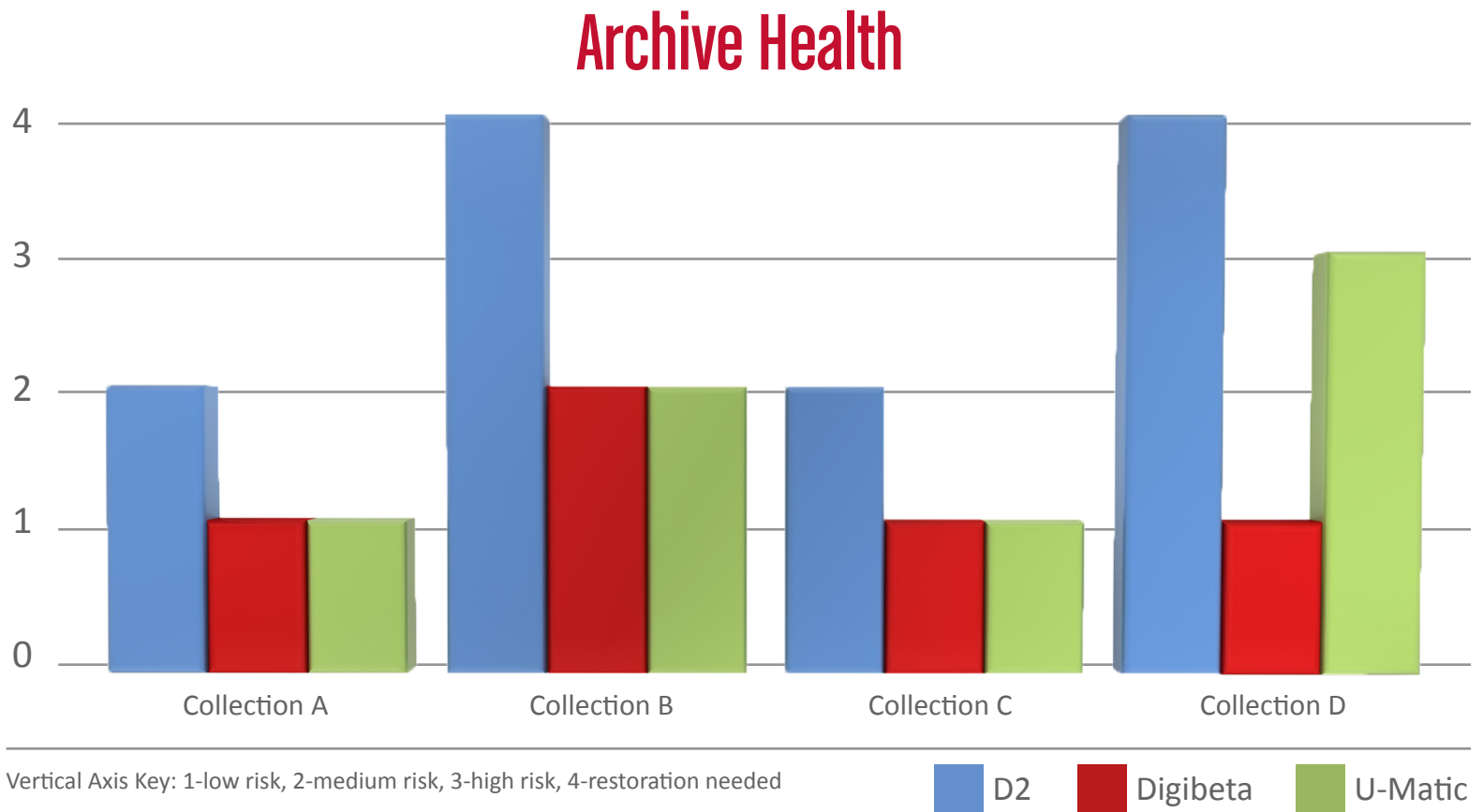
An Institutional Archive is one that has elements of both a Broadcast Quality Archive as well as an Aggregate Archive. This archive usually has collections from various sources; however those sources are fairly controlled. One major source may account for the majority of the Archival Masters, and their production has been controlled, following stringent recording standards. Other Masters may exist not adhering to any recording standards, however these Masters have been well maintained and usually pertain to the archived collection, such as subject matter, and therefore are a valuable resource. Though Masters may exist from various sources, most sources are known and footage has not traded hands often, or at all. Any low quality Masters were sent to this archive due to the content, and therefore are treated as Archival Masters.

Examination of both the archive as a whole in addition to the tapes is crucial to expectations during a Migration process.

