

Title: Variable Potentiometer Motor Speed Control

Description: The lab task involves constructing a simple circuit and modifying a draft program to vary a pulse width modulated (PWM) signal based on an input analog voltage varied via a potentiometer. Completing the tasks require you be familiar with the built-in firmware functions of the Arduino Integrated Development Environment (IDE). See below for details on the task and for the format and content of the required report to be submitted at the beginning of the next laboratory session.

Task Specifics:

- 1) Create a new program using the Arduino IDE and the following draft code:

```
int PWMpin = 3;      // PWM output to drive the motor
int POTpin = 0;      // analog input from the POT
int val = 0;          // variable used to read the analog input
int PWMout = 0;       // variable used to write the PWM duty cycle

// The setup() method runs once, when the sketch starts

void setup() {
    TCCR2B = TCCR2B & 0b11111000 | 0x07; // 1024 divider for tmr 2
}

// the loop() method runs over and over again,
// as long as the Arduino has power

void loop()
{
    val = analogRead(POTpin); // read data from the POT
    /* Insert Code Here */
    analogWrite(PWMpin, PWMout); // update PWM output signal
}
```

Note the section that reserves space for your additional code.

- 2) Construct a circuit according to the attached diagram. Note the specific pins on the Arduino board specified in the diagram.
- 3) Add to the draft code such that if the user adjusts the potentiometer through its full range, the output PWM signal is adjusted from zero to one hundred percent. In other words, the potentiometer controls the motor speed. Note the minimum PWM duty cycle at which the motor begins to turn. Measure this using the oscilloscope. Include this information in the report.

Report Format and Guidelines:

Your report must include the following at a minimum:

- 1) A title page containing the experiment number, experiment title, date of lab, due date of report and printed names of the group members.

- 2) A paper copy of the source code Task 2. Ensure all programs include header and statement comments as described in class.
- 3) A summary of the tasks completed for this laboratory session and a description of your solution to complete Task 2.
- 4) Integrate data specified to be included in the Task descriptions into your descriptions from 3).

Your report should be typed, stapled and written with proper grammar and correct spelling. Your report will be graded on readability as well as content.

Circuit

