



epec

ENGINEERED TECHNOLOGIES

▶ Touch Panels
Capabilities, Design, & Assembly

[4.5.13]

▶ DELIVERING QUALITY SINCE 1952.

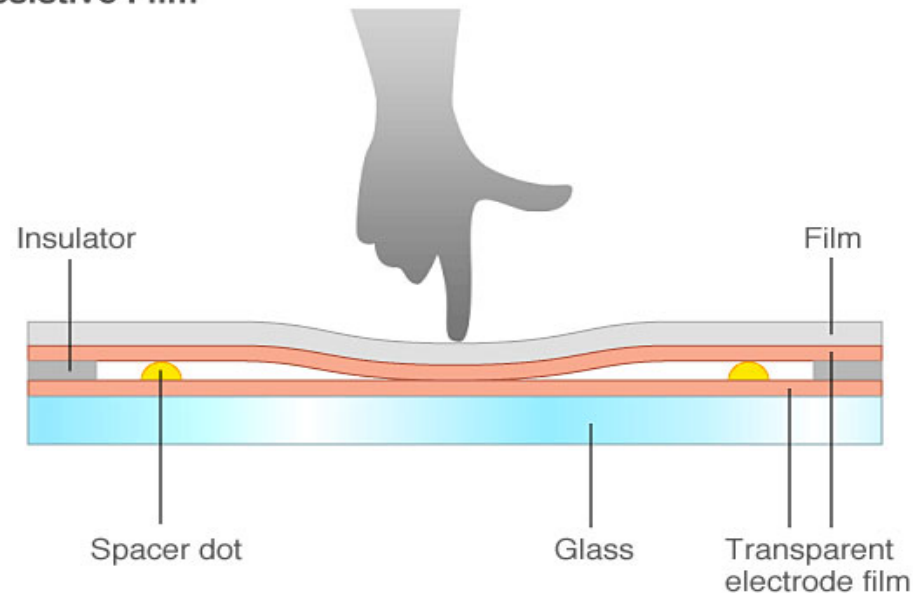
- ▶ Touch panels are the new interface standard
- ▶ Epec's Touch Technologies
 - Benefits
 - Applications
 - Sizes
- ▶ Design/Engineering
- ▶ Assembly/Integration
- ▶ Summary



Resistive Touch Panels

- ▶ Two transparent electrode layers (film/film or film/glass) are separated by very small transparent insulation spacers. Pressure from a finger or stylus brings the layers into contact. The result is a drop in voltage at the contact point. The change in voltage is detected by the controller.

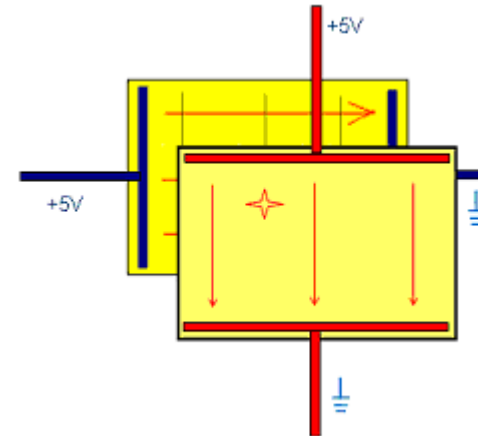
Resistive Film



Resistive Touch Panels

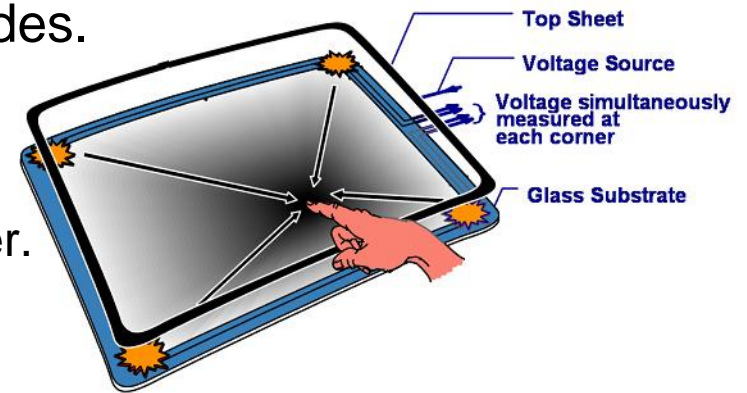
▶ 4-Wire

- X/Y are separate layers.
- Touch screen will not operate with damaged top layer.



