



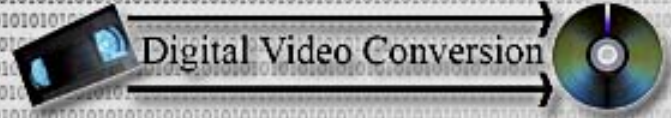
Digital Video Conversion



For the Small Shop



Nicolettecinemagraphics  
PRODUCTIONS ET TECHNIQUES



# OUTLINE

- Introduction
- Experiment Concept
- Experiment Examples
- Explanation of Results
- Recommendations
- Questions



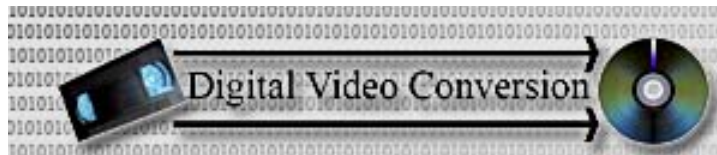
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# INTRODUCTION

- Reasons for experiment and presentation
  - Digitizing is what we do
  - Personal evaluation of best conversion methods
  - Video is a very complex subject
  - Engineering/ Mathematics/ Computer Science

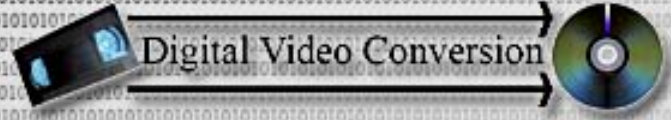




# BEFORE WE START....

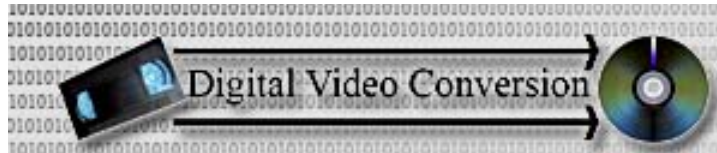
Lets take a minute talk about our previous knowledge of

- Video Production
- Video Conversion



# EXPERIMENT CONCEPT

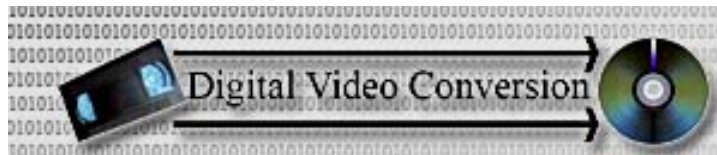
- Converting VHS to DVD
- Utilizing consumer level products
- Choosing three different methods
- Analyzing results



# WHY CONVERT

- Inherently self detrimental
- Low life expectancy
- Obsolete players





# VHS DEGRADATION

- Playback causes damage
  - Loss of magnetism
  - Loss of emulsion
  - Tape stretching



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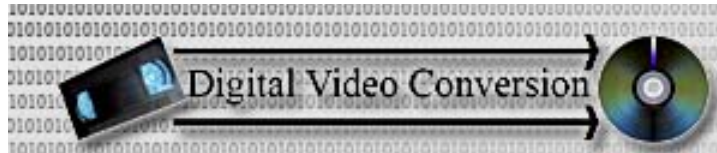


# LIFE EXPECTANCY

- Low life expectancy
- 10-15 years
- Optimal condition
  - Particle free
  - 60-70 degrees
  - 30% to 70% constant RH





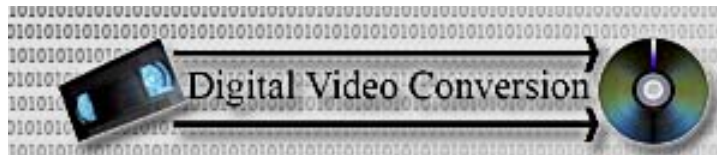


# VHS OBSOLETE!

- Most electronics stores only carry a few VHS players.
- Quality players are becoming harder to find

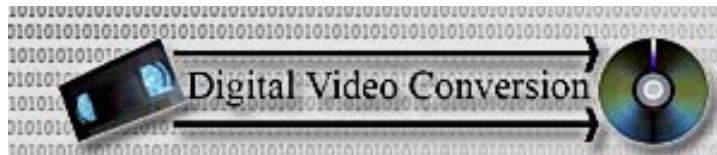


Now that we know why,  
How do we do it?



