UNIVERSITY OF UTAH
STUDENT COMPUTING LABS

Digital Video
Act I – Introduction and Camcorders

University of Utah
Student Computing Labs
Macintosh Support
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Class overview

- What is Digital Video (DV)
- Video formats
- Camcorders
- Filming Techniques

Video Editing history

- 1990, 13 years ago: $200,000
- 1995, 8 years ago: $8,000
- Now: $1,100 for an eMac and DV cam
  - New education price
    - Used/refurbished/demo even cheaper!
  - Quality better than ever before

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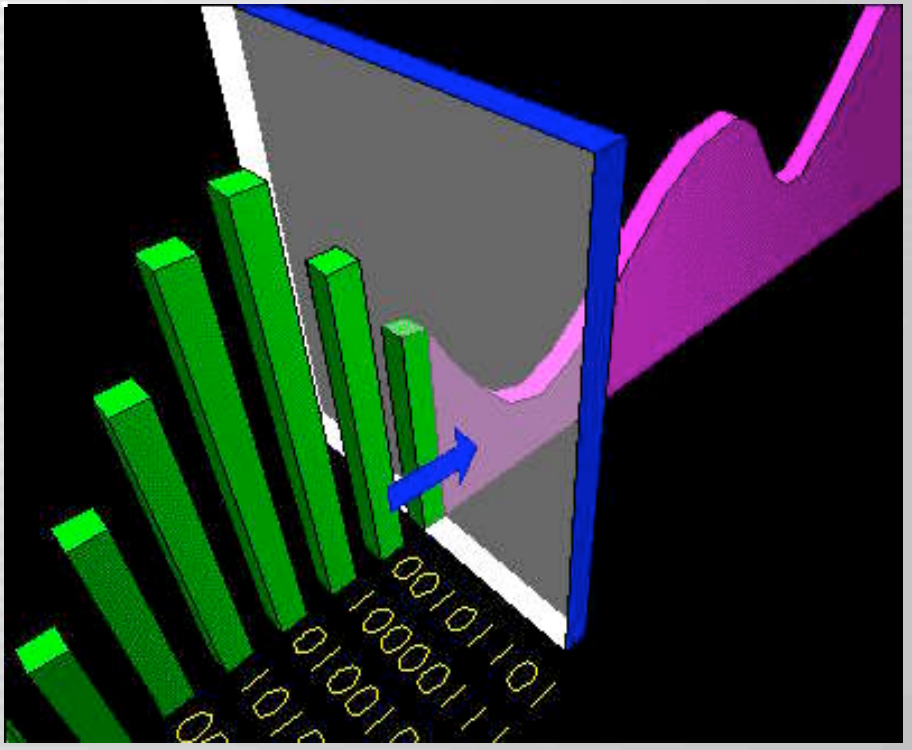
What is DV?

- Digital
  - 1's and 0's
- Analog
  - 0 to 10000...
- Why does it matter?
  - Degradation...



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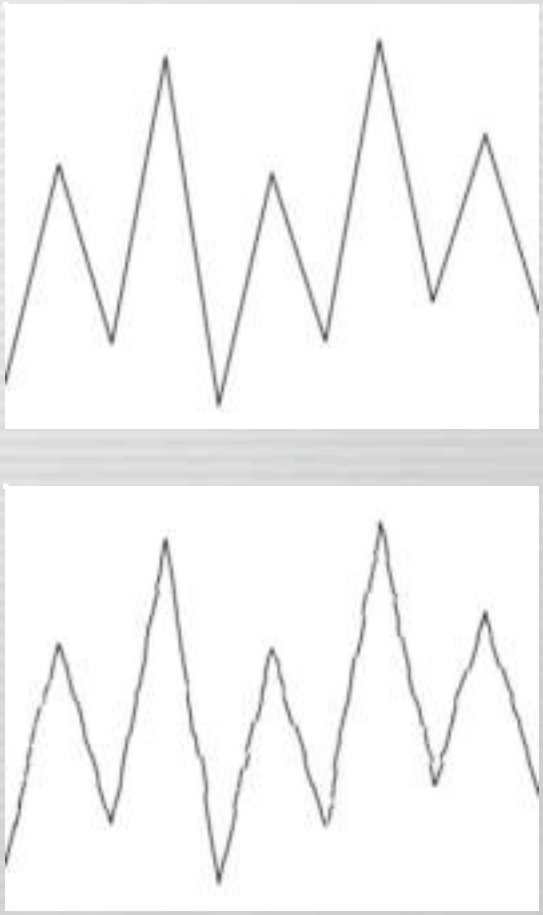
What is DV?