# ESTIMATING ARCHIVE HEALTH

The expected success rate of a migration process can be directly related to both an archive's ability to carry out the preservation, conservation, and restoration of the Archival Masters, as well as the health of the Archival Masters and the Archive Type discussed previously. When an archive begins to evaluate the projected success rate of a migration effort, a collection by collection approach is best.

Collections within an archive tend to be similar in format and style to each other, and therefore the health of the collection can be graphed to estimate the median health of the archive. Estimation on the health of a collection can be made by looking at the health of a variety of samples. In the following example, it is clear that the relative health of the D2 format is low, and in two collections has reached a point where restoration intervention may be necessary. From this graph we can form a migration plan that takes into account an understanding of the expected success rate of migration.



# A PHASED APPROACH TO MIGRATION

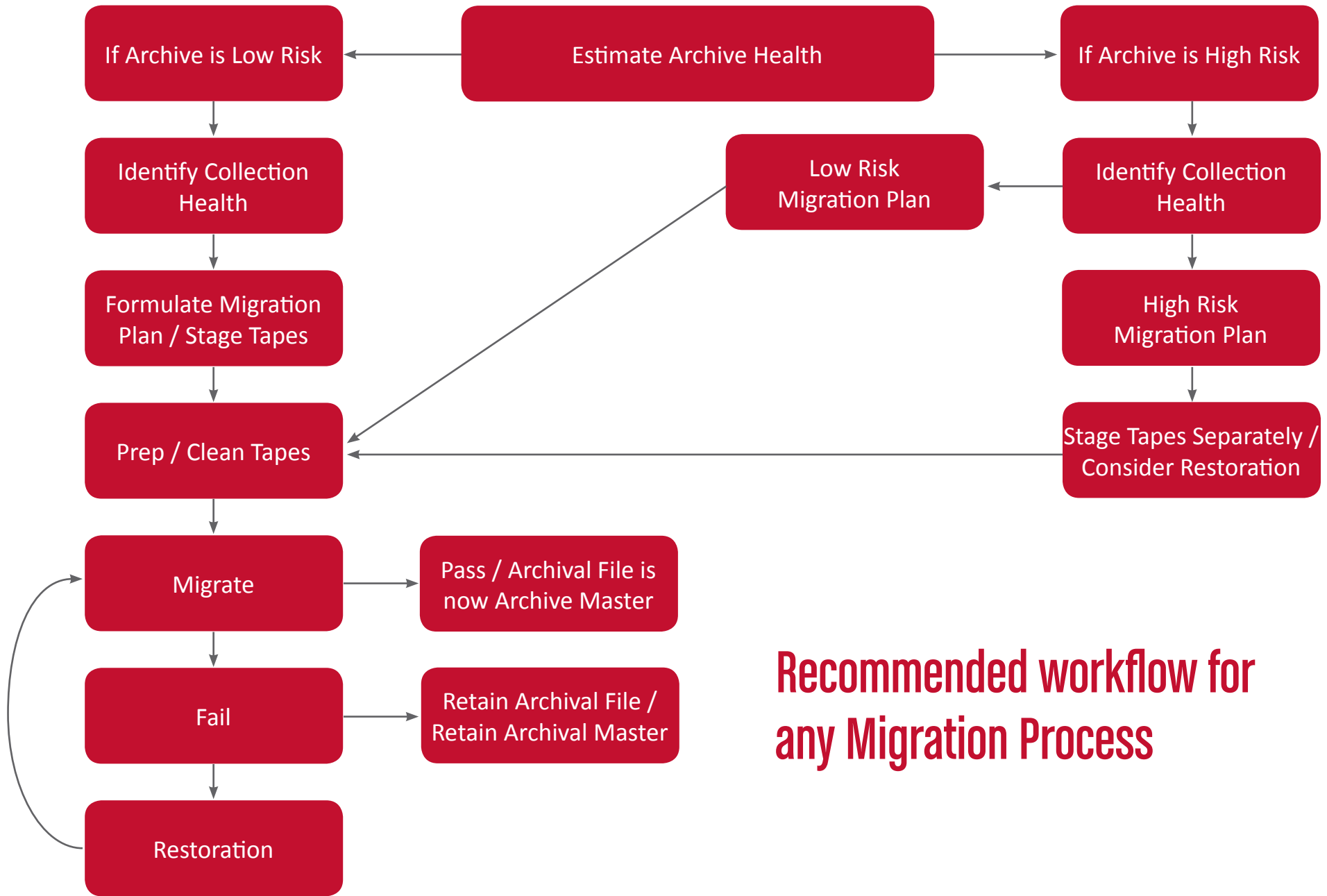
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Difficulties during migration should be expected, but a phased approach to the migration process can give an archive plenty of time to organize a restoration strategy should one become necessary. Often, a migration plan is made based on the desired availability of a particular collection and the overall health risks associated with the tape stock. However, it is important to consider the collection health as well. If a collection is determined to be high risk or in need of restoration, a workflow, separate from the main workflow for normalized tapes, can be implemented giving the archivist the time and space to properly deal with the high risk collection rather than halting all progress.

