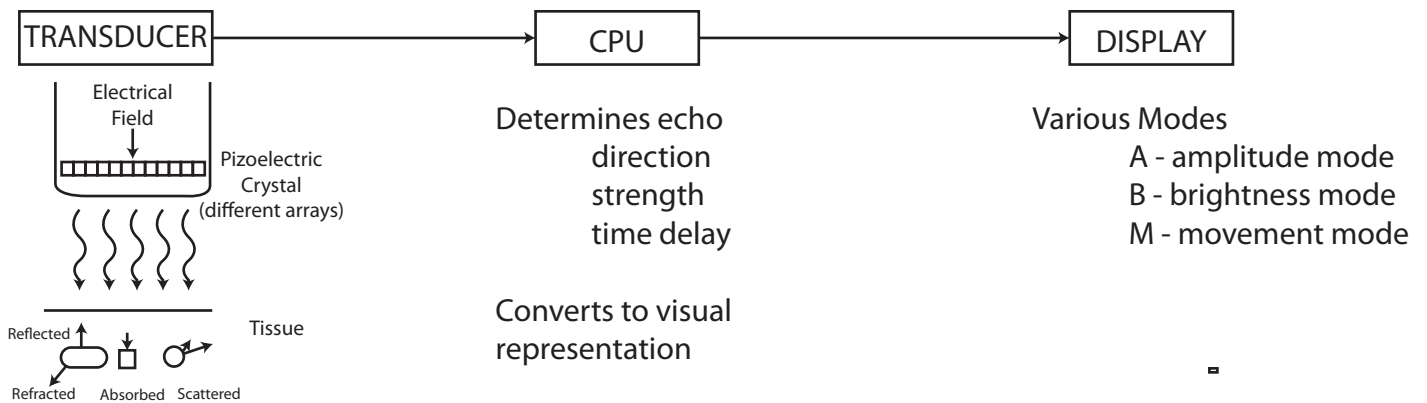
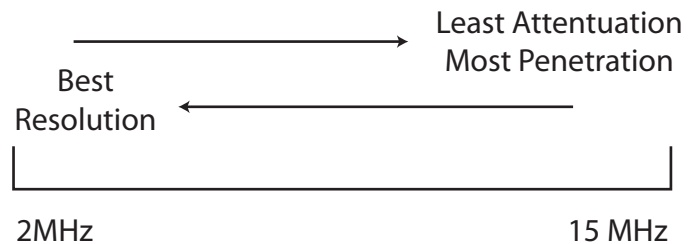


Definitions: US is frequencies above 20000 Hz
 Medical US is usually 2-15 MHz
 Doppler is the perceived change in frequency when the source and observer are changing distance relative to each other.
 Towards increases the frequency (displayed red in Med US)
 Away decreases the frequency (displayed blue in Med US)



Frequency determines
 Attenuation (loss of energy)
 Resolution (ability to determine two points)
 Penetration (depth of image)



Attenuation
 Absorption (US Wave changes to heat)
 Scattered (uneven surfaces)
 Reflected (is the measured component)
 Smooth surfaces
 Angle of incidence approaching 90 degrees
 Acoustic mismatch between different tissues

Tissues have different attenuation coefficients
 Water = 0.002 (minimal energy lost)
 Kidney = 1
 Bone = 5 (most signal attenuated)

Resolution
 Axial
 Lateral
 Elevation

Gain (amplification of returning signal)
 Time gain compensation (for echo delay from deep tissues)