Problem Statement Discussion Electromania

Tachometer

- Ever thought how a speedometer in cars, bikes etc. works??
- Can we build it using the knowledge on MCU we have so far??
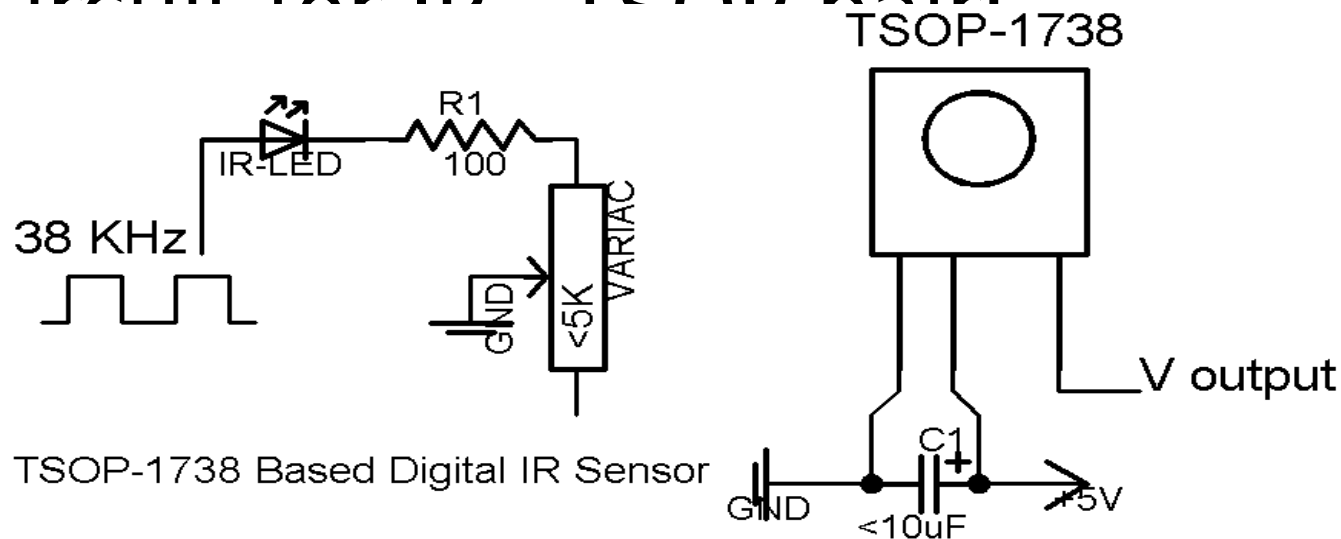
Problem Statement

- To design a tachometer device that measures the speed (rpm) of a DC motor.

- <u>Sensor module</u>: This module will contain sensors that will detect the speed of the motor.

- <u>Display module</u>: This module will receive data from the sensors and calculate the speed. The speed will be displayed on any displaying unit like LCD.
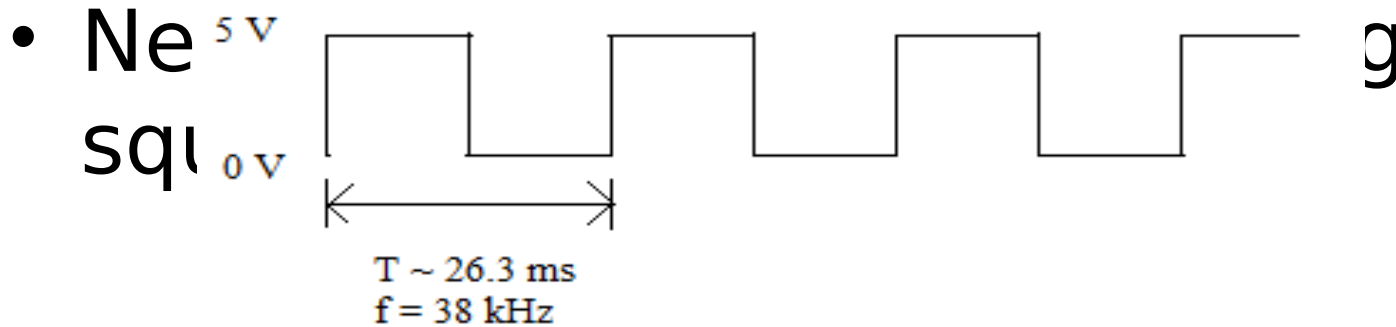
Sensor Module

- What parameter do we need to calculate speed??
- Speed (rpm) = Revolutions per minute

$$= 1/\text{ time for 1 revolution(min)}$$

- Need to sense the completion of 1 revolution.
- Possible sensors: TSOP, Laser Rx-Tx

TSOP Sensor

- It detects IR led blinking at the rate of 38kHz.

