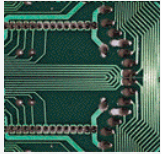


## Media Interface Technology



<http://www.mat.ucsb.edu/5940/>

## Logistics

Does everyone have the book?  
(Designing Embedded Hardware)  
Read ch. 5-8...

Are you signed up for the Sensors mailing list???

Who still needs a lab kit?

## Transducers

Transducers convert actions in the physical world to electrical signals the CUI can deal with... or vice versa

They range from simple switches to custom built sensors and actuators

## Simple Switches

Normal “undisguised” switches

- many types, from wall mount to step switches, look in catalogs, radioshack...

Make your own switch

- two metal plates on either side of a piece of foam rubber with holes in it...

Needs to be robust to stand up to use

- commercial options are good this way, ie. [www.tapeswitch.com](http://www.tapeswitch.com), etc.

Roller switches, hair trigger switches

- consider how much tactile feedback you want

## Non-contact Switches

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### Beam Switches (burglar alarm type)

- uses a light beam and a photoelectric cell to detect movement through doors, etc...

### Magnetic (reed switches)

- Thin pair of contacts inside a protective housing that are drawn together when exposed to a magnetic field... put magnet under an object and a reed switch on a platform to sense presence

### Motion Detectors (burglar alarm)

- Detect changes in the Infrared light in a space to detect movement, usually have digital outputs but a few can be found that have analog to provide a measure of "how much" movement is happening

## Position (non-contact)

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### IR sensors

- the Sharp Electronics GP2D family of sensors are fairly cheap, easy to use, different ranges up to about 56 inches, hook to A/D input on PIC

### Ultrasonic sensors

- robotic sensors such as the Devantech SRF series at [www.acroname.com](http://www.acroname.com) - longer range possible, a bit more complicated to interface - some programming required to either capture pulses via interrupts (SRF04) or receive I2C data (SRF08, etc)...

### Magnetic sensors

- Hall effect sensors such as [www.allegromicro.com](http://www.allegromicro.com) - sense short distances very accurately... (also the polhemus and ascension trackers but \$\$\$!)

## Position (contact)

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### Flex sensors

- very easy to use, [www.imagesco.com](http://www.imagesco.com)

### Pressure sensors, eg. FSR from [www.interlinkelec.com](http://www.interlinkelec.com)

- can measure static pressure or position (with pad)

### Potentiometers (look in catalogs, online...)

- Rotational movement
  - single turn (various types)
  - multi-turn (various types)
- linear movement
  - different lengths
  - some are motorized

## Movement

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### Accelerometers from Analog Devices, Inc.

- [www.analog.com](http://www.analog.com) - MEMs devices to sense movements and also the static force of gravity... different ranges of measurement, the ADXL203 is a fairly low-g device with analog output, breakout boards available from [www.sparkfun.com](http://www.sparkfun.com)

### Mercury Switches

- simple on/off indicators depending on tilt angle

### Pinball tilt sensors

- easy to build your own with a pair of optical transmitter/receiver to sense the pendulum's interruption of the light

## Making Movement

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Regular DC motors

- geared, ungeared, vibration with off-center weight...

Servo Motors

- these are easy to work with, made for remote control airplanes but only travel 180 degrees... probably around \$20/each at any hobby store

Stepper Motors

- need driver chip such as the UCN5804...

Solenoids

- in/out, can be driven via relay circuit, etc...

Muscle Wire (Shape Memory Alloys)

- thin metal filaments that shorten in length when powered, need driving circuitry, etc. [www.mondo.com](http://www.mondo.com)

## Others...

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There are many other sensors...

- Pyroelectric (flame detectors), thermopile arrays, electronic compasses, GPS for outdoors, etc, etc etc...

See what you can find!

## Time to Build

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Questions about the lab kits? Soldering?

Let me know...