



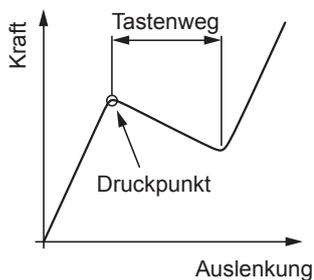
Haptic feedback

A new operating concept for touch systems

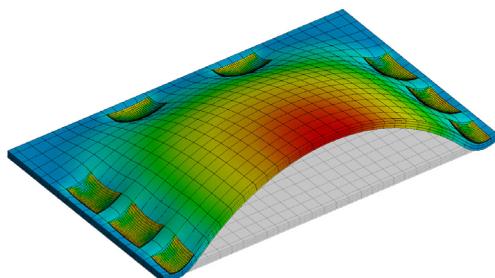
The Linz Center of Mechatronics GmbH (LCM) offers a novel touch screen with innovative features. The heart of the system is a transparent plate that is actively deformed by piezoelectric materials, and thus gives the operator a similar feeling as when pressing a conventional key.

In conventional touch screens, although information can be entered by touch, the user does not feel a tactile reaction. However, with LCM's patented concept a plate is suddenly deflected precisely at the moment it is touched so that the user has a sensation comparable with a conventional key press. This intuitive type of operation greatly increases the input accuracy.

DESIGN FEATURES:



The sensor technology is based on a measurement of the deflection of the plate at different locations. This way, both the position and the intensity of the contact can be detected. When a minimum load is exceeded, the board deflects suddenly. This briefly results in a negative stiffness (a characteristic of a key confirmation) in the load deflection curve, see diagram on the left.



The deflection of the plate is effected by piezoelectric patch transducers. These are glued to the plate and deform when an electrical voltage is applied, as shown in the diagram on the left. By placing the sensors and actuators in the peripheral regions of the sheet, there is no interference in the visible area.

Prototype - technical data

Acrylic glass plate (thickness 5 mm), clamped at the edge*

Conventional flat screen (22") below the sheet*

Strain gauges for measuring the contact

Piezoelectric patch transducers for active deflection

Control via a real-time embedded system

Communication with PC: Transmission of key confirmation and position

*Also available for glass as well as other materials or other sizes.

BENEFITS:

- Low energy consumption
- No interference in the visible area
- Compact design
- Easy to integrate into existing systems
- Very robust because:
 - No moving parts
 - No complex mechanics and mounting (sheet simply has to be firmly clamped)
 - Simple seal

APPLICATIONS:

The robust and relatively simple construction means that it can be used in practically in all areas where touch screens are used. For example:

- Self-service devices of any kind (e.g. ticket machines)
- Consumer electronics
- Industrial applications
- Automotive industry

For the elderly and persons with impaired sensory capabilities, this intuitive method of operation makes complex equipment much easier to use.