Touch Technologies:
a TouchSystems Primer

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1. Resistive .................................................................................................................. 4
2. Surface Capacitive (SCap) ...................................................................................... 6
3. Projected Capacitive (PCap) .................................................................................. 8
4. Dispersive Signal Technology (DST) ..................................................................... 10
5. Infra Red (IR) ....................................................................................................... 12
Touch is a universal language. We use touch to communicate. A hand on the shoulder brings comfort. A pat on the back says “good job” or “well done.”

We touch other things, too. We touch our smartphones – we may be the sort who are rarely separated from them – and our tablets and e-readers. We touch the payment screens at the grocery store. We might order a meal via a digital menu. We touch and touch and touch.

It’s no surprise, then, that a demand exists and is increasing for touch-enabled devices. We live in a touch-rich world. Touch is intuitive to us. It’s natural. It’s our language, and we want to speak it.

While we may speak with touch, we use different languages or technologies to accomplish that communication. Some touch technologies only work with smaller screens. Others are designed for large-format displays. Still others can be used with both small and large screens. Size isn’t the only reason for the different technologies; the technologies offer different touch experiences. Some technologies only offer a single touch point and are akin to pointing and clicking with a mouse. Others provide multiple touch points, resulting in touch solutions similar to their smaller counterparts the smartphone and tablet.

With younger generations, the demand for touch is more acute. They’ve grown up with tablets and smartphones and expect most screens to be interactive.
Resistive touch technology has a few varieties, but it’s mostly used in its 5-wire form. Resistive is the cost-efficient workhorse of touch technology. It’s integrated into screens ranging from six to 24 inches.

How it works: A 5-wire resistive touch technology sensor consists of two panes separated by “spacer dots,” glass beads that are silk-screened onto the bottom pane. The top pane is a polyester sheet with a conductive coating applied to its underside. The bottom pane is made of glass, is covered with a conductive coating on its topside, and has an electric current applied to its four corners. When a person presses on the top sheet, it bends, causing its conductive coating to come into contact with the conductive coating on the bottom layer of glass. The electric circuit closes, and the voltage at the point of contact is read by a wire attached to the top sheet.

Diagram: Resistive Touch Technology
**Advantages:**
Low cost solution
Low power consumption
Screen can be activated with a finger, stylus, or pen

**Disadvantages:**
Requires periodic calibration
Less transmittance and overall optical quality
Less durable than other touch technologies

**Applications:**
Point-of-sale terminals
Industrial machine controls
Medical equipment
Office automation

**Product Offerings:**

- M51790R-UME
- P2490R-U1
- M11990R-U3i
Surface Capacitive (SCap) rose to prominence in the '70s and '80s due to ATM and legacy gaming applications. It has seen a decline in use, but it continues to be popular in the home security market because of its optical clarity and finger-only input.

How it works: A surface capacitive sensor comprises a single pane with a conductive coating on its top surface. Wires are attached to the four corners, and a small voltage is applied to each of the corners. When a person touches the screen, a small current flows from that point and is registered as a touch by the four corners.

Diagram: Surface Capacitive (SCap) Touch Technology
**Advantages:**
Higher transmittance than resistive because it has fewer layers

**Disadvantages:**
Less durable than some touch technologies
Less optical quality
Requires periodic calibration

**Applications:**
Point-of-sale terminals
Kiosks
Gaming

**Product Offerings:**

- M51750C-UME
- P2050C-U
- P2450C-U1
Projected Capacitive (PCap) has grown in popularity because of its optical clarity and durability. It’s found in smartphones, tablets, and some desktop monitors and smaller large-format displays.

**How it works:** A projected capacitive touch screen consists of a charged matrix, or field, of columns and rows that are read or scanned by the sensor. When a finger or stylus touches the screen, the charge is interrupted. The sensor reads that interruption as a touch point or points.

Diagram: Projected Capacitive (PCap) Touch Technology
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**Advantages:**
- Multi-touch capabilities
- More durable and reliable than other technologies
- Technology can be integrated with different types of glass

**Disadvantages:**
- Limited inputs – doesn’t work with all gloves and styluses
- Can be expensive when integrated with larger sizes
- Prone to electromagnetic interference (EMI)

**Product Offerings:**

- IS1534P-U
- IW2235P-U
- IW3234P-U
Dispersive Signal Technology, commonly known as DST, is a 3M technology. It’s often integrated with large-format displays because of its resistance to scratches, dirt, and debris and its ability to withstand heavy use.

**How it works:** DST uses a single pane of glass. Sensors are placed in each corner of the glass. When a person touches the glass, energy (bending waves) flows from the touch location. The sensors detect the waves, read them, and triangulate the touch point.
Applications:
Wayfinding
Kiosks
Retail
Digital menu boards

Advantages:
High optical quality
Good durability
Works with various inputs including fingers and styluses

Disadvantages:
“Click-and-point” touch technology

Product Offerings:

X5550D-U2

V4250D-U3
**Infra red**, like DST, is a common technology used with large-format displays. It can be a cost-effective touch solution, but its popularity is mostly due to the way in which it integrates with displays – it adds little to a display’s depth – and its ability to identify multiple touch points.

**How it works:** Infra red touch technology uses a perimeter of infra red LEDs placed on two sides of the display and photo transistors placed on the opposing sides. The sides work in pairs; the signal from the LED transistors is read by the opposing photo transistors. When that signal is interrupted, it indicates a blocked infra red beam, which, in turn, indicates a touch point. While most infra red displays don’t require a layer of glass in order to work, a pane of glass usually is recommended to protect the underlying display from damage and to prevent glare.
Applications:
Retail
Hospitality
Restaurants
Education

Advantages:
High optical quality and transmittance
High durability and reliability
Good anti-glare with the use of chemically etched glass
One-time calibration

Disadvantages:
Surface obstructions can cause false touch points
Limited use in environments with direct sunlight

Product Offerings:

V4650D-U3
X4050D-U1
About TouchSystems

TouchSystems, established in 1996, remains a pioneer in the touch industry. TouchSystems works with customers to create innovative touch solutions, such as desktop touch monitors, interactive (single- and multi-touch) digital signage, all-in-one systems, and kiosks. TouchSystems is based in Hutto, Texas and is a certified woman- and minority-owned small business.