



HPA

2026 | TECH RETREAT

**Lets Roll Tape-
Again.**

Jeff Sengpiehl - Technologist

How long do we keep Motion Picture Masters?

Motion Pictures Film- Roundhay Garden Scene- 1888. Thought to be oldest surviving filmed images

Television B/W- The Edsel Show -1957



Television Color- Kraft Music Hall Staring Milton Berle- 1958

Repurposing Remastering Content

1939



Repurposing Content

2025



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75 year old OCM – 35mm



75 year old OCM – 35mm



I Love Lucy

1951 · Sitcom · 6 seasons

Overview Watch show Episode guide Cast

Watch show

Available on EDIT SERVICES

 Pluto TV Free Watch	 Paramount+ Subscription Watch
 YouTube Primetime subscription Watch	 The Roku Channel Subscription (Require...) Watch
 fuboTV Subscription (Require...) Watch	 Amazon Prime Video Subscription (Require...) Watch
 Fandango at Home \$1.99 Watch	 Apple TV \$2.99 Watch



Archive at Capture – How we grew up

- Inherent to the media capture process
- Media costs were baked into production budget- not in post or as an afterthought
- Post Production deliverables came from the archive masters
- Physical media was less likely to suffer data loss
- With film and videotape, Duplicate Masters were easy to create



The Digital Revolution!

Camera Cards - Ephemeral

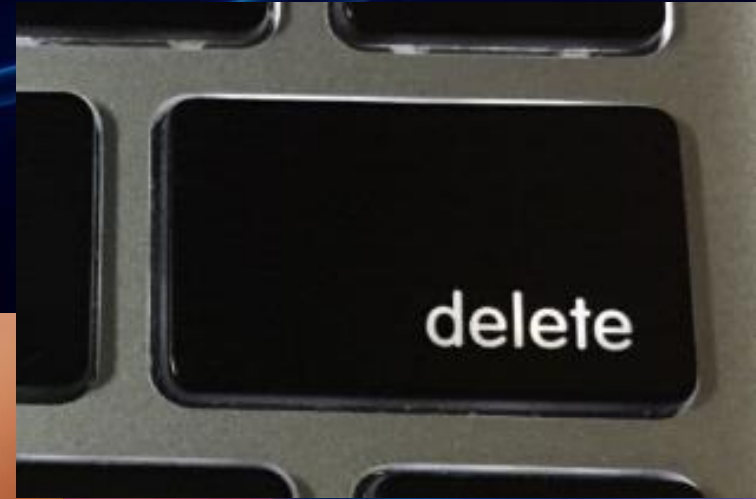
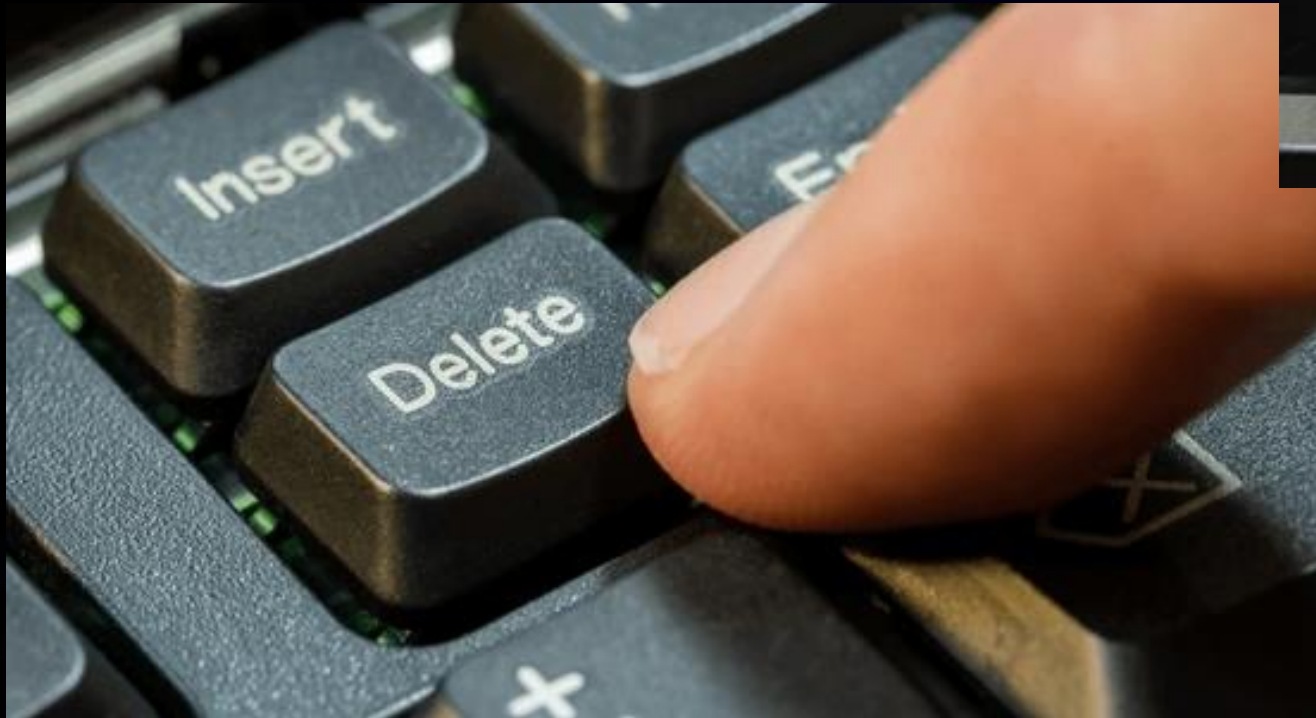
Direct to HDD, HDD Raid

Media handling, Duplication- all as post processes.