# CONSUMER PRODUCTS

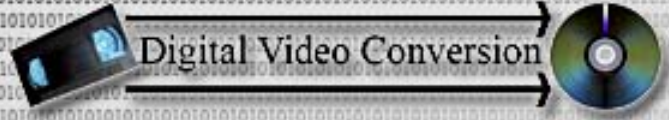
- VHS to DVD Recorders
- Conversion boxes
- Camcorders



# VHS TO DVD RECORDERS



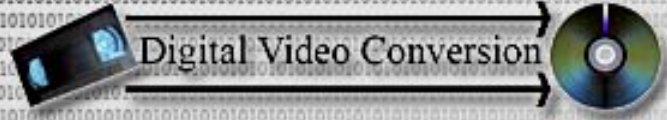
- One touch dubbing
- Record as well as playback
- Reasonably priced \$80-\$400



# CONVERSION BOXES

- Compact
- Transfers any analog signal to digital
  - VHS to Camcorder
  - VHS to DVR
  - VHS to Computer
  - Wide price range \$17-\$1500



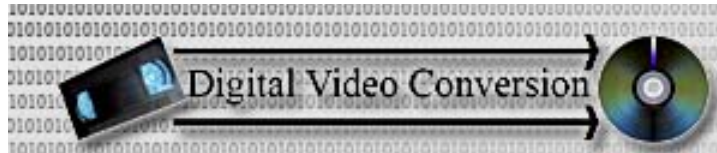


# CAMCORDERS

- Conversion
- Record
- Playback
- Back up on digital tape
- Several models and prices
- Can be output to other devices
  - TV, VHS, DVR or Computer







# CONVERSION METHODS

- DVD Recorder /Sony RDR-VX515
- Conversion Box/ Canopus 100
- Lower priced Camcorder/Canon ZR700
- High Priced Camcorder/ Canon GL1



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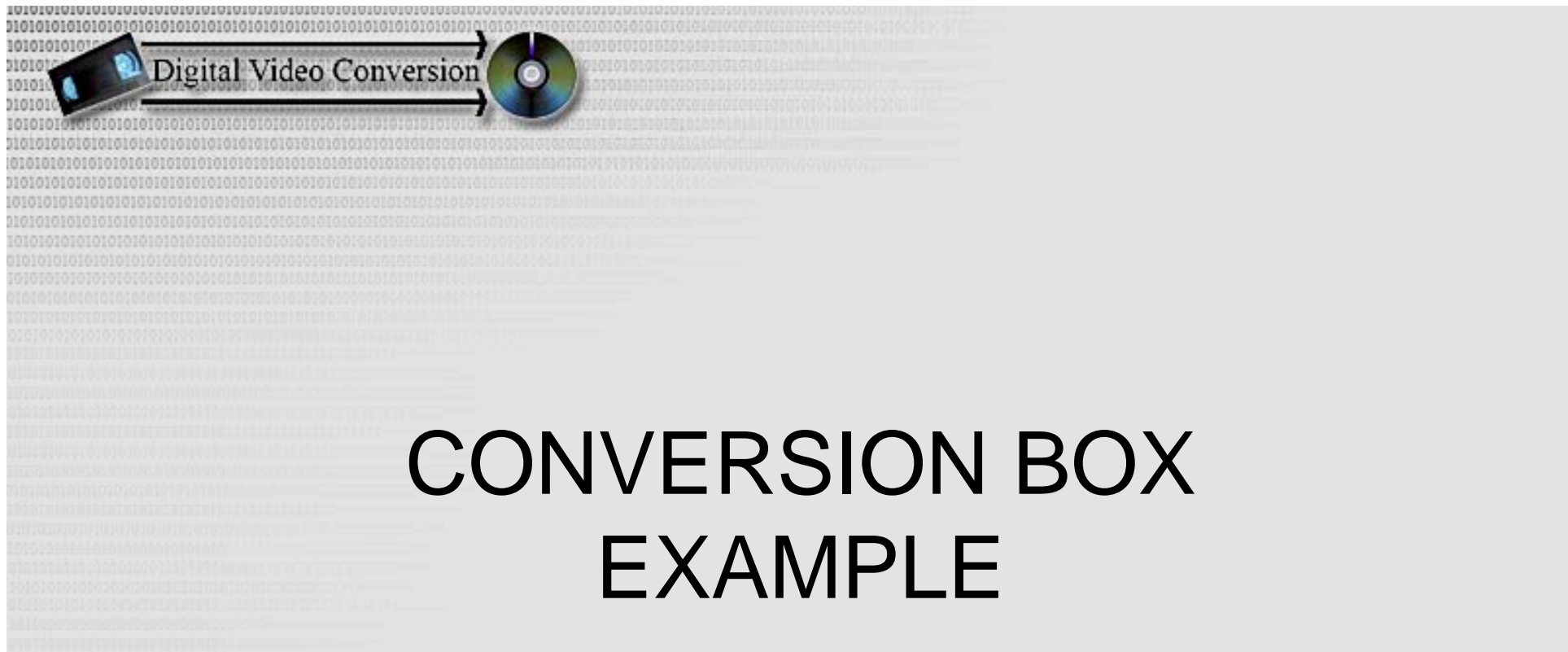
# ANALYSIS PROCESS

