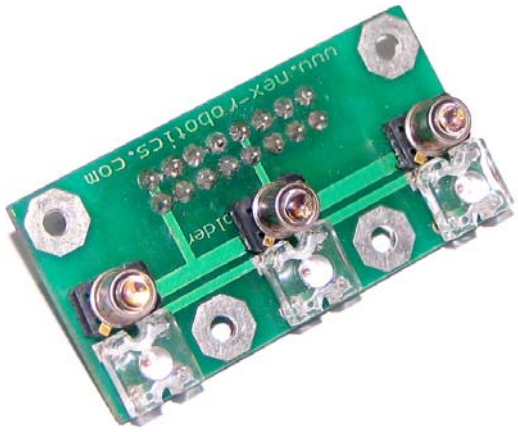
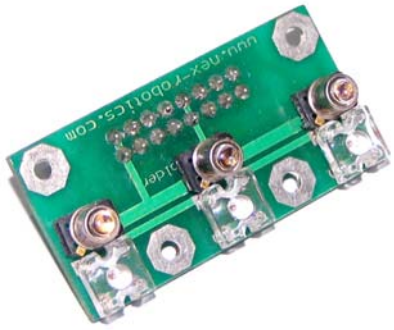
3 Channel Line Sensor
August 2007



Package contains:
3 Channel Line Sensor
FRC Cable with Box connector

3 Channel Line Sensor



Introduction:

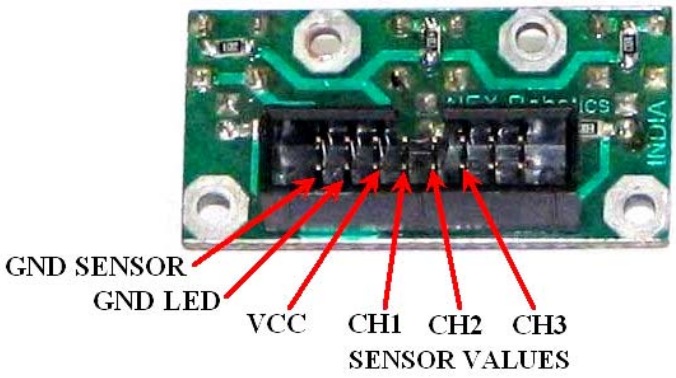
Line sensors are used for sensing white line on dark surface or black line on light surface. These line sensor boards have One, Three, Five or Seven line sensors connected together. These sensors working together can follow any curved or zig-zag path. Because of multiple sensors it can even detect nodes and move on the maze of white or black lines. Line sensor consists of high intensity red LED for illumination and directional photo transistor for line sensing. Phototransistor consists of a photo transistor and convex lense.

Because of precise alignment between lense and photo transistor it has very narrow viewing angle of 5 degrees. This makes this line sensor highly immune to ambient light. This sensor gives 0.18 volts on bright surface and gives 2.2V or more on the dark surface. Its output is analog in nature. Because of analog output one can write complex algorithm to follow white line using microcontroller. This sensor has very proven track record in various robotics competitions. This sensor first designed by Sachitanand during Robocon 2004. Team V.E.S.I.T. won competition that year.

Specifications:

- Supply: 5V, 120mA maximum
- Sensor output: Analog out, 0.18V to 2.2V
- Illumination: Red ultra bright LEDs
- Sensing element: Directional photo transistor with 5 degree viewing angle
- Sensing distance: 9mm to 20mm from the lens assembly of the sensor
- Optimal sensing distance: 10mm from the lens assembly of the sensor
- Number of sensors: 3
- Distance between adjacent sensors: 18mm
- Connector: 16 Pin FRC male connector
- Mounting: Four 3mm mounting holes
- FRC cable included for 3 channel line sensors

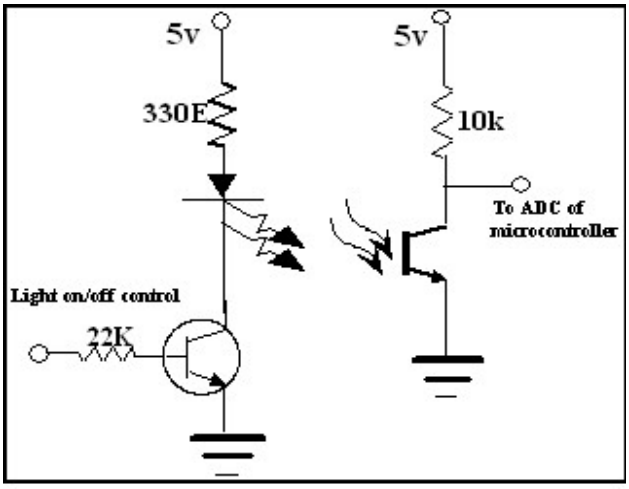
Pin Connections:



NOTE: For normal operation short pins GND SENSOR AND GND LED and connect it to ground

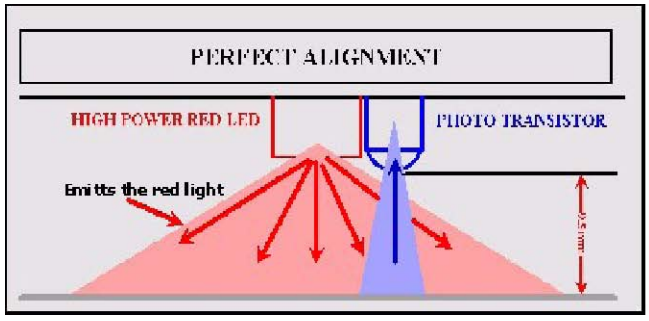
Working of White line sensors:

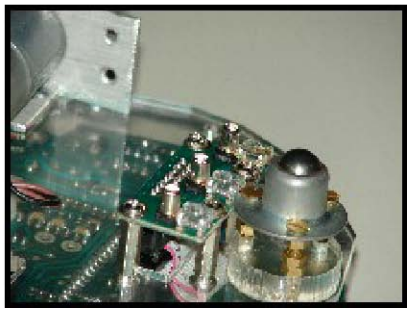
White line sensors are used for detecting white line on the ground surface. White lines are used to give robot sense of localization. White line sensor consists of a highly directional phototransistor for line sensing and ultra bright red LED for illumination. Because of directional nature of the phototransistor it does not get affected with ambient light unless it is very bright.



Circuit diagram of the white line sensor

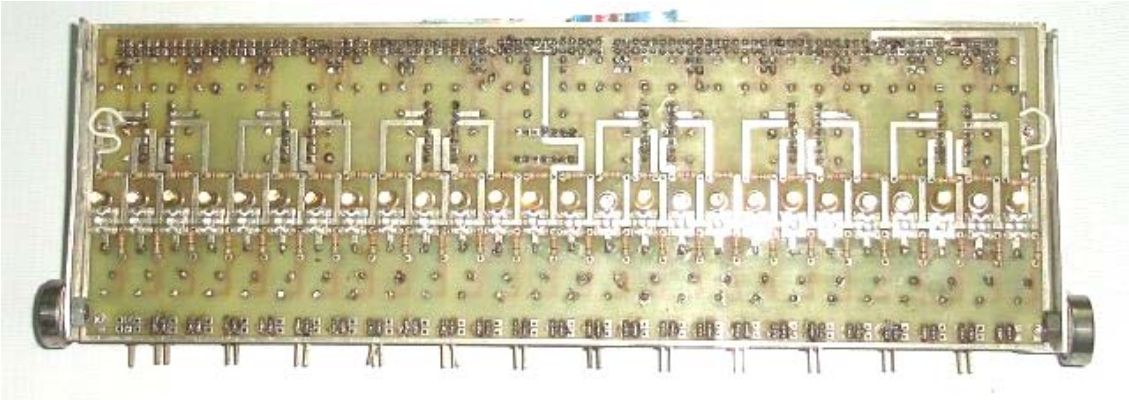
When the robot is not on a white line, amount of light reflected is less, so the photo transistor remains in active region. In this case, the line sensor gives an output in the range of 1 volt to 5 volt. When the sensor is on a white line, reflected light drives the photo transistor into saturation. In this case, the sensor gives an output in the range of 0.15 to 0.8 volts. Power to the red LEDs can also be turned OFF to extend robot's battery life.