▶ 5-Wire

- Bottom layer contains all the electrodes.
- Top layer is probe.
- Increased durability.
 - Operates with scratched/cut top layer.





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Resistive Touch Panels

▶ Benefits

- Lowest cost technology
- Low power consumption
- Pressure actuated.
 - Finger, gloves and stylus.
- Resistant to water and dust.

▶ Limitations:

- One Touch
- Lower light transmission (78 - 82%)
- Lower durability than other technologies
 - 4-wire: 1 Million touches
 - 5-wire: 10 Million touches

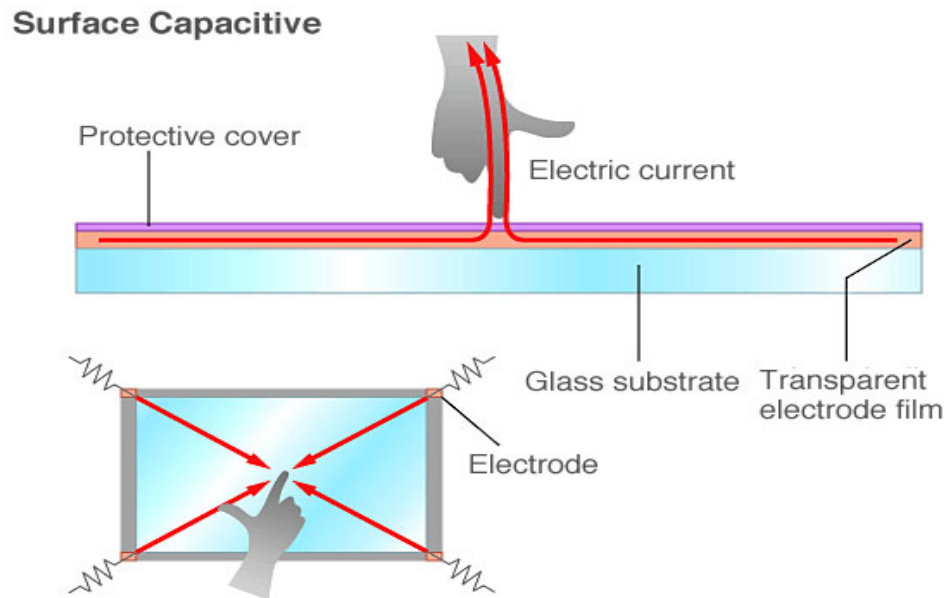
▶ Size Range: 2.8 - 21" (Diagonal)

- Standard and custom sizes.



Surface Capacitive

- ▶ A transparent electrode film is placed on glass substrate (under scratch resistant cover). A small voltage is applied to each corner, generating a uniform low voltage electrical field across the panel. The location of a touch is calculated by the change in the electrical current.





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Surface Capacitive

▶ Benefits

- 90% light transmission
- Unaffected by moisture, temperature and dust.
- Works with finger and conductive stylus.
- Over 100 Million actuations.

▶ Limitations:

- Single touch
- Finger or conductive stylus only.
- May require calibration (EMI)

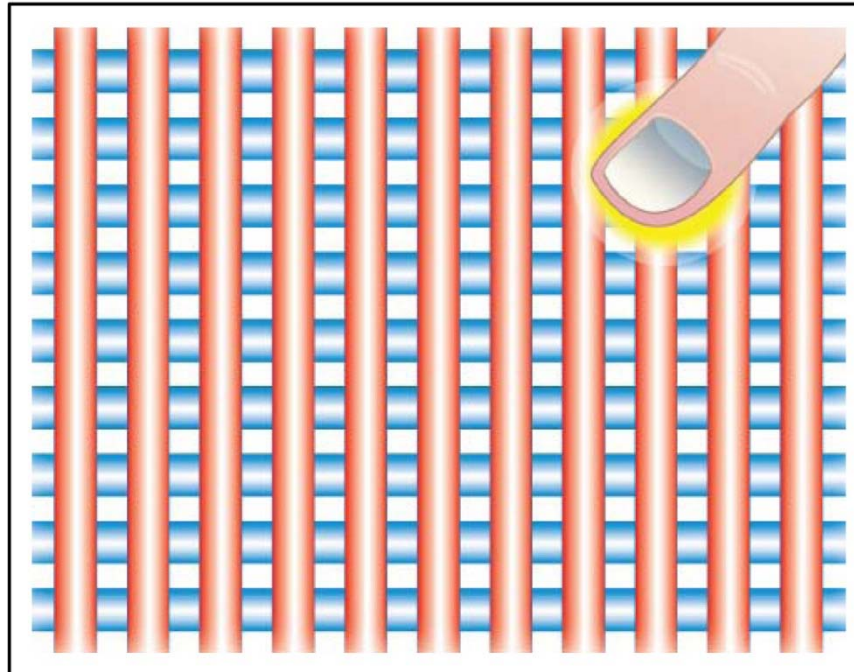
▶ Size Range: 5 - 24" (Diagonal)