- Use each method to convert VHS to DVD
- Analyze DVD footage for
  - Picture quality
  - Color quality
  - Digital Artifacts





# DVD RECORDER EXAMPLE



# CONVERSION BOX EXAMPLE



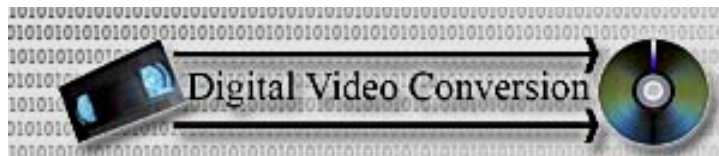


# LOW PRICED CAMCORDER EXAMPLE



# HIGH PRICED CAMCORDER EXAMPLE





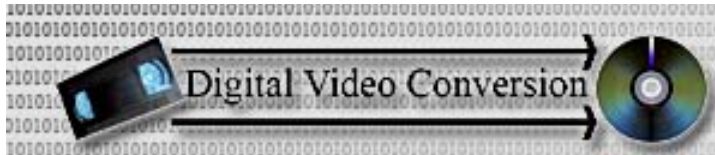
# COMPARISON



Canopus



Sony Recorder



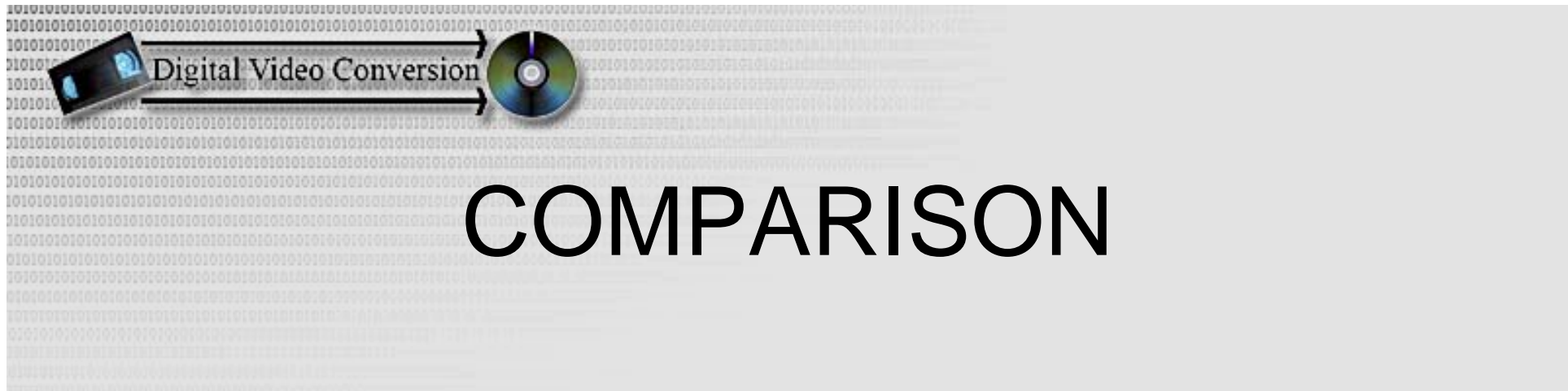
# COMPARISON



Canopus



Sony Recorder



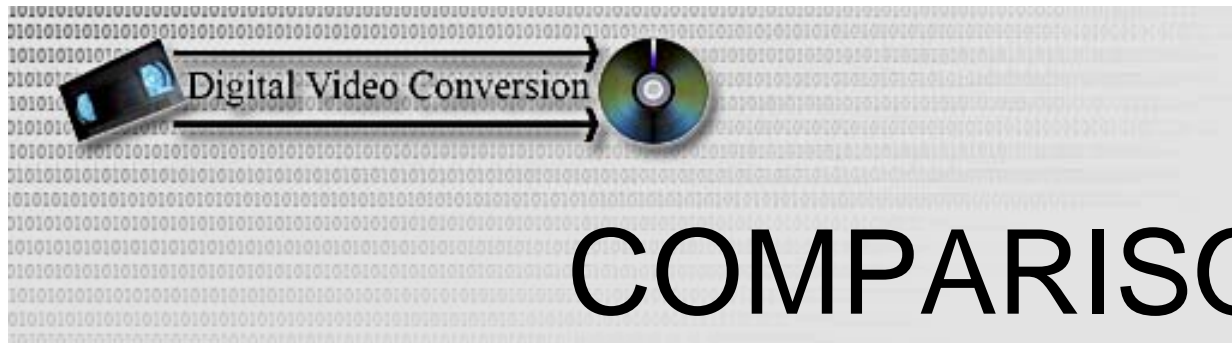
# COMPARISON



Canopus



