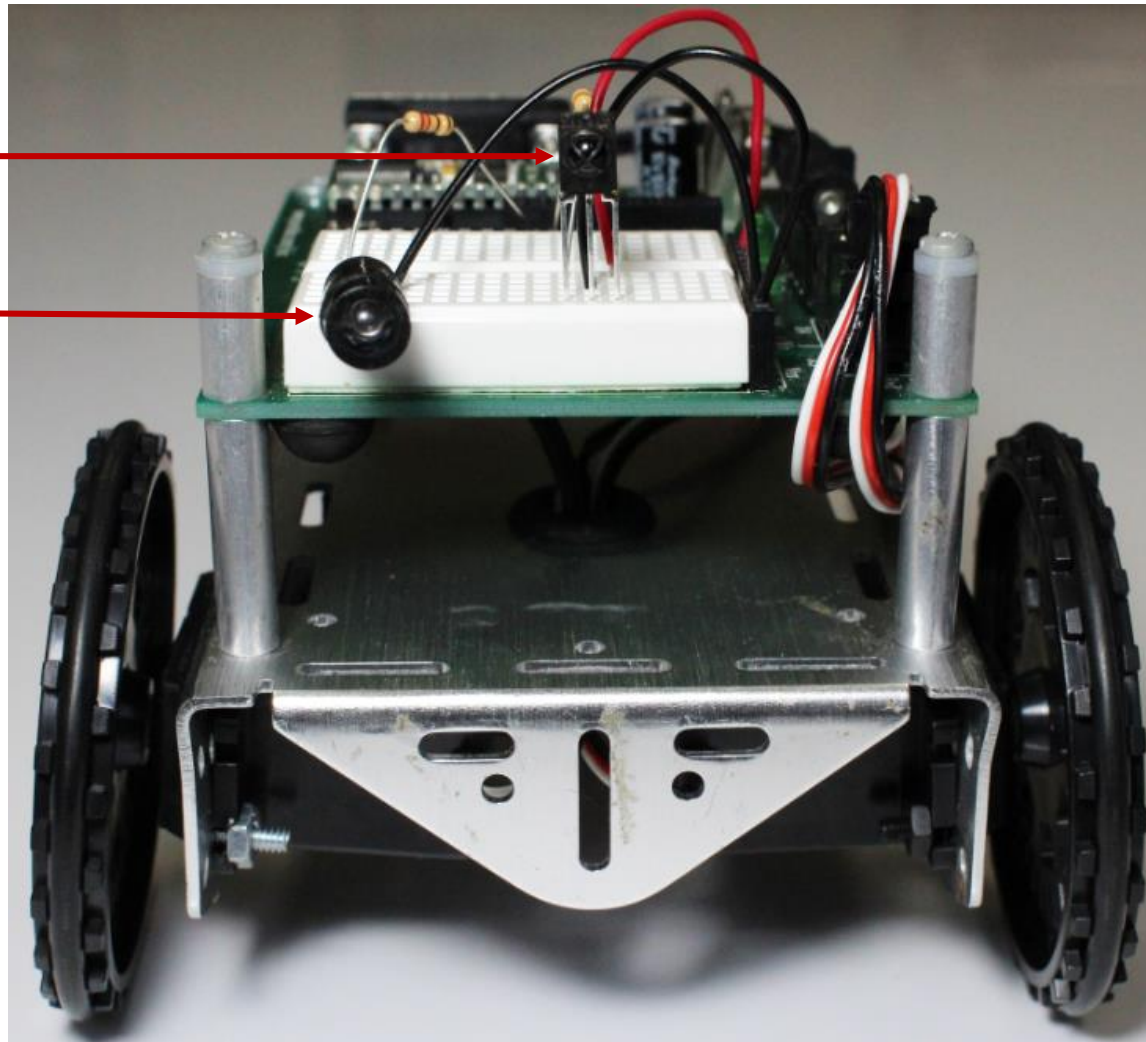# IR sensors for beacon location

IR detector

IR LED

the parts

IR detector
Sharp GP1Ux511QS

This sensor detects infrared (IR) light. However, to avoid detecting the IR component