

BEAM SENSORS - LIGHT SENSORS



Light sensors are one of the most commonly used sensors on BEAMbots, normally to enable a 'bot to be phototropic or photophobic.

Photodiodes

All P-N junctions are light sensitive; photodiodes are just P-N junctions that are designed to optimize this effect. Photodiodes can be used two ways -- in a photovoltaic (here it becomes a current source when illuminated -- seesolar cell), or photoconductive role.

To use a photodiode in its photoconductive mode, the photodiode is reverse-biased; the photodiode will then allow a current to flow when it is illuminated.

'Most any photodiode will do for BEAMbots; I'd suggest you select one based on what has a convenient "field of view" (some are sensitive to light from such a broad field that you'll need to build them "blinders" so they'll only respond to light from a given range of directions.

ThermoCentrovision has an interesting site on the technology behind photodiodes here.

Phototransistors



Like diodes, all transistors are light-sensitive. As this is normally an undesirable trait, most transistors spend their working lives in opaque packages.

Phototransistors, on the other hand, are designed specifically to take advantage of this inherent light sensitivity. The most-common variant is an NPN transistor with an exposed base region. Here, light striking the base replaces what would ordinarily be voltage applied to the base -- so, a phototransistor amplifies variations in the light striking it. Note that phototransistors may or may not have a base lead (if they do, the base lead allows you to bias the phototransistor's light response).

Photoresistors



Photoresistors, as their name suggests, are resistors whose resistance is a function of the amount of light falling on them. Their resistance is very high when no light is present (up to millions of Ohms), and significantly lower when they are illuminated (hundreds of Ohms). These are also often called Light-dependent Resistors (LDRs) and Cadmium-Sulfide (CDS) cells.

Light-Emitting Diodes (LEDs)

A tutorial on using LEDs is available [here](#). The things you'll need to consider are current drain (general rule: small is better than big), and LED type (regular vs. infrared vs. flashing). LEDs can be used as photodiodes (tho' their sensitivity is relatively low, so they're only useable this way in very bright conditions).

Source: http://www.solarbotics.net/library/pieces/assy_sensors_light.html