

One-Handed Interaction Techniques for Multiple Pressure-Sensitive Strips

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Goals

- Small form factor manual input device & GUI
- Wearable friendly
- Single-handed operation
- Minimize interaction time

In WIMP interfaces:

1. Move hand to device

~~2. Move cursor to widget~~

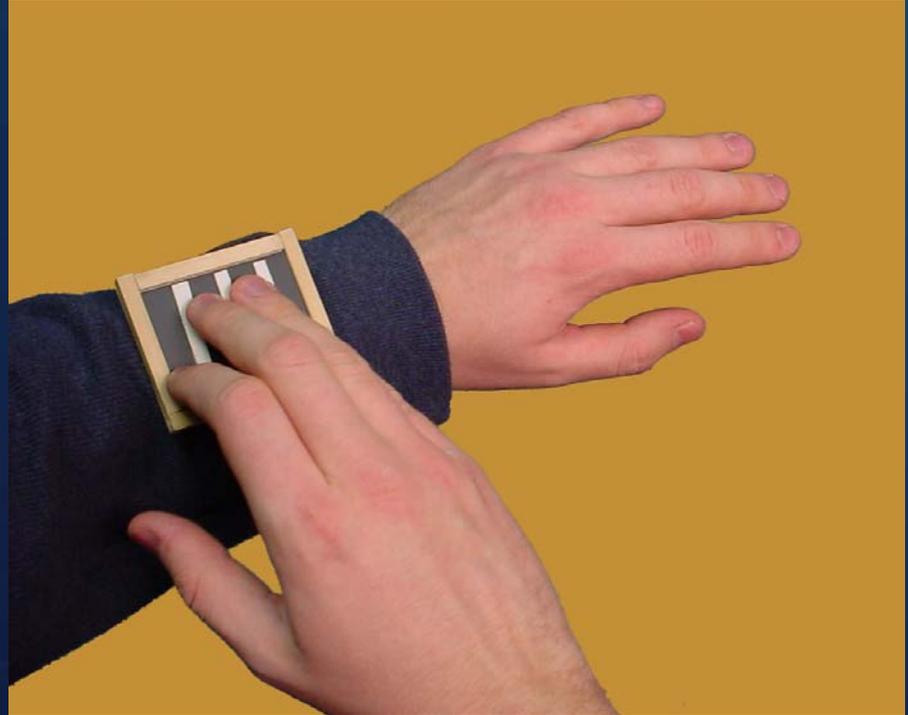
3. Change parameter with widget



- Eliminate on-screen cursor navigation

Results

- One handed
- Mobile
- Off the shelf technology
- Control up to 14 widgets
- Minimize/eliminate widget screen space

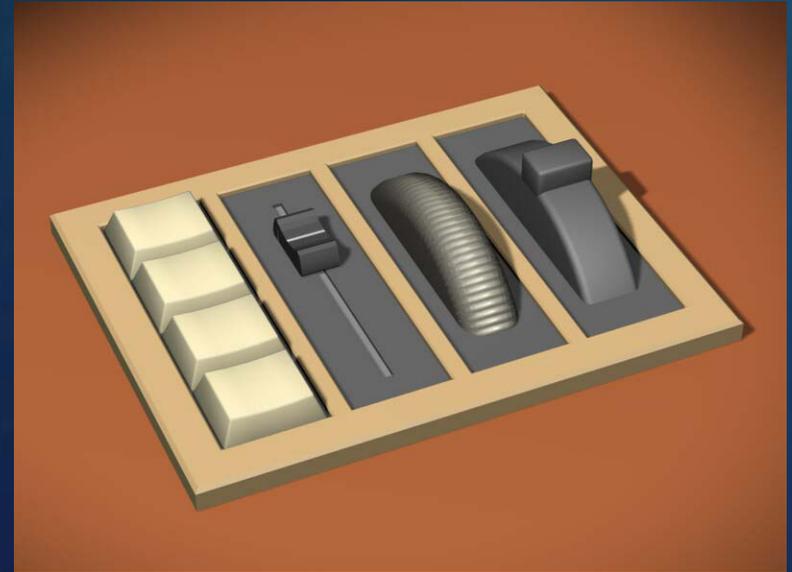


Basic Approach

Subdivide touch-sensitive surface into four 1D linear strips



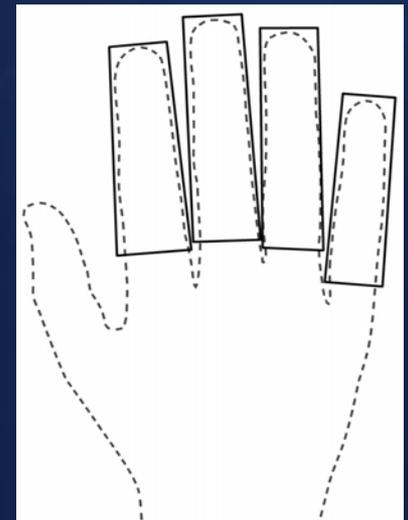
Changes a traditionally 2D device into a 4 x 1D device



Virtual Widgets:

- Buttons of variable sizes
- Slider
- Spinner wheel
- Spring loaded wheel

→ Fast reconfigurability in software



Enhancement 1: Pressure

“Pressure” with
capacitance sensing

Can I sense
pressure?

