DEPT. OF ELECTRICAL & ELECTRONICS ENGINEERING
SRM UNIVERSITY, Kattankulathur – 603203.

Title of Experiment	:11. DC Motor Speed measurement and Control
Name of the candidate	: GAUTAM NAG
Register Number	:RA1811005010278
Date of Experiment	: 21/04/2021
Date of submission	**:21/04/2021**

S.NO:	**MARKS SPLIT UP**	**MAXIMUM MARKS (50)**	**MARKS OBTAINED**
1	PRE LAB	5	
2	PROGRAM	25	
3	EXECUTION	15	
4	POST LAB	5	
TOTAL		50	

Staff Signature

11.DC Motor Speed Measurement and Control

PRE-LAB

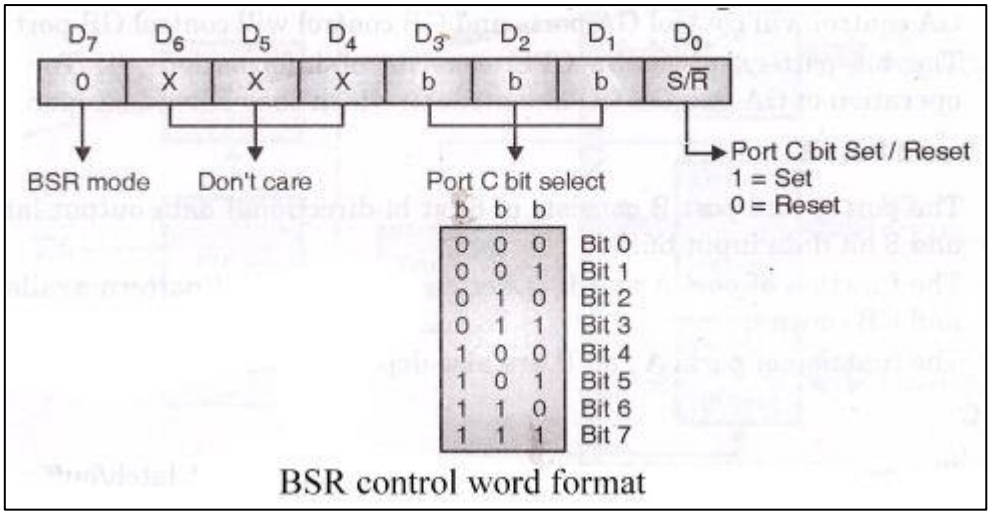
1. **What are the modes used in keyboard modes?**
   - Scanned Keyboard mode with 2 Key Lockout.
   - Scanned Keyboard with N-key Rollover.
   - Scanned Keyboard special Error Mode.
   - Sensor Matrix Mode.

2.What are the methods of speed control in DC Motor?

- Resistance variation in the armature circuit: This method is called armature resistance control or Rheostat control.
- Variation of field flux Φ This method is called field flux control.
- Variation of the applied voltage.

3.Draw the control word format BSR Mode?

Control Word format in input/output mode Control Word and BSR Mode Format Page 2 The figure shows the control word format in the input/output mode. This mode is selected by making D7 = '1' . D0 or D1 or D3 or D4 are "SET", the corresponding ports act as input ports



BSR control word format

4. What are the features of 8279 Keyboard controller?

- Simultaneous keyboard and display operations.
- Scanned keyboard mode.
- Scanned sensor mode.
- 8-character keyboard FIFO.
- Right or left entry 16-byte display RAM.
- Programmable scan timing.
- Used for Interaction between keyboard and different microprocessor.

5.Draw the pin diagram of 8255 PPI

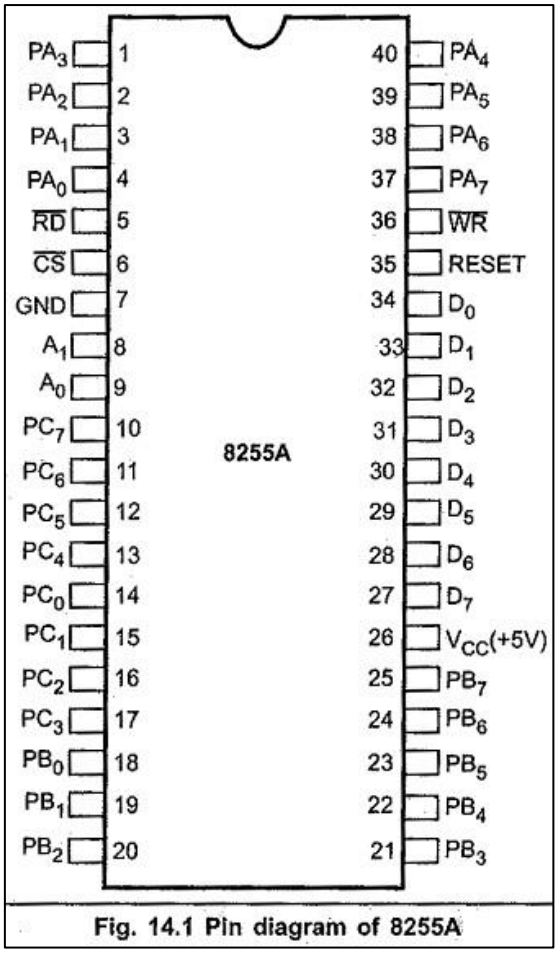


Fig. 14.1 Pin diagram of 8255A

11. DC Motor Speed Measurement and Control

Aim:

To write an assembly language program to control the speed of DC Motor using EdSim 51.

