EXPERIMENT-10

TIMERS and PULSE WIDTH MODULATION

INTRODUCTION:

Pulse Width Modulation (also called Pulse Duration Modulation) is a method of regulating the output voltage of a switching power supply by varying the width, but not the height, of a train of pulses that drives a power switch .A good analogy is bicycle riding. You peddle (exert energy) and then coast (relax) using your momentum to carry you forward. As you slow down (due to wind resistance, friction, road shape) you peddle to speed up and then coast again. The 'duty cycle' is the ratio of peddling time to the total time (peddle + coast time). A 100% duty cycle means you are peddling all the time, and a 50% duty cyclemeans you are peddling only half the time.PWM for motor speed control works in a very similar way. Instead of supplying a varying voltage to a motor, it is supplied with a fixed voltage value (such as 5V), which starts it spinning immediately. The voltage is then removed and the motor 'coasts'. By continuing this voltage on/off cycle with a varying duty cycle, the motor speed can be controlled.

OBJECTIVES:

● To learn to apply Pulse Width Modulation on a square wave.

● To learn to use PWM for speed control of a DC motor.

EQUIPMENT/TOOLS:

● KeilμVision.3IDE

● ATMEL 89S52 Microcontroller

● Microprocessor Trainer Board

LAB CODE:

org 0x0

AGAIN1:

MOV TMOD,#10H

MOV TL1,#0B7H

MOV TH1,#0FFH

SETB TR1

BACK:

JNB TF1,BACK

CLR TR1

CPL P2.3

CLR TF1

AGAIN0:

MOV TMOD,#01H

MOV TL0,#0EDH

MOV TH0,#0FFH

SETB TR0

BACK:

JNB TF0,BACK

CLR TR0

CPL P2.3

CLR TF0

SJMP AGAIN1

END

ISSUES:

no issue found while doing the experiment.

CONCLUSION:

IN this lab i learn how to apply Pulse Width Modulation on a square wave and the use PWM for speed control of a DC motor.

POST LAB:

1- What is meant by PWM?

Pulse-width modulation (PWM) is a modulation process or technique used in most communication systems for encoding the amplitude of a signal right into a pulse width or duration of another signal, usually a carrier signal, for transmission.

2- What is the significance of value of frequency in PWM wave?

In practice, there are switching losses that increase with frequency. Each transition from high to low requires some amount of energy, such as to charge or discharge the gate capacitance of a MOSFET. There is also a transitional period where the transistor being switched is neither fully off nor fully on, and thus dissipates more power than it would at either extreme. With increased frequency, this energy cost is paid more times per second, thus losses go up.

3- Can we use PWM in digital to analog conversion process? If yes, how?

Yes, we can use PWM in digital to analog conversion process. This can be done by using a low pass filter alongside our PWM generator.