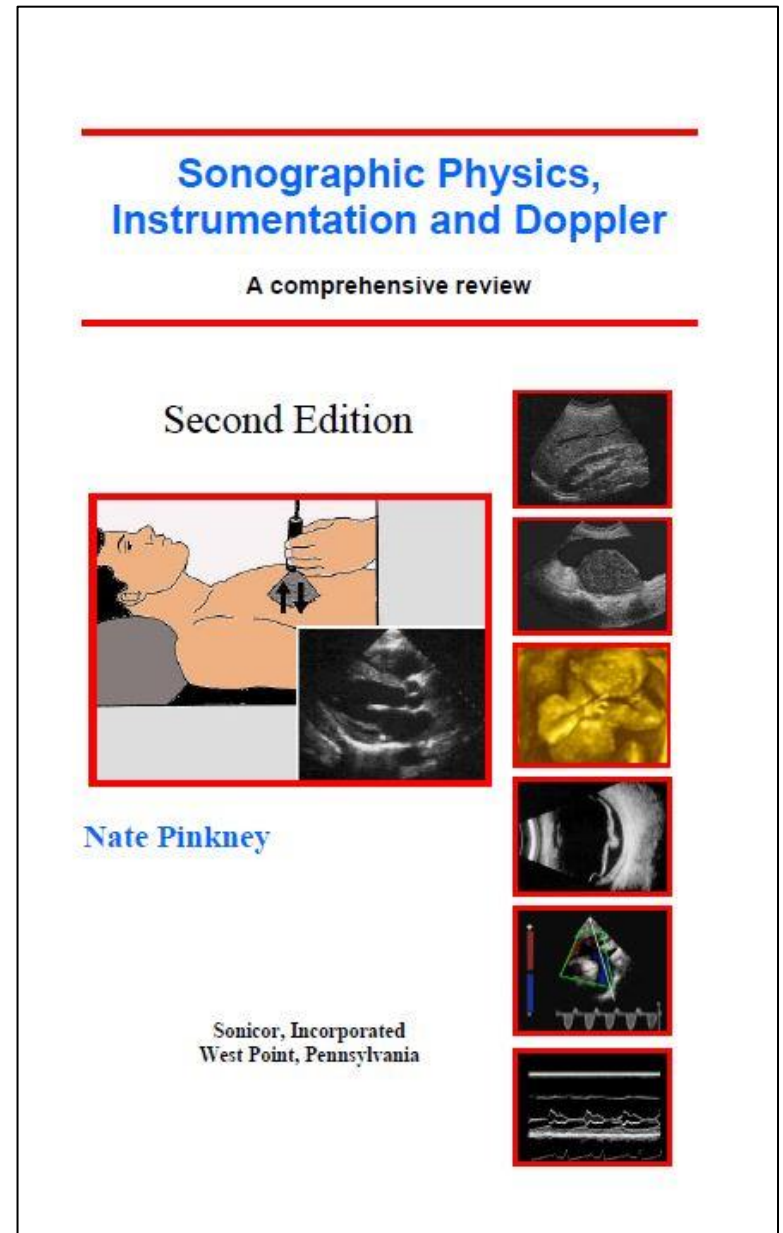


# Lesson 08:

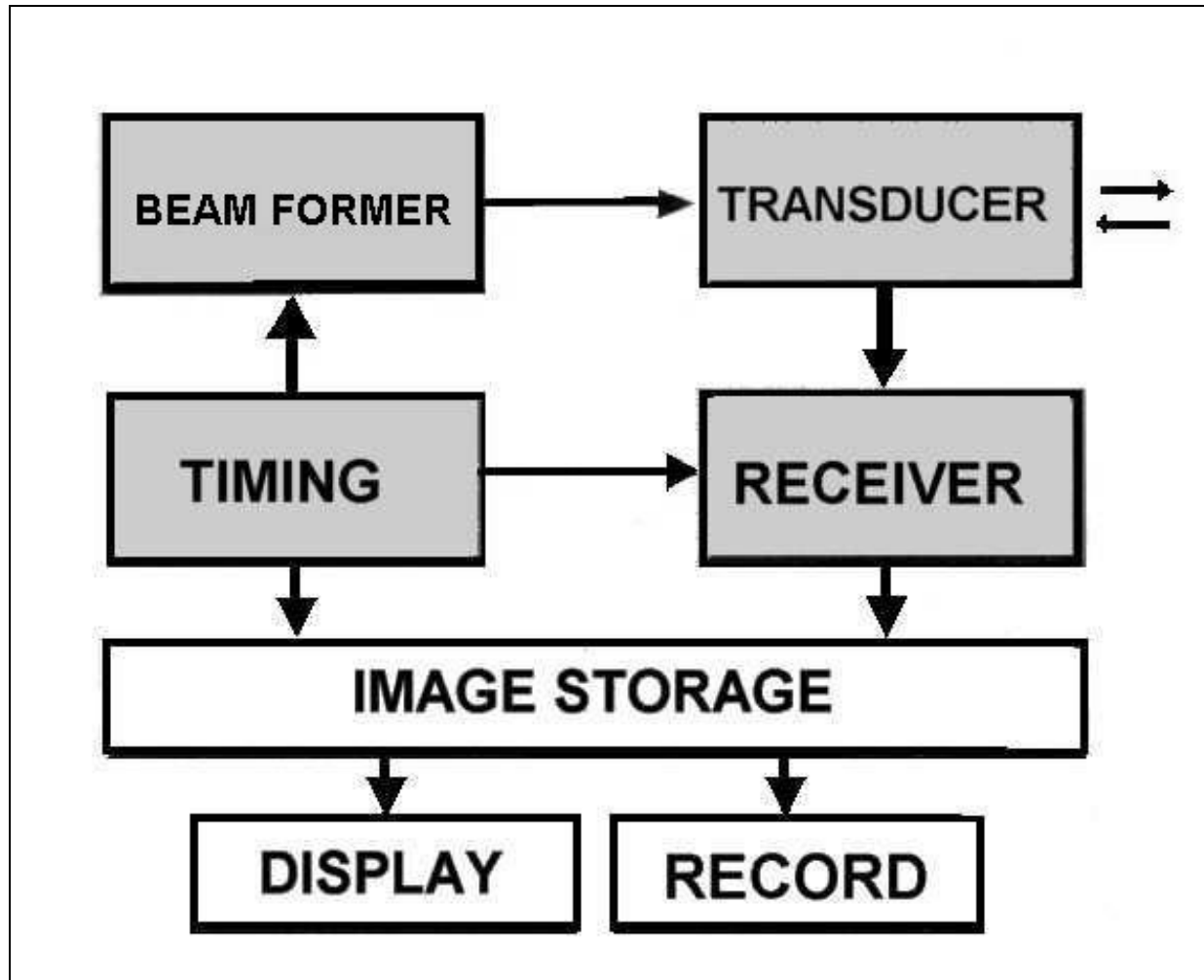
## Image Storage, Processing, Magnification, and Recording