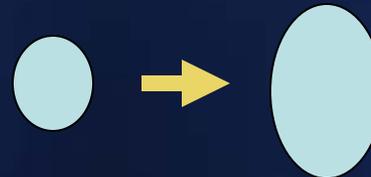
Finger presses harder



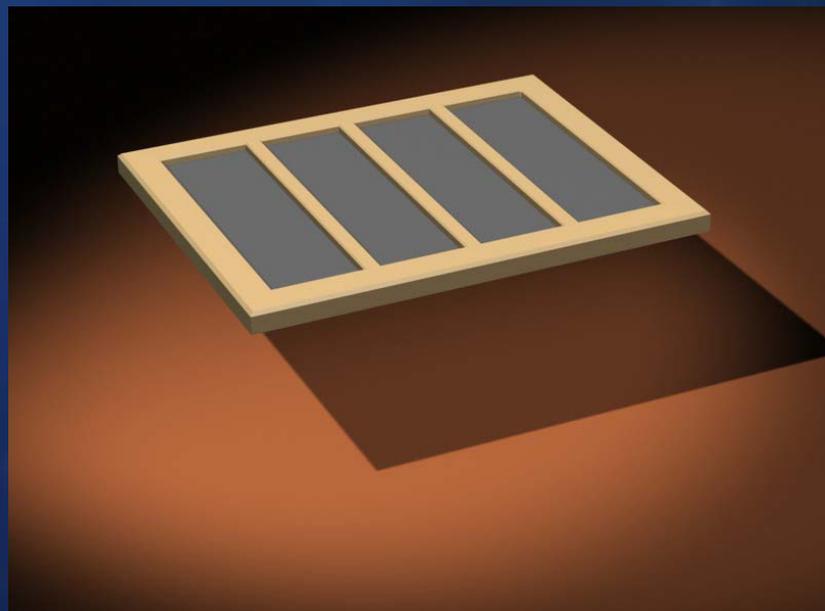
Contact area increases



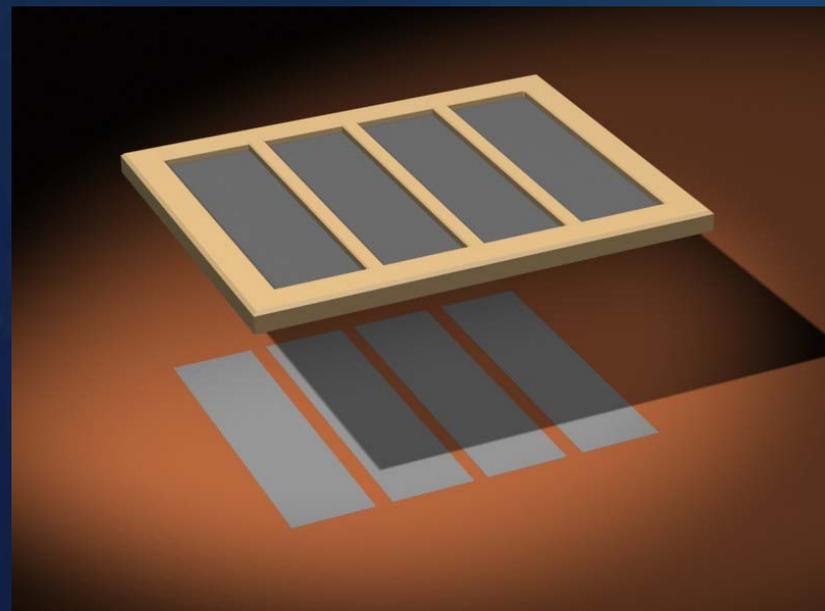