- Analog
  - 0 to 10000...
  - Original
  - After time



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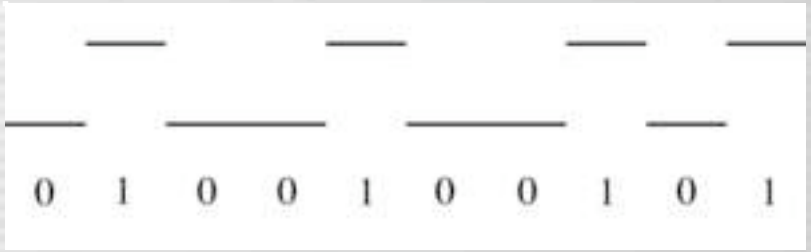
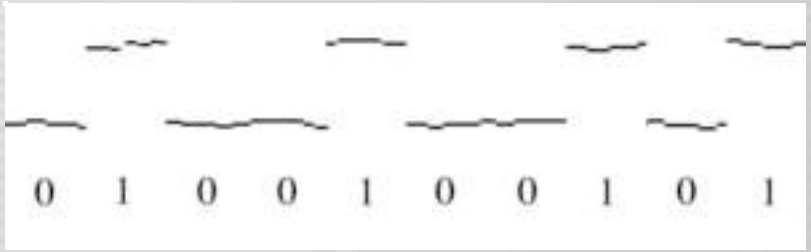




Video standards

- What are standards about?
  - Frames per second
  - Pixel resolution
- Several standards
  - NTSC
  - PAL
  - SECAM

Video standards

- What devices does this apply to?
  - VCR's
  - DVD's
  - TV's
  - Camcorders
  - Computer file format

Video standards

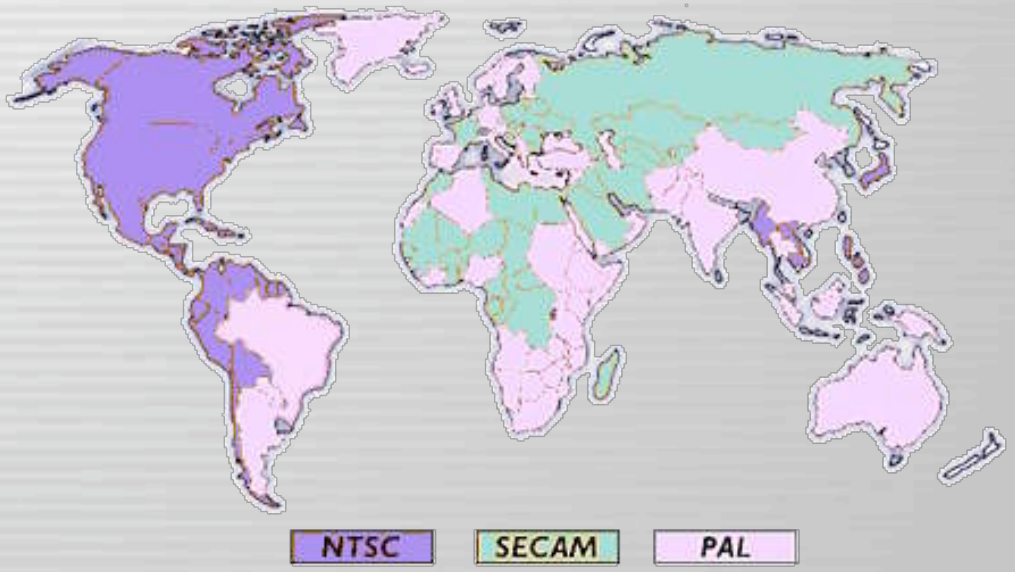
- What is a frame?