This lesson contains 25 slides plus 8 multiple-choice questions.

Accompanying text for the slides in this lesson can be found on pages 43 through 47 in the textbook:

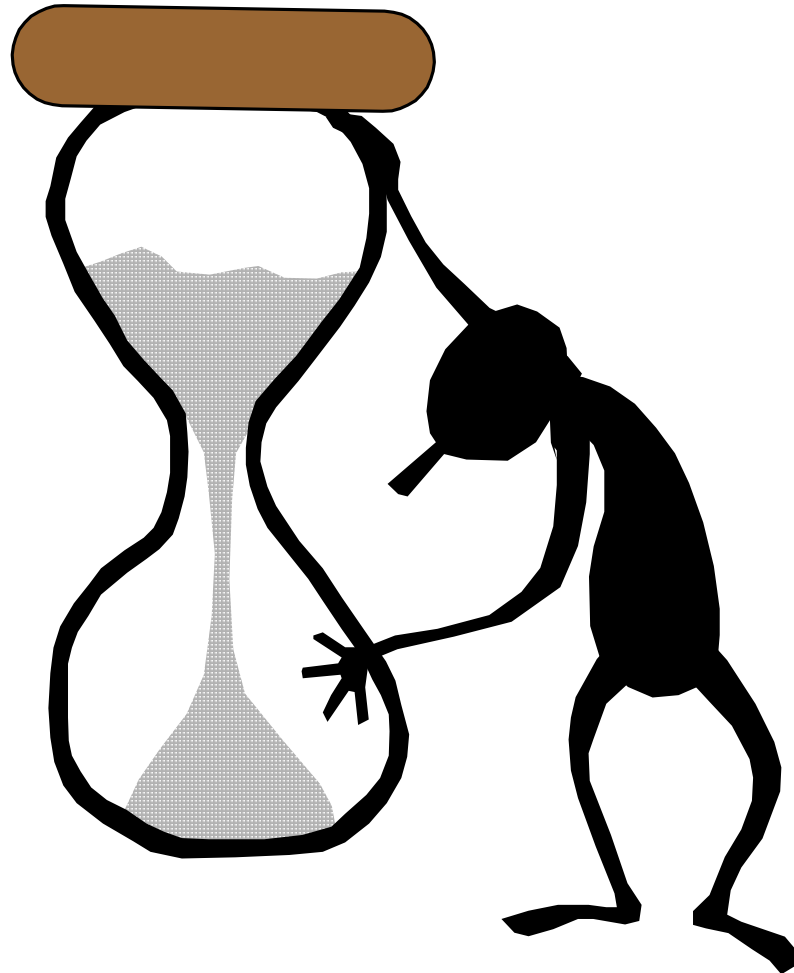


# Image Storage and Processing



# Image Storage and Processing

**ANALOG**  
**OR**  
**DIGITAL ?