Capacitance increases



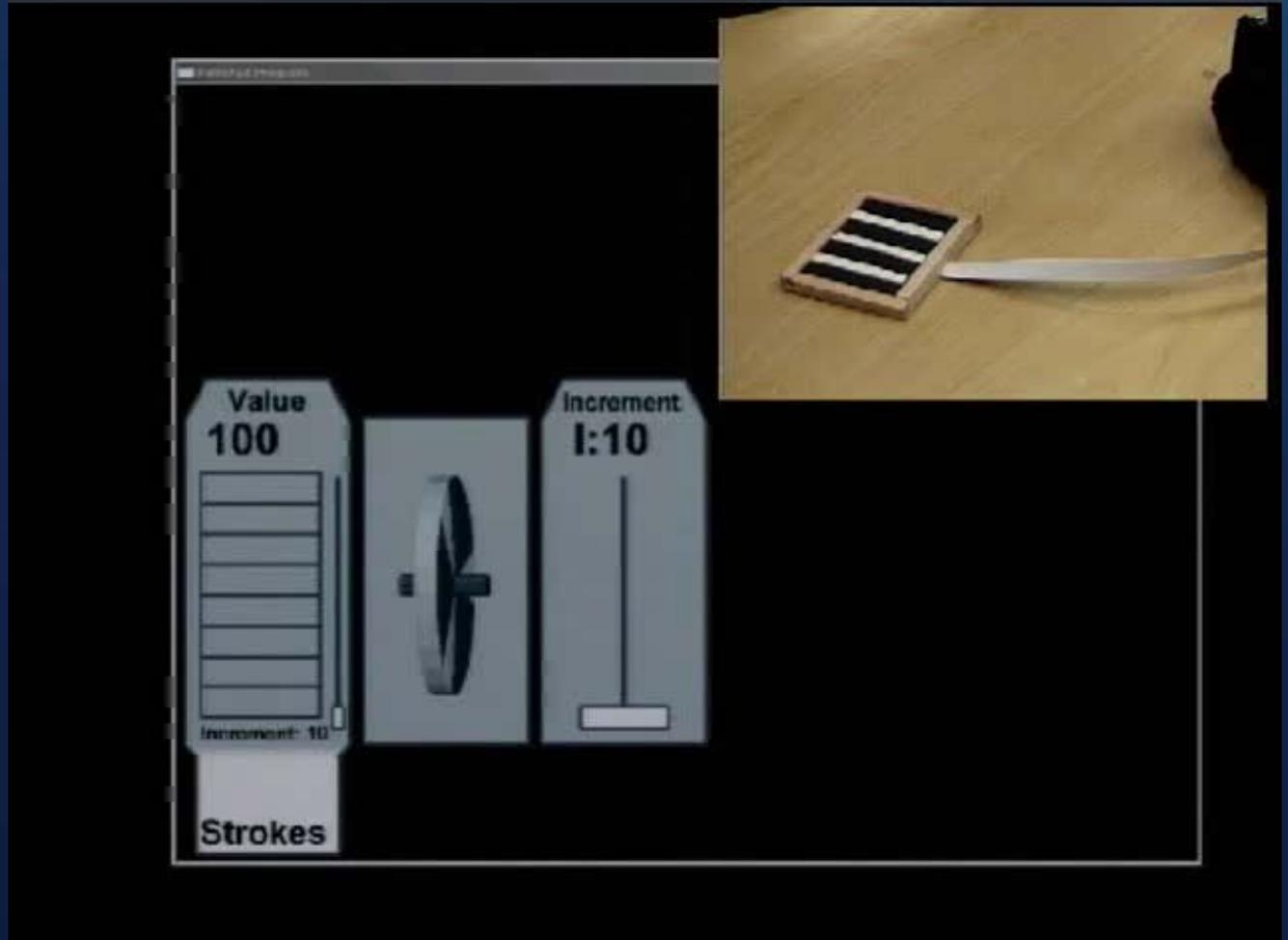
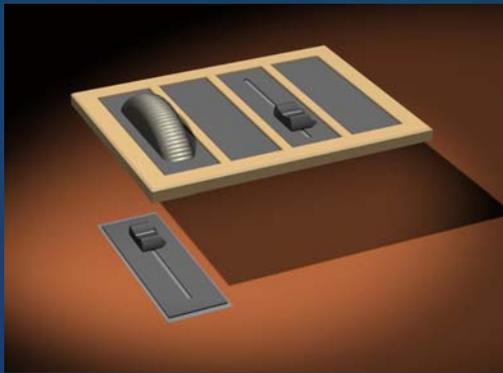
Pressure sensitivity virtually doubles number of strips