- Standard and custom sizes



Projected Capacitive (PCAP)

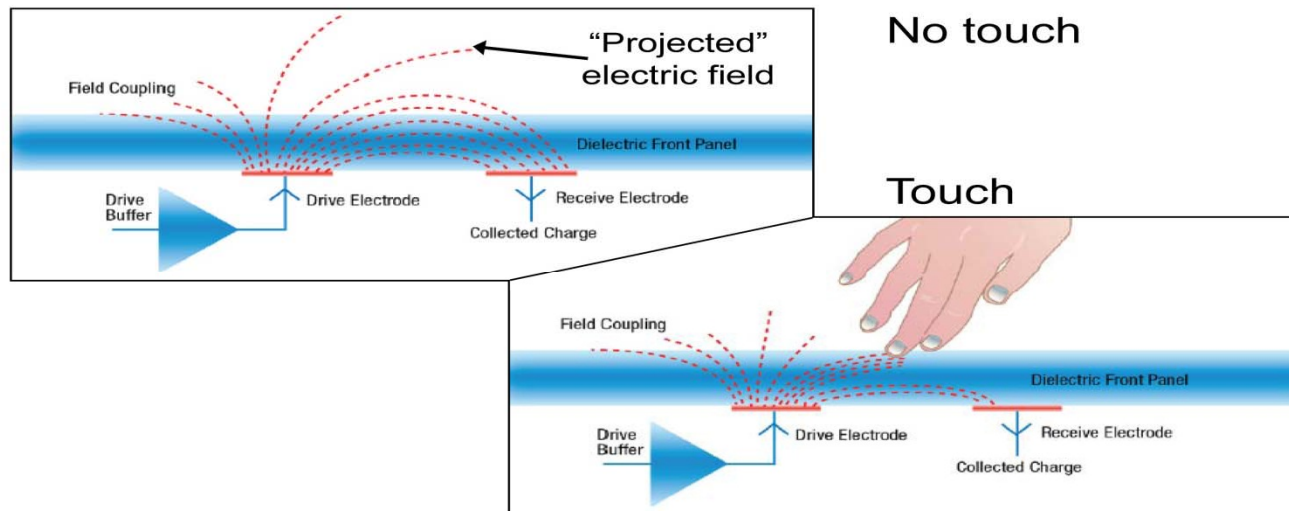
- ▶ 1 or 2 conductive layers form an X-Y array of lines to create a grid of electrodes. The X/Y intersections are scanned continuously.



: Rows and columns of electrodes in two layers

Projected Capacitive (PCAP)

- ▶ By apply voltage, a grid of capacitors is created. Bringing a finger close to the sensor changes the electrostatic field. The change at every point on the grid is measured to determine the location.





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Projected Capacitive (PCAP)

▶ Benefits

- Glass top layer
 - Scratch resistant
- Multi-touch – recognizes two or more simultaneous touch points.
 - 2- 10 multi-touches (dependent on controller)
- Touch coordinates are drift free.
- Precise position location
- Excellent optical clarity (90%+)
- Zero-bezel design (flush surface)
- Auto-calibration

▶ Limitations

- Gloved hand*
- Higher cost

▶ Size Range: 7 - 24" (Diagonal)



Touch Controllers/Interfaces

- ▶ Controller
 - PCBA
 - Chipset
 - COF (Chip on flex)

- ▶ Interface
 - USB
 - RS232
 - I2C

- ▶ Drivers available for most operating systems including
 - Windows
 - Linux
 - Android



Design Considerations

► What is the best solution for my product?