of regular sunlight or light from other stray IR sources, the sensor only looks for light coming in at 38 kHz.
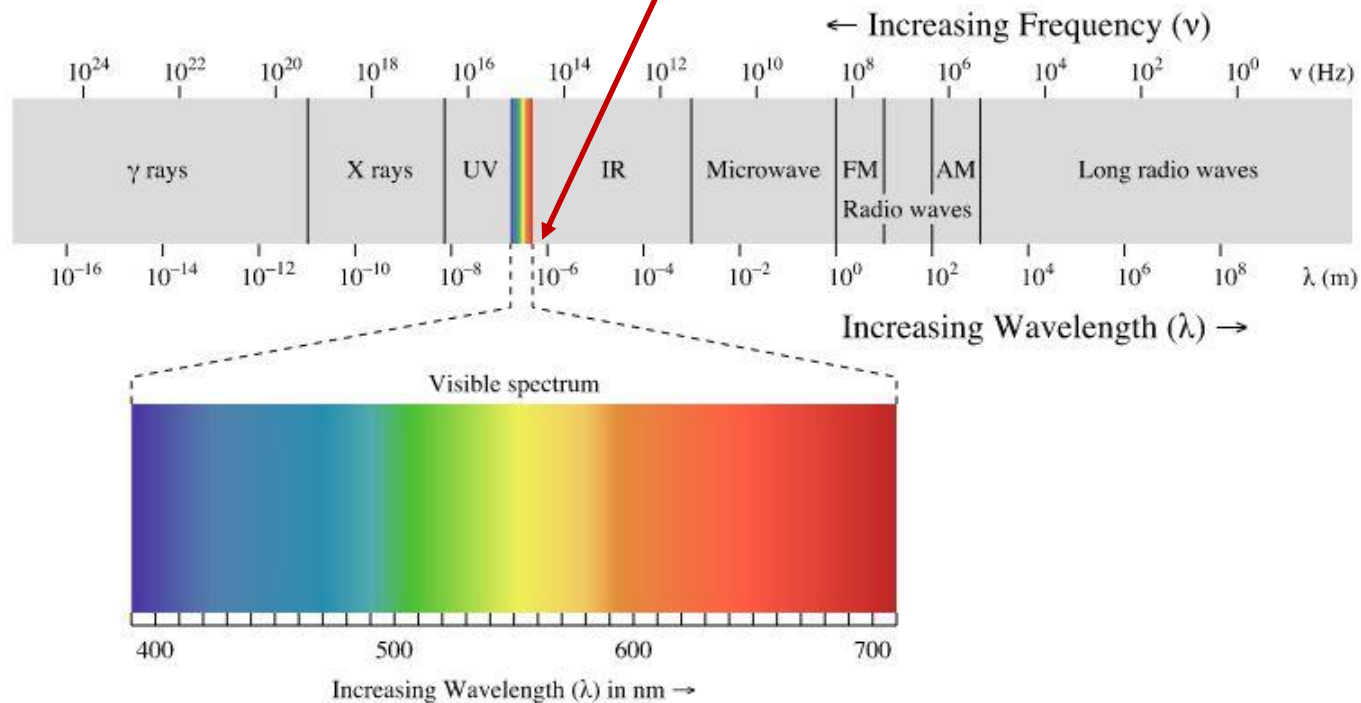
IR LED *(not your usual LED)*
outputs 940 nm wavelength light