- If IR led detected, output= 0
  Otherwise, output =1
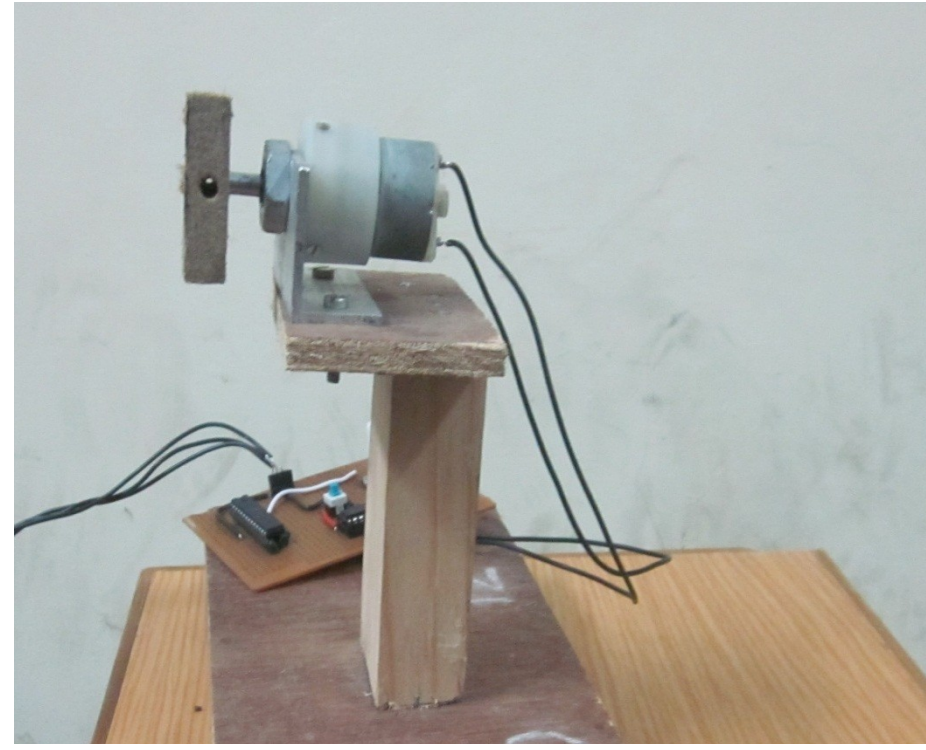
- Circuit for IR- TSOP pair:

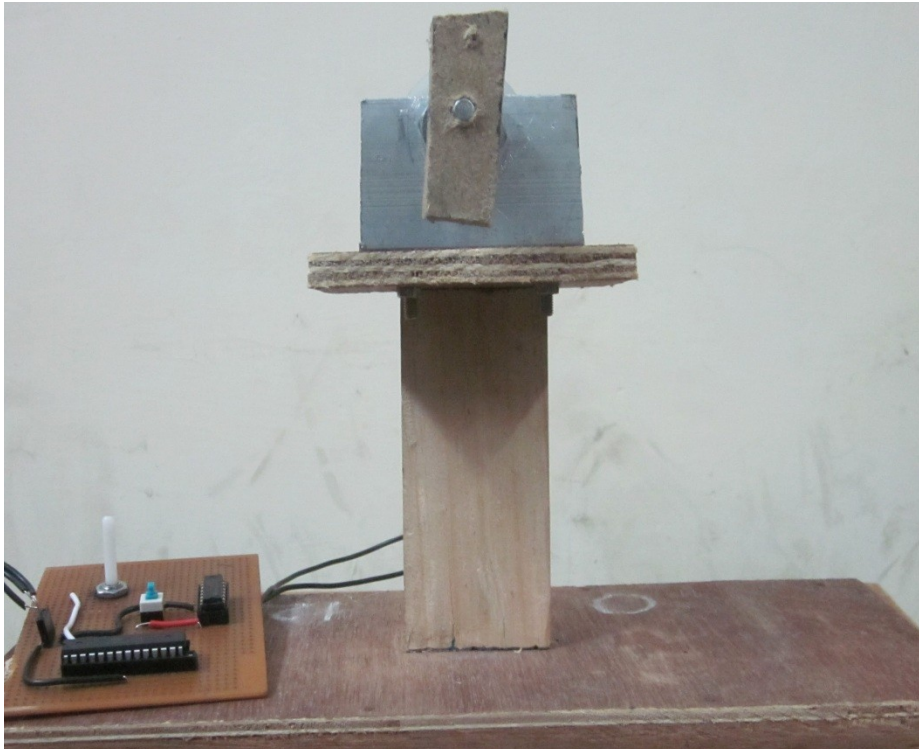TSOP-1738

38 KHz

IR-LED R1 100

VARIAC <5K

GND

V output

C1 <10uF

GND +5V

TSOP-1738 Based Digital IR Sensor

Making the IR led to blink at 38kHz

- Ne 5 V   g squ 0 V

T ~ 26.3 ms
f = 38 kHz

- Use of Timers

Hardware Description

- Calculate the speed of above given motor.
- Need to sense the completion of 1 rotation using the IR- TSOP pair.

Display module

- Receives data from sensors
- Data in case of TSOP sensor: The instant when a revolution is completed.
- Computing Speed:

    1. We have the instants when 1 revolution is
        completed.

    2. We can find time between 2 such instants using

        timers.

- Displaying the speed on LCD.

Details for Competition

- Ideas Discussion & Component Distribution:

    Date :11th and 12th January; Venue: E-club, Hall 3

    Come with complete circuit diagram and a pseudo-code for the program to be written on MCU.

- Prelims: 20th January 12

    Problem Statement for Prelims:

    Detection of obstacle using IR- TSOP pair and displaying the same on LCD

- Main event: 28th & 29th January 12

Contacts

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