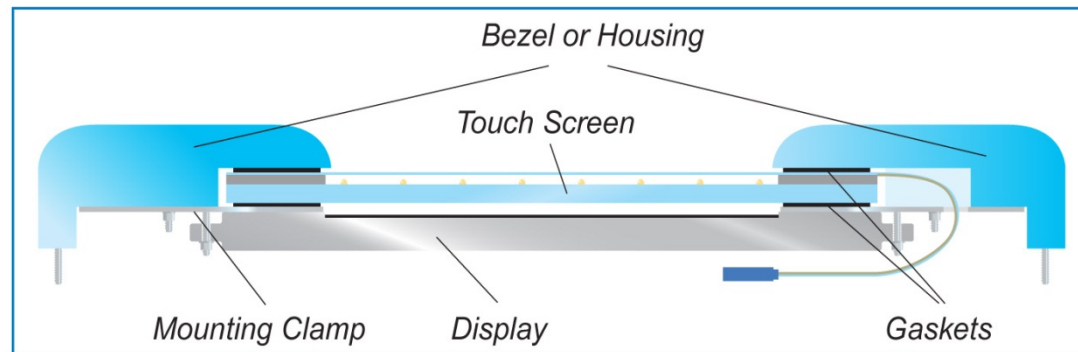
- Size
- Environment
- Application
 - Aerospace, medical and military
- Durability
 - Number of touches
 - Surface hardness
 - Sealing
 - Nema4 and IP65
- Input
 - Stylus, gloved hand, finger
- Cost



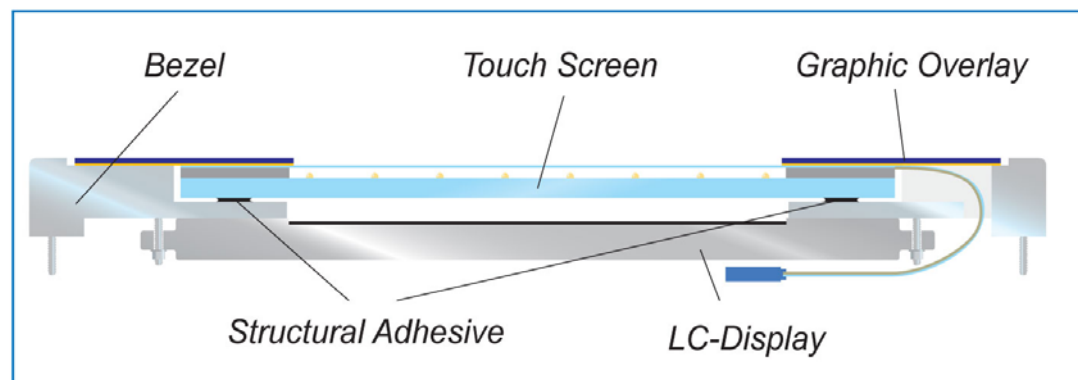
Touch Panel Integration

▶ Mounting the touch panel to the display

— Rear Mounting



— Front Mounting



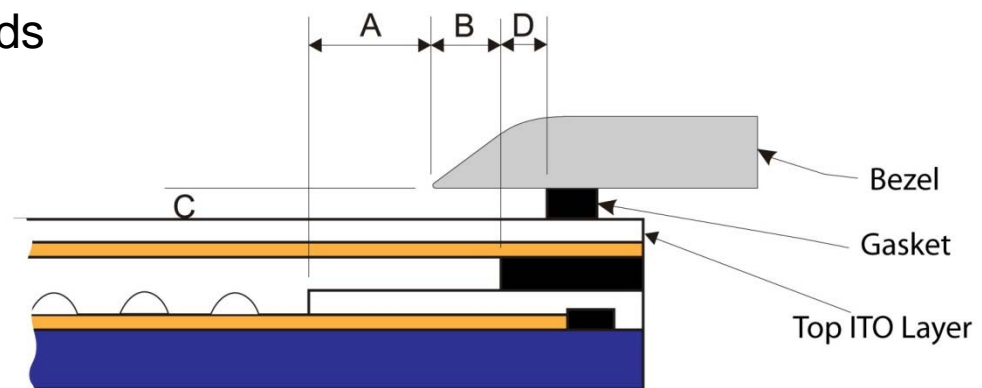
Touch Panel Integration

▶ General Guidelines

- A. Bezel edge to active area - 1.00 mm (min)
- B. Bezel edge to viewable area - .8mm (min)
- C. Bezel face to touch screen - .3 - .7 mm
- D. Gasket edge to viewable area – 1.00 (min)
 - Spacing may need to increase due to gasket material.