Video standards

- **Pixel resolution**

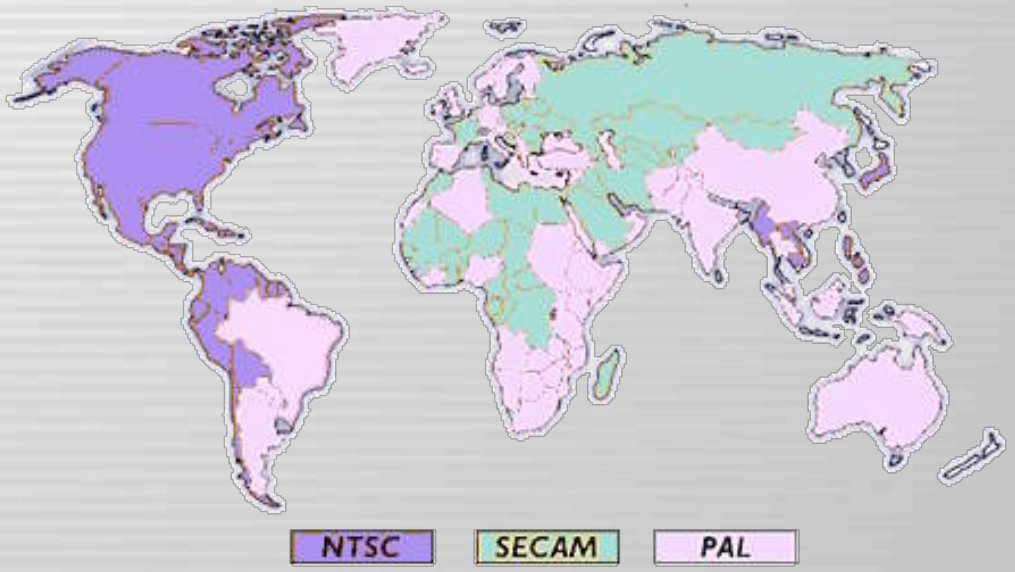
Video standards

- NTSC (National TV Standards Committee)
  - America, Japan, 30 others
  - About 30 fps
  - 720x480 pixels



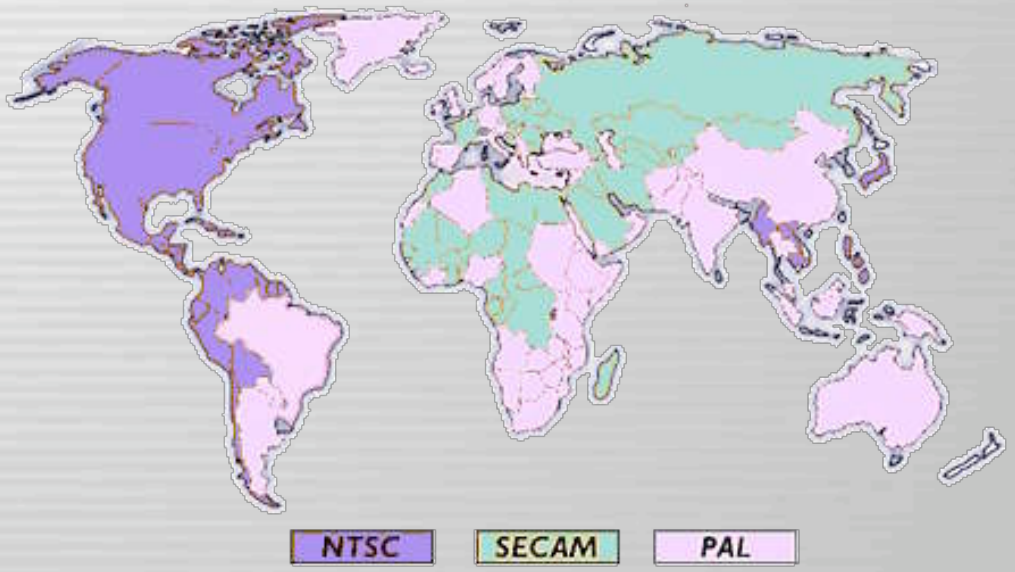
Video standards

- PAL (Phase Alternating Line)
  - Europe, Africa, Middle East, Australia, China, etc.
  - 25 fps
  - 720 x 576 pixels