We write an Arduino sketch to make this LED flash 38,000 times per second so it can be detected by the PNA4602M.
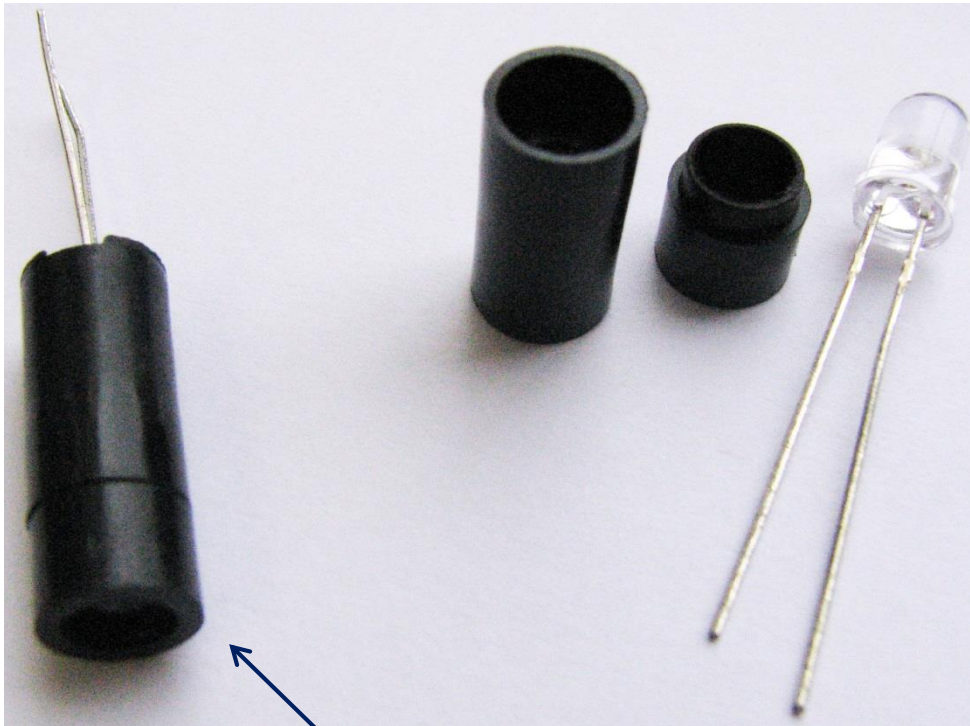
IR light

IR detector is most sensitive around 940 nm (to match the IR LED)

← Increasing Frequency (ν)

| | | | | | | | | | | | | | ν (Hz) |

10^{24} 10^{22} 10^{20} 10^{18} 10^{16} 10^{14} 10^{12} 10^{10} 10^{8} 10^{6} 10^{4} 10^{2} 10^{0} ν (Hz)

γ rays   X rays   UV   IR   Microwave FM   AM   Long radio waves

Radio waves

10^{-16} 10^{-14} 10^{-12} 10^{-10} 10^{-8} 10^{-6} 10^{-4} 10^{-2} 10^{0} 10^{2} 10^{4} 10^{6} 10^{8} λ (m)

Increasing Wavelength (λ) →

Visible spectrum

400   500   600   700

Increasing Wavelength (λ) in nm →

wikipedia.org

install LED shield
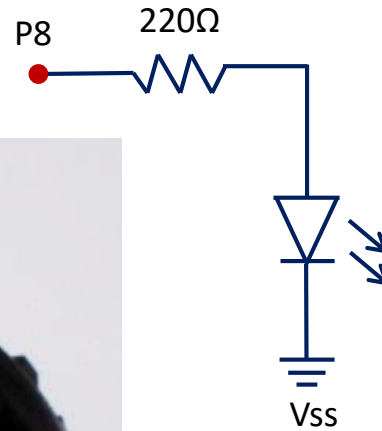
(the LED shield aims the LED light)

Insert the legs of the LED through the holes in the longer black cylinder, and then install the smaller top piece over the exposed end of the LED.

