**Project 1**

**IR receiver**

* TSOP36256 has a carrier freq. of 56kHz
* Supply Voltage – 2.7V – 5.5V
* Power dissipation 30mW
* Output current 10mA
* Supply current 1.2mA
* Viewing angle 45deg
* Wavelength sensitivity ~ 800-1100nm peak @ 950nm
* Output active low
* Data Signal:
  + Carrier freq. as close as possible to 38kHz
  + Burst Length >= 10cycles/burst
  + After each burst at least 14 cycles of gap time is necessary
  + Up to 800 short bursts/sec can be received continuously
* Disturbances suppressed by receiver
  + DC light
  + Continuous signal at 38kHz

**Project 2**

**IR receiver**

* Standard carrier freq. (sensitivity range)
  + 33 – 40kHz or 50 – 60kHz
* Digital out – if IR signal detected then output low, if no detection then output high
* **Possible Receivers**
  + <http://www.vishay.com/docs/81732/tsop348.pdf>
  + <http://www.vishay.com/docs/81733/tsop382.pdf>
  + <http://www.vishay.com/docs/82090/tsop48xx.pdf>
* TSOP34856
  + Leaded mount
  + Supply voltage = 2.5-5.5V
  + Improved immunity against ambient light
  + Carrier freq. range 30 – 56kHz
  + Power consumption = 10mW
  + Transmission distance = 45m
  + Eemin = 0.1(mW/)(typ) 0.25(mW/)(Max)
  + Viewing angle = 45deg
  + Wavelength sensitivity – Peak @ 950nm
  + Data Signal:
    - Carrier freq. as close as possible to 38kHz
    - Up to 1800 short bursts/sec can be received continuously
* TSOP382xx
  + Leaded mount
  + Supply voltage = 2.5-5.5V
  + Improved immunity against ambient light
  + Carrier freq. range 30 – 56kHz
  + Power consumption = 10mW
  + Transmission distance = 45m
  + Eemin = 0.15(mW/)(typ) 0.35(mW/)(Max)
  + Viewing angle = 45deg
  + Wavelength sensitivity – Peak @ 950nm
  + Data Signal:
    - Carrier freq. as close as possible to 38kHz
    - Burst Length >= 10cycles/burst
    - After each burst at least 14 cycles of gap time is necessary
    - Up to 1800 short bursts/sec can be received continuously
  + Disturbances suppressed by receiver
    - DC light
    - Continuous signal at 38kHz
* TSOP45xx
  + Leaded mount
  + Supply voltage = 2.7-5.5V
  + Improved immunity against ambient light
  + Carrier freq. 56kHz
  + Power consumption = 10mW
  + Transmission distance = 45m
  + Eemin = 0.17(mW/)(typ) 0.35(mW/)(Max)
  + Viewing angle = 45deg
  + Wavelength sensitivity – Peak @ 950nm
  + Data Signal:
    - Carrier freq. as close as possible to 38kHz
    - Up to 1800 short bursts/sec can be received continuously

**IR Transmitter**

* Must be PWM at 38kHz to be detected (or within receiver freq. range)
* “The maximum possible transmission distance of an IR system depends on various parameters but is mainly condiotnal on the radiant intensity of the emitter(Ie) and sensitivity of the receiver(Eemin).”
* Possible Emitters
  + <http://www.vishay.com/docs/81007/tsal5300.pdf>
  + <http://www.vishay.com/docs/81010/tsal6200.pdf>
  + <http://www.vishay.com/docs/81009/tsal6100.pdf>
* TSAL5300
  + Leaded mount
  + Peak wavelength = 940nm
  + Angle of half intensity = +- 22deg
  + Radiant intensity: min = 30 typ = 45 max=150
    - Ie = 45 (mW/sr) @ = 100mA, = 20ms
    - Ie = 350 (mWsr) @ = 1A, = 100µs
  + Power dissipation = 160mW
  + Rise/Fall time = 800ns @ = 100mA
  + Rise/Fall time = 500ns @ = 1A
* TSAL6200
  + Leaded mount
  + Peak wavelength = 940nm
  + Angle of half intensity = +- 17deg
  + Radiant intensity: min = 40 typ = 60 max= 200 (mW/sr)
    - Ie = 340 (mW/sr) @ = 100mA, = 20ms
    - Ie = 500 (mWsr) @ = 1A, = 100µs
  + Power dissipation = 160mW
* TSAL6100
  + Leaded mount
  + Peak wavelength = 940nm
  + Angle of half intensity = +- 10deg
  + Radiant intensity: min = 80 typ = 130 max= 400 (mW/sr)
    - Ie = 650 (mW/sr) @ = 100mA, = 20ms
    - Ie = 1000 (mWsr) @ = 1A, = 100µs
  + Power dissipation = 160mW

Parts:

* IRrx – TSOP34856
* IRtx – TSAL6200/TSAL6100
* Timer – LM555
* Resistors
  + 2– POT 10k
* Switch