SUN TRACKER
MINI PROJECT
LEARNING PROCESS

- Identified the project
- Grabbed the details of project
- Prepared the block diagram
- Prepared the circuit diagram
- Fabricated PCB
- Sun Tracker Model is made
MODEL OF SUNTRACKER
LDR

Have a look at these circuits

\[ VL = \frac{V_{cc}R}{R+RL} \quad \text{VR} = \frac{V_{cc}R}{R+RD} \]

Design criteria: 
\((VL - VR)\) should be maximum

More light on R-L, then \( VL > VR \)
PERIPHERAL INTERFACE CONTROLLER

![Diagram of a peripheral interface controller](image-url)
DC MOTOR & MOTOR DRIVER

The L293D is designed to provide bidirectional drive currents of up to 1 A at voltages from 4.5 V to 36 V. The L293D is designed to provide bidirectional drive currents of up to 600-mA at voltages from 4.5 V to 36 V.

When an enable input is high, the associated drivers are enabled, and their outputs are active and in phase with their inputs. When the enable input is low, those drivers are disabled, and their outputs are 0 and in the high-impedance state.
The **78xx** (sometimes **LM78xx**) is a family of self-contained fixed linear voltage regulator integrated circuits.

- The 7805 has a 5 volt output, while the 7812 produces 12 volts. The 78xx line are positive voltage regulators.
- Internal thermal overload protection, no external components required and internal short circuit current limit.
CIRCUIT DIAGRAM

SOLAR TRACKER
Power Supply Unit:

The Power supply unit provides a 12V and a 5V supply to the solar tracking system at a time. The adapter provides 12V. The 12V supply drives the DC motors. The voltage regulating circuit provides the Vcc(5V) for the microcontroller PIC 16F877A. IC LM7805 is used as the positive voltage regulator for regulating 9V DC supply from the Battery to 5V regulated supply.
LDR (Light Dependent Resistor) varies its resistance according to the intensity of light incident on it. A 555 coupling circuit is provided for coupling LDR’s output to microcontroller’s input.
The DC motor driver L293D drives the two DC motors at a time. It provides ground voltage for the DC motors. If one of the input to DC motor is high, the DC motor driver drives the motor. Otherwise it stops the motor.
PROGRAMMING PART
START

SET i=0

Is i<4

yes

Read the ith analog channel and set it as xi

no

i++

Is x0-x1>20

yes

Make the system move forward

no

Is x1-x0>20

yes

Make the system move backward

no

Is x2-x3>20

no

Is x3-x2>20

yes

Make the system move backward

no

Is x2-x3>20

yes

Make the system move left
int x1,x2,x3,x0,temp,k,i;
sbit LCD_RS at RD2_bit;
sbit LCD_EN at RD3_bit;
sbit LCD_D4 at RD4_bit;
sbit LCD_D5 at RD5_bit;
sbit LCD_D6 at RD6_bit;
sbit LCD_D7 at RD7_bit;
sbit LCD_RS_Direction at TRISD2_bit;
sbit LCD_EN_Direction at TRISD3_bit;
sbit LCD_D4_Direction at TRISD4_bit;
sbit LCD_D5_Direction at TRISD5_bit;
sbit LCD_D6_Direction at TRISD6_bit;
sbit LCD_D7_Direction at TRISD7_bit;
void main()
{
    TRISA  = 0xFF;    // PORTA is input
    TRISC  = 0;       // PORTC+ is output
    TRISB  = 0;       // PORTB is output
    Lcd_Init();
    Lcd_Cmd(_LCD_CLEAR);
    Lcd_Out(1,2,"solar tracker ");
    delay_ms(1000);
    while(1)
    {
    
    
    
    }
ADCON0.CHS0 = 0;
ADCON0.CHS1 = 0;
ADCON0.CHS2 = 0;
x0 = ADC_Read(0);
ADCON0.CHS0 = 1;
ADCON0.CHS1 = 0;
ADCON0.CHS2 = 0;
x1 = ADC_Read(1);
ADCON0.CHS0 = 0;
ADCON0.CHS1 = 1;
ADCON0.CHS2 = 0;
x2 = ADC_Read(2);
ADCON0.CHS0 = 1;
ADCON0.CHS1 = 1;
ADCON0.CHS2 = 0;
x3 = ADC_Read(3);
if((x0-x1)>20)
{
}
RC0_bit=1;
RC1_bit=0;
}
else if((x1-x0)>20)
{
RC0_bit=0;
RC1_bit=1;
}
else
{
RC0_bit=0;
RC1_bit=0;
}

if((x2-x3)>20)
{
RC2_bit=1;
RC3_bit=0;
}
else if((x3-x2)>20)
{
RC2_bit=0;
RC3_bit=1;
}
else
{
RC2_bit=0;
RC3_bit=0;
}

Link: mikroC
Link: real pic simulator
PCB LAYOUT
PIC Microcontroller Based Sun Tracking System is a project based on the automatic tracking logic which is a fast growing area in research, industry and engineering applications. It can be modified to sense the parameters like pressure, light intensity, temperature, etc towards a radiation source. Further provisions can be made to measure the distance traveled and provide real time video and audio transmission back to an observation center. The future scopes for this project are as follows:

" Space explorations where a particular radiation source is to be tracked

" In GOT (Go Onto Target) guidance systems and intelligent bullets

" In anti-missile weapons which tracks the heat radiations of missiles.

" In surveillance systems and auto tracking radar systems.

" In data-acquisition systems to keep their antennas continuously directed at moving target without manual operation.
REFERENCE

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- ieee.org
- "Electronics for you"
- http://www.microe.com
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