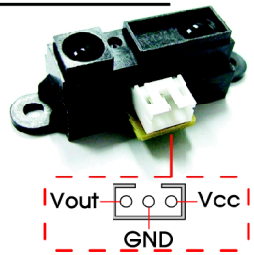
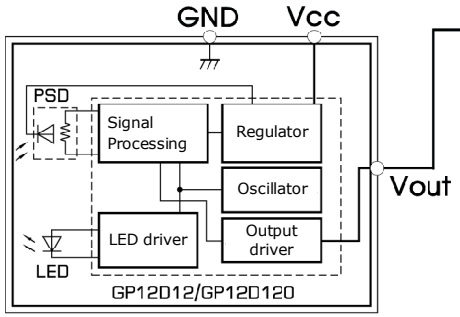
GP2D120 Infrared Ranger/Distance sensor

GP2D120 features

- Uses Infrared light reflection to measure range
- Can measure a range from 10 to 80 cm for GP2D12 and 4 to 30 cm for GP2D120
- 4.5-5 V supply and 33mA electric current
- The output voltage range is 0.4 to 2.4V @ +5V



GP2D120 Infrared Ranger module has 3 terminals: Vcc, Ground and Vout. To read the voltage values from the GP2D120, you must wait till after the acknowledgement period which is around 32 to 52.9 ms.



GP2D120 Vout	Convert value	Distance
0.4	82	33
0.5	102	26
0.6	123	22
0.7	143	19
0.8	164	16
0.9	184	14
1.0	205	13
1.1	225	12
1.2	246	11
1.3	266	10
1.4	287	9
1.5	307	8
1.6	328	8
1.7	348	7
1.8	369	7
1.9	389	6
2.0	410	6
2.1	430	6
2.2	451	5
2.3	471	5
2.4	492	5
2.5	512	5
2.6	532	4

GP2D120 operation table

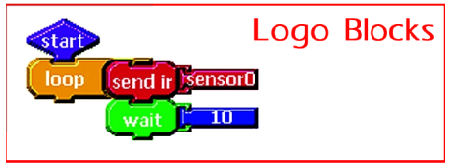
The output voltage of GP2D120 at a range of 30 cm and +5V power supply is between 0.25 to 0.55V, with the mean being 0.4V. At the range of 4-30 cm, the output voltage will change at 2.25V+- 0.3V.

From testing table beside, at 26cm. length Vout is 0.5V. The conversion value is 102.

Inrefacing with i-BOX must connect at SENSOR0 to SENSOR3 port and use SENSOR command block to read date from it. For example, if i-BOX reads 307 mean GP2D120 far from object 8cm.

Test GP2D120 with i-BOX

1. Make the programming code below to read value from GP2D120 Infrared distance sensor to show values via Cricket Monitor.

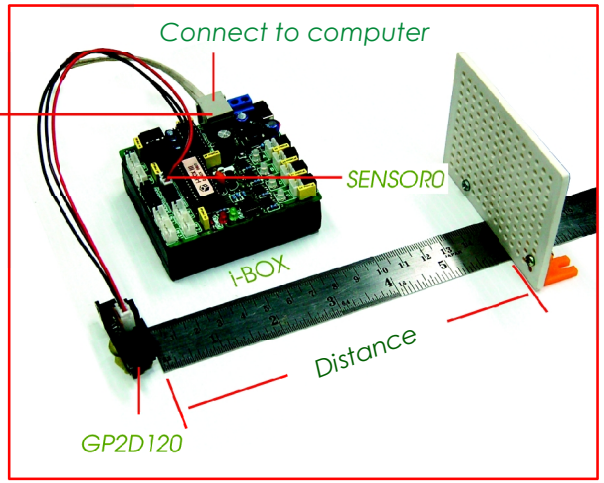


Cricket Logo

```
to start
 loop [
 send (sensor 0)
 wait 10 ]
end
```

2. Connect GP2D120 to i-BOX at SENSOR0 port. Download testing code from step 1. Press RUN switch on i-BOX. Move GP2D120 module slowly and see the result at Cricket Monitor.

Cricket Monitor displays the sata reading from GP2D120 sensor

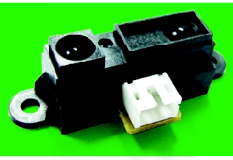


3. Convert the data reading to distance value. Compare the result with GP2D120 table.

4. Change object to BLACK color and test operation again. Compare the result between both activities.

From step 4, after change to black color object GP2D120 module cannot work well. Because it use infrared reflection but blakc color absorb all infrared. It reflects very low density or sometime not reflect. Then using GP2D120 must becareful this limitation.

NanoTank vs GPD120 activity



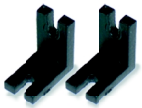
Part list

GP2D120 with cable

12-Hole Straight joiner

3x10mm. screw

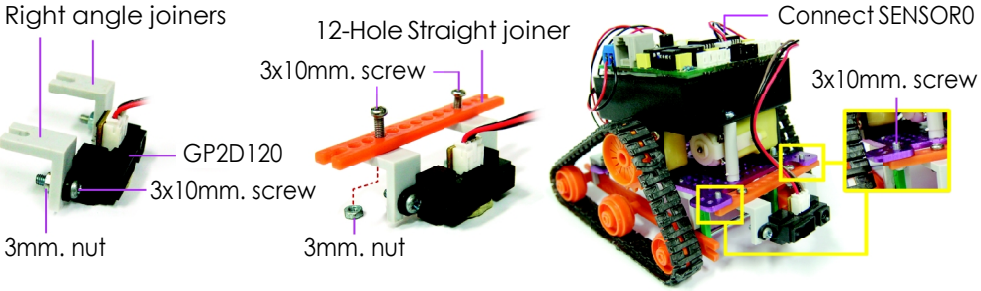
3mm. nut



Right angle joiner

Construction

1. Attach 2 Right angle joiners with both side of GP2D120 with 3x10mm. screws and 3mm. nuts.
2. Attach Straight joiner and Right angle joiner with 3x10mm. screws and nuts.