**



# Image Storage and Processing

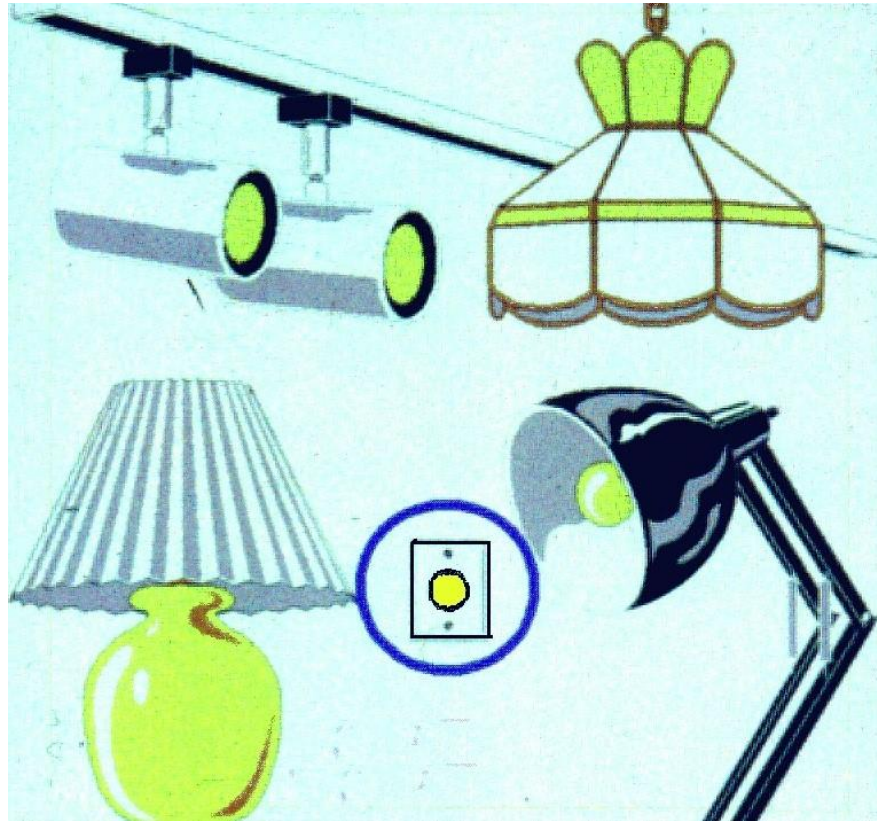


# Image Storage and Processing

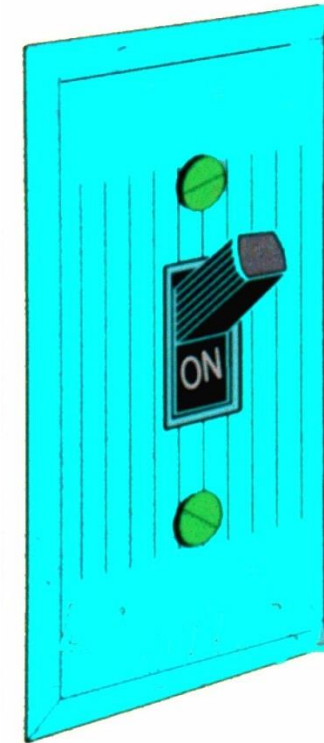


**DIGITAL**

# Image Storage and Processing

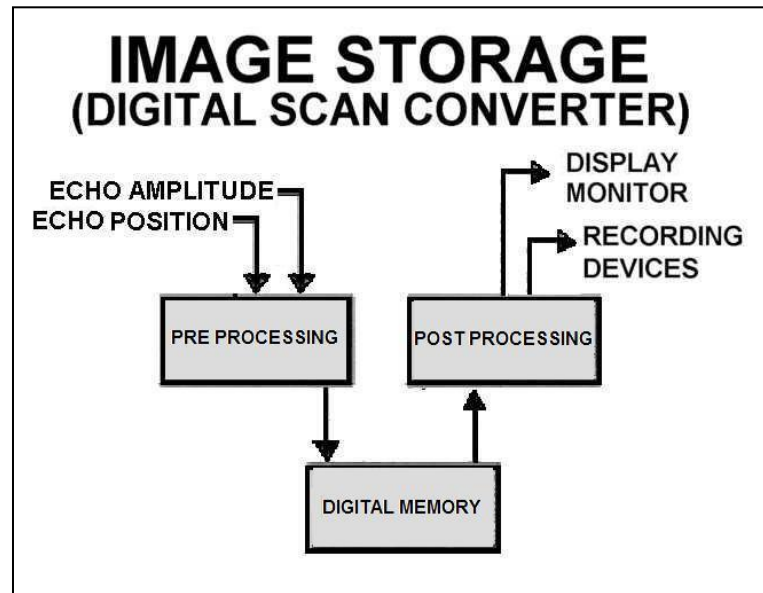
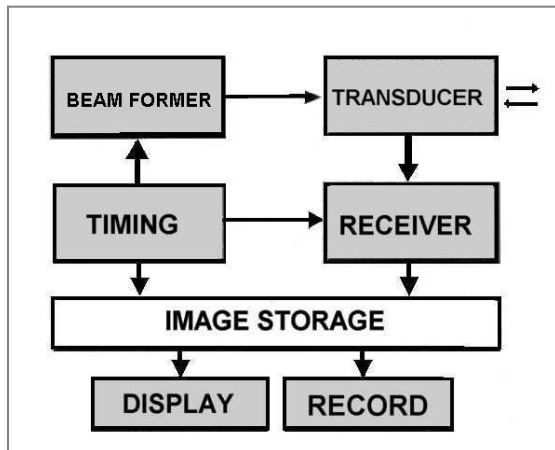


