Practical Assignment 06

Problem statement: Write an embedded c program to transfer elements from one location to another for following:

i) Internal to Internal Memory transfer
ii) Internal to External memory transfer.

Objective: understand memory transfer from one location to another.

Platform: PC, MPLABX IDE, XC8 compiler

Theory:

Registers:

- special Function register (SFR)
- WREG (Working Register acts as an accumulator)
- status register that stores flages.
- Indicates operation that stores Flags.
- Registers hold memory address
- Bank select register (BSR)
- file select register (FSR)
- Program counter (PC)
- stack pointer (SP)

- 3 memory blocks are:
  - enchanced flash program memory
  - Data memory
  - EEPROM data memory.

- Program memory Organization

The PIC18F2581458 devices have a 21-bit program counter that is capable of addressing a 2-mbyte program memory space. The Reset vector address is at 000h and the interrupt vector address are at 0008h and 0018h.

- Data memory Organization

The data memory is implemented as static RAM each register in the data memory has a 12-bit address, allowing up to 4096 bytes of data memory. The data memory map is divided into as many as 16 banks that contains 256 bytes each.

- General Purpose Register file:

The register file can be accessed either directly or indirectly. Indirectly addressing operates through the file select register.
~~Enh~~ Enchanced MCU devices may have banked memory in the GPR area.

- Special function Registers

The special function Registers can registers used by the CPU and peripheral modules for controlling the desired operation of the devices.
These registers are implemented as static RAM.

Conclusion:

Thus we have to study the memory transfer in one location to another location in the embedded c.

Practical Assignment 05

Problem Statement: Write an embedded C program for sorting the numbersin ascending and descending order.

Objective : study of ascending and descending No.

Platform : PC, MPLABXIDE

Theory:
Bubble sort is a simple algorithm which is used to sort a given set 'n' element provided in form of an array with 'n' number of elements. Bubble sort compares all elements one by one and sort them based on their values. If the given array is to be stored in ascending order.

1 Conditional Operator
The conditional operator can appear in two forms. as if and if-else operator
Here is an example of the operator.

if (expression) operation:
As mentioned

if operation 1; else operation 2;

The syntax of the if-else statement

```
if (expression);
        operation 1;
else
    operation 2;
```

2. Function Declaration
- Function name
- Function Body
- List Parameter
- Declaration of Parameter.
- Type of function result.

```
Type-of-result function-name (type argument1, type
                argument2);
{
  command;
  command;
  ...
}
```

Example

```
/* Example computes the result of division
   of the numerator number by the denominator
   denom. The function return a real. */

real div (int number, int denom);
```

1 starting with the 1st elements compare the current element with the next element of the array.
2 If the current element is greater than the next element of the array. swap them
3 If the current is less than the next element move to the next element repeat step1.

- Algorithm : Ascending order

1 Declare the array num of n' number
2 i = 0
3 j = i+1
4 if num [i] > num [j] then exchange their position
5 i = i +1
6 j = j+1
7 if i <= n , repeat steps 5, 6, 7
8 end.

- Algorithm : Descending order

1 Declare the array num of 'n' number
2 i = 0
3 j = i+1
4 if num [i] > num [j] then exchange their position.
5 i = i+1
6 j = j+1
7 if i <= n , repeat 5, 6, 7 steps.
8 End.

Conclusion:
Program is executed in MPLABXIDE and o/p is observed in file register window as shown above

Practical Assignment 09

Problem statements: Write an embedded c program for generating PWM signal for serval DC motor

Platform: MPLAB X IDE SOFTWARE proteus.

Theory:

- In case of the motor, the mechanical energy produced is in the form of a rotational movement of the motor shaft.
- The direction of rotation of the shaft of motor can be reversed by reversing the direction of direct current through the motor.
- The motor can be rotated at certain speed by applying a fixed voltage to it.
- for applying varying voltage, we can make use of the PWM technique.