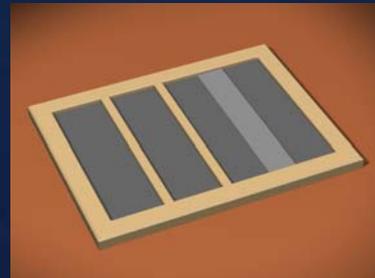
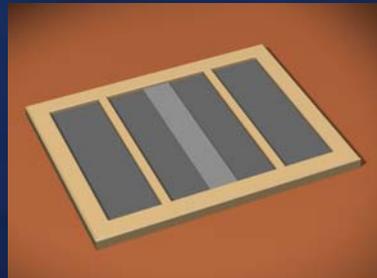
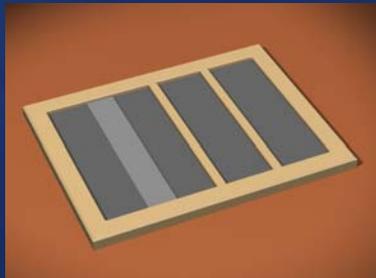
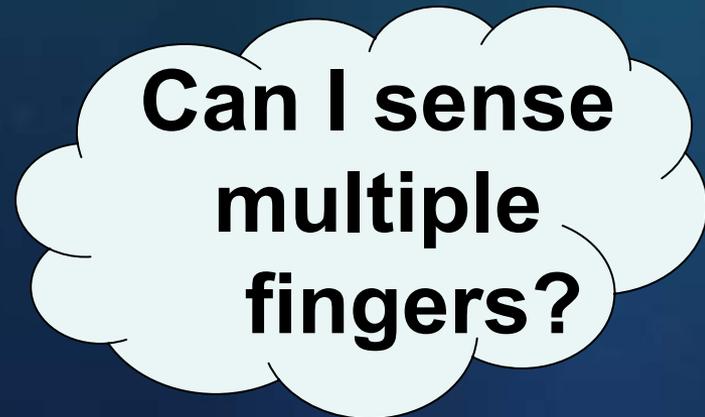
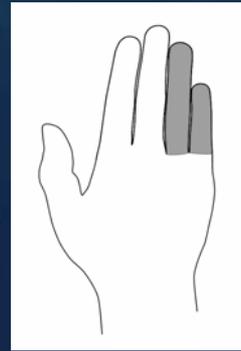
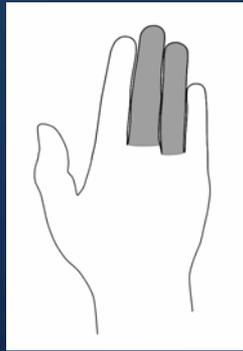
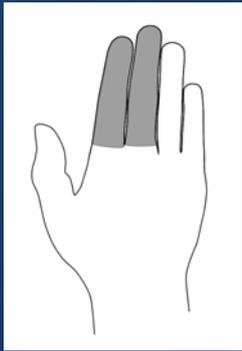
4 x 1D



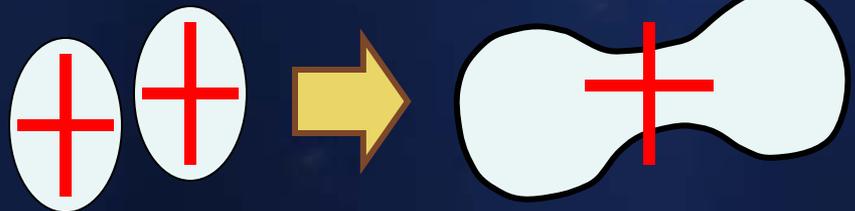
8 x 1D

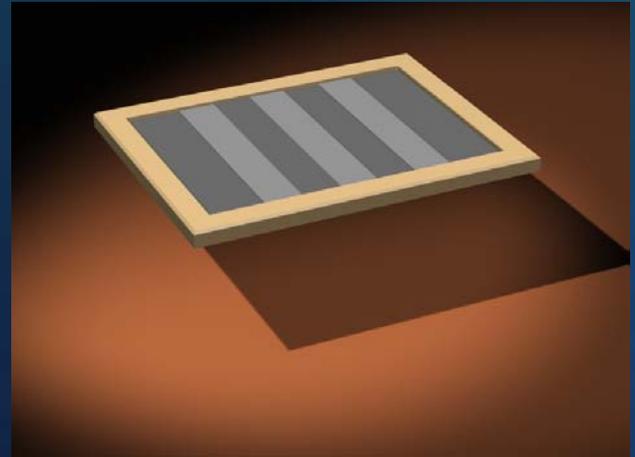
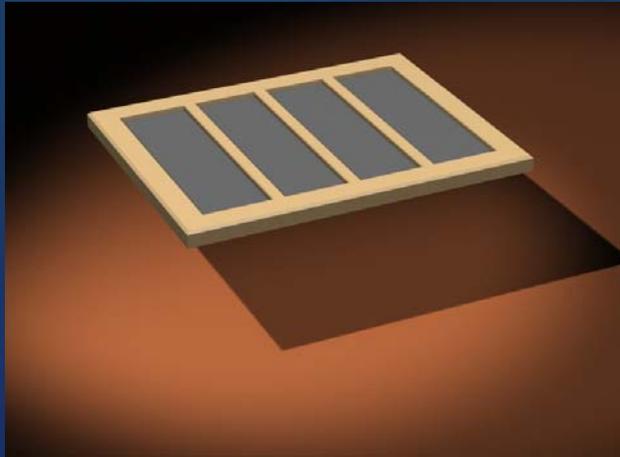