**ANALOG**



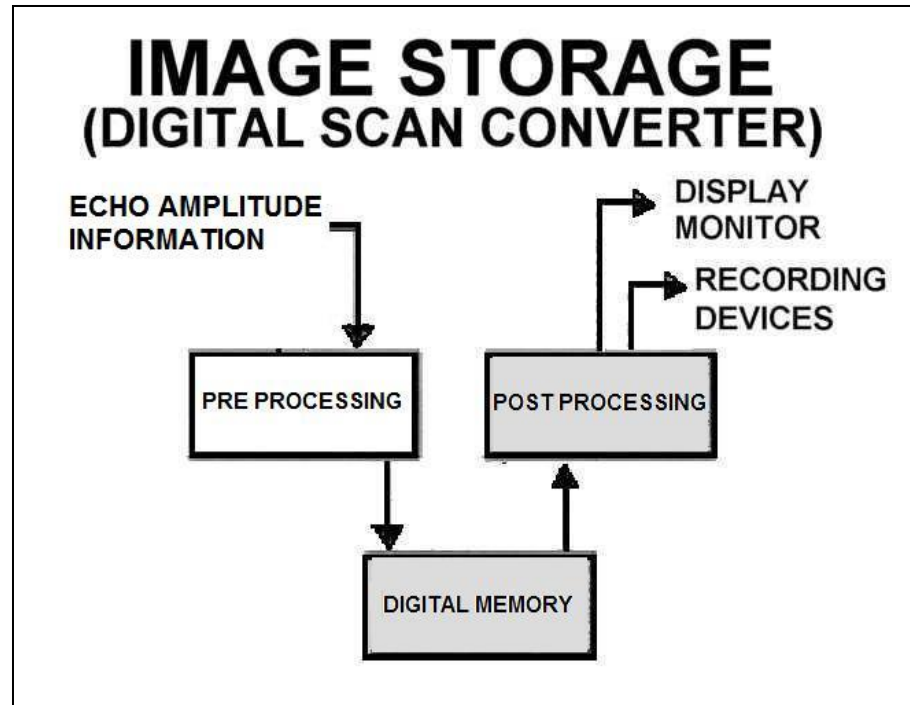
**DIGITAL**

# Digital scan converter



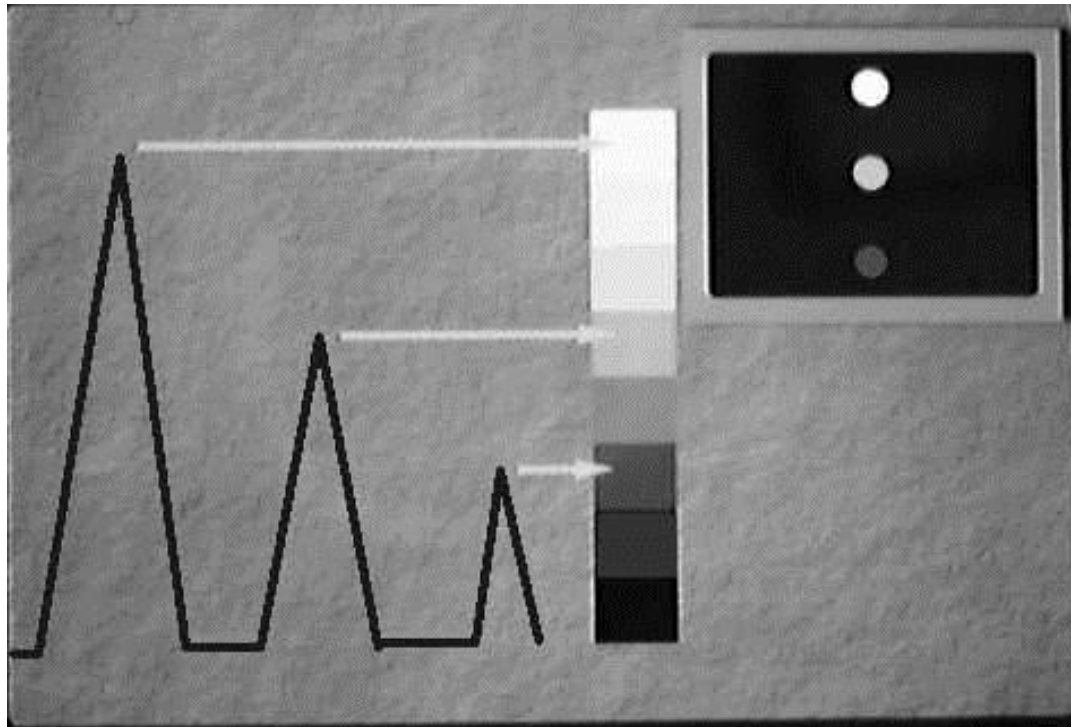


# Pre processing





# Pre processing



# Bits vs. gray shades

## BITS & GRAY SHADES

<u>bits (n)</u>	<u>gray shades</u>
4	16
5	32
6	64
7	128
8	256
9	512
10	1024

# Bits vs. gray shades

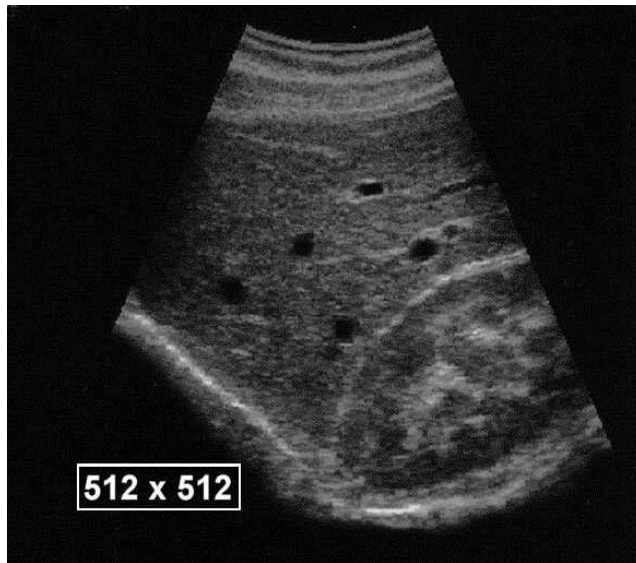


**4 BITS (16 GRAY SHADES)**

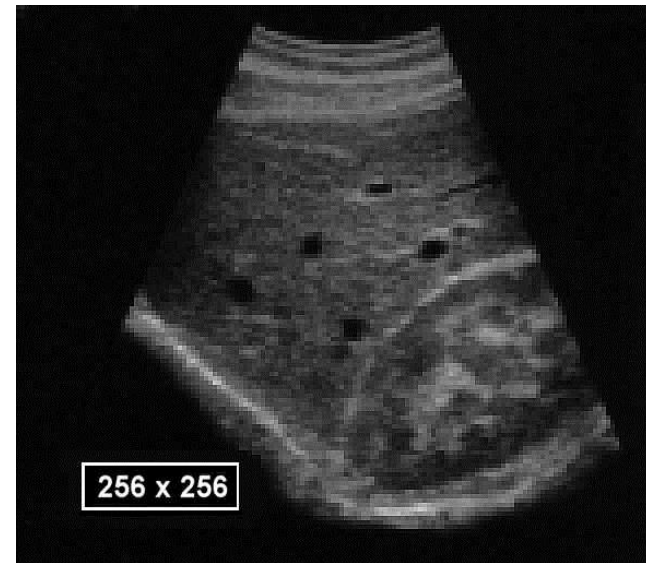


