

Drip Irrigation Controller

Abstract

In the field of agriculture, use of proper method of irrigation is important and it is well known that irrigation by drip is very economical and efficient. In the conventional drip irrigation system, the farmer has to keep watch on irrigation timetable, which is different for different crops. The project makes the irrigation automated. With the use of low cost sensors and the simple circuitry makes this project a low cost product, which can be bought even by a poor farmer.

This project is best suited for places where water is scarce and has to be used in limited quantity. Also, third world countries can afford this simple and low cost solution for irrigation and obtain good yield on crops.

The heart of the project is the Zilog Z8F6401 microcontroller. The microcontroller has built in 8-channel analog to digital converter, timers, UART controller that will be used in this project. A 16x2 LCD is connected to the microcontroller, which displays the humidity level and ambient temperature. