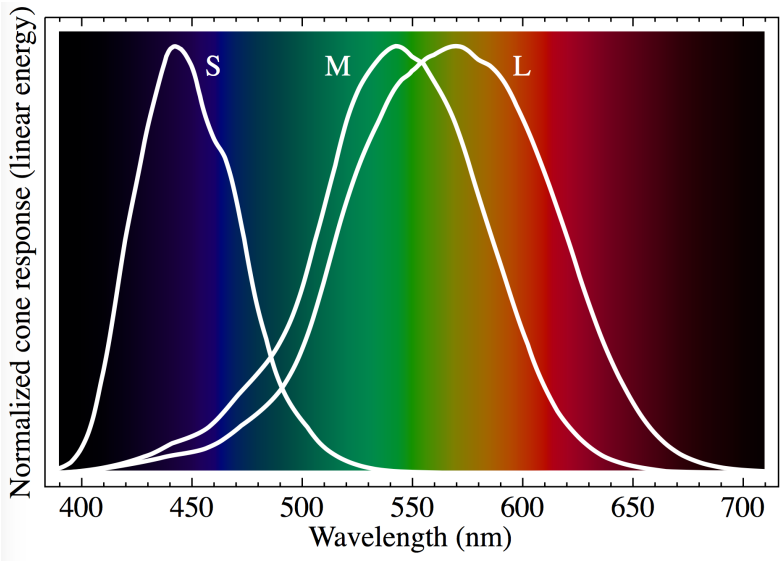
A Quick Introduction to Television (and Video)

Reto Kromer • AV Preservation by reto.ch

La preservazione digitale del film e del video
Università di Udine a Gorizia
7–10 maggio 2018



Medium and/or Carrier

- sound
- film
- television
- video
- files

Sound Recordings

- wax cylinder
- gramophone record
- magnetic wire
- magnetic tape
- files

Photography (Cinema)

black and white:

- blue sensitive emulsion
- orthochromatic emulsion
- panchromatic emulsion

Magnetic Tape

- open reel
- cassette
- cartridge

Common Magnetic Formats

Audio

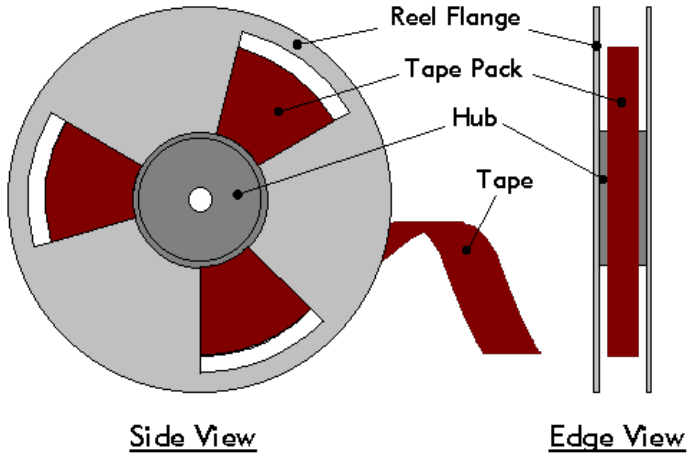
- 2″, 1″, 1/2″, 1/4″

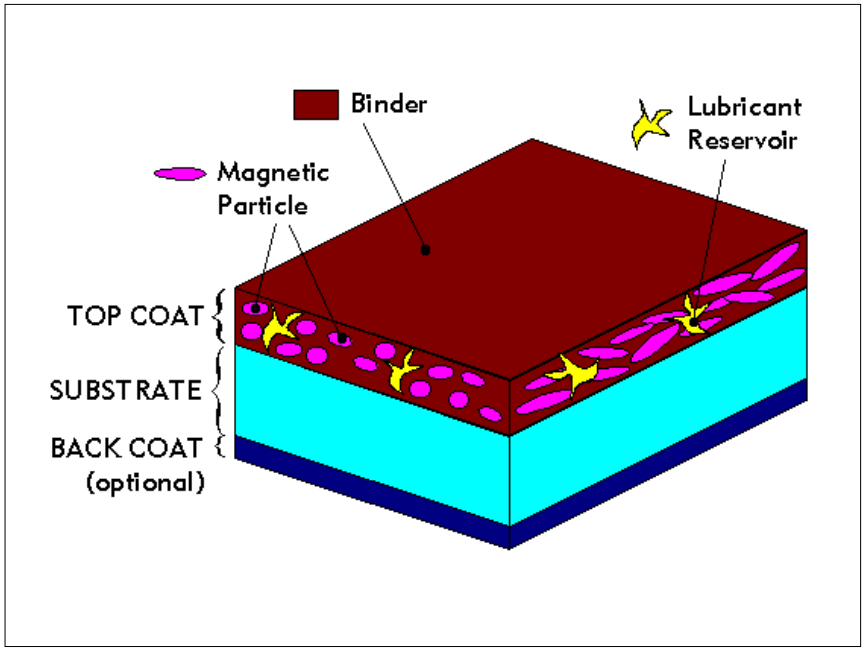
Cinema

- 35 mm, 17.5 mm, 16 mm

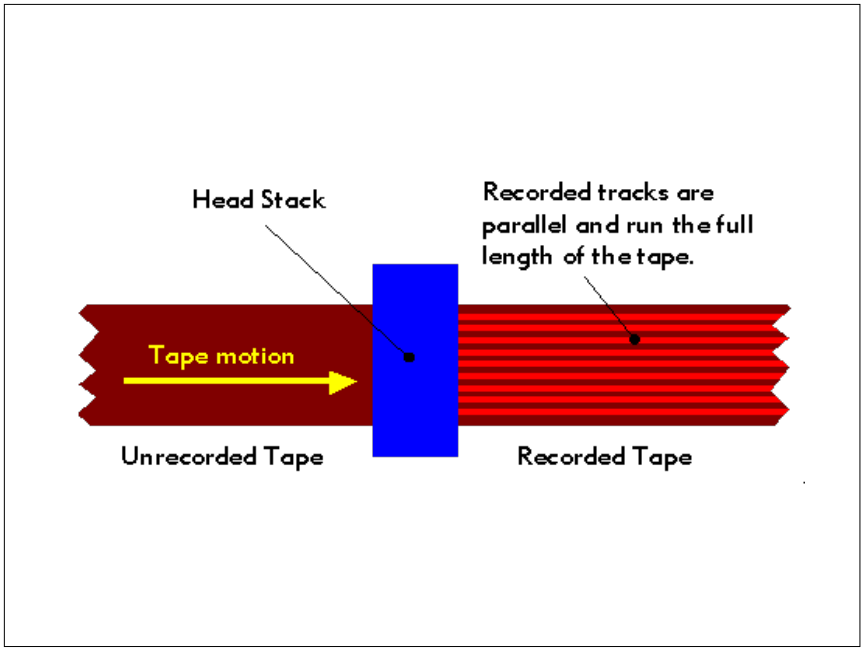
Video

- 2″, 1″, 3/4″, 1/2″

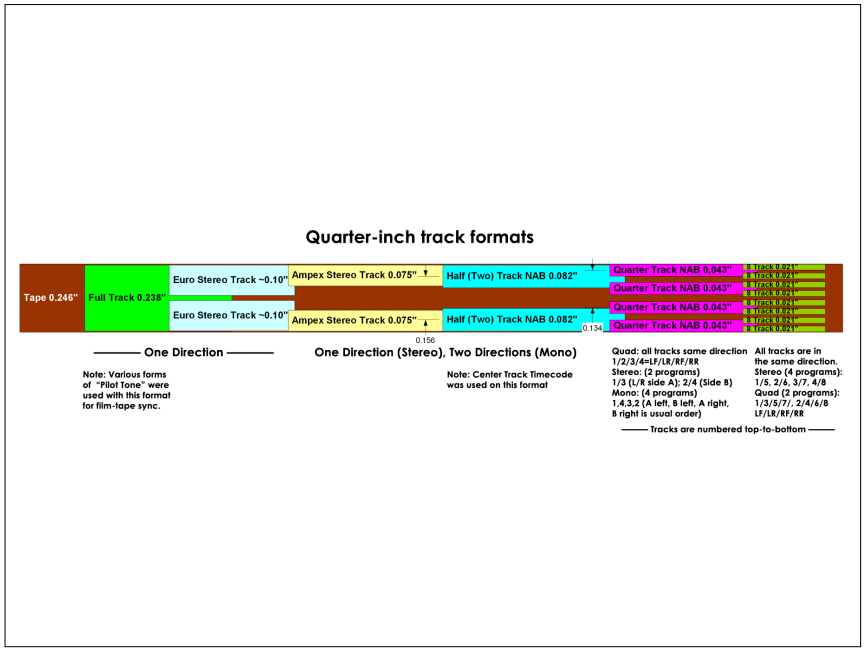



Binder
Lubricant Reservoir
Magnetic Particle
TOP COAT
SUBSTRATE
BACK COAT (optional)

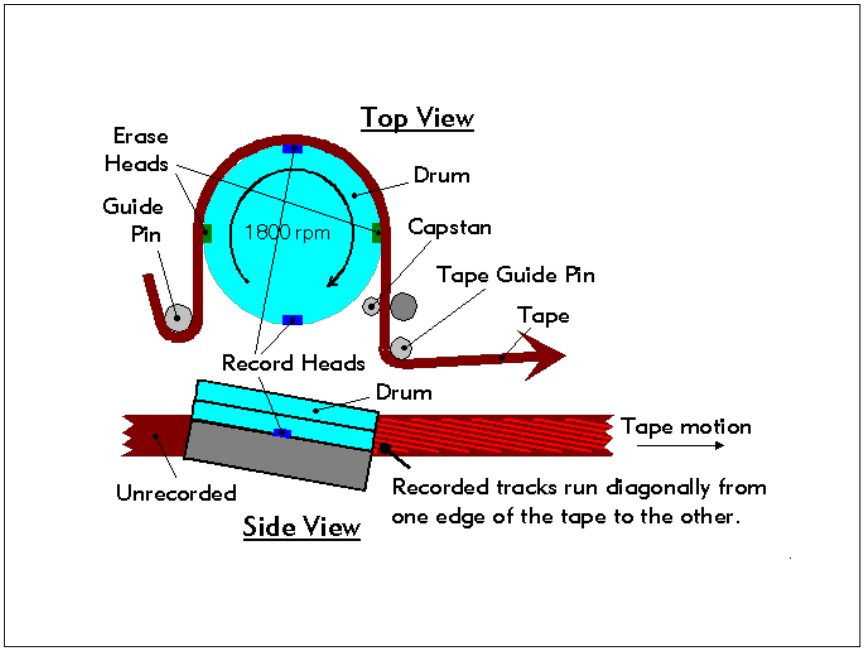
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Head Stack
Recorded tracks are parallel and run the full length of the tape.
Tape motion
Unrecorded Tape
Recorded Tape

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Quarter-inch track formats
Tape 0.246"
Full Track 0.238"
Euro Stereo Track ~0.10"
Ampex Stereo Track 0.075"
Half (Two) Track NAB 0.082"
Quarter Track NAB 0.043"
0.156
0.134
One Direction
One Direction (Stereo), Two Directions (Mono)
Note: Various forms of "Pilot Tone" were used with this format for film-tape sync.
Note: Center Track Timecode was used on this format
Quad: all tracks same direction 1/2/3/4=LF/LR/RF/RR
Stereo: (2 programs) 1/3 (L/R side A); 2/4 (Side B)
Mono: (4 programs) 1,4,3,2 (A left, B left, A right, B right is usual order)
All tracks are in the same direction.
Stereo (4 programs): 1/5, 2/6, 3/7, 4/8
Quad (2 programs): 1/3/5/7, 2/4/6/8
LF/LR/RF/RR
Tracks are numbered top-to-bottom

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Top View
Erase Heads
Drum
Guide Pin
1800 rpm
Capstan
Tape Guide Pin
Tape
Record Heads
Drum
Tape motion
Unrecorded
Recorded tracks run diagonally from one edge of the tape to the other.
Side View

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Sound Film Production

image	sound
photochemical	photochemical
photochemical	magnetic
photochemical	digital
photochemical + digital	digital
digital	digital