▶ Gasket material selection

- NEMA 4 and IP65 standards



► There is no perfect touch technology!

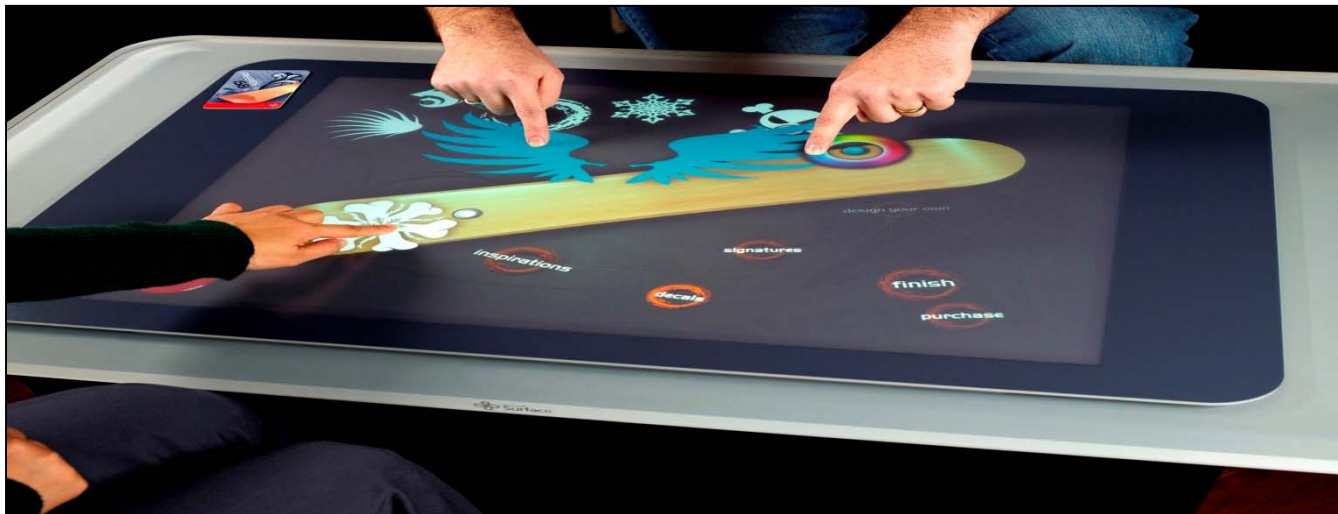
TOUCH TECHNOLOGY				
	Resistive	Surface Capacitive	Projected Capacitive	Infrared
Size	2.8 - 21"	5 - 24"	7 - 24"	15 - 46"
Touch Accuracy	Good	Good	Excellent	Good
Operating Force	50g - 100g	0g	0g	0g
Light Transmission	Poor/Good	Very good	Excellent	Excellent
Calibration Stability	Poor/Good	Poor	Good	Excellent
Touch Life	1 - 10 Million	100 Million	Unlimited	Unlimited
Gloved Hand	Yes	No	Yes	Yes
Stylus	Yes	Cond. Stylus	Cond. Stylus	Yes
Sealing	Nema 4/IP65	Nema 4/IP65	Nema 4/IP65	Nema 4/IP65
Multi-touch	No*	No	Yes	No
Operating Temp	(10) -70°C*	(20) -70°C	(10) -70°C	(20) -70°C
Humidity	Good	Excellent	Excellent	Excellent
Surface Moisture	Unaffected	Unaffected	Unaffected	Affected
Surface Contaminants	Unaffected	Unaffected	Unaffected	Affected



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Summary

- ▶ Multiple touch technologies.
 - Epec's technology offerings cover over 90% of the touch units sold.
- ▶ Standard and custom sizes.
 - Engineering documentation is available for standard sizes.
- ▶ Design support from concept through production.
 - Reverse engineering





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- ▶ We are a leading provider of printed circuit boards, flex and rigid-flex circuits, membrane switches, touch panels, silicone rubber keypads, graphic overlays, custom battery packs, and electronic fans & motors.



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MOTORS



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Thank You

- ▶ If you require additional information please contact us with any questions or requests.

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