**8 BITS (256 GRAY SHADES)**

# Matrix

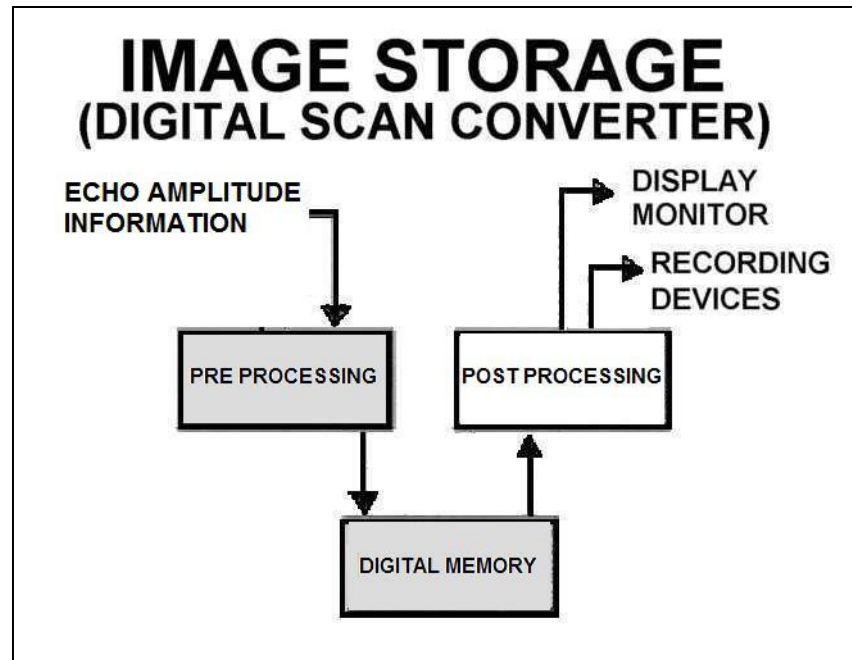


**262,144 PIXELS**

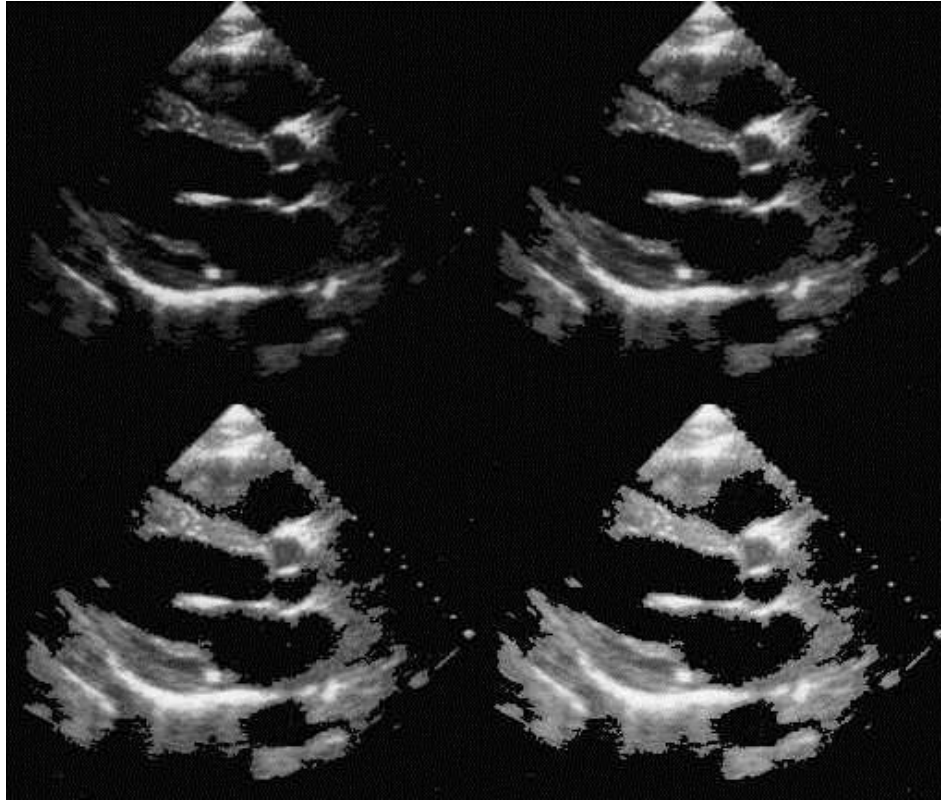


**65,536 PIXELS**

# Post processing



# Post processing



**GRAY-SCALE MAPPING BY DIFFERENT SETTINGS  
OF THE POST PROCESSING CONTROL**

# Magnification



**WRITE**

**READ**

**ZOOM**

**MAG**

**RES**

**SCALE**

**SIZE**

**FOV**



# Magnification controls

**SCALE**

**SIZE**

**FIELD-OF-VIEW**

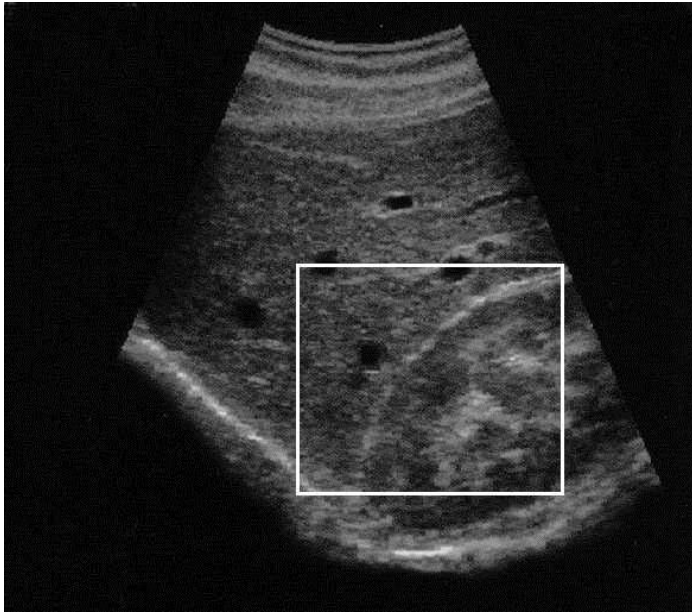