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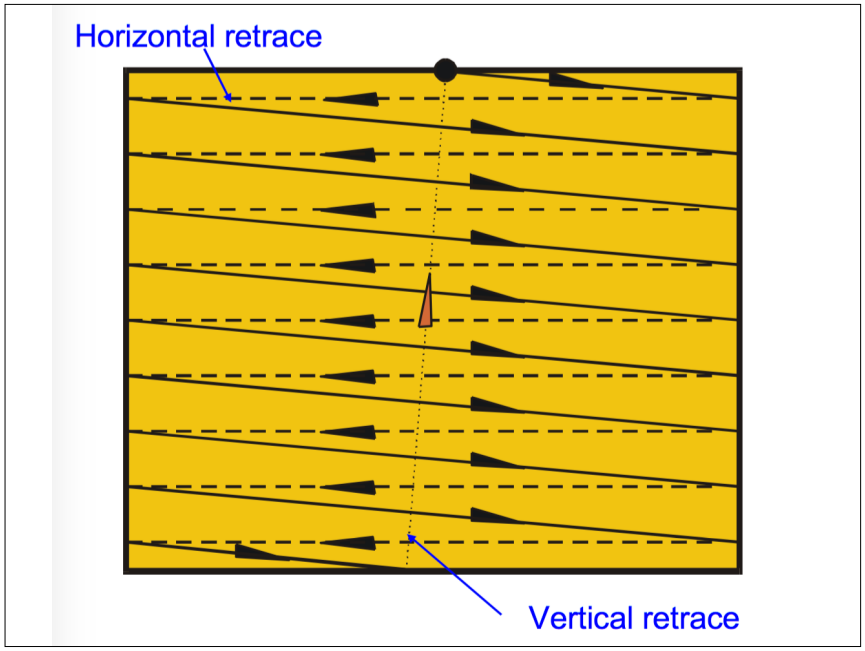
Television

- film
- live
- film and live
- film, magnetic and live
- magnetic and live
- files and live

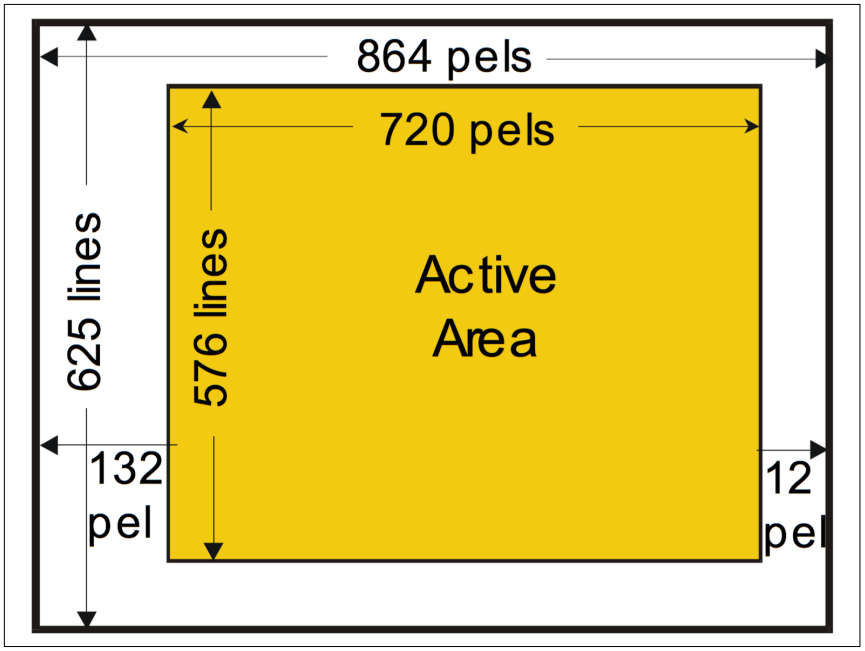
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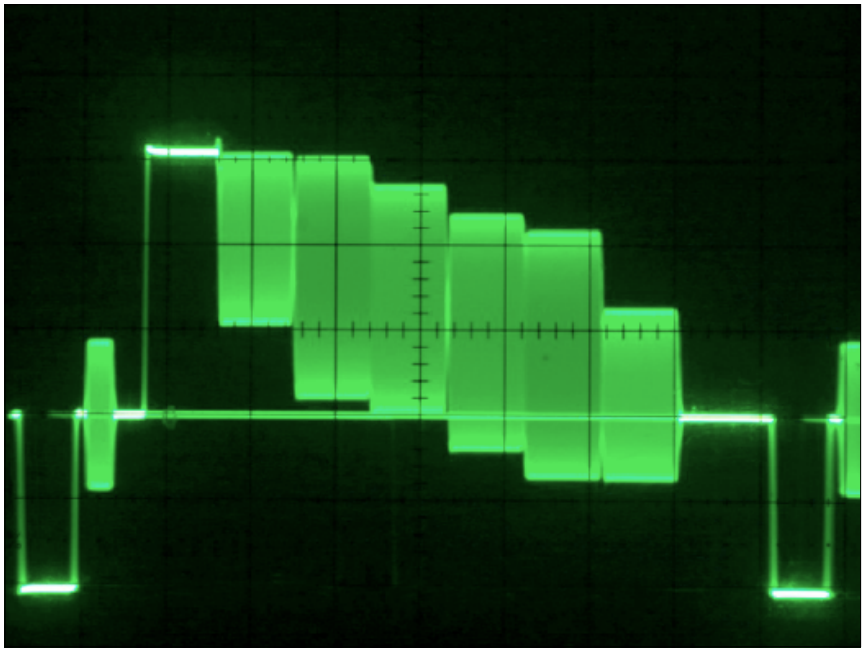
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Horizontal retrace
Vertical retrace

