PLANAR

Touch Display Sensors

A Guide to Choosing Your Next Touchscreen

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The 411 on Touchscreens

You see a lot of devices using touchscreens in many public Places, such as information kiosks, factories, hospitals, bank ATMs, not to mention all of the latest gadgets. Touchscreens are designed to make the operation of machines and devices very easy and to conserve space as they need no additional peripherals or accessories.

A touchscreen basically consists of a touch sensor, a controller circuitry an d a software program that runs these hardware units. The touch sensor has an electric current passing through it which undergoes a change when it is touched.

A variety of touch sensors offer flexibility and choices when developing your touch device. This guide is meant to lead you down that touch sensor path to match the perfect sensor with your display project.

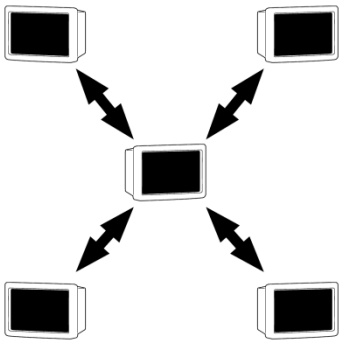
Touchscreen Technology for Displays and Monitors

Among the many benefits in choosing touchscreen technology for your display needs, providing a fast and intuitive interface for the user is by far the most useful.

With the opportunity for users to simply touch the monitor to make choices, the need to know how to use a computer is eliminated, along with the need for a keyboard. So, the interface experience is trouble-free.

Touch Sensor Types

Choosing an appropriate touch sensor can be challenging, but this e-Book will guide you through features found in five touch sensor types and help you reach a decision about the option that best suits your requirements.



The types of touch sensors covered in this e-Book include:

- Resistive
- Surface Capacitive
- Projective Capacitive
- Infrared
- Surface Acoustic Wave

Resistive Features

Input

- Requires touch, any object (e.g. gloved hand, pen, credit card corner)

Optical Performance

- Reflection: unenhanced ~25%
- Transmission: 75% - 80%

Reliability

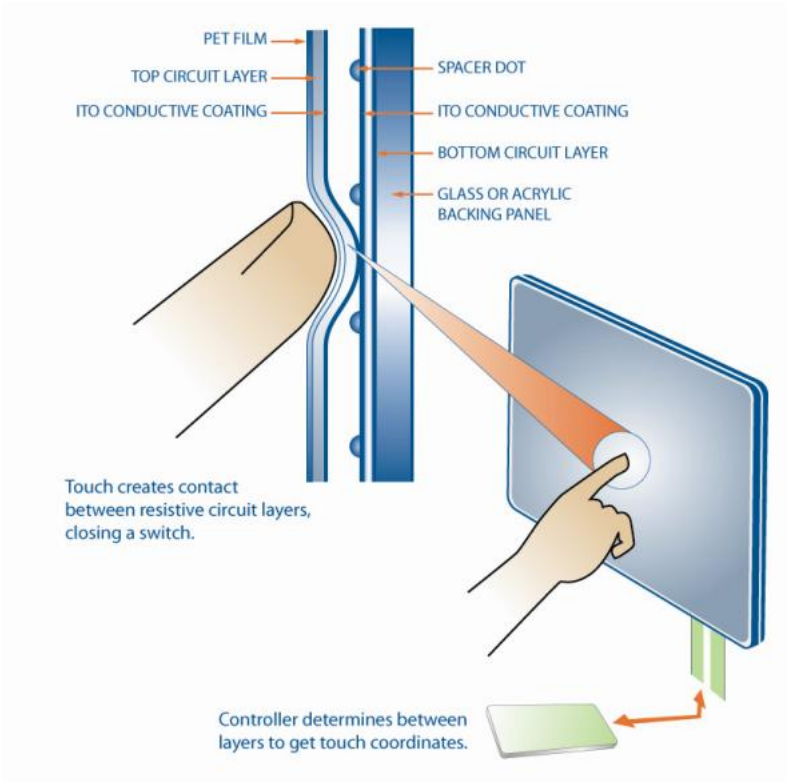
- 4 wire – 1 million touches
- 5 wire – 35 million touches

Positional accuracy <1.5% of true position

- Stability better with 5 wire

Enhancements

- Optical bonding
- AR/AG
- Anti-smudge
- Linear polarizer and circular polarizer
- Protective overlays



Surface Capacitive

Surface (Spatial) Capacitive Features

Input

- Requires touch, any object (e.g. gloved hand, pen, credit card corner)