**DEPTH**

**RES**

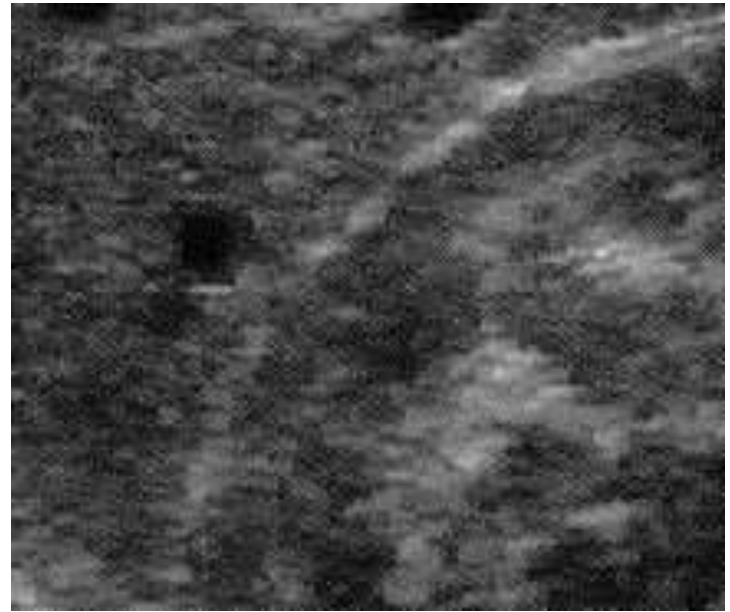
**ZOOM**

**MAG**

# Write magnification

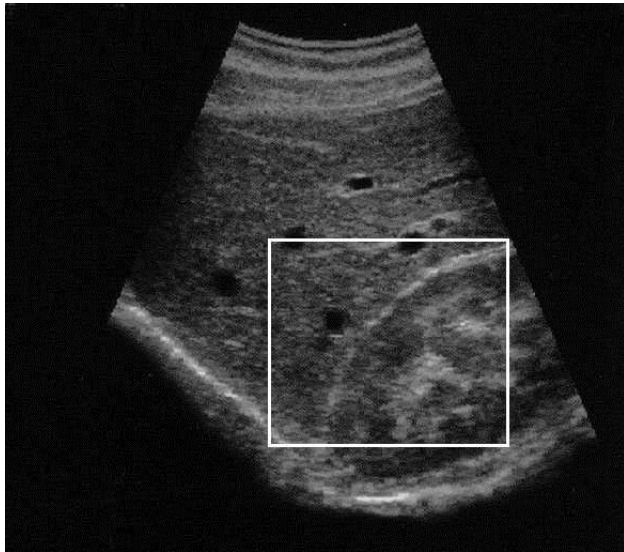


**NORMAL SIZE  
PRIOR TO MAGNIFICATION**

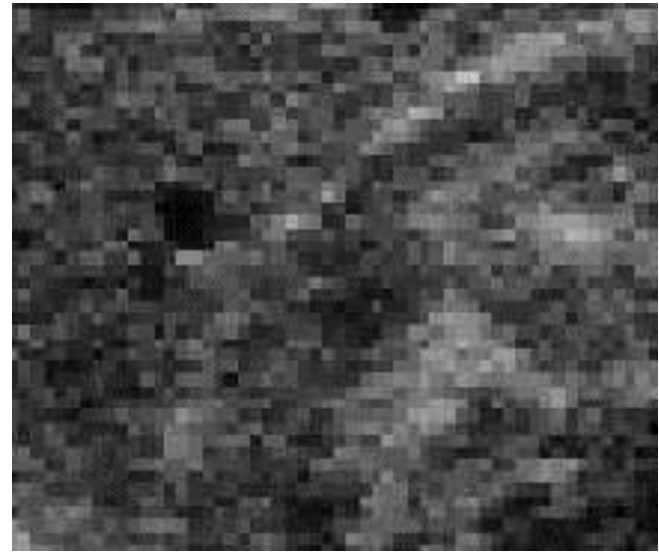


**AFTER WRITE MAGNIFICATION  
NO CHANGE IN THE NUMBER  
OF DISPLAYED PIXELS**

# Read magnification

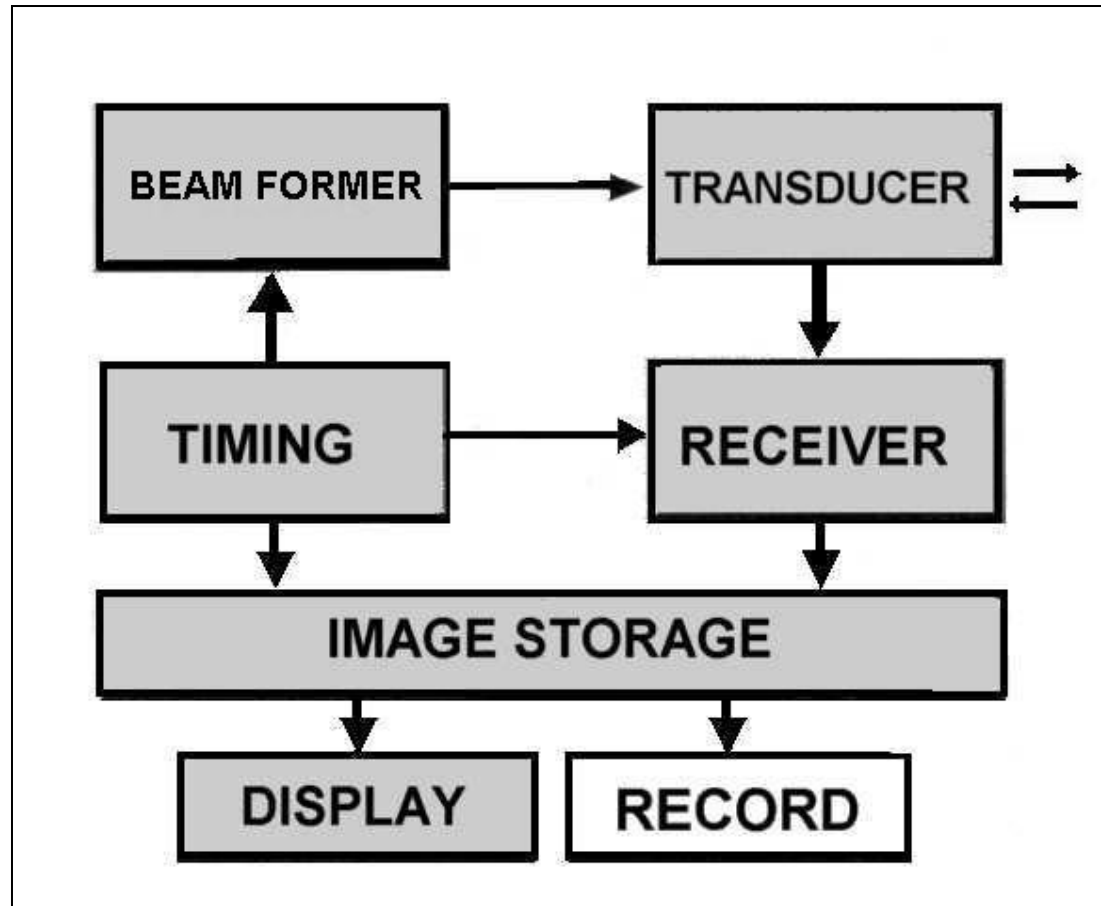


**NORMAL SIZE  
PRIOR TO MAGNIFICATION**