Apparatus required:

Hardware Requirement :

8051 Microcontroller kit, Power supply

Software Requirement :

8051 EdSim

EDSIM51 PROGRAM-

```
MOV TMOD,#50H ; PUT TIMER 1 IN EVENT COUNTING MODE
```

```
 SETB TR1              ; START TIMER

MOV DPL, #LOW (LEDcodes); I PUT THE LOW BYTE OF THE START ADDRESS OF THE 7 SEGMENT

                                   ; I CODE TABLE INTO DFL

MOV DPL, #HIGH (LEDcodes); PUT  THE HIGH BYTE INTO DPH

CLR P3.4  ; I

CLR P3.3   ;I ENABLE DISPLAY 0

AGAIN:

CALL  SETDIRECTION  ;SET THE MOTOR'S DIRECTION

MOV A,TL1 ; MOVE THE TIMER 1 LOW BYTE TO A

CJNE A,#10,SKIP ;IF THE NIBBLE OF REVOLUTION IS NOT 10 SKIP  NEXT INSTRUCTIONS

CALL CLEARTIMER; IF THE NIBBLE OF REVOLUTION IS 10,RESET TIMER 1

SKIP:

MOVC A,@A+DPTR; I GET 7 SEGMENT CODE FROM CODE TABLE-THE INDEX INTO THE TABLE IS

                          ; I DECIDED BY THE VALUE IN A

                           ; I (EXAMPLE: THE DATA POINTER POINTS TO THE START OF THE

                           ; I TABLE-IF THERE ARE TWO REVOLUTIONS,THEN A WILL CONTAIN TWO,

                           ; I THEREFORE THE SECOND CODE IN THE TABLE WILL BE COPIED TO A

MOV C,F0; MOVE MOTOR DIRECTION VALUE THE CARRY

MOV ACC.7,C; AND FROM THERE TO ACC.7( THIS WILL ENSURE DISPLAY0'S DECIMAL POINT

                    ;WILL INDICATE THE MOTOR DIRECTIONS

MOV P1,A ;I MOVE ( 7 -SEG CODE (OR) NUMBER OF REVOLUTIONS AND MOTOR DIRECTION

                  ;I INDICATOR TO DISPLAY 0

JMP AGAIN ;  DO IT ALL AGAIN

SETDIRECTION:

PUSH ACC ; SAVE VALUE OF A ON STACK

PUSH 20H; SAVE VALUE OF LOCATION(FIRST BIT -ADDRESSABLE IN RAM) ON STACK

CLR A;CLEAR A

MOV 20H,#0 ;CLEAR LOCATION 20H
```

```
MOV C,P2.0; PUT SW0 VALUE IN CARRY

MOV ACC.0, C; THEN MOVE TO ACC.0

MOV C,F0 ;MOVE CURRENT MOTOR DIRECTION IN CARRY

MOV 0, C ;MOV TO LSB OF LOCATION 20H

CJNE A,20,CHANGE DIR ;I COMPARE SW0(LSB OF A) WITH F0(LSB OF 20H)

                              ;I -IF THERE ARE NOT SAME,THE MOTOR'S DIRECTION NEEDS
REVERSED

 JMP FINISH    ; IF THEY ARE THE SAME,MOTOR DIRECTION DOES NOT NEED TO BE
CHANGE

CHANGEDIR:

CLR P3.0 ;I

CLR P3.1; I STOP MOTOR

CALL CLEARTIMER; RESET TIMER I

MOV C, P2.0; MOVE SW0 VALUE TO CARRY

MOV F0, C; AND THEN TO  F0-THIS IS THE MOTOR DIRECTION

MOV P3.0,C; MOVE WS0 VALUE (IN CARRY TO MOTOR CONTROL BIT 1

CPL C; INVERT THE CARRY

MOV P3.1,C ; I AND MOVE  IT  TO MOTOR CONTROL BIT 0

                    ;I VALUE TO CONTROL BIT 1 AND MOTOR WILL START

                     ; I AGAIN IN THE NEW DIRECTION
```