Sony Recorder



# COMPARISON

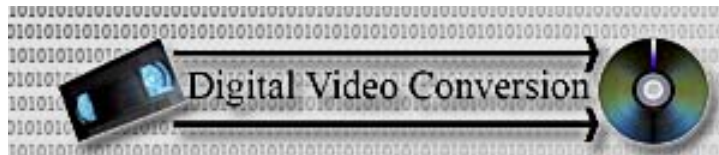


Canopus  
X-30,y-20 = R149,G140,B157



Sony Recorder  
X-30,y-20 = R140,G143,B153





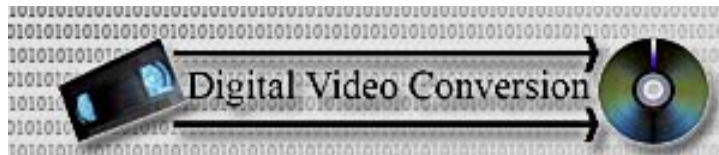
# CAMCORDERS



Canon GL1



Canon ZR700



# CAMCORDERS



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Canon ZR700





# CAMCORDERS



Canon GL1



Canon ZR700



# CAMCORDERS



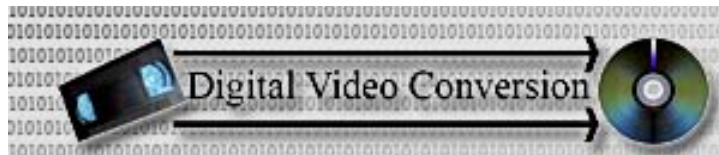
Canon GL1

X-30,y-20 = R177,G181,B190



Canon ZR700

X-30,y-20 = R172,G172,B184