Clear the cards, back to set.



What have we lost..



What have we lost..



What is LTO

1/2" Form Factor

Approximately Half the size of VHS

You may use it today, just as Glacier



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What is LTFS.



Standardized formatting of Tape- can mount on any computer OS with a Simple Extension, and files can be read. Provides The same level of compatibility as any single video tape or film format



Preservation

Home > Preservation > Information by Media Type > Sustaining Moving Image Files

Media Types

[Audio](#)
[Bound Materials](#)
[Digital Media](#)
[Microfilm and Microfiche](#)
[Motion Picture Film](#)
[Negatives](#)
[Paper and Parchment](#)
[Photographs](#)
[Video](#)

Motion Picture Film Guidance: Sustaining Moving Image Files

How Do I Best Ensure That My Digital Files Will Be Usable In The Future?

Digital preservation for any type of file involves many components, such as:

Choosing a sustainable digital format.

- A sustainable format is one that is lossless and uncompressed. Some examples for motion pictures include DPX, TIFF, Motion JPEG 2000, and WAV for audio.

Choosing a sustainable storage media.

- Sustainability may look different for institutions or individuals based on needs and available resources. Some examples of longer term storage media include Linear Tape Open (LTO), Cloud Storage, and Redundant Array of Independent Disks (RAID). Whichever storage media is decided upon will require maintenance and monitoring, and will continue to incur costs for support.

Identifying recordings that you want to preserve.

- There are many factors that go into deciding what recordings to preserve. Points of consideration may take deterioration, age, uniqueness, content value, and format obsolescence into account.

Organizing files using proper file naming conventions, embedded metadata, and structured directories.

Table of Contents for Motion Picture Film:

- [Important Characteristics of Motion Picture Film Formats](#)
- [Identifying Motion Picture Film Formats](#)
- [Determining Condition](#)
- [Storing Motion Picture Film](#)
- [Playback and Digitization](#)
- [Sustaining Digital Files](#)
- [Emergency Preparation, Response, and Recovery](#)
- [Additional Resources](#)
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Capture?

LTO 10- Full Height Drive write speed

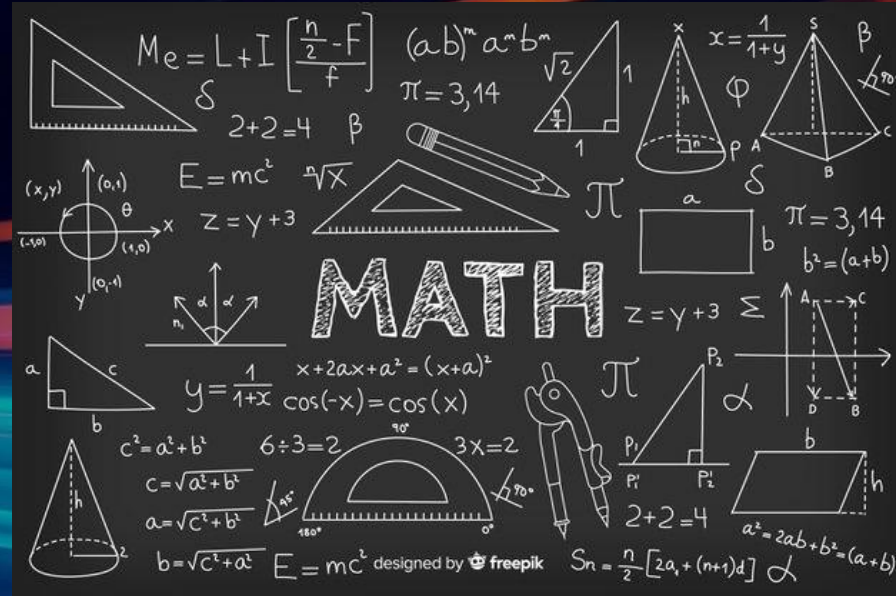
400 MB/s Per Drive

The videotape comparison

Compression

4K JPEG XS, 1.6 Gb/s - 2 streams fit into 400 MB/s. 487 Minutes per tape

14 DNX 220 Streams fit into 400 MB/s.



How could we get back to Archive at Capture?

LTO 10- Full Height Drive write speed- each
400 MB/s Per Drive X4 – 1.6 GB/second.

Simple NVME Cache

Standard S3 interface tools.

Tape as RAID?

What is RAIL

Writing to multiple tapes at once- Simple RAID for Speed.

Writing to multiple Libraries for Speed and Security- Redundant Array of Independent Libraries.

Erasure Coding.

How could we get back to Archive at Capture?

Conversion- Serial Video to Files- Generally used today
Streaming formats to files on tape.

SMPTE- 2110. Each 1080p Stream is about ~3 Gb/s

NDI. Each 1080p Stream is about 150 Mb/s – Capture methods exist today

**Together- Lets make archive the easy
button again**



Lets make archive the easy button again

Simplify essence to file flows



Lets make archive the easy button again

Simplify essence to file flows



Budget for long term retention up front again

– pays off in the long run

Lets make archive the easy button again

DoctorPostProduction@gmail.com

Let's connect!



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