**AFTER READ MAGNIFICATION  
A REDUCTION IN THE  
NUMBER OF DISPLAYED PIXELS**

# Recording devices



# Recording devices



# Recording devices



COLOR PAGE PRINTER

**HARD-COPY**

# Recording devices





# Recording devices



VIDEOCASSETTE RECORDER

**NOT HARD-COPY**

# Recording devices

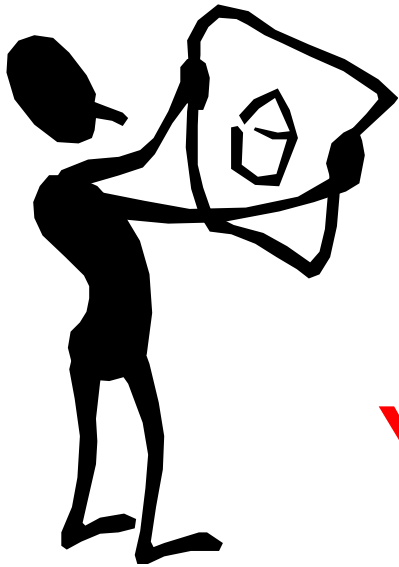


# Recording devices

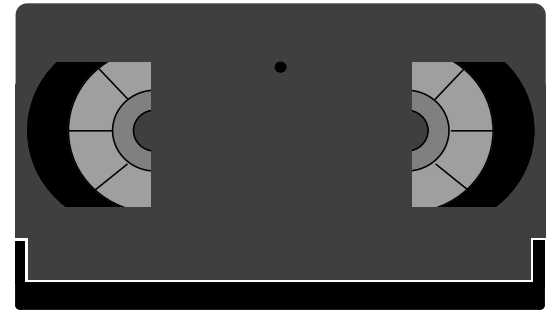
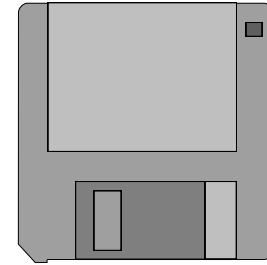


