TOUCH SCREEN TECHNOLOGY

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Introduction Of Touch Screen

- A touch screen is a display which can detect the presence and location of a touch within the display area.

- The term generally refers to touch or contact to the display of the device by a finger or hand.
History

- 1971
  the first "touch sensor" was developed by Doctor Sam Hurst (founder of Elographics) called "Elograph".
History

- **1974**
  the first true touch screen incorporating a transparent curved glass sensor surface came on the scene developed by Sam Hurst and Elographics.

- **1977**
  Elographics developed & patented *five-wire resistive* technology, called “AccuTouch”.
Types

Resistive Touchscreens
- consists of a glass or acrylic panel that is coated with electrically conductive and resistive layers. The thin layers are separated by invisible separator dots.

Advantages
- High touch resolution
- Pressure sensitive, works with any stylus
- Not affected by dirt, dust, water, or light
- Costs are relatively low when compared with active touch screen technologies.

Disadvantages
- 75% clarity
- Resistive layers can be damaged by a sharp object
Types

5-Wire Resistive Touchscreens
- better version of 4-Wire Resistive technology.

Advantages
- High touch resolution
- Pressure sensitive, works with any stylus
- Not affected by dirt, dust, water, or light
- More durable than 4-Wire Resistive technology
- May function even if top layer is damaged

Disadvantages
- 75% clarity
- Resistive layers can be damaged by a sharp object
- Much expensive than 4-Wire Resistive technology
How It Works

Resistive Touch Screen Construction

Flexible Transparent Surface

Transparent Conductive Layer

LCD Display Layers

Glass Substrate

Non-conductive Separator Dots
Types

**Capacitive Touchscreens**
- consists of a glass panel with a capacitive (charge storing) material coating its surface.

**Advantages**
- High touch resolution
- Pressure sensitive, works with any stylus
- Not affected by dirt, dust, water, or light

**Disadvantages**
- Must be touched by finger, will not work with any non-conductive input
How It Works

Mutual Capacitance Screen Construction

- Protective Anti-reflective Coating
- Sensing Lines
- Insulating Material
- Driving Lines
- Protective Cover
- Bonding Layer
- Driving Lines
- Sensing Lines
- Glass Substrate
- LCD Display Layers

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How It Works

Self Capacitance Screen
Types

PenTouch Capacitive Touchscreens
- is a durable Capacitive type touch screen with an attached pen stylus. It can be set to respond to finger input only, pen input only, or both.

Advantages
- High touch resolution
- Pressure sensitive, works with any stylus
- Not affected by dirt, dust, water, or light

Attached pen stylus for precise input

Disadvantages
- Must be touched by finger or attached pen stylus, will not work with any non-conductive input
Types

Surface Acoustic Wave Touchscreens
-is one of the most advanced touch screen types. It is based on sending acoustic waves across a clear glass panel with a series of transducers and reflectors. When a finger touches the screen, the waves are absorbed, causing a touch event to be detected at that point.

Advantages
- High touch resolution
- Highest image clarity
- All glass panel, no coatings or layers that can wear out or damage.

Disadvantages
- Must be touched by finger, gloved hand, or soft-tip stylus. Something hard like a pen won't work
- Not completely sealable, can be affected by large amounts of dirt, dust, and / or water in the environment.
Touch Sensing Process

1. Screen registers touch
2. Raw data is captured
3. Background noise is removed
4. Pressure points are measured
5. Touch areas are established
6. Exact coordinates are calculated
The iPhone’s processor and software are central to correctly interpreting touch input. The capacitors send raw touch-location data to the iPhone’s processor. The processor uses software located in the iPhone’s memory to interpret the raw data as commands and gestures.
Multi-Touch

- **Multi-touch** denotes a set of interaction techniques which allow computer users to control graphical applications with several fingers.
- Multi-touch consists of a touch screen or touchpad, as well as software that recognizes multiple simultaneous touch points.
Comparing Touch Screen Technologies

- A resistive system registers a touch as long as the two layers make contact, which means that it doesn't matter if you touch it with your finger or a rubber ball.

- A capacitive system, on the other hand, must have a conductive input, usually your finger, in order to register a touch.

- The surface acoustic wave system works much like the resistive system, allowing a touch with almost any object -- except hard and small objects like a pen tip.
Future of Touch Screen Technology
What Are Touch screens Used For?

- Public Information Displays
- Retail and Restaurant Systems
- Customer Self-Service
- Control and Automation Systems
- Computer Based Training
- Assistive Technology
Feed Back

- Any questions or suggestions regarding Touch Screen Technology or this presentation are welcome.
Thank You