Optical Performance

- Reflection: unenhanced ~15%
- Transmission: 90%

Reliability

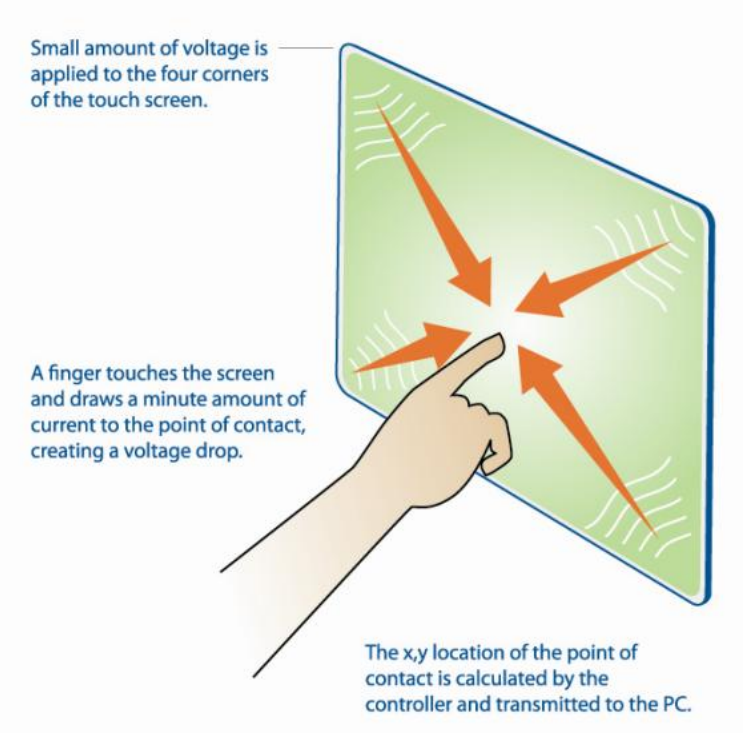
- No moving parts - > 160 million touches

Positional accuracy <1.5% of true position

- Stability better with 5 wire

Enhancements

- Optical bonding
- AR/AG, Anti-smudge
- Anti-smudge
- Linear polarizer and circular polarizer
- Vandal glass



Projected Capacitive

Projected Capacitive Features

Input

- Requires touch, any object (e.g. gloved hand, pen, credit card corner)

Optical Performance

- Reflection: unenhanced ~12%
- Transmission: 88%

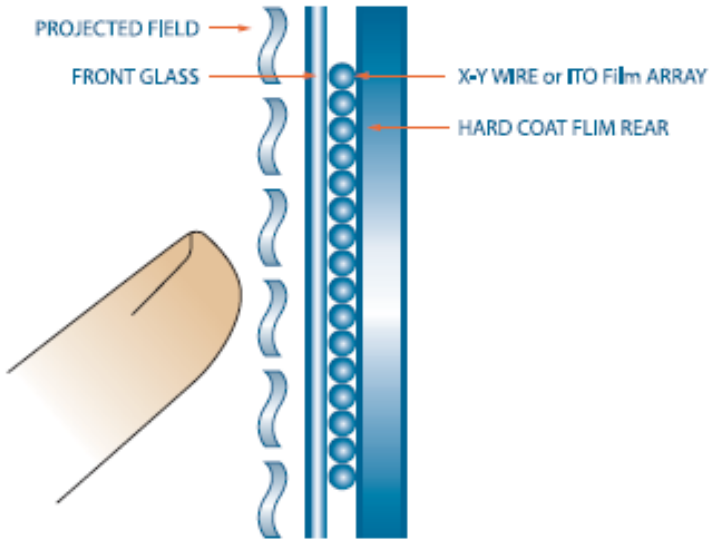
Reliability

- No moving parts - >160 million touches

Positional accuracy <1.5% of true position

Enhancements

- Optical bonding
- AR/AG
- Anti-smudge
- Linear polarizer and circular polarizer
- Vandal glass



Capacitance forms between the finger and an electrode in the sensor grid.

Infrared

Infrared Features

Input

- Requires touch – finger, gloved hand or other opaque material

Optical Performance

- Reflection: unenhanced ~ 8-10%
- Transmission: 92%

Reliability

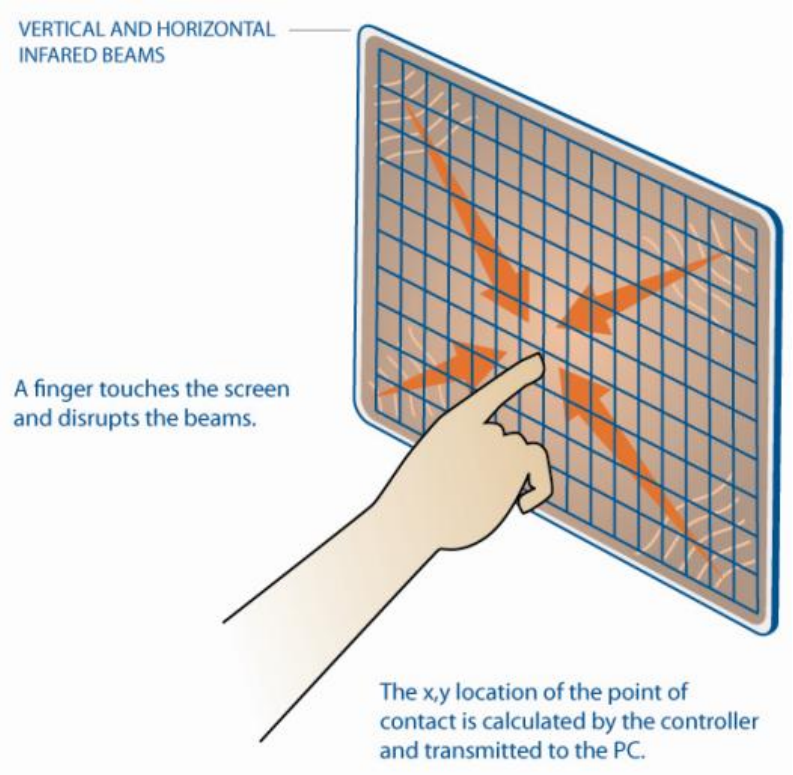
- No moving parts - >160 million touches