# ALL FOUR



<- Canopus



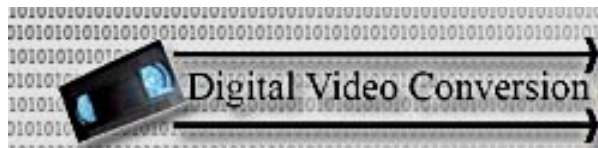
Sony Recorder ->



<- Canon GL1



Canon ZR700 ->



# ALL FOUR



<- Canopus  
X-30,y-20 = R149,G140,B157

Sony Recorder ->  
X-30,y-20 = R140,G143,B153

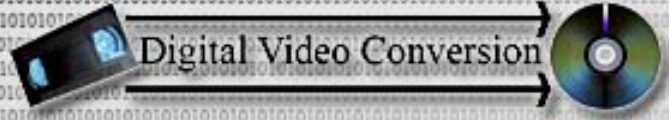


<- Canon GL1  
X-30,y-20 = R177,G181,B190

Canon ZR700 ->  
X-30,y-20 = R172,G172,B184

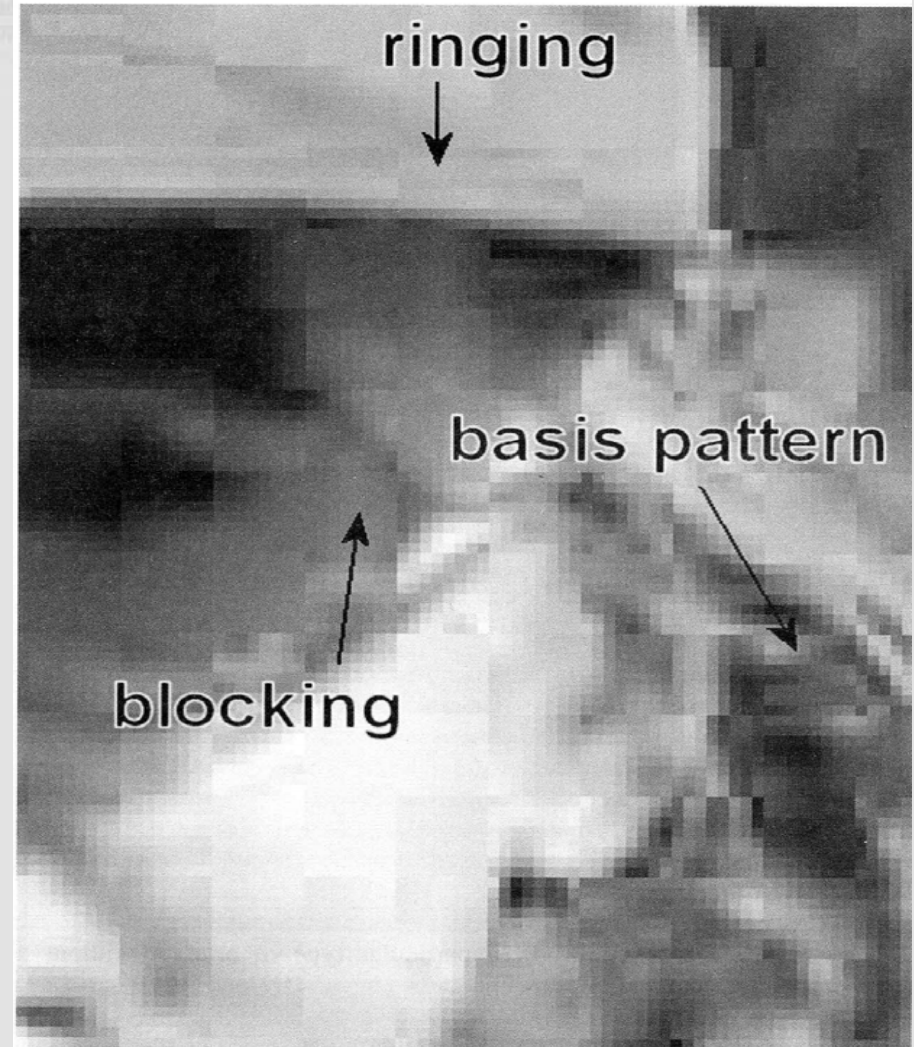






# Digital Artifacts

Prediction Errors  
that occur during  
video compression  
which is inherently  
“lossy”