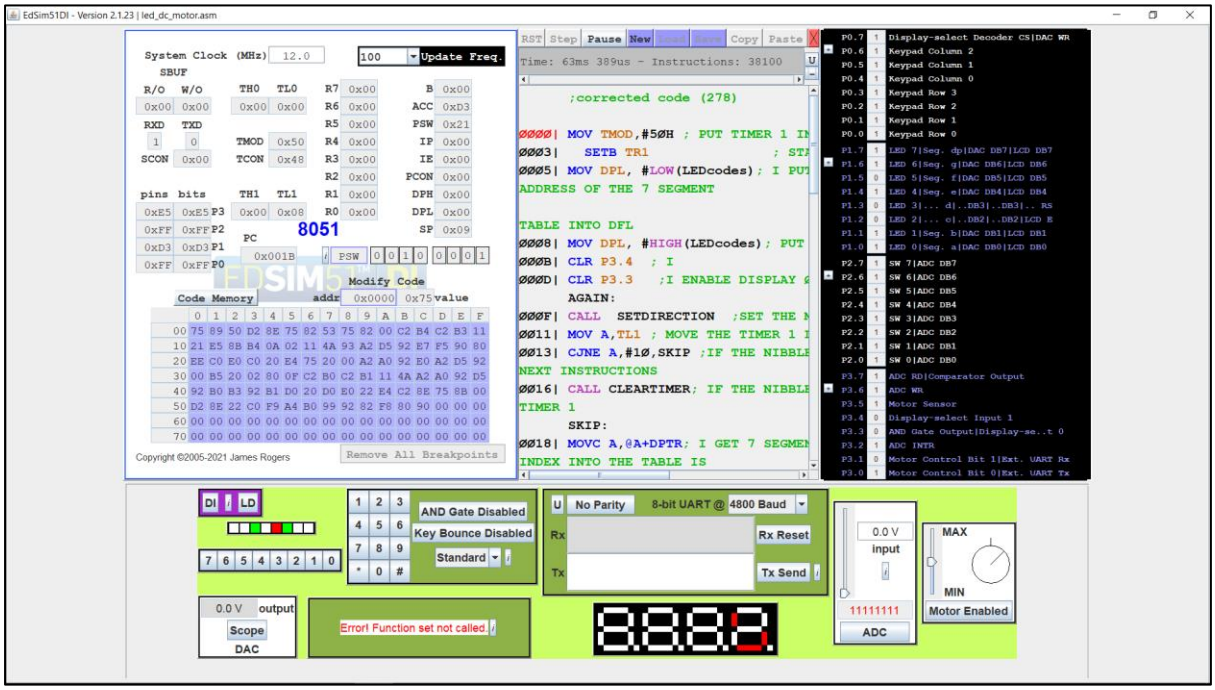
FINISH:

```
POP 20H ; GET ORIGINAL VALUE FOR LOCATION 20H FROM STACK

POP ACC  ;GET ORIGINAL VALUE FOR A FROM THE STACK

RET ;RETURN  FROM SUBROUTINE

CLEARTIMER:

CLR A ;RESET  REVOLUTION COUNT  IN A TO  ZERO

MOV TR1 ;STOP TIMER 1

MOV TL1, #0 ;RESET TIMER 1 LOW BYTE TO ZERO

SETB TR1 ;START TIMER 1

RET; RETURN FRO SUBROUTINE

LEDCODES  : I THIS  LABEL POINTS TO THE START ADDRESS OF THE 7-SEGMENT
CODE TABLE

                    ; I WHICH IS STORED IN PROGRAM MEMORY USING THIS COMMAND
BELOW
```

DB

11000000B,11111001B,10100100B,10110000B,10011001B,10010010B,10000010B,11111000B,10000000B,10010000B

SIMULATION :



Result:

Thus an assembly language program of speed control of DC Motor program was executed.

POST-LAB

1. **What is a programmable peripheral device?**

PPI 8255 is a general purpose programmable I/O device designed to interface the CPU with its outside world such as ADC, DAC, keyboard etc. ... It consists of three 8-bit bidirectional I/O ports i.e. PORT A, PORT B and PORT C. We can assign different ports as input or output functions

2. **What is handshake port?**

Handshaking is a technique of communication between two entities. However, within TCP/IP RFCs, the term "handshake" is most commonly used to reference the TCP three-way handshake. For example, the term "handshake" is not present in RFCs covering FTP or SMTP.

3. **What is resolution in DAC?**

The resolution of a DAC is given by the number of bits, N. The resolution is the smallest increment of output that the DAC can produce. An 8-bit, DAC has a resolution of 8 bits, or one part in 28

4. **What are the different types of ADC?**

- Successive Approximation (SAR) ADC.

- Delta-sigma (ΔΣ) ADC.
- Dual Slope ADC.
- Pipelined ADC.
- Flash ADC.

5.List the function performed by 8279.

- Simultaneous keyboard and display operations.
- Scanned keyboard mode.
- Scanned sensor mode.
- 8-character keyboard FIFO.
- Right or left entry 16-byte display RAM.
- Programmable scan timing.
- Used for Interaction between keyboard and different microprocessor.