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| Experiment number | 5 |
| Experiment title | Write assembly language program to display Message “TE EXTC” on LCD Display |
| Hardware requirement | 8051 Development kit, LCD Display |
| Software requirement | Keil software |

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| Aim | Display “TE EXTC” message on LCD Display |
| Theory | * The complete interfacing of LCD Display to 8051   LCD Interfacing with 8051 Microcontroller (89S52): Tutorial with Circuit  Diagram and Code  **16X2 LCD** : 16×2 Liquid Crystal Display which will display the 32 characters at a time in two rows (16 characters in one row). Each character in the display is of size 5×7 pixel matrix. This matrix differs for different 16×2 LCD modules, if you take JHD162A, this matrix goes to 5×8. There are 16 pins in the LCD module.  Follow these simple steps for displaying a character or data   * **E=1;** enable pin should be high * **RS=1;** Register select should be high * **R/W=0;** Read/Write pin should be low.   To send a command to the LCD just follows these steps:   * **E=1;** enable pin should be high * **RS=0;** Register select should be low * **R/W=0;** Read/Write pin should be low.   **COMMAND**:There are some preset commands which will do a specific task in the LCD. These commands are very important for displaying data in LCD. The list of commands given below:   |  |  | | --- | --- | | COMMAND | FUNCTION | | 0FH | For switching on LCD, blinking the cursor | | 1H | Clearing the screen | | 2H | Return home | | 4H | Decrement cursor | | 6H | Increment cursor | | EH | Display on and also cursor on | | 80H | Force cursor to beginning of the first line | | C0H | Force cursor to beginning of the second line | | 38H | Use wo line and 5X7 matrix | | 83H | Cursor line 1 position 3 | | 3CH | Activate second line | | 0C3H | Jump to second line position 3 | | 0C1H | Jump to second line position 1 | |
| Algorithm / Flowchart | 1. load 0CH in accumulator 2. load accumulator value in P0 to display on cursor off 3. load 38H in accumulator 4. load accumulator value in P0 to initialization of 16X2 LCD in 8bit mode 5. load 80H in accumulator 6. load accumulator value in P0 to cursor at home position 7. load 01H in accumulator 8. load accumulator value in P0 to clear display 9. load the message bit to accumulator 10. load accumulator value in P0 11. Continue the step:9 and step:10 to transfer complete message on LCD |
| Program | ORG 0000H  MOV A,#0CH  ACALL CMD  MOV A,#38H  ACALL CMD  MOV A,#80H  ACALL CMD  MOV A,#01H  ACALL CMD  MOV A,#'T'  ACALL DT  MOV A,#'E'  ACALL DT  MOV A,#0C0H  ACALL CMD  MOV A, #'E'  ACALL DT  MOV A,#'X'  ACALL DT  MOV A, #'T'  ACALL DT  MOV A,#'C'  ACALL DT  HERE : SJMP HERE  CMD: CLR P1.1  CLR P1.2  MOV P0,A  SETB P1.0  ACALL DELAY  CLR P1.0  RET  DT: SETB P1.1  CLR P1.2  MOV P0,A  SETB P1.0  ACALL DELAY  RET      DELAY : MOV R2,#0FFH  NEXT: MOV R3,#0FFH  L1: DJNZ R3, L1  DJNZ R2, NEXT  RET  END |
| Results / Output |  |
| Conclusion | Thus program written for Displaying an Message on LCD Display Interfaced with 8051 Microcontroller. |

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| Faculty Sign | Grade received |