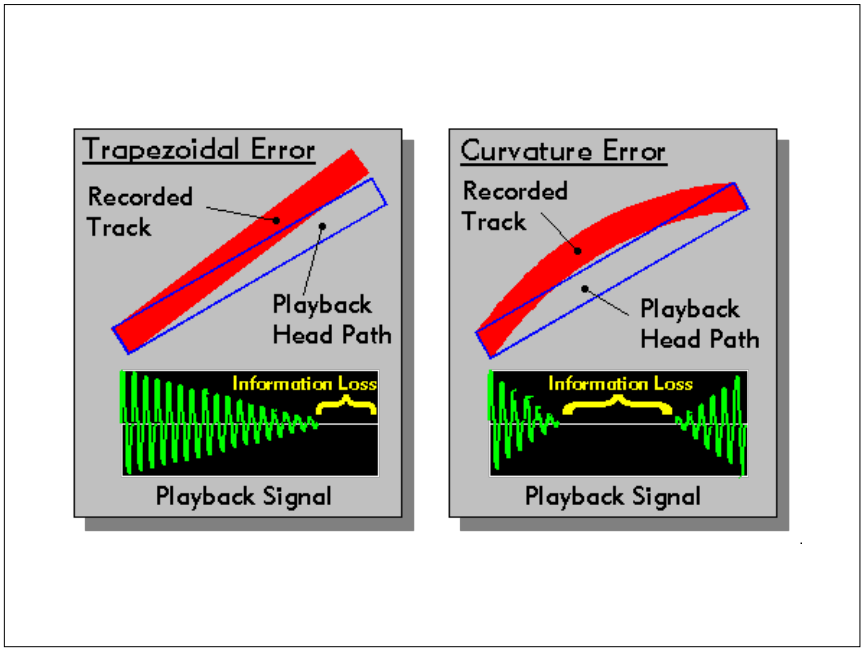
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864 pels
720 pels
625 lines
576 lines
Active
Area
132
pel
12
pel

18



19


Trapezoidal Error
Recorded
Track
Playback
Head Path
Information Loss
Playback Signal
Curvature Error
Recorded
Track
Playback
Head Path
Information Loss
Playback Signal

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Workflow

- identification
- preparation
- digitisation
- quality control (QC)
- cataloguing

Identification

Format Identification

Videotape Identification and Assessment Guide. Texas Commission on the Arts, 2004

