

Resistive touch: a press becomes a voltage

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Resistive handheld: stylus input and a physical keyboard coexist.

Yuri Litvinenko from Kirov, Russia | [Source](#) | [CC BY 2.0](#). Unmodified photograph; scaled for display.

The voltage-divider mechanism

Two conductive surfaces face each other across a small separation. Pressing the flexible top surface makes contact. In a four-wire panel, the controller drives a voltage gradient along one layer and uses the other as a voltage probe. It then swaps roles to measure the other axis.

For an ideal uniform sheet, $x/L = V_{\text{touch}}/V_{\text{drive}}$. With a 100 mm span, a 3.0 V gradient and a 1.2 V sample, the inferred position is 40 mm from the zero-voltage edge. This calculation assumes a high-impedance measurement and ignores edge-field distortion, contact resistance and settling.

The animation separates pressing, X acquisition, Y acquisition and release. Real controllers must allow switching transients to settle and reject contact bounce.

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Why the wire count matters

A five-wire design drives both coordinate gradients on the lower resistive layer. The upper layer senses voltage rather than defining an axis gradient. This changes how upper-sheet wear affects measurement. Eight-wire panels add sensing connections to a four-wire arrangement to help compensate drive-path voltage drops; they are not eight-touch panels.

Analog panel wiring is controller-specific. Identify electrode names and connector orientation from the actual drawing; never infer a pinout from wire count. A controller may deliver raw samples over SPI or I2C, while another adds a USB interface and HID firmware.

Conventional analog resistive is often used for single touch. Specialized controllers and panel structures can support additional contacts; verify the exact supported gestures rather than claiming all resistive systems are single-touch.

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What to validate

The practical trade is reliable physical actuation versus the force, wear and optical consequences of the compliant stack. Test the intended glove, rounded stylus, diagonal drag and edge targets. Compare the first and last taps after temperature exposure and repeated use.

Calibration estimates a mapping between sensor coordinates and displayed targets. A three-point affine fit can correct translation, rotation, scale and shear, but cannot repair arbitrary nonlinear distortion or intermittent contact. Use independent validation points after fitting.

For the voltage-divider example, a 12-bit converter has 4,096 codes: the nominal 100 mm/4,095 code spacing is about 0.0244 mm. This is quantization, not a claim of 0.0244 mm touch accuracy.

Apply the idea

A 150 mm ideal axis is driven with 3.3 V and sampled at 2.2 V. Find x . Explain why an accurate answer does not prove an accurate panel.

Discussion: $x = 150 \times 2.2/3.3 = 100$ mm. Sheet uniformity, calibration, noise, mechanics and the actual contact location still affect accuracy.

References:

S01 Elo - [AccuTouch five-wire resistive operation](#)

S02 Texas Instruments - [TSC2008-Q1: four-wire resistive controller and SPI](#)

S26 Texas Instruments - [TSC2013-Q1 dual-touch resistive controller](#)