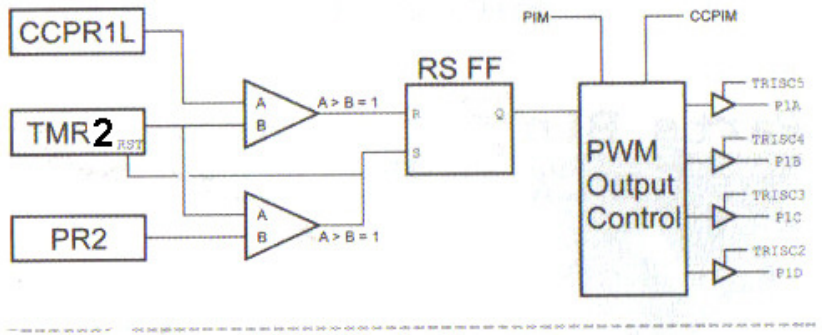
Motor Experiment

EET 250

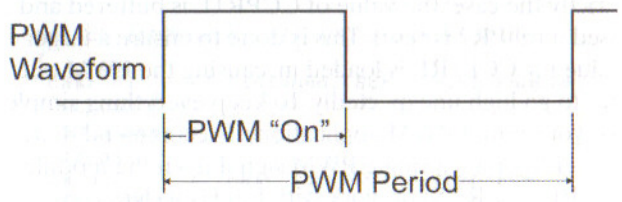
Objective

- Learn about PIC and DC Motor Control
- Limited to single direction on/off motor and speed control
- Uses PWM features of the CCP1 module