Enhancement 2: Dual-finger Strips



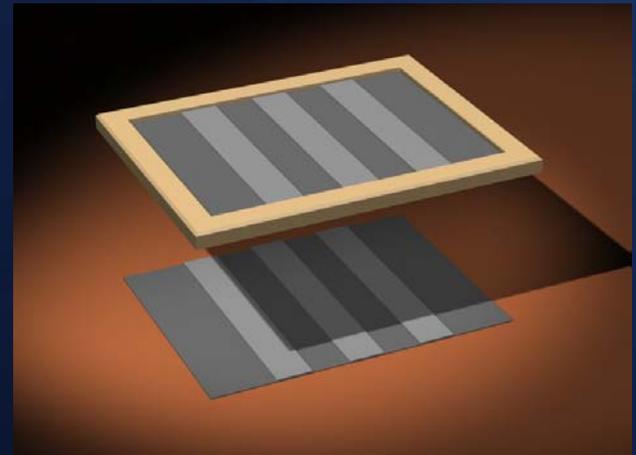
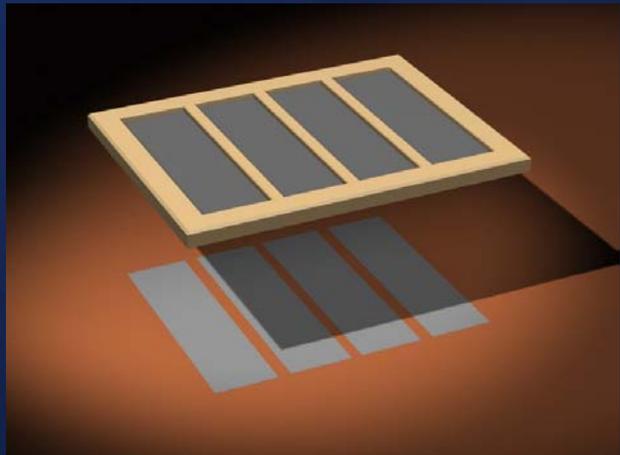
- Position of centroid of two contact areas
- Larger capacitance