→ www.arts.texas.gov/wp-content/uploads/2012/04/video.pdf

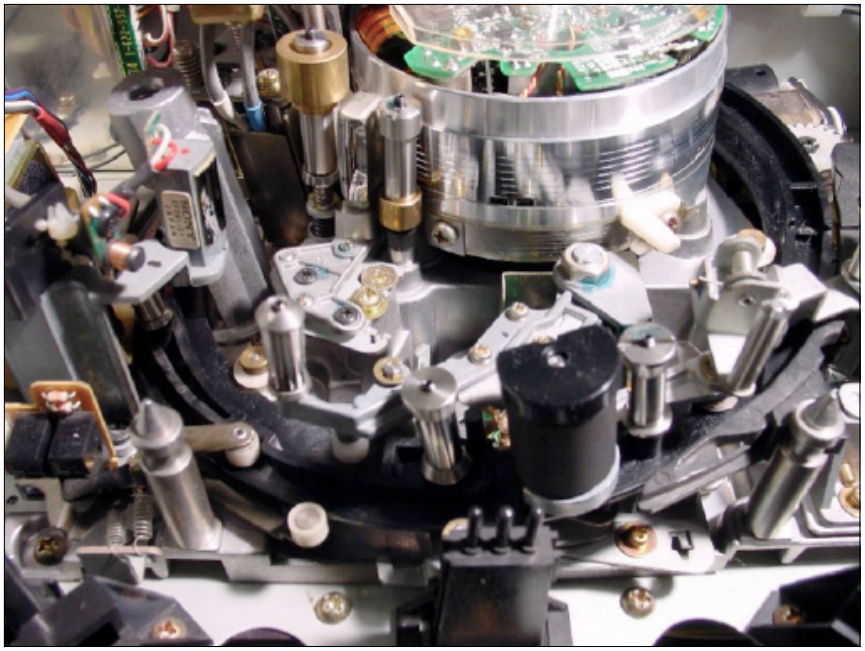
Preparation

Storage and Handling

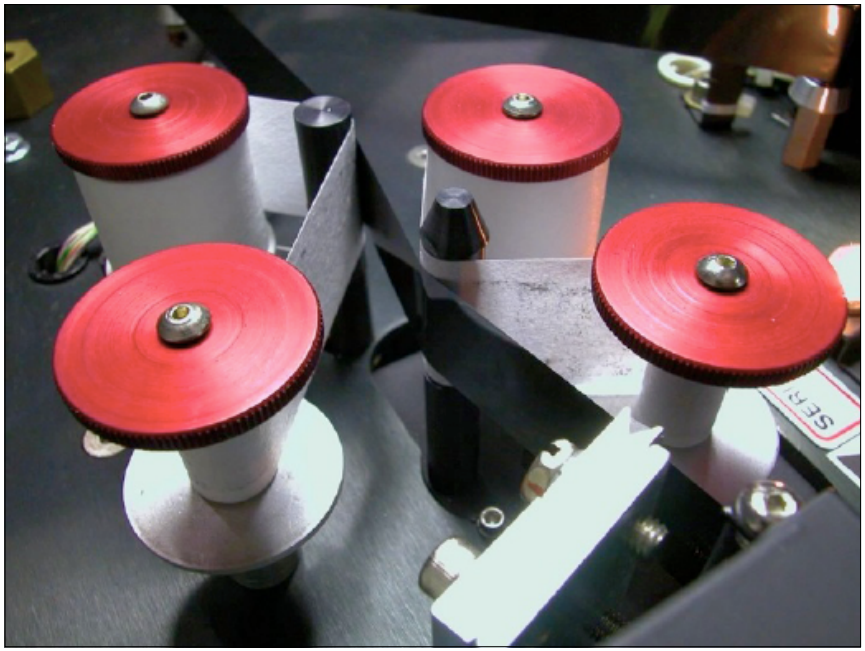
John W. C. Van Bogart: **Magnetic Tape Storage and Handling. A Guide for Libraries and Archives.** Commission on Preservation and Access, Washington DC; National Media Laboratory, St. Paul MN June 1995

