Digital / Analog Sensing

\[ 0\,\text{v} = \text{logic 0} \quad \text{or} \quad 5\,\text{v} = \text{logic 1} \]

\[ 0\,\text{v} \leq \text{range 0v-5v} \rightarrow 0 - 255 \]

Contact / Bump Sensing

Bump Switch (tactile sensor)

Open = 5\,\text{v}

Closed = 0\,\text{v}
Light Sensor (Cds Photocell)

5V

47kΩ

IN

~ 0.3 V - ~ 4.6 V

~ 3kΩ - ~ 500kΩ

light dark

Cadmium Sulfide (Cds)

spectral response ~ human eye
Reflective Photo sensor

5V  
330Ω

IR LED

5V
47kΩ

IN

IR Photo transistor

wall
(reflectivity is color dependent)

~5V → 0V

*** Related Device

Opto-isolator

+5V +5V

IN

OUT
Sharp IR Range Finder

emitter

detector

PSD
linear CCD

Position - sensitive detector

GP2D 120 → 1.5" - 12"
current ~ 30 mA

GP2D 12 → 4" - 30"
6-1. GP2D120 Example of Output distance characteristics.

- White paper (Reflectance ratio 90%)
- Gray paper (Reflectance ratio 18%)

Analog voltage output (V) vs. Distance to reflective object (cm)
Sonar (Devantec Range Finder)

40 kHz sonic burst
"chirp"
SRF04 → range 3" - 10 ft.
current ~ 30 mA

Beam Pattern

SRF04 Timing Diagram

Trigger Pulse 10µS Min

Sonic Burst 8 Cycle

Echo Pulse Output
To User Timing Circuit

Echo Pulse 100µS to 18mS
if no Object Detected

Note. Echo Pulse is Approx. 36mS from End of Echo To Next Trigger Pulse
Devantec Compass

CMPS03 ~ 20 mA

Magnetic field sensors $\rightarrow$ Philips KMZ51
Sensitive enough to measure Earth magnetic field

\[
\begin{array}{c}
\text{N} \\
\text{S}
\end{array}
\quad \text{horizontal component when \parallel to ground}
\]

$\Rightarrow$ PWM Output (Pulse Width Modulation)

\[
\text{4.1-36.99 ms} \quad 65 \text{ms}
\]

$0^\circ - 359.9^\circ$

\[T = 66 \text{ms} \sim 120 \text{ms}\]