**Auto Irrigation System**

**USER MANUAL**

Read the user manual carefully before operating the circuit, to ensure correct usage through understanding.

**INTRODUCTION**

This project is about a moisture-sensing automatic plant watering system using 8051 microcontroller. The system simply senses the moisture level and switches on the irrigation pump when the moisture is below the set limit. The system switches off the pump when the moisture rises above the set point. The moisture level threshold can be set using a trim pot on the system. The status of the pump (whether ON or OFF) is displayed on a 16×2 LCD display.

Steps followed by the User

* Connect the adapter to the circuit.
* Make sure the circuit is in plastic box.
* Insert the probes in the soil of your flowering pot or field.
* Switch on the device.
* Let the device do the work for you.
* When done with turn it off.

**PROGRAM:**

# include <at89x51.h>

# define LCDPort P2

sbit RS=P1^0;

sbit RW=P1^1;

sbit EN=P1^2;

sbit sensor=P3^2;

sbit relay = P3^1;

void delay(int t)

{

int i;

while(t>0)

{

i=1275;

while(i>0) i--;

t--;

}

}

void LCDCommand(unsigned char Value)

{

RS=0;

RW=0;

LCDPort=Value;

EN=1;

delay(2);

EN=0;

return;

}

void LCDData(unsigned char Value)

{

RS=1;

RW=0;

LCDPort=Value;

EN=1;

delay(2);

EN=0;

return;

}

void LCDInit()

{

LCDCommand(0x38); // Initialize LCD in 8-bit mode /// For four bit use 0x30;

LCDCommand(0x06); // display on cursor off

LCDCommand(0x0c); // Cursor in incrementing mode

LCDCommand(0x01); // Clear the Display

}

LCDPuts(char \*s)

{

int i;

for(i=0;s[i];i++) LCDData(s[i]);

}

void LCD\_goto\_XY(int x , int y)

{

if(y == 1)

LCDCommand(0x80 | x);

else if(y == 2)

LCDCommand(0xC0 | x);

}

void GPIO\_INIT()

{

sensor = 0xFF; // Initialize the sensor pin as INPUT

//sensor = 0;

relay = 0x00; // Initialize the relay pin as OUTPUT

}

void displayStatus(unsigned char \*status)

{

LCDCommand(0x01);

LCD\_goto\_XY(4,1);

LCDPuts("Status");

LCD\_goto\_XY(0,2);

LCDPuts(status);

}

void main()

{

GPIO\_INIT();

LCDInit();

LCDCommand(0x01);

LCD\_goto\_XY(2,1);

LCDPuts("Automatic");

LCD\_goto\_XY(0,2);

LCDPuts("Irrigation Sys.");

delay(1000);

while(1)

{

//delay(100);

if(sensor == 1)

{

displayStatus("Less moisture");

relay = 1;

delay(500);

}

else if(sensor == 0)

{

displayStatus("Enough moisture");

relay = 0;

delay(100);

}

}

}

**WORKING:**

Objective of the Auto irrigation system is to provide the user the complete automation of the system so what the project does is that it uses YL-69 as the soil moisture sensor which is the main component which reads the moisture in the soil once the data read is sent to comparator YL- 38 to compare the values obtained so it either returns high or low as digital read from pin Do the micro controller accepts the digital read data from the pin number Port 3.2 of At89s52which is 8051 Atmel microcontroller the data read from the pin is processed by the algorithm designed so also at the side of the LCD “Auto irrigation system” is displayed at the start of the device when powered on

The output voltage of the sensing probe is connected to the inverting input of the opamp. When the moisture level is high more current passes through the sensing probe and so the voltage at the inverting pin will be higher than the reference. The reference can be set using the trim pot R2. At this condition output of the opamp goes low and sinks the LED D1 to make it glow.

Case 1 : When the moisture is lower than the set point, the opposite happens. So in simple words, a LOW output of the opamp indicates a high moisture which gets displayed at the LCD Screen, the spot relay disconnects the connection and the pump motor stops.

Case 2: HIGH output of the opamp indicates a low moisture which is displayed on the LCD screen and thus then after verifying the situation the relay makes a connection and thus motor pump runs (relay interfaced at pin 3.1)

The output of the opamp is marked as pin D0 on the sensor YL 38 module.

LED D2 is just a power ON indicator. Capacitors C1 and C2 are noise filters

LCD is interfaced at port 2 of microcontroller and RS is at P1.0;

RW is at P1.1; EN=P1.2.

**Advantages**

* It can be easily scaled, thus easy implementation on large lands
* Integration of faster processors and GSM 900A can be used to drive the motor remotely from hand via text messages and also create internet hotspot for further IoT applications
* Integration of Node MCU8266 to develop a remote server of storing and keeping track of data
* Do data prediction and make it more feasible and automated system
* Low in cost because of low end components used.
* Can be used for the a small pot watering system at your house

**Limitations**

* System has a problem with the soil moisture sensor it can easily corrode. Rusting of the probe is a real problem. The carbon rod inside the batteries can be used. They are very good conductors and do not rust.
* Manual supervision need in case of an override
* Basic setup for the fields will most likely be very complex