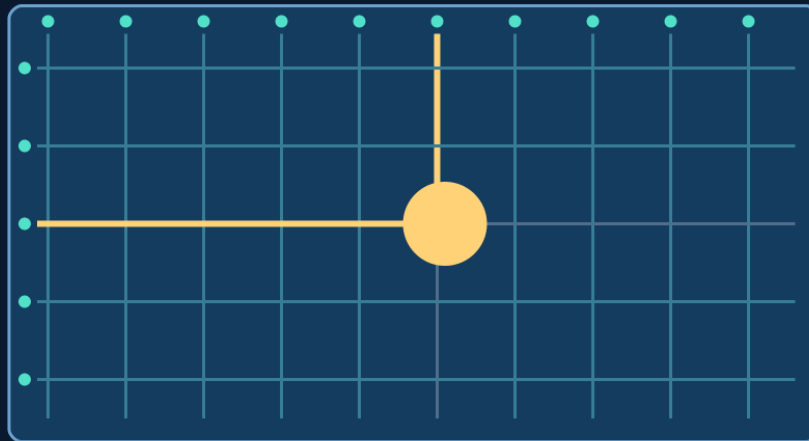


Infrared beam grids: locating an interrupted path

Chapter 6 | Reading 1 of 3

Infrared: interrupted light paths



Solid: optical path

Dashed: interrupted

Plane above glass

Illustrative mechanism • not to scale • no product performance prediction

From emitters to coordinates

Infrared emitters and detectors are arranged around the active area. The controller pulses emitters and observes received light. An object entering the sensing plane blocks or attenuates selected paths. The pattern of interrupted paths provides position information.

A simple orthogonal illustration has horizontal and vertical beams. Two blocked rows and two blocked columns can imply four intersections even when only two fingers are present. Practical multitouch products use more observations and tracking strategies; do not assume a sparse grid automatically supports unambiguous multitouch.

The animation shows one contact and beam interruption. Its beam pitch is enlarged for teaching and is not a product-resolution specification.

Infrared beam grids: locating an interrupted path

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The advantages come with geometry

Sensing can occur above a protective window, keeping touch electrodes out of the viewing area. Detection need not depend on the object's electrical conductivity. This makes the approach useful to investigate for gloves, passive tools and unusual display sizes.

The optical plane may sit above the image and physical glass. It can therefore detect a finger before contact. Plane height and viewing angle affect apparent alignment, especially near the edges. A raised bezel, corner obstruction or accumulating debris can compromise paths.

Sunlight tolerance depends on receiver range, optical filtering, modulation and processing. A statement about a technology family does not replace testing a particular frame under the required illumination.

For applications that challenge conventional IR receivers in full sunlight, consider ShadowSense as a separate optical candidate. Chapter 7 explains its ambient-light rejection and a custom NVIS illumination option.

Infrared beam grids: locating an interrupted path

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Design and test the perimeter

Check the opening, allowable frame depth, LED and detector keep-out regions, gasket placement, cable exit and cleaning access. Bezel material must transmit the relevant infrared wavelengths if it covers optical paths.

Challenge the assembly with low-angle sunlight, different finger sizes, two contacts crossing, sleeves near the edge, and a sustained obstruction. Evaluate recovery after removing the obstruction. Separate a temporary blocked region from a whole-panel failure.

For night-vision applications, include emitters in the emission assessment. Infrared that people cannot see can still matter to another sensor. Chapter 18 examines this interaction without assuming that a particular wavelength is automatically safe.

Apply the idea

A finger is detected 3 mm above the glass. Is that necessarily a defective sensor?

Discussion: No. It may be the intended optical sensing plane. The integration and user-interface requirements determine whether early detection and apparent offset are acceptable.

References:

S08 Elo - [Infrared beam-grid operation](#)

S09 Baanto - [ShadowSense operating principle](#)

S23 DLA ASSIST - [MIL-STD-3009 status and scope; base 2001, validation notice 2024](#)

S29 Baanto - [ShadowSense Pro - full-sunlight ambient-light specification](#)