**PACS WORKSTATIONS**

# HARD COPY?

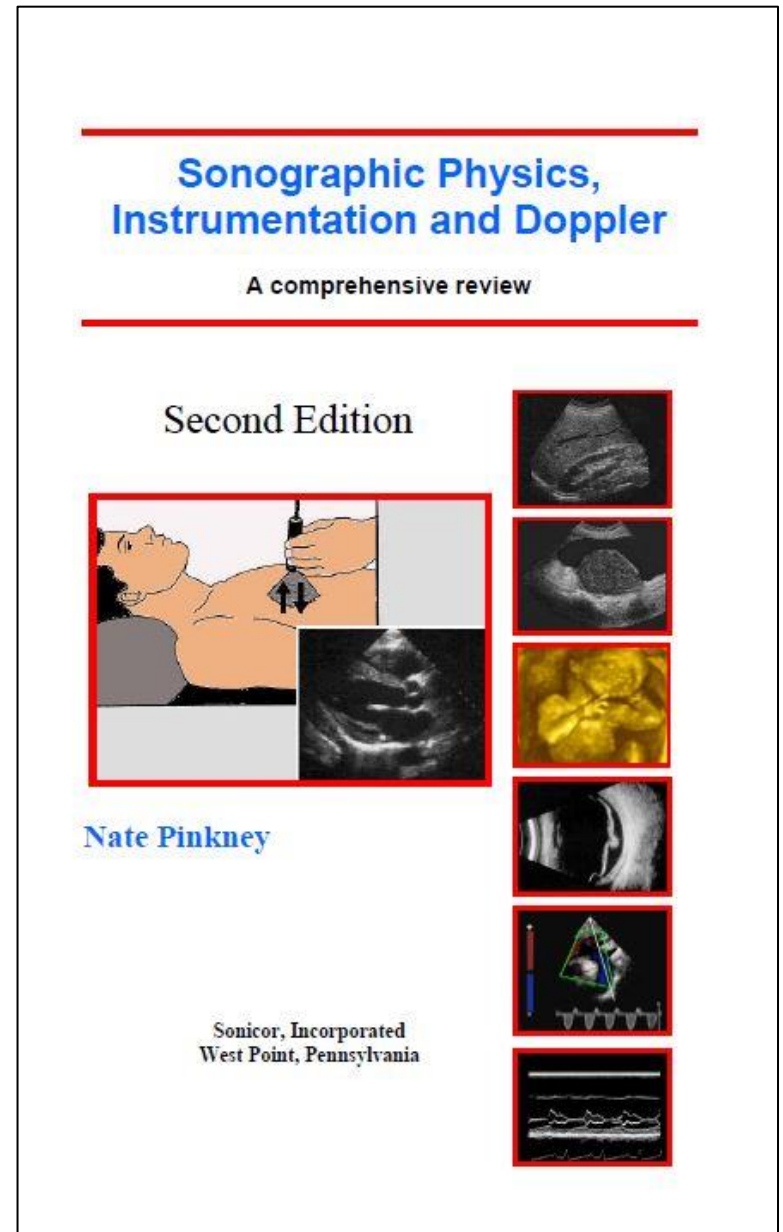


**YES**



**NO**

Answers to the following **EIGHT** practice questions were derived from material in the textbook:



## Question 1

If the output signal from the receiver is analog, what is needed for proper digital storage of echo amplitudes?

- a modem
- high pulse repetition rates
- pre processing
- post processing

## Question 1

If the output signal from the receiver is analog, what is needed for proper digital storage of echo amplitudes?

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- high pulse repetition rates
- pre processing
- post processing



## Question 2

What supplies the signal to the display monitor in the ultrasound system?

- beamformer
- pre processor
- receiver
- scan converter

## Question 2

What supplies the signal to the display monitor in the ultrasound system?

- beamformer
- pre processor
- receiver
- scan converter

## Question 3

What is a digital picture element called?

- voxel
- bit
- pixel
- matrix

## Question 3

What is a digital picture element called?

- voxel
- bit
- pixel
- matrix

## Question 4

How many bits does the digital memory have if the ultrasound system stores and displays 256 discrete gray shades?

- 256 bits
- 8 bits
- 4 bits
- 16 bits

## Question 4

How many bits does the digital memory have if the ultrasound system stores and displays 256 discrete gray shades?

- 256 bits
- 8 bits
- 4 bits
- 16 bits

## Question 5

What can be used to alter the displayed brightness of an image that has been stored in the memory?

- pre processing
- write magnification
- dynamic range
- post processing

## Question 5

What can be used to alter the displayed brightness of an image that has been stored in the memory?

- pre processing
- write magnification
- dynamic range
- post processing



## Question 6

What is the type of magnification that results in the enlargement of individual displayed pixels?

- write zoom
- read magnification
- SCALE magnification
- DEPTH magnification

## Question 6

What is the type of magnification that results in the enlargement of individual displayed pixels?

- write zoom
- read magnification
- SCALE magnification
- DEPTH magnification

## Question 7

If the image on the ultrasound system's display monitor is normal, but the gray scale quality of the hard-copy image is poor, what should be adjusted to correct the problem?

- post processing
- pre processing
- the hard-copy imager
- TGC

## Question 7

If the image on the ultrasound system's display monitor is normal, but the gray scale quality of the hard-copy image is poor, what should be adjusted to correct the problem?

- post processing
- pre processing
- the hard-copy imager
- TGC

## Question 8

What is the type of medium that is used for video tape recording?

- magnetic
- thermal
- optical
- paper

## Question 8

What is the type of medium that is used for video tape recording?

- magnetic
- thermal
- optical
- paper

## **END OF LESSONS 08**

For information on the accompanying textbook, visit the Website:

[www.Sonicorinc.com](http://www.Sonicorinc.com)