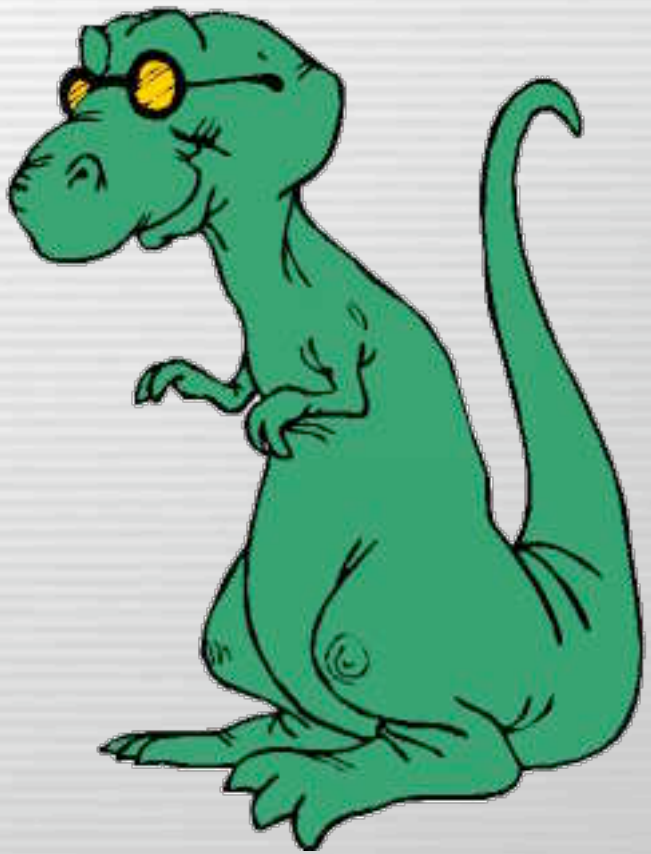
Video standards

- SECAM (SEquential Couleur Avec Memoire)
  - France, parts of Africa, some Soviet countries
  - Same size as PAL, but not compatible
  - 25 fps
  - 720 x 576 pixels



Old analog camcorders

- VHS
- S-VHS
- VHS-C
- 8mm
- Hi8



Analog: VHS

- 1.5 foot long
- Heavy
- Shoulder rest
- Use full size VHS tapes
- 1980's
- Only a few sold today

Analog: S-VHS (Super VHS)

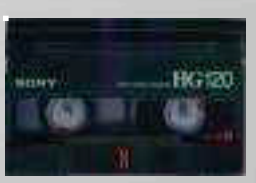
- S-VHS (Super-VHS)
- Uses special S-VHS tapes
- Requires special, expensive equipment and jacks
- Sharper video quality than VHS
- Inexpensive ($300-$400)

VHS-C (VHS-compact)

- Tapes smaller than S-VHS and VHS
- Requires special adapter
- Clever but a nuisance
- Inexpensive ($200-$300)

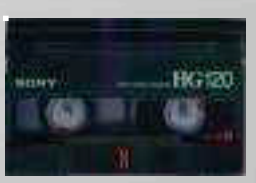
8mm

- A little bigger than a 6-in. Subway sandwich
- Tapes smaller than VHS-C
- VCR's can't play 8mm tapes
  - Camcorder connects to the TV/ VCR for playback
- Inexpensive ($200-$300)
- Popular among people without computers

Audio cass  8mm 

Hi8

- Higher quality recordings than 8mm
- Tapes same size as 8mm
- Inexpensive ($200–$400)

