Chapter 8 Distance Detection

1. Sonar - send out a pulse of sound. Sound travels at about 340 m/s. Time the round trip and calculate the distance to the reflecting object. This was used in early auto-focus cameras from Polaroid.

2. Using IR LED's and detectors and varying the frequency.

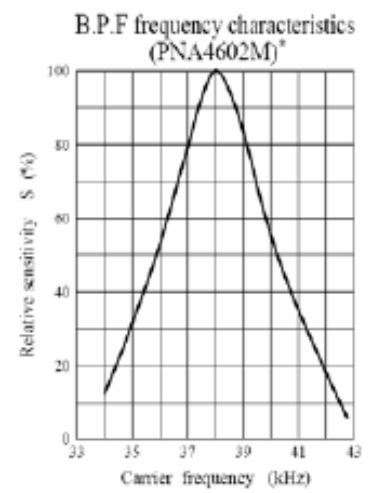


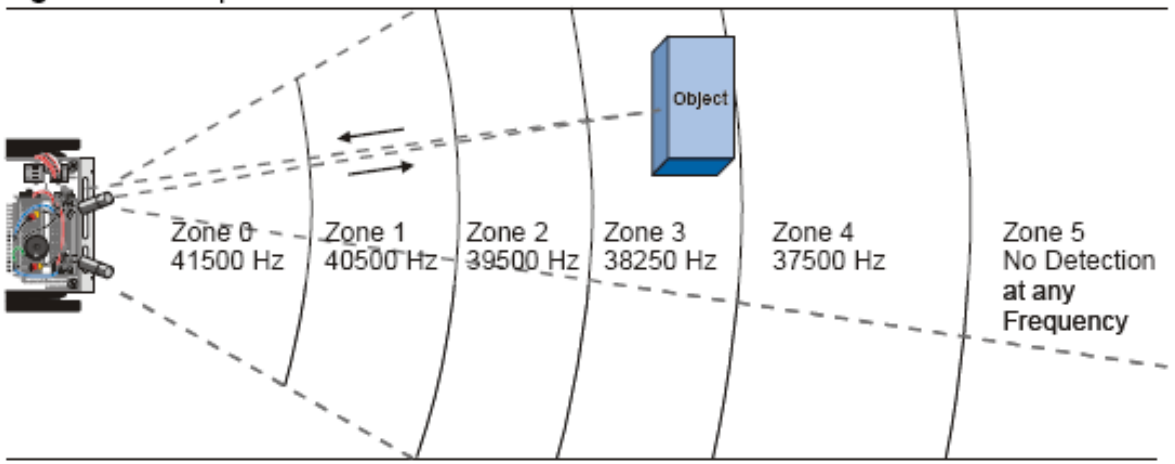
Figure 8-1
Filter Sensitivity Depends on Carrier Frequency

Another way to think about it is that the most sensitive frequency will detect the objects that are the farthest away, while less sensitive frequencies can only be used to detect closer objects. This makes distance detection simple. Pick 5 frequencies, then test them from most sensitive to least sensitive. Try at the most sensitive frequency first. If an object is detected, check and see if the next most sensitive frequency detects it. Depending on which frequency makes the reflected infrared no longer visible to the IR detector, you can infer the distance.

Frequency Sweep is the technique of testing a circuit's output using a variety of input frequencies.

In this example, the object is in Zone 3. That means that the object can be detected when 37500 and 38250 Hz is transmitted, but it cannot be detected with 39500, 40500, or 41500 Hz. If you were to move the object into Zone 2, then the object could be detected when 37500, 38250, and 39500 Hz are transmitted, but not when 40500 and 41500 Hz are transmitted.

Figure 8-2: Frequencies and Zones for the Boe-Bot



Assignment:
1. Read Chapter 8 in order to understand how distance detection works.
2. Make sure your IR LED's have 1 kΩ resistors.
3. Do Chapter 8 activities 1 and 2.

Next performance test:
Follow MY boe-bot at a distance of a couple of inches. Do NOT bump into me or lose me.