

# EE214 ELECTRONIC CIRCUITS LABORATORY TERM PROJECT

## NOTE CONTROLLED VEHICLE (AKA PIED PIPER OF HAMELIN)

### 1. DESIGN SPECIFICATIONS

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#### 1.1. SPECIFICATIONS FOR RECEIVER

The receiver must receive the sound signal that comes from the flute and should turn this signal into an electrical signal by using a transducer called microphone. These type of microphones give very small voltage and current. You should take this into consideration for your design.

#### 1.2. SPECIFICATIONS FOR VEHICLE

You are required to construct a simple vehicle by connecting two motors and wheels to the sides of a breadboard. You may use small 3-6-9 V DC motors for this purpose and you should also consider the required current for the motor.

#### 1.3. SPECIFICATIONS FOR CONTROL UNIT

The control unit should decide and perform the action to be taken. It contains decision and function subunits. The decision subunit distinguishes the notes by their frequencies and informs the function subunit accordingly. The function subunit, then, actuates the motors and provides proper motor drives.

While differentiating the sound signal that comes from receiver, unwanted signals at the output will be tolerated up to 15% of the wanted signal at the output in magnitude. If the magnitudes of the unwanted signals are between 15% and 20%, you will get 2.5 pts. for that differentiation. If the magnitudes of the unwanted signals are between 20% and 25%, you will get 1.5 pts. for that differentiation.

### 2. BONUS

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A student cannot get any bonus credit, unless all steps that are announced in the project document are accomplished. In other words, you must get full credit from the design test. Please check the evaluation rubric for further details about the design test.

#### 2.1. HIGH QUALITY FILTER DESIGN

While differentiating the sound signal that comes from receiver, unwanted signals at the output will be tolerated up to 15% of the wanted signal at the output in magnitude. If the magnitudes of the unwanted signals are smaller than 5%, you will get extra 3 pts. for each differentiation.

#### 2.2. SPEED CONTROL OF THE OPERATION

For this step, you are required to design a speed control system. Continuous speed control requires continuous speed change and you will adjust the speed according to the amplitude of the speed signal.

For this purpose you are required to produce a sinewave in any frequency with adjustable amplitude. The speed control part should be designed independently from the other parts of the project and only the output signal must be fed to control unit. According to amplitude of the sinewave, control unit should produce proper motor drive signals.