➔ www.clir.org/pubs/reports/pub54

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Digitisation

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AMIA Open Source

vrecord

➔ github.com/amiaopensource/vrecord

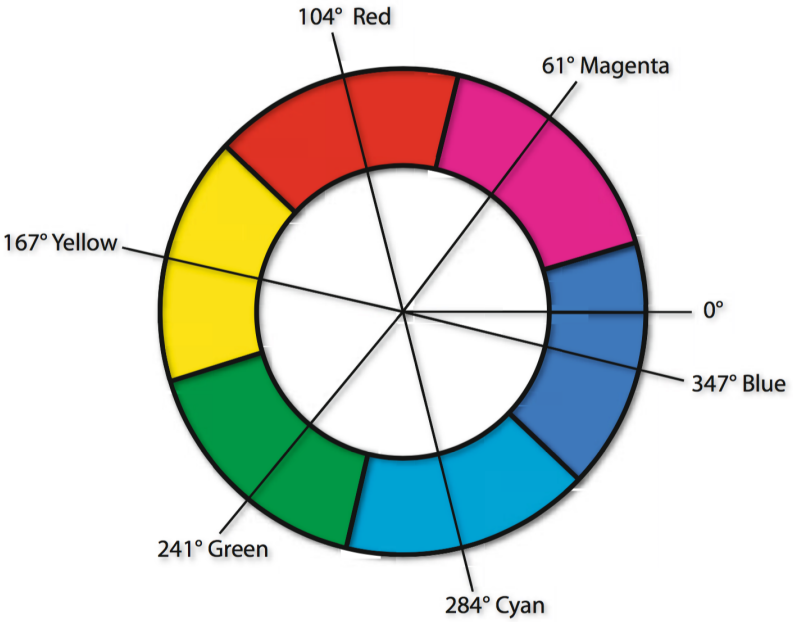
audiorecorder

➔ github.com/amiaopensource/audiorecorder

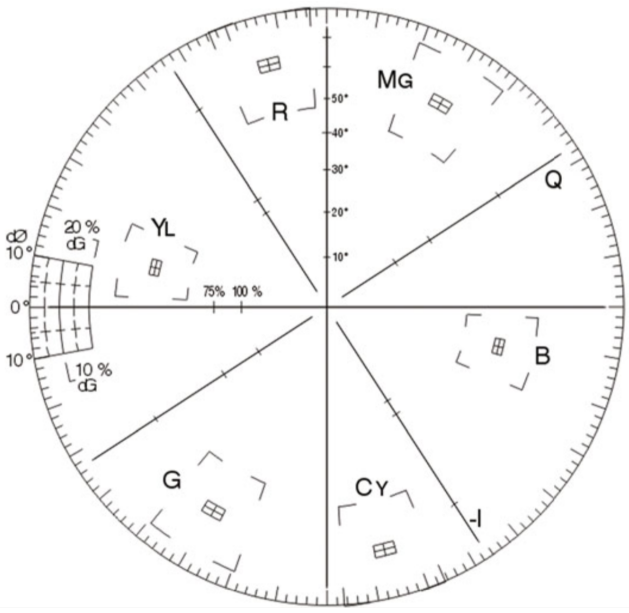
LTOpers

➔ github.com/amiaopensource/ltopers

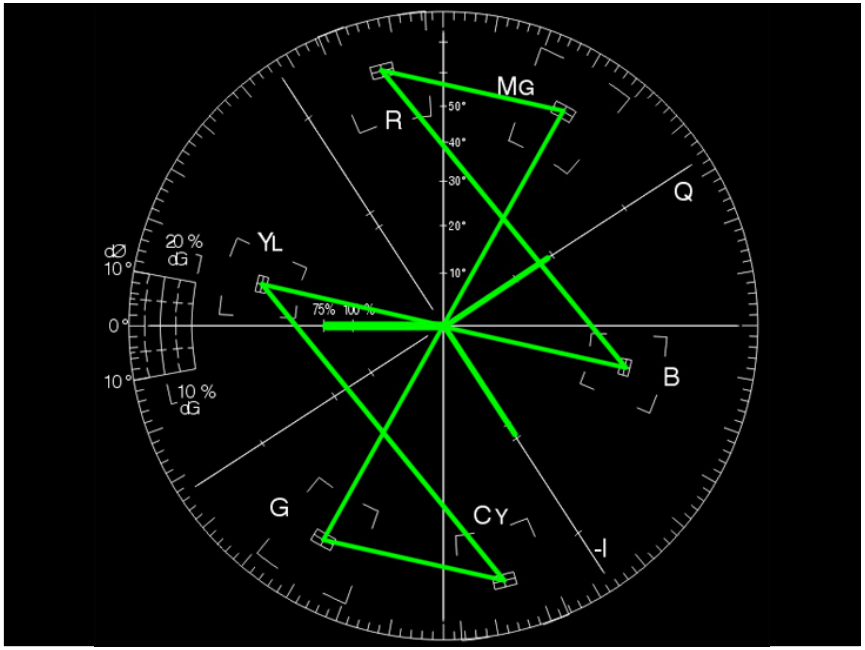
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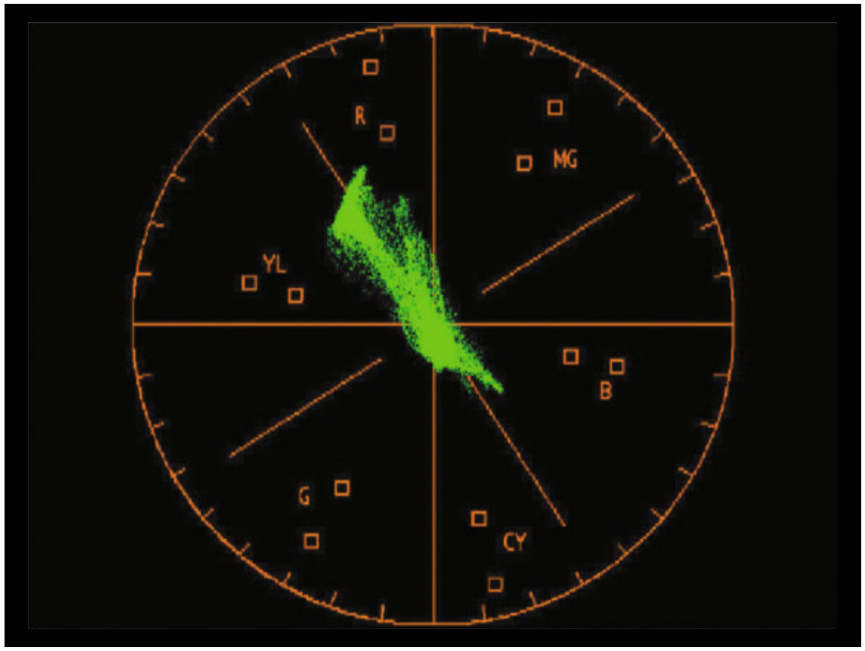
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Quality Control

Quality Control

QCTools (GUI), **qcli** (CLI)

➔ bavc.org/preserve-media/preservation-tools

QCTools Documentation

➔ bavc.github.io/qctools/

AV Artifact Atlas

➔ bavc.github.io/avaa/

File Validation

MediaConch (GUI, CLI, web)

➔ mediaarea.net/MediaConch/

Cataloguing

Technical Metadata Extraction

ffprobe (CLI)

➔ ffmpeg.org

MediaInfo (GUI, CLI, web)

➔ mediaarea.net/MediaInfo

Working

File Transformations

ffmpeg (CLI)

➔ ffmpeg.org/

Cookbook for Archivists

➔ avpres.net/FFmpeg/

ffmprovisr

➔ amiaopensource.github.io/ffmprovisr/

Player

ffplay (CLI)
➔ ffmpeg.org
VLC (GUI)
➔ www.videolan.org/vlc/
mpv (CLI)
➔ mpv.io

Sound-Track Extraction

AEO-Light (GUI)
➔ usc-imi.github.io/aeo-light/

Project's Website
➔ imi.cas.sc.edu/mirc-software-overview/

DCP Encoder

DCP-o-matic (GUI)
➔ dcpomatic.com
OpenDCP (GUI)
➔ opendcp.org

AV Preservation by reto.ch

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