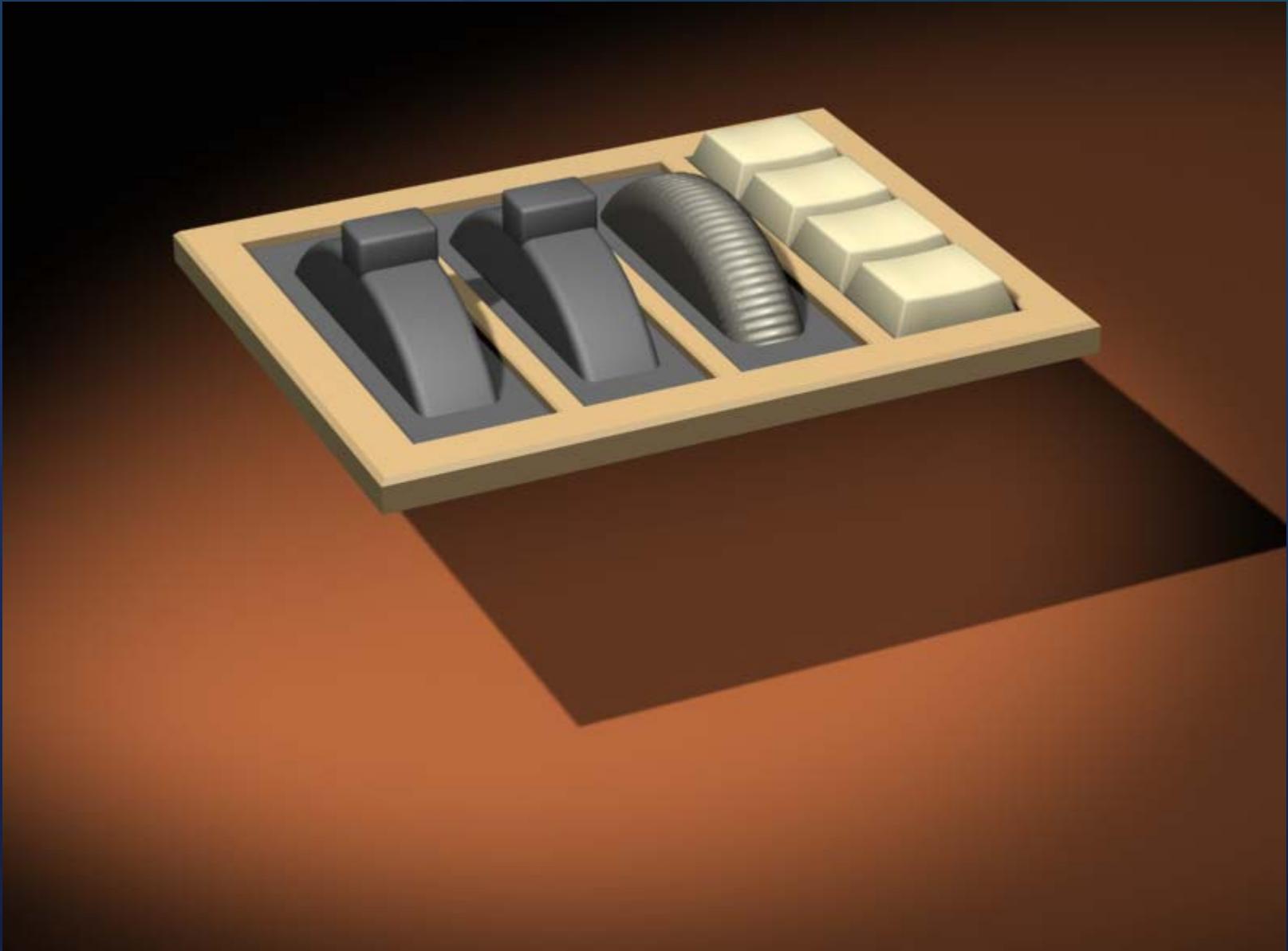
4 x 1D

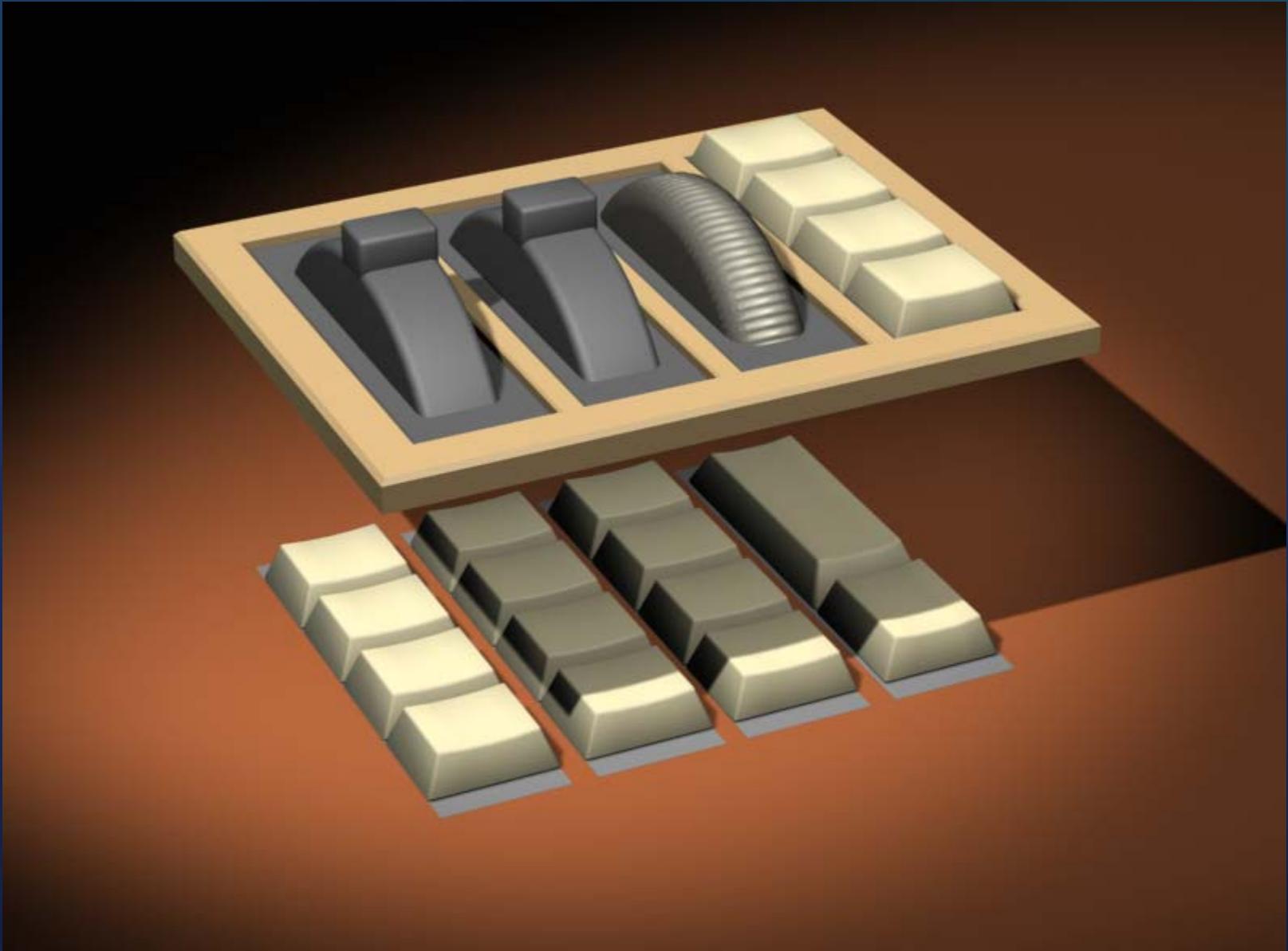

7 x 1D

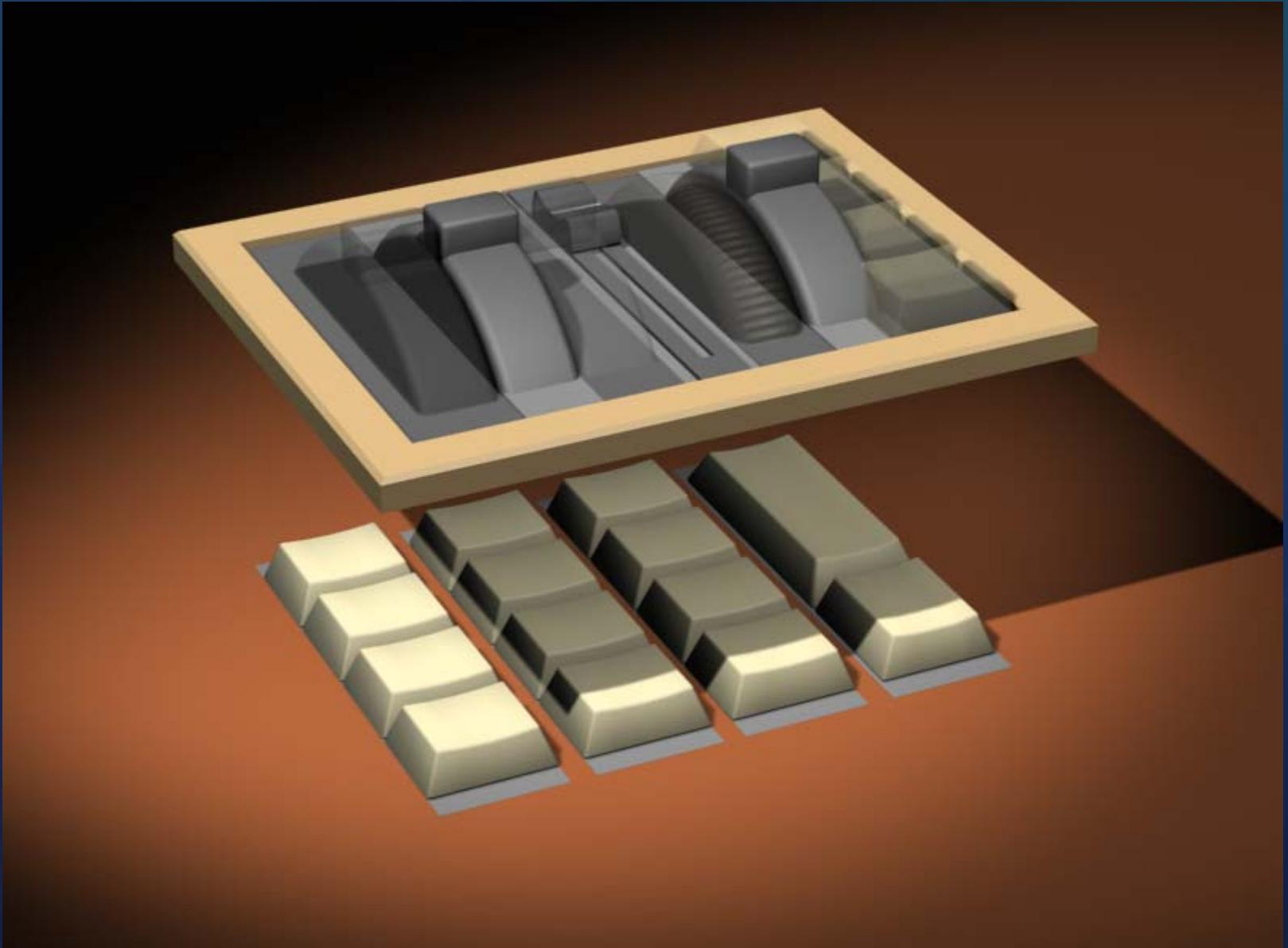