Audio cass  Hi8 

Media Converter

- Converts analog to digital
- About $300

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Digital Camcorders

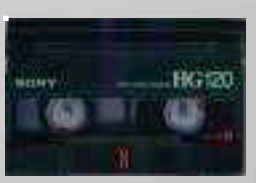
- Digital8
- DVD
- MiniDisc
- MicroMV
- MiniDV

Benefits of digital

- Smallest camcorders (size of a walkman)
- Smallest tapes
- Batteries last longer
- Quality better than analog
- Easier to transfer to computer

Digital8

- Same 8mm tape as Hi8
- Can play 8mm and Hi8 tapes
- Data stored digitally
- Quality better than analog 8mm and Hi8
- Quality not as good as other digital formats

Audio cass  Digital8 

DVD

- Record onto DVD
- New, not many models
  - 2 – 4 models?
- Expensive ($900–$1100)

MiniDisc

- Similar to DVD camcorders
- New, only 1 model?
- Expensive ($1000)
- Smaller discs
- Quality not as good

MicroMV

- Sony only
- New
- MPEG–2 compressed
- Tiny tapes 5.3 mm x 3.8 mm
- Expensive ($1000–$1500)
- Does not work with Macintosh

MiniDV camcorders

- The standard
- Start at $300 (no price limit)
- Tape smaller than 8mm
- Best quality
  - Picture quality better than digital satellite
  - Better audio quality than CD's
  - No copy degradation
-

MiniDV camcorders

- The eye, aka CCD (Charged Coupled Devices)
  - 3 CCD
    - Better color accuracy
    - Records low light
  - 1 CCD
    - Cheap

MiniDV camcorders

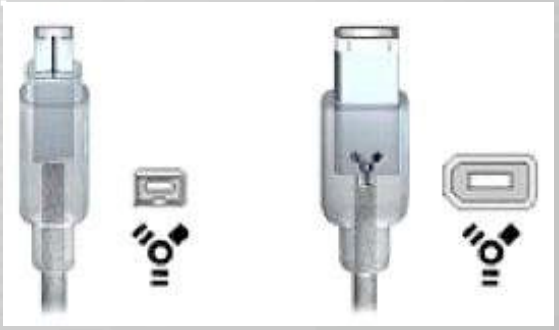
- 2 families of DV camcorders
  - Professional
    - VERY Expensive ($4,500+)
    - 3 CCD
    - Interchangeable lenses
    - Very expandable
    - Large
  - Consumer
    - Cheap ($400–$800)
    - 1 CCD
    - Limited expandability
    -

MiniDV Features

- Many features
  - Some required
  - Some nice
  - Some useless and even harmful
- Not everyone agrees what is best
- The following is listed most important first (according to us)

Features – Firewire

- a.k.a. “DV in/out”, “DV terminal”, “IEEE-1394”, “i-Link”
- Some older European camcorders have DV out but not DV in
- Some companies make cameras with bad Firewire ports
  - Stick with the popular ones



Features – Analog Inputs

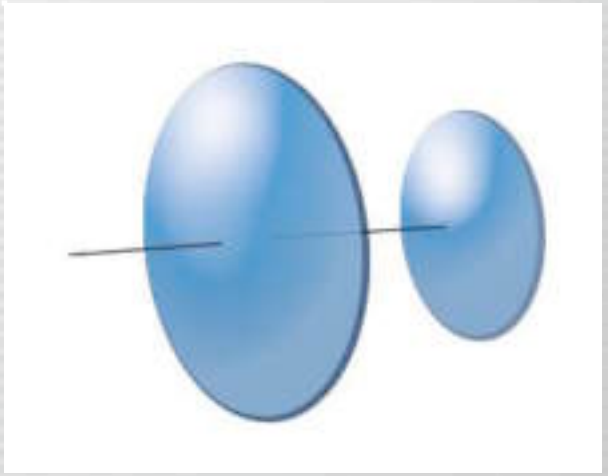
- Import/export VHS easily
- S-Video most common
- Or RCA

Features – LCD

- Big
  - 2.5” to 3.5” normal
- Flexible
  - Reversible
  - Swiveling capability

Features – Image Stabilizer

- Optical
  - Prism that moves opposite direction of shaking camera
- Electronic
  - Motion sensors try to compensate
- Digital
  - Zooms in and crops →