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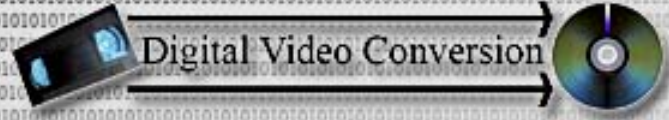


# WHY LOSSY COMPRESSION

- Storage has not yet reached the level needed to store the amount of bits needed to be a lossless copy of a moving image original.

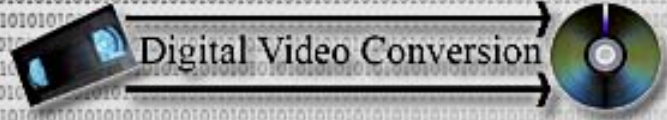






# LOSSY CONTINUED

A digital equivalent of a single film frame needs to be scanned at around 3000 ppi. A single negative scanned at the closest size of 3400 ppi would give a 28.8 MB image file when saved in tiff format. To transfer this information to a strip of motion picture film, one would need 24 fps x length. So a 2 hour silent film would be 24 fps x (60 sec x 60 min x 2 hrs) = 172800 images. At 28.8 MB per image that would require 4976640 MB or 4.9 TB for storage.



# DONT FORGET LOSSY

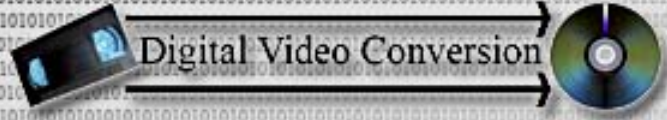
90 minutes of raw video footage from a mini-dv tape equals approximately 16 gigabytes of storage space.

Single layer DVD's 4.7 gigs =

70% compression ratio

Dual layer DVD's 8.5 gigs=

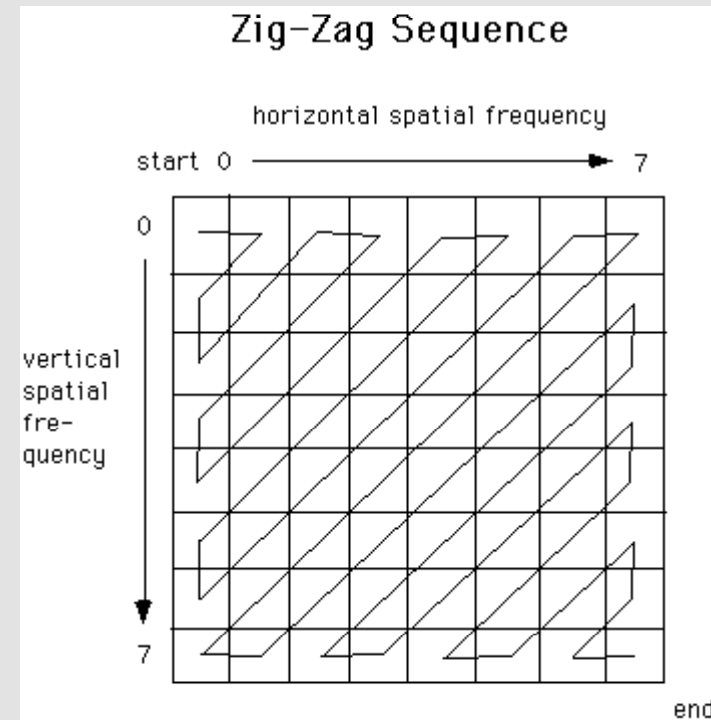
47% compression ratio

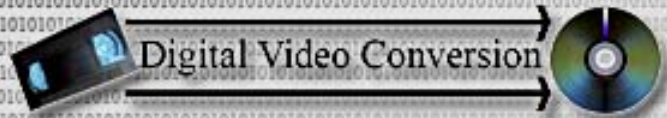


# HOW IT WORKS

Compressors use an algorithm to analyze the pixels of an image in a Zig-Zag method.