Key PIC Peripheral CCP1 in conjunction with Timer2



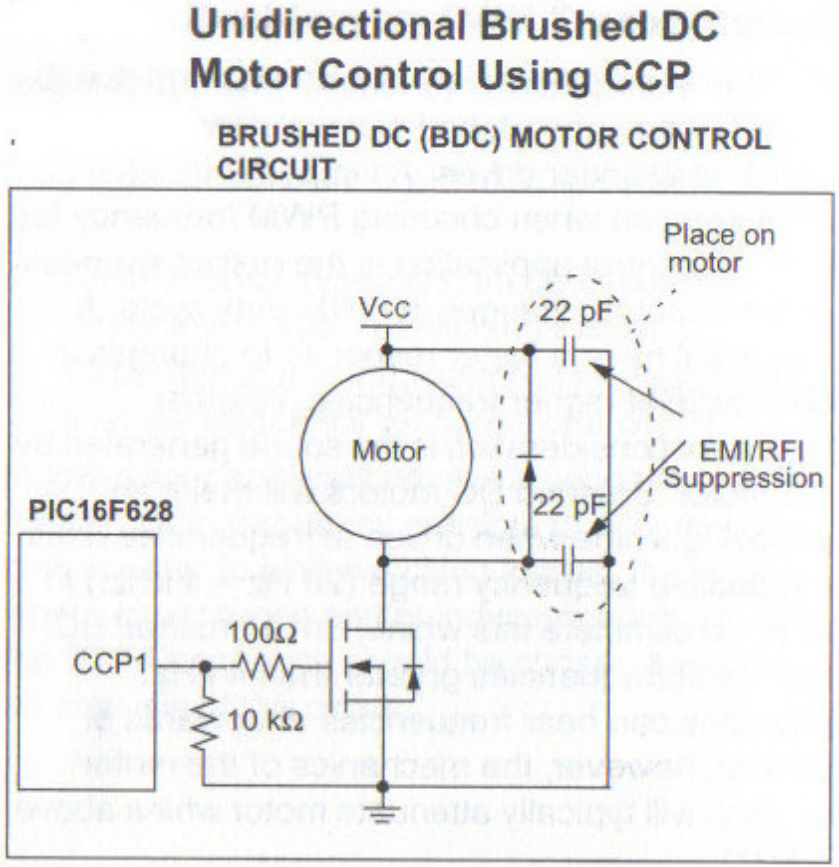
PWM block diagram



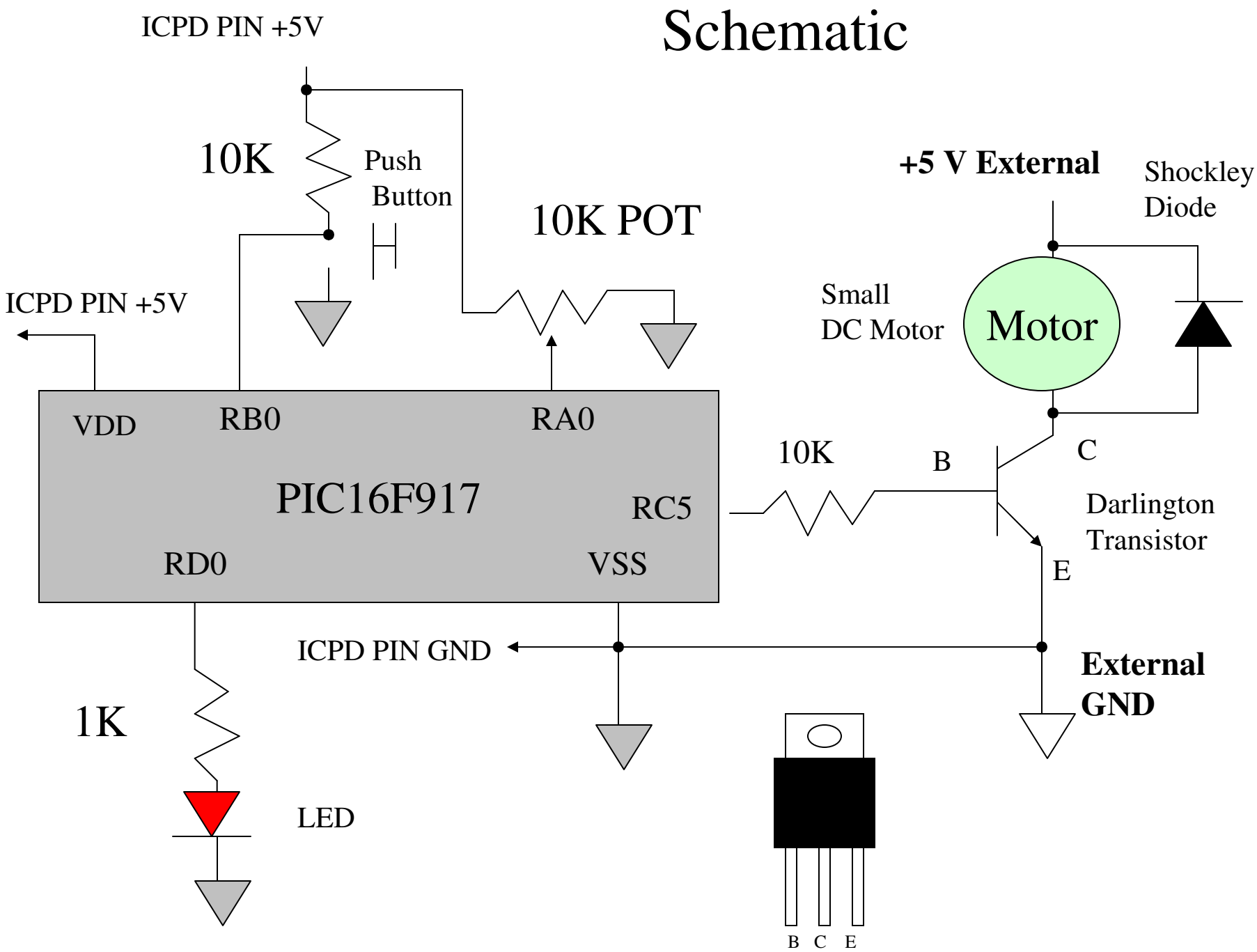
$$\text{Duty Cycle} = \frac{\text{PWM On}}{\text{PWM Period}}$$

PWM

Unidirectional Motor Control using CCP1



Schematic


ICPD PIN +5V
10K
Push
Button
10K POT
+5 V External
Shockley
Diode
ICPD PIN +5V
Small
DC Motor
Motor
VDD
RB0
RA0
10K
B
C
PIC16F917
RC5
Darlington
Transistor
RD0
VSS
E
ICPD PIN GND
External
GND
1K
LED
B C E

16F917 PINS

- RA0 -- pot input for motor speed setting
- RD0 --- led out to indicate motor is spinning
- RC5--- PWM output for motor control
- RB0 --- Motor on/off control

Exercise

- Assemble LED, Pushbutton and Pot to PIC16F917
- Construct drive circuit for motor consisting of Darlington with 10K to RC5 and motor with reverse diode and external power and ground connection
- Connect DIP ground to external ground
- Show circuit to Instructor -Sign off_____
- Set external power to +5V
- Hook up PICKIT2 and turn on external power
- Open , build and download Motor.mcp
- Execute and validate operation
  - Pushbutton turns on motor –led indicate motor is on
  - POT speeds up or slow down motor based upon CW or CCW rotation
  - Demo to instructor –Sign OFF _____