If you don't have a shield, a piece of paper can be rolled up and taped around the LED.
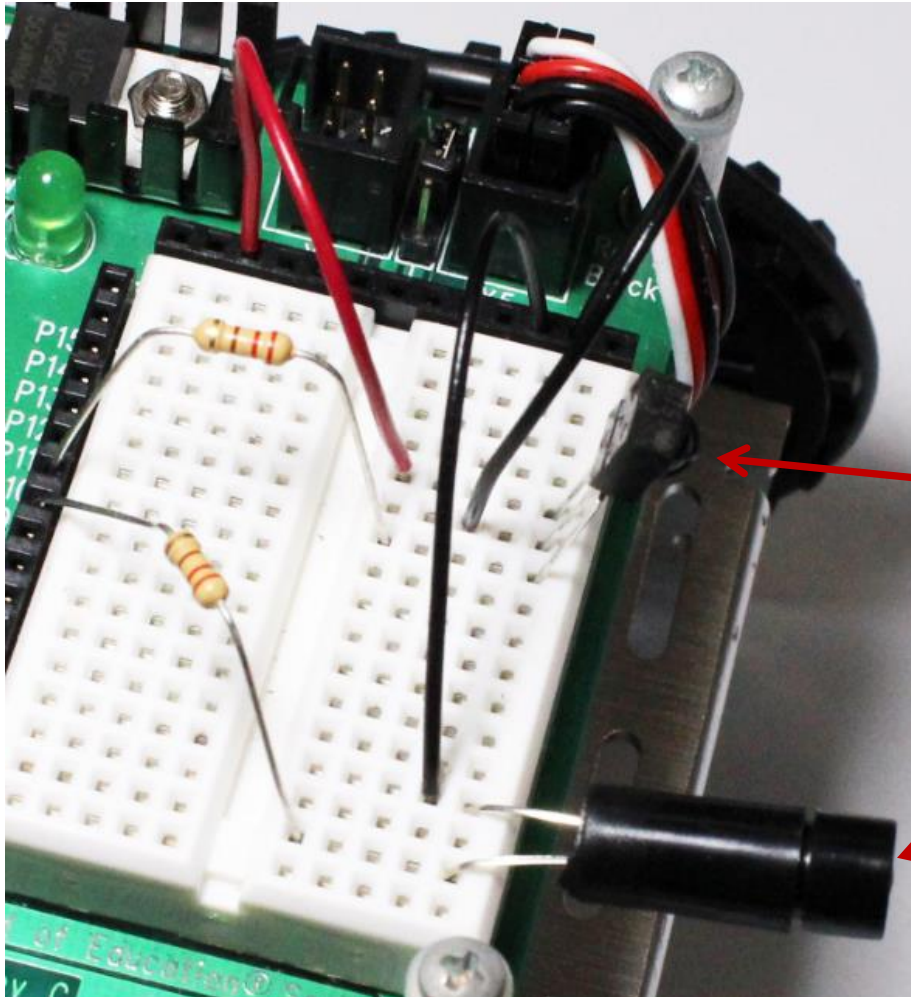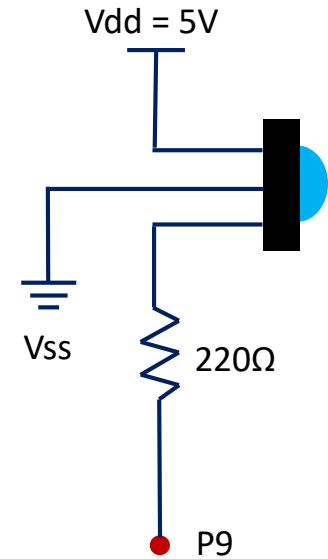
LED will look like this after shielding

build circuits

LED circuit

P8   220Ω

Vss

IR receiver circuit

Vdd = 5V

Vss   220Ω

P9

IR detector

IR LED

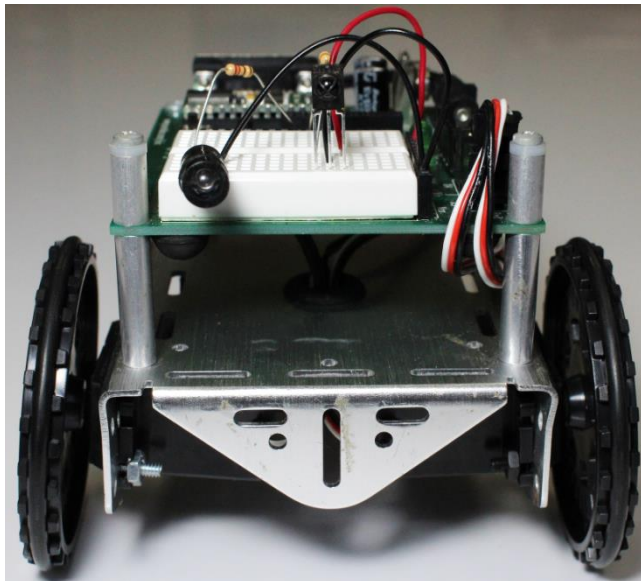Be sure to aim your LED and IR detector so that they have a clear view (nothing in the way)

program

```
'  {$STAMP BS2}
'  {$PBASIC 2.5}

DO
 FREQOUT 8, 1, 38500          ← makes IR LED on P8 blink at 38,500 Hz for 1 ms

 IF (IN9 = 0) THEN            ← P9 goes LOW when the detector sees IR light
     PULSOUT 13,850
     PULSOUT 12,650           ← go forward if IR light is detected
     PAUSE 20
 ENDIF
LOOP
```

tips for seeking a beacon

You won't need an IR LED on your vehicle if you are looking for a beacon.

If you don't see it with your IR detector, what would you need to do?