This data is then used to predict the proceeding images.





# HOW IT WORKS

This is an image showing how motion prediction is accomplished during the compression process.

## “I” frames

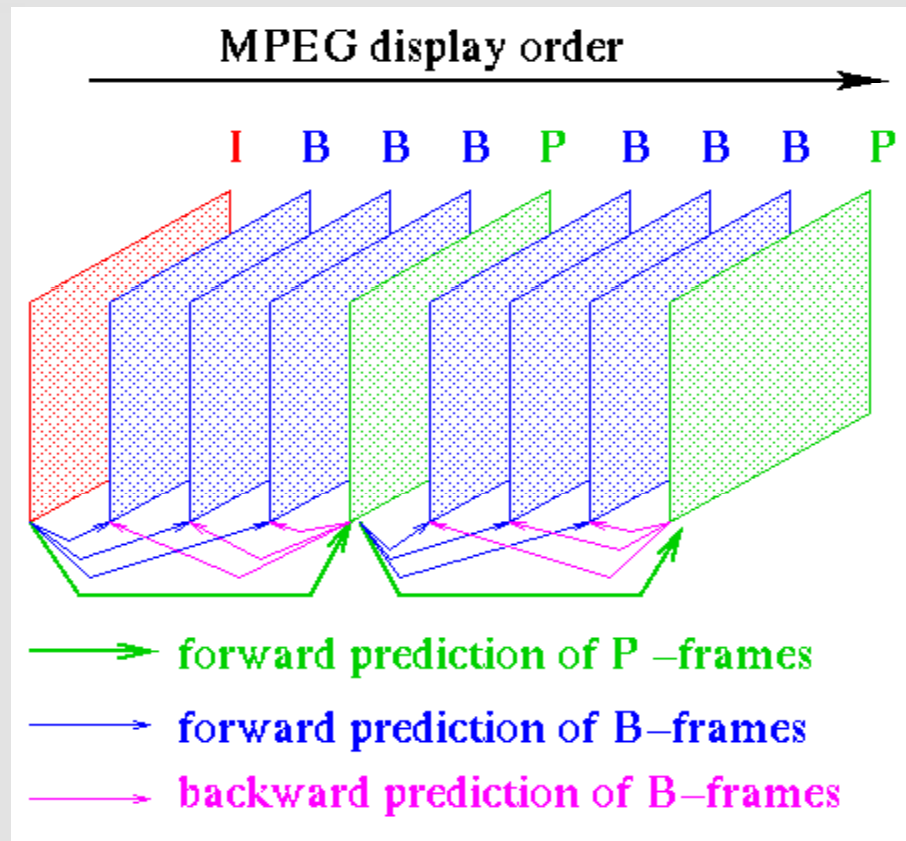
are analyzed independently for data content

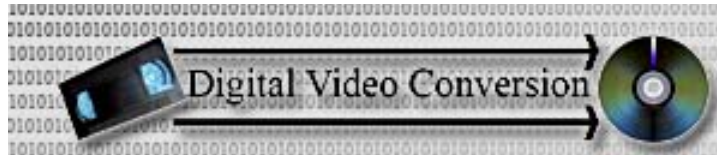
## “P” frames

can contain image data and motion data

## “B” frames

can contain image data and motion data





# MORE EXAMPLES

Now that we know a little bit about  
how video is compressed,  
lets look at some comparisons.





