Scanning Acoustic Microscopy

SAM Training Outline

I. Introduction to SONIX Inc.
- A. History of Company
- B. Resources Available at SONIX

II. Acoustic Properties and Definitions
- A. What is Ultrasound ?
  1. Acoustic Impedance
  2. Waveform Reflection Attributes
- B. Benefits of Ultrasound
- C. Transducer Selection
  1. Physical Description
  2. Manufacture Specifications
- D. Inspection Modes and Scan Image Views
  1. Pulse-Echo and Through-Transmission
  2. A-Scan, B-Scan and C-Scan

III. SAM System Configuration
- A. System Schematic
- B. Electrical Components (Pulser/Receiver, A/D, and Motor Controller)
- C. Mechanical Components (Motors, Encoders, and Immersion Tank)

IV. SAM Theory of Operation
- A. Initial Setup
  1. Focusing Technique
  2. Front Surface Follower
  3. Use of Data Gates
- B. Software Controls
  1. Scanning Limitations
  2. Data and Information Windows

V. Presentation and Interpretation of SAM Images
- A. Image Types
  1. Peak Amplitude
  2. Time of Flight
  3. Phase Inversion
- B. Data Storage and Retrieval

VI. Routine Maintenance of SAM System

VII. Open Discussion for Questions and Advanced Topics

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Optional Intermediate/Advanced SAM Training

I. Hardware/Software Controls
- A. System Structure (A/D, Pulser/Receiver, Motor Controller)
- B. Software Utilities and Setup Files
  1. SONIX.INI File
  2. Control File
  3. Feature Parameters and Configuration

II. Advanced Imaging Methods
- A. Loss of Back Wall Scan
- B. Material (Bulk) Scan
- C. Peak Amplitude Image Verification
  1. Through-Transmission
  2. Signal Comparison
  3. Phase Inversion

III. Advanced Applications and Techniques
- A. Gating Techniques
- B. Advanced Waveform Interpretation
- C. How to Get the Best Image
  1. Data Gate Width and Location
  2. Palette Control
  3. Adding Annotation and Derived Image
  4. 3-D Visualizations
- D. Shear, Compression, and Rayleigh Waves

IV. Image and File Manipulations
- A. Post-Image Processing
  1. Mathematical Filters
  2. Image Cropping and Smoothing
- B. Exporting and Importing Files
- C. Compatibility with other Software

V. Optional Topics
- A. Tray Scan, Skip & Scan, and Jump Scan
- B. Auto Analysis
- C. Cluster Detection
- D. Threshold and Histogram Technique

VI. Open Discussion for Questions and Applications