- As shown in above fig we have connected 1 kΩ Potentiometer at ADC channel 0 of PIC18F4550 to change the speed of DC motor

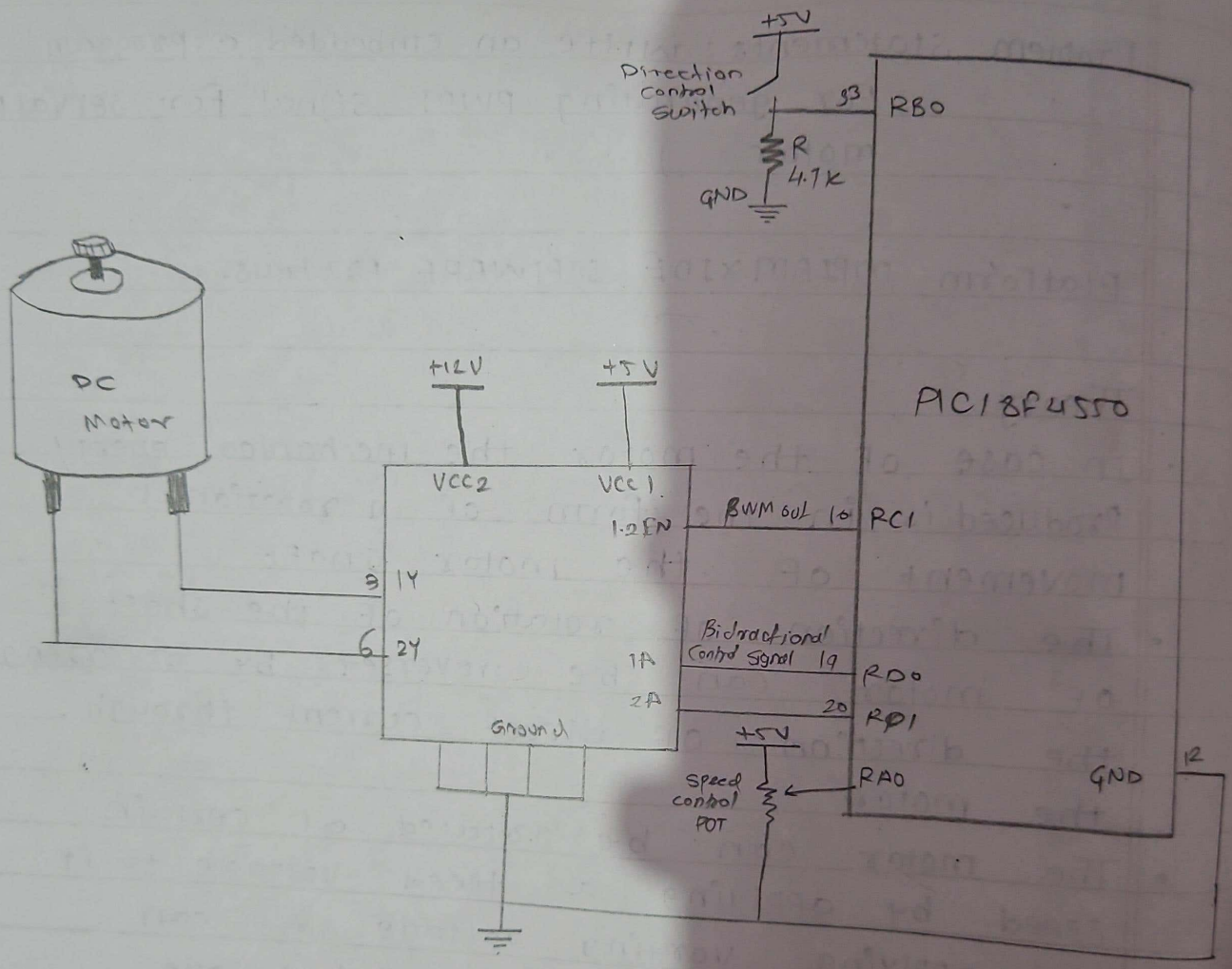
- one toggle switch is connected to the INT0 Pin which control the motor rotating direction

- PORTD is used as an output control signal port. It provide control to motor 1 input pins of the L293D motor driver which rotates the motor clockwise and anticlockwise by changing their terminal polarity

Conclusion:

observed the DC motor Rotation interfacing DC motor to PIC microcontroller.

Awade


+5V
Direction control switch
33
RB0
R
4.7k
GND
PIC18F4550
DC Motor
+12V
+5V
VCC2
VCC1
1,2EN
PWM out
10
RC1
3
1Y
6
2Y
1A
2A
Bidirectional Control Signal
19
RD0
20
RD1
Ground
+5V
Speed control POT
RA0
GND
12

Practical Assignment 11

Problem ~~o~~statement: write an embedded c program for Temperature sensor interfacing using ADC and display on LCD.

Platform: MPLAB XIDE SOFTWARE, proteus

Theory:
The LM35 is a temperature sensor widely used in electronic project and midrange devices.
It has limited usage in industrial application due to maximum temperature range limitation
It's rated to a full range of -55°c to 150°c.