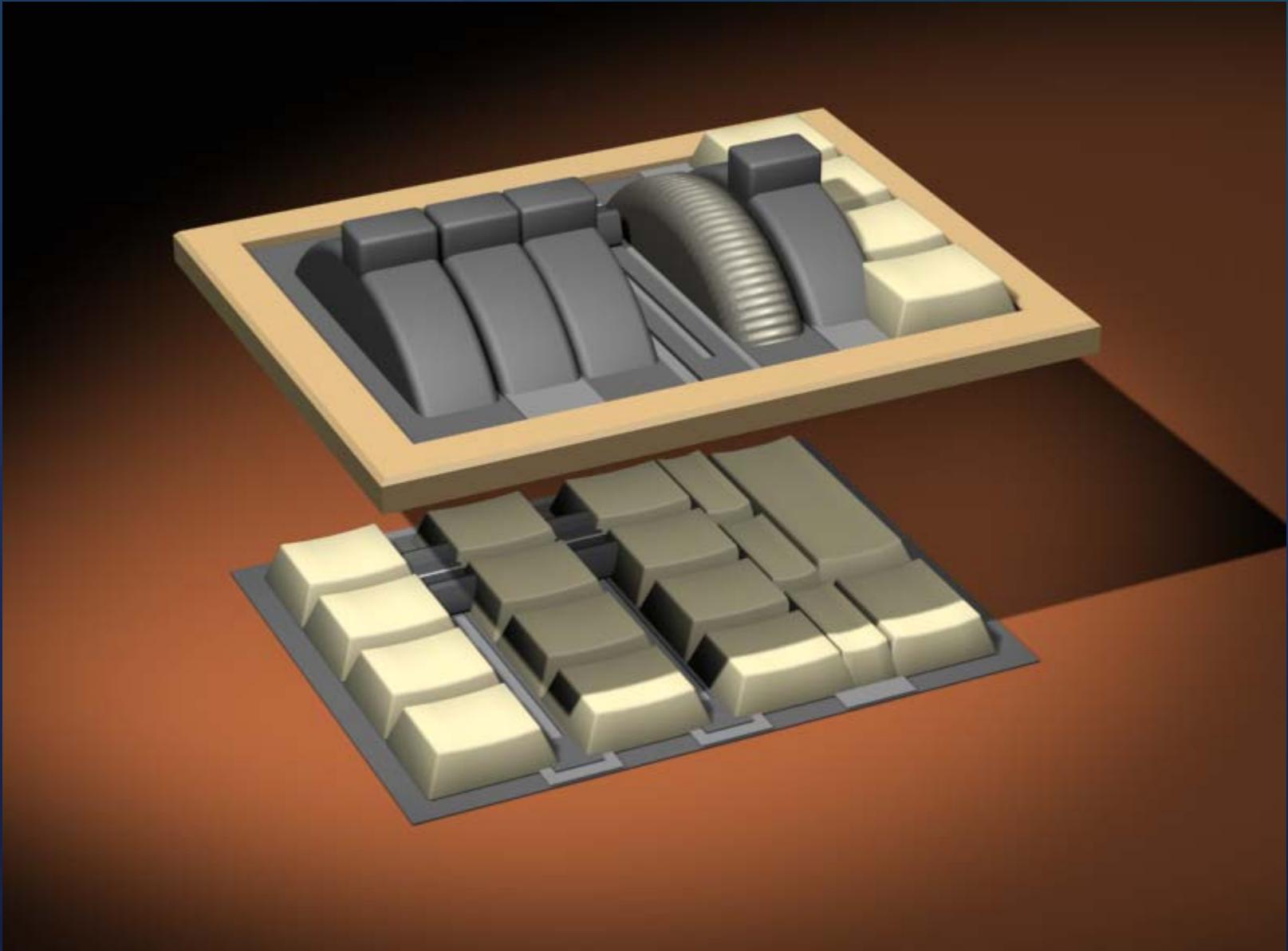
8 x 1D

14 x 1D











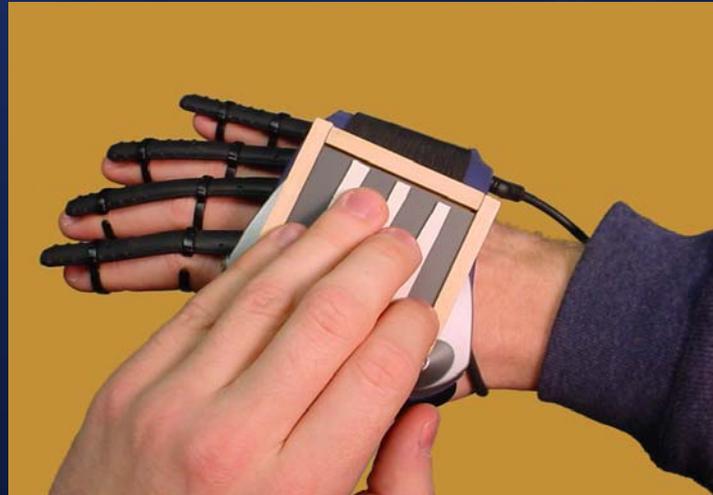


Conclusions

- One hand
 - Four linear strips
 - + pressure
 - + multiple finger
- Direct control of 14 widgets



Possibilities...



with P5 VR glove

with Tablet PC