Features – Optical zoom

- Actual zoom – telescoping lens
- "12X/300X" – Optical = 12X, Digital = 300X

Full frame

Optical zoom

Digital zoom

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Features – Zooming

- One-speed zooming bad
  - 2 buttons
- Variable-speed zooming good
  - Variable knob

Features – Manual override

- Focus
  - When filming through bushes

- Exposure
  - When filming in bad lighting conditions

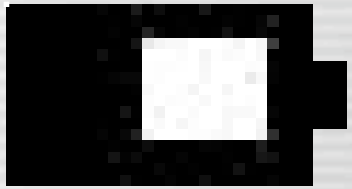
Features – Manual override

- Focus example

Out of Focus

In Focus

Features – Battery indicator

- Digital time-remaining for battery
  - Not very helpful: 
  - Nice: 1hr 43 mins

Features – Light

- Built–in light

- Or at least external light

Features – Exposure Options

- Preprogrammed exposure options
  - Canned focus/shutter speed/aperture, etc
    - Spotlight
    - Sports
    - Sand/Snow
    - Low Light

"Low light" mode off

"Low light" mode on

Features – Remote control

- Helps reduce camera jiggle

- Good for interviews

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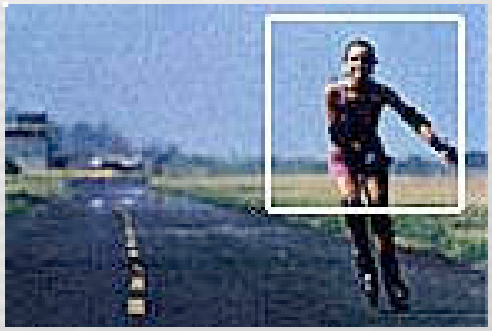
Features – Backlight mode

- Turns auto exposure off
  - Picture will be overexposed

Features – "FlexiZone"

- FlexiZone (a.k.a. PushFocus)
  - Lets you move the camera's point of focus



Features – Night vision

- Night–vision mode

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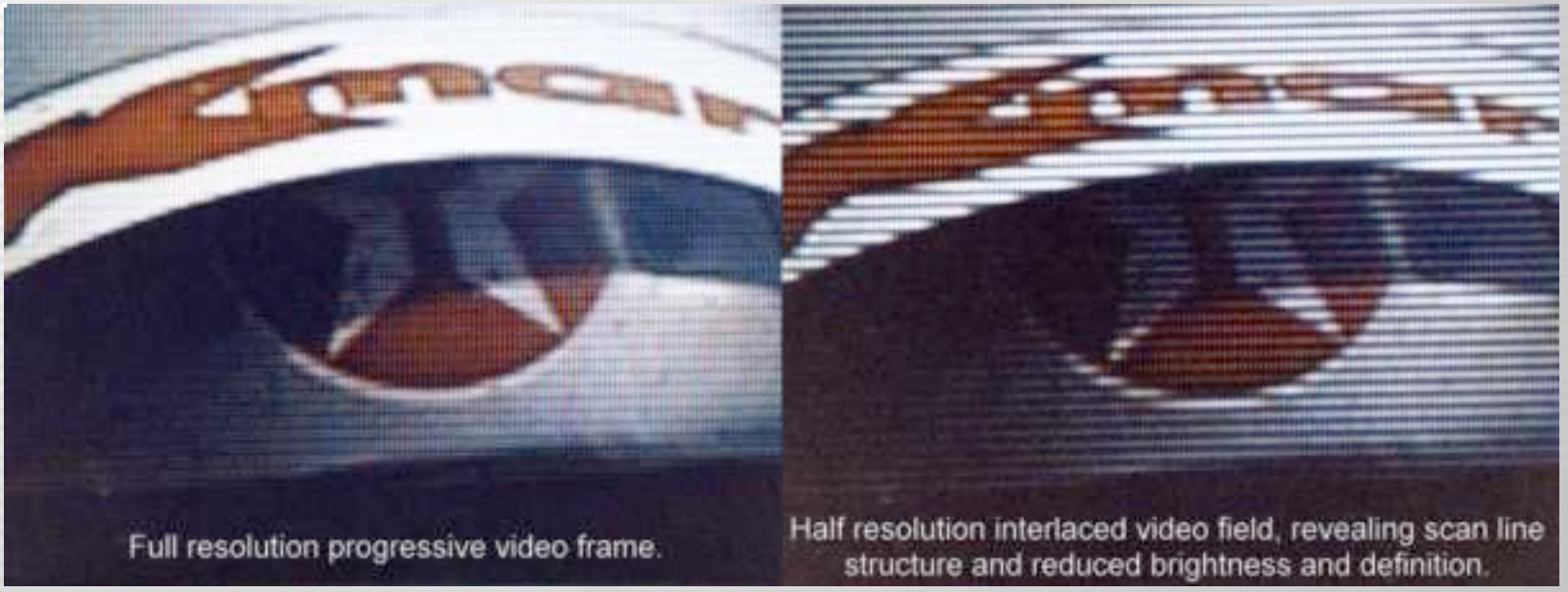
Features – Progressive Scan