# RAW COMPARISON

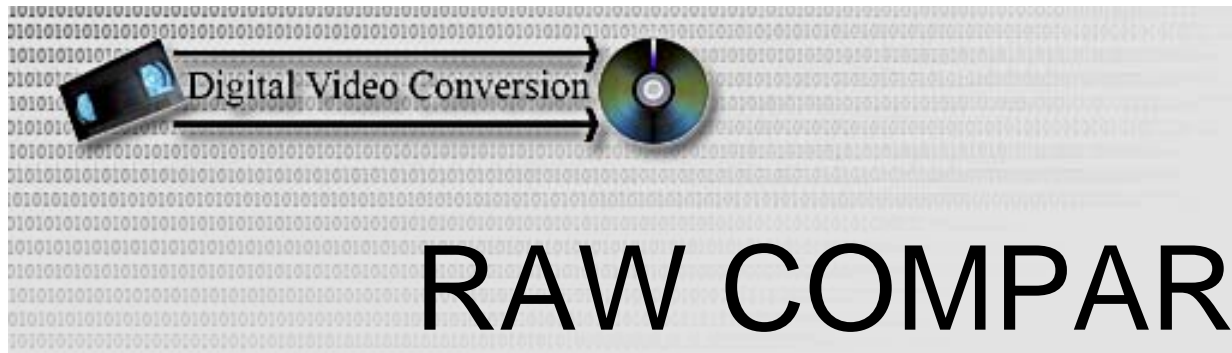


Canon ZR700 DVD



Canon ZR700 RAW





# RAW COMPARISON



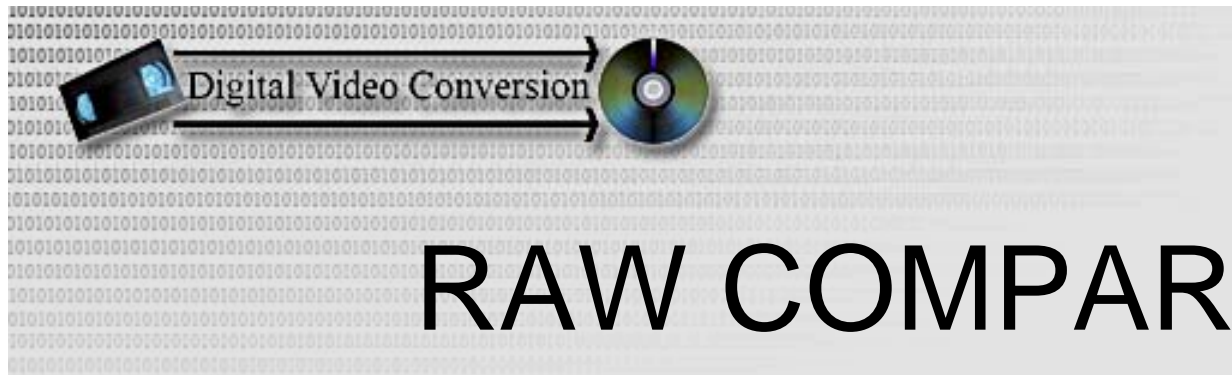
Canon ZR700 DVD

X-30,y-20 = R172,G172,B184



Canon ZR700 RAW

X-30,y-20 = R170,G170,B182



# RAW COMPARISON



Sony Recorder

X-30,y-20 = R140,G143,B153



Canon ZR700 RAW

X-30,y-20 = R170,G170,B182



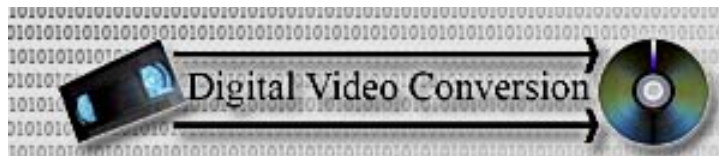
# RAW COMPARISON



Sony Recorder



Canon ZR700 RAW



# RAW COMPARISON



Sony Recorder



Canon ZR700 RAW

400% enlargement



Digital Video Conversion



# RECOMMENDATIONS

- Use a camcorder with A/V inputs
- Store at least three copies
  - Original
  - Mini-dv
  - DVD





Digital Video Conversion



# THINGS TO REMEMBER

- Find bench test/technical reviews
- Having more than one format is important
- Remember to plan for the future
  - Bluray and HDDVD hold 6-10 times more than single layer DVDs



Nicolettecinemagraphics  
PRODUCTIONGRAPHICS





# Questions Anyone?