A workflow which addresses relatively healthy tapes should be segregated from the workflow for tapes in need of special attention to ensure continued migration progress. In addition, a migration policy should be instated which clearly defines the actions taken for high risk migrations. If a migration is unsuccessful, or content restoration is needed which enhances or alters the original recording, the original Archival Master should be retained until such time as a viable migration solution is found which migrates the footage without any major changes to the original recording.

However, if restoration is performed, and an enhanced migration can be achieved, retention of the original Archival Master is still recommended in addition to the enhanced migration. It is also recommended to retain a copy of a failed migration.

It is possible that during the migration process, digital artifacts can appear due to a range of issues with the video signal. This is very rare, but if the migration is unsuccessful, but produces an Archival File which has digital artifacts present, it is imperative to retain the original Archival Master until developments to the migration process can render a faithful Archival File as close to a clone of the original as possible.



## Recommended workflow for any Migration Process



# WORKFLOW BREAKDOWN

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The first step in the Migration Process is to step back and view the Archive Health as a whole. Considering the sources of the footage will allow the archivist to gauge the success rate of migrations. While most migrations are successful, alterations or developments to the Migration Infrastructure may be required for some tapes. It is best to examine the Collection Health, and segregate tapes which might need more attention than others. By segregating all High Risk Collections, Low Risk Collections can be migrated without disruption. Cleaning of both High Risk Collections and Low Risk Collections is recommended. Several Tape Cleaners exist on the market which will accomplish this, including SAMMAclean offered as part of DIVASolutions by Front Porch Digital. If a migration does fail, meaning either the tape is in such disrepair that it is unable to pass through a VTR or the resultant file is not a faithful recreation of the Archival Master, then restoration is recommended.

A videotape may be in need of restoration for a number of reasons. Restoration can be performed by a professional for binder hydrolysis, oxide re-adhesion, or an array of problems with the tape stock which prevents nominal migration. It is highly recommended that a Professional Tape Cleaning Service be consulted prior to any restoration work. If the archivist seeks restoration on a particular video tape, it is also recommended that the archivist retain the unfaithful migrated Archival File. If restoration fails, this may be the only Archival File which can be created. If restoration is successful, re-migrate the tape and dispose of the first Archival File only when it has been proven that the new Archival File is a faithful reproduction of the original content.

If the migration is successful, the resultant Archival File is now a faithful Archival Master and should be stored accordingly in a secure and well maintained Archival System. At this point the migration is complete; however a Content Storage Management is needed. Content Storage Management will allow the archivist to manage the Archival File throughout its new life cycle, including metadata control, rights management, and allows for web publishing of content. Full function program suites are recommended such as DIVASolutions DIVArchive, DIVAdirector, and DIVApublish *mpx*.

# QUALITY CONTROL

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## Preparation

The first step in the Migration Process begins with preparation of material to be migrated. From viewing archive health to physically attaching a barcode, the first step during a migration is crucial to further success. At this point, essential metadata is associated with an asset which ensures that the asset is trackable. Either a preexisting database can be imported, or metadata can be added which ensures that the asset is tracked through the Migration Process. Front Porch Digital's SAMMAprep offers both preparation software as well as a bar code system which prepares the asset for migration.

## Encoding

The second step in the Migration Process involves the physical encoding of material into Digital Files. This process can be accomplished with either an array of encoders, or a simplified workflow inclusive system such as Front Porch Digital's SAMMASolo or SAMMArobot. This system allows for the simultaneous encoding of multiple file formats to ensure that the Archival Master is only processed through a VTR once. The SAMMA system also automatically collects vital health metadata about the file and tape which is essential in gauging the quality of the digital files created during migration.

## Human Intervention

Following encoding with the SAMMA system, health reports and graphs are generated which give an accurate picture of the asset health. This step is essential in determining if the asset was successfully migrated. Without Front Porch Digital's SAMMA system, each individual digital file must be reviewed by a video technician to ensure successful migration. This can be time consuming and costly, so an inclusive system such as the SAMMA system is recommended.

## Asset Management

At this point the physical migration of the material is completed, however a minimum of four new files have been created, all of which are now treated as the new asset. An Archival File of preservation quality, a Use Copy file for editing, low resolution proxies, as well as a metadata XML file have been created which now require asset management. It is suggested that the asset package be checked into an asset management program such as Front Porch Digital's DIVArchive, which will be able to manage and control the asset through the new phase of the asset life cycle.