Positional accuracy <2mm of true position

- Stability better with 5 wire

Enhancements

- Optical bonding
- AR/AG
- Anti-smudge
- Linear polarizer and circular polarizer
- Vandal glass



Surface Acoustic Wave

Surface Acoustic Wave Features

Input

- Requires touch – finger, gloved hand or other soft material

Optical Performance

- Reflection: unenhanced ~8%
- Transmission: up to 92%

Reliability

- No moving parts - >50 million touches

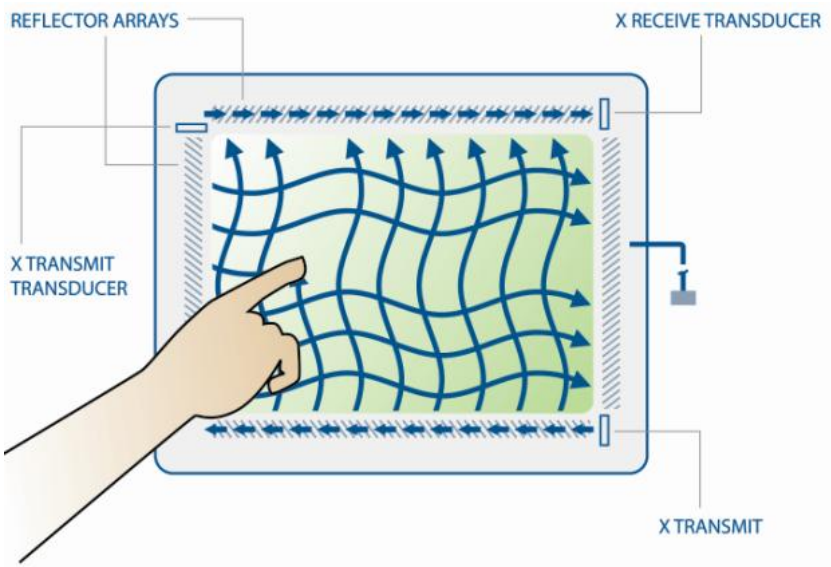
255 levels of pressure (Z-axis)

Positional accuracy <1% of true position

- Stability better with 5 wire

Enhancements

- Optical bonding
- AR/AG
- Anti-smudge
- Linear polarizer and circular polarizer
- Vandal glass



When you touch the screen, you absorb a portion of the waves traveling across it. The received signals for X and Y are compared to the stored digital maps, the change is recognized, and a coordinate is calculated.

Touch Sensors - Summary

	4 Wire Resistive	5 Wire Resistive	Surface Capacitive	Projected Capacitive	Infrared	Surface Acoustic Wave
Transmission / Reflectance	Poor	Poor	Fair	Fair	Best	Best
Color Purity	Fair	Fair	Fair	Good	Best	Best
Speed	Best	Best	Best	Good	Good	Best
Accuracy	Best	Best	Good	Good	Best	Best
Multi-Touch	Poor	Poor	Poor	Fair	Best	Poor
Drag	Best	Best	Best	Good	Best	Best
Palm Rejection	Best	Best	Poor	Poor	Poor	Poor
Signature Capture	Best	Best	Poor	Poor	Poor	Poor
Gloved Hand	Best	Best	Poor	Fair	Best	Best
Protective Overlay	Fair	Fair	Poor	Good	Best	Poor
Durability	Poor	Fair	Good	Good	Best	Best
Cost	Best	Best	Good	Fair	Good	Good

Best
Good
Fair
Poor

About the Author

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Mr. Phillips has over 20 years experience in product, program and engineering management within the display industry. Prior to joining Planar, he was a Project Manager at White Electronic Design responsible for their industrial, military and PC display product lines. While there, he focused his extensive experience in optically enhancing displays for sunlight readability, including optical bonding. Prior to White, Mr. Phillips spent 5 years at Planar as a Program Manager for the Medical Business Unit, working on the Invitium thin client workstation with customers like GE, Phillips, Siemens, and Baxter. At Planar, he also worked as a Program Manager for the Transportation Business Unit and managed the development of the Truck PC display for Freightliner/Delphi.

Guide to Selecting Your Custom or Touchscreen Display

For an interactive guide to defining and selecting a rugged or custom display, visit www.planarembedded.com/guide-to-custom-lcd

For an interactive guide to selecting a touchscreen display, visit http://www.planartouch.com/guide

These applications will help you collect the answers you need for your project and will email you a summary of your project definition.