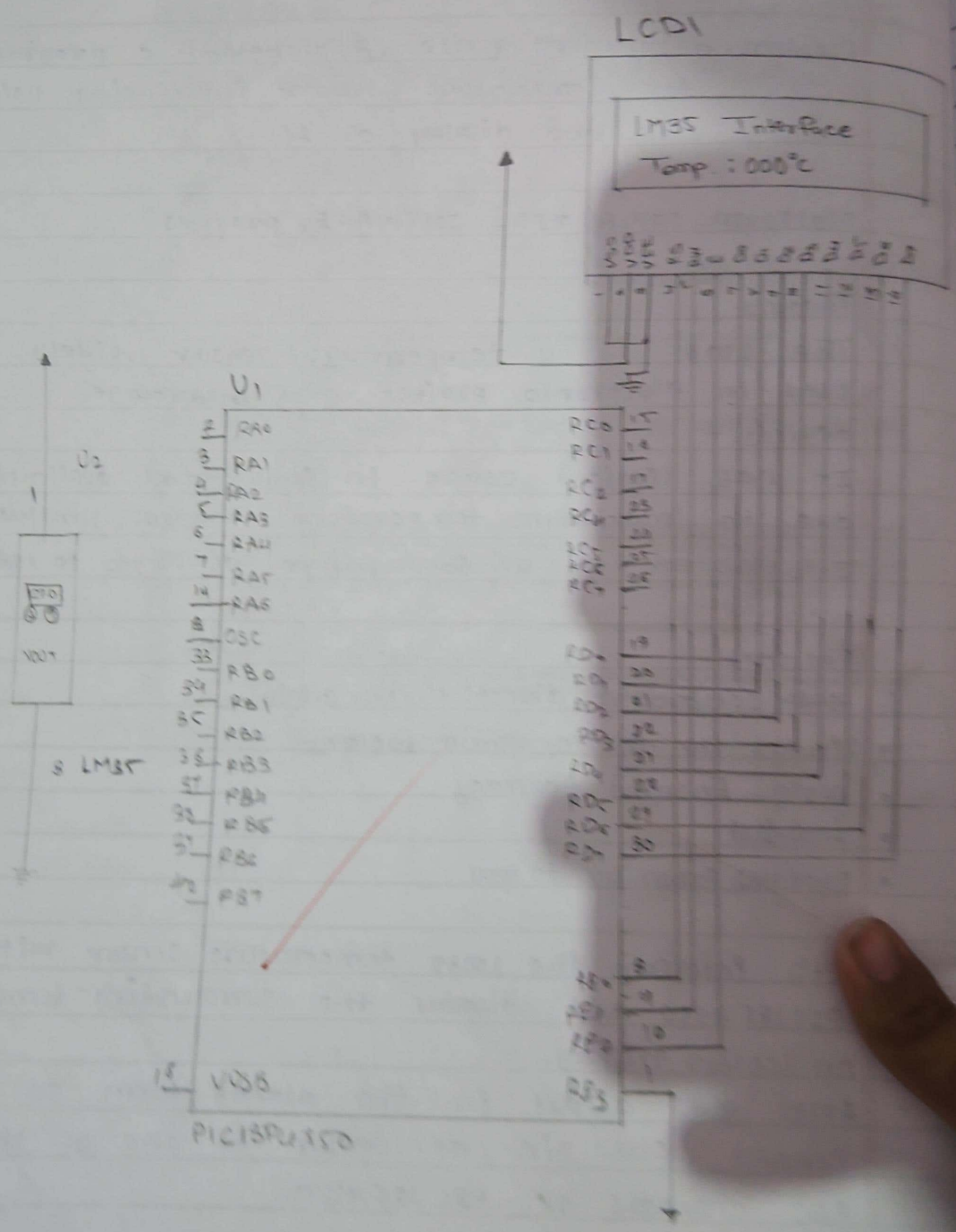
Features:
- ~~call~~ calibrated directly in celsius.
- Linear +10 -mV/°c scale factor
- 0.5°c Ensured Accuracy
- Low-Cost
- Operates From 4V to 30V

Let's interface the LM35 temperature sensor with PIC18F4550 and display the surrounding temp. on LCD16x2 display.
LM35 gives output in the alanog form so connect out pin of Sensor to one of the ADC channels of PIC 18F4550.

Conclusion:

Observed the temperature on LCD with temperature sensor interfacing with PIC microcontroller.

Howate



Conclusi
Observed
Senior