## Comparison

Following ingestion into an Asset Management System, comparison of later derivatives of the asset is essential to the long term management of the asset. Since multiple copies of an asset exists, comparison to each other is necessary to ensure that all copies are faithful to the original Archival File.

# A SAMMA WORKFLOW SOLUTION

## SAMMA Solutions

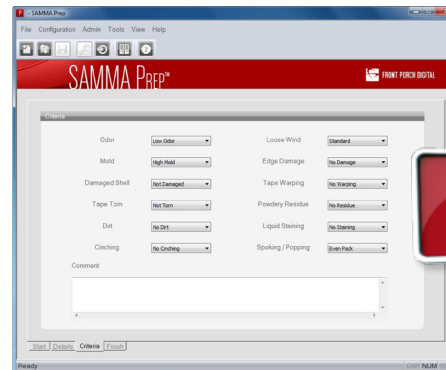
Front Porch Digital now offers a simple but powerful migration system which can assist the archivist in the digital migration of videotape content. SAMMA provides a workflow solution which takes the archivist through the migration process to provide a lossless high quality Archival File which can replace the Archival Master videotape or serve as a robust addition to the endangered videotape collection.



## SAMMAprep

The SAMMA workflow solution begins with the identification and organization of collections within the archive to be migrated as outlined in the recommendations above. Once the collections to be migrated have been identified, each master is physically inspected and put through a preparatory phase which not only ensures the physical health of the individual tape, but also initiates a metadata profile attached to a barcode which is printed out and placed directly on the tape. This preparatory phase is designed to identify any potential problems with the physical condition of the tape prior to migration, create a metadata profile for the asset or tie the asset to a pre-existing metadata profile imported from a previous database, and create a unified machine readable barcode label which ensures proper asset control through the migration process. Steps in this process include:

- Archive Health Estimation
- Collection Identification and Health Estimation
- Collection Selection for Migration
- Migration Plan
  - Low Risk Plan
  - High Risk Plan
- Tape Pulling and Staging for Migration Process
- SAMMAprep Operations
  - Physical Inspection
  - Metadata Profile Creation / Association
  - Barcode Label Integration



Should a tape fail to pass the physical inspection, it should be re-archived until restoration on the tape can be performed. This workflow should be built into the operation to ensure migration of other content continues.

## SAMMAclean

As an optional step in the SAMMA Solutions workflow, the SAMMAclean device automatically cleans the tape at faster than real time speeds, while collecting important metadata regarding both the health of the video signal and the health of the physical tape. This Condition Metadata is essential to the Quality Assurance step, and gives the archivist a physical graph representation of the asset health which can be used to verify successful migration without time spent physically viewing the material. SAMMAclean is available for the U-Matic, Betacam, and VHS formats. This step ensures that any at-risk videotapes are cleaned and prepared for migration. Cleaning the tape often allows a formerly faulty tape to become playable; as well it removes dirt which helps improve the life of the playout heads in the tape machines. Because of a variety of reasons, including tape stretch and creases, a tape may fail to pass this stage. If so it should be re-archived until restoration on the tape can be performed.

## SAMMASolo / SAMMArobot

SAMMASolo is a powerful Migration Engine designed for simultaneous transcoding content into multiple formats depending on the needs of the archive and the proposed Migration Plan. This all inclusive, hands off approach to migration make it ideal for non-technical staff operation.

SAMMA uses JPEG2000 as the archival copy when transcoding video content. The JPEG2000 format has been widely adopted by the archival community for video archiving. A broad selection of additional formats may be selected and up to 5 can be generated simultaneously depending upon the needs of the client.

The files are stored temporarily on SAMMA and can then be sent directly to a Front Porch Digital DIVArchive system, or can be transferred via FTP to another disk location.

SAMMA is also available in a robot configuration for mass tape migrations. The SAMMArobot can be loaded with up to seven SAMMASolos and operate 24/7 with minimal human intervention. Once tapes are loaded into a storage array, the robot takes control and migration commences freeing the archivist to continue with alternative tasks. SAMMArobot can be configured as a Umatic, Betacam, or VHS system.



# CONCLUSION

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Archivists face an array of considerations when an archive is at risk and in need of the often daunting task of migration. Archive type and health are paramount considerations in forming the Migration Plan and allow the archivist to form a crucial understanding of the expectations for success rates. Understanding the relative health of the individual collections allow for a detailed Migration including handling video tapes that may need restoration.

By following a phased migration plan, segregating the high risk workflow, conducting restoration when needed, and pushing Archival Files to a Content Storage Management System (CSM); any videotape library can be migrated into an accessible, functional, modern archive.



# Expectations during the Digital Archive Migration Process



**FRONT PORCH DIGITAL**

Solutions for the past, present, and future of media



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