- Progressive-scan CCD (vs. interlaced)



Progressive scan Interlaced

Features – Still-camera

- Most DV cams are a miserable 640 x 480 pixels (0.3 megapixels)

Real digital still camera
2272x1704 pixels (4.1 MP)

DV cam “still camera” mode
640x480 pixels (0.3 MP)

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Features rarely used

- Control-L or LANC

NEVER use these features

- Undesirable features
  - Title generator
  - Fader
  - Audio dubbing
  - Special effects
  - Date/time stamp
  - Built-in editing
- Why
  - Permanent edits
  - Harder to do on camcorder than computer

Companies with a good rep

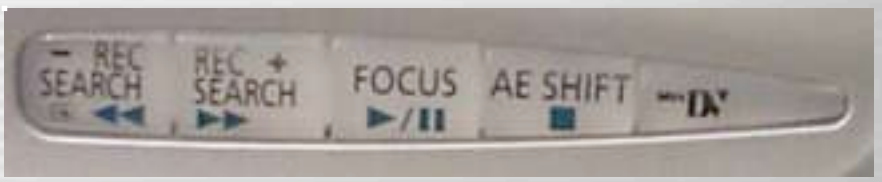
- Canon
- SONY
- Panasonic
- JVC

Where to buy

- Local stores
  - TV Specialists
    - State employees get a discount
  - Circuit City
- Internet
  - shopper.com
  - dealtime.com
  - eBay
  - unlimited

Camcorder Operation

- 2 Modes
  - VTR (VCR)
    - Play
    - Rewind/fast-forward
    - Stop
  - Camera
    - Record
- READ THE MANUAL!!!!



Filming tips – audio

- Get an external microphone

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Filming tips – stabilization

- Use tripod, monopod, or clamp
- Put left hand UNDER camcorder
- Use image stabilization
- Stay zoomed out

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Filming tips – Panning

- Only do when needed
- Linger; pan; linger
- Start on good scene, end on good image
- Practice panning
- Pan towards right
- Follow moving objects or visual "lines"
- Turn image stabilizer off

Filming tips – Zooming

- Don't zoom while recording
- Instead, use dolly shots, with a wheelchair or bike or whatever
- Or, record and linger; pause recording and zoom; record and linger
- Exceptions: zoom as slow as possible, zoom when panning (practice this)

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Filming tips – Lighting

- Make sure there is enough, but not too much
- Setup extra lights if needed
- Use backlight mode if needed and if camcorder has the feature
- Learn the camcorder exposure settings

Filming tips – Focus

- Auto focus ok most of the time

- When there are no defined edges, or there are objects between the subject, use manual focus

Filming tips – Angles

- Use a variety of angles
- Don't break the 180 degree rule
  - Unless the camera is rolling whole time

This info on the web

- http://www.macos.utah.edu
- Click on “Documentation”
- Click on “Digital video”

Contact

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- Email – mac@scl.utah.edu