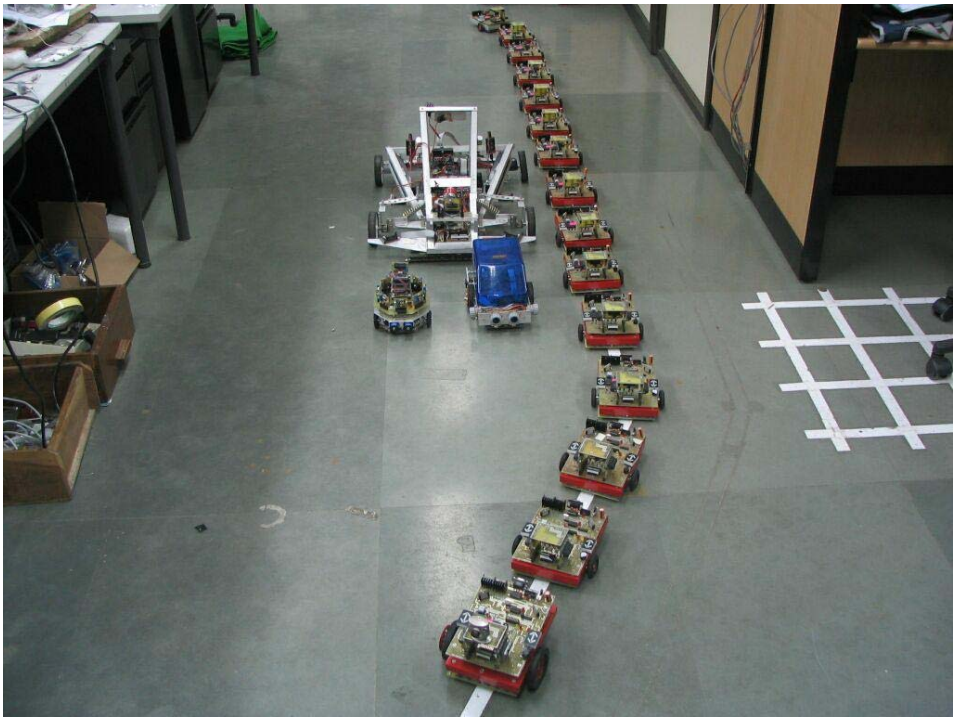
Perfect white line sensor alignment White line sensors these sensors were used in following robots:

1. Robocon 2004 India winning team



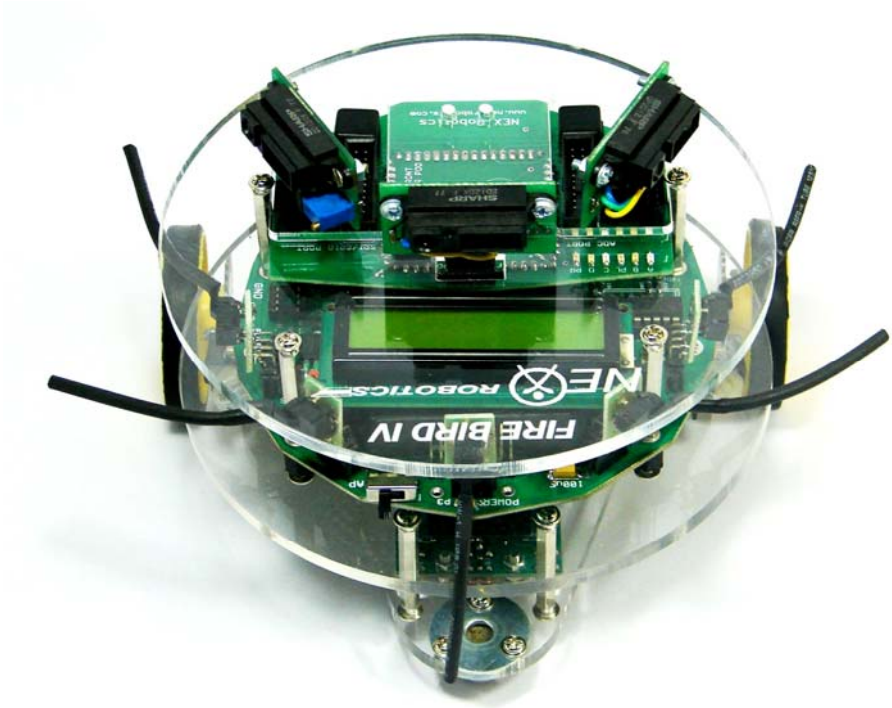
26 channel white line sensor used in Robocon 2004

2. Fire Bird and Dexter series of robots



Fire Bird 1 robots doing adaptive cruise control 3. Fire Bird III robots

3. Fire Bird IV Robot



Fire Bird IV robot

- Insert FRC cable in proper direction. If you insert cable in opposite direction sensor will get damage.
- Do not exceed your supply more than 5V it will immediately damage your sensor.
- Beware of static electricity. It can damage your sensors. Touch ground (may be back side of your PC) before touching the sensor.