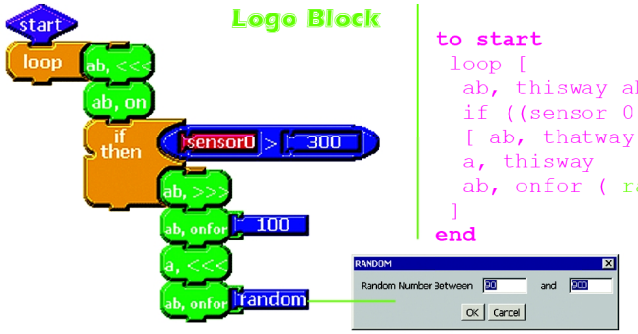


3. Attach all structures from step 2 at front of NanoTank robot with 3x10mm. screws. Connect GP2D120's cable to SENSOR0 of i-BOX.

Touchless obstacles avoidance robot

The programming below controls robot move forward and check GP2D120 data more than 300 or not. If more, means detect some obstacle. Robot will move backward and turn left. The turning value is random number not equal in each turning time.

Logo Block



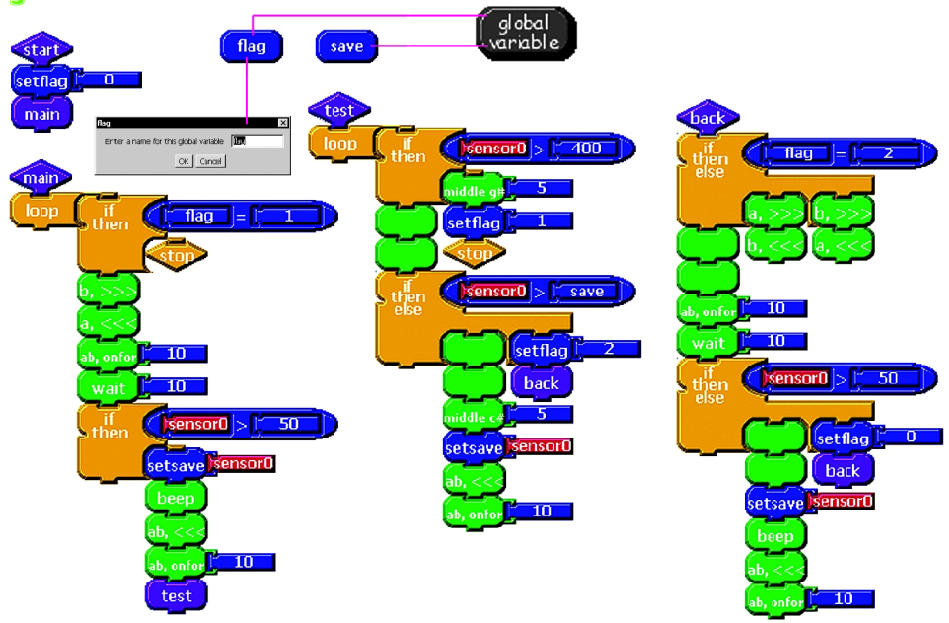
Cricket Logo

```
to start
 loop [
  ab, thisway ab, on
  if ((sensor 0) > 300)
  [ ab, thatway ab, onfor 100
  a, thisway
  ab, onfor ( randomrange 90 900 ) ]
 ]
end
```

Finding object robot

The code below controls robot move and read GP2D120 value. If lower 50 means no object. The value that found object is more than 50. The first value that detect object will be store in memory. Robot still move forward if value still increase. It means close the object. Until value over 400, robot must stop before touch the object. If value decrease, robot will turm back to anther direction for finding object continue.

Logo Block



Cricket Logo

```
global [ Save flag ]

to start
setflag 0 Main
end

to Back
 ifelse (flag = 2)
  [ a, thatway b, thisway ]
  [ b, thatway a, thisway ]
 ab, onfor 10
 wait 10
ifelse ((sensor 0) > 50)
  [ setSave (sensor 0)  beep
  ab, thisway ab, onfor 10 ]
  [ setflag 0 Back ]
end

to Main
 loop [ if (flag = 1)[ stop ]
 b, thatway a, thisway
 ab, onfor 10 wait 10
 if ((sensor 0) > 50)
  [ setSave (sensor 0) beep
  ab, thisway ab, onfor 10 Test ] ]
end

to Test
 loop [
 if ((sensor 0) > 400)
  [ note 75 5 setflag 1 stop ]
 ifelse ((sensor 0) > Save)
  [note 110 5 setSave (sensor 0)
   ab, thisway ab, onfor 10 ]
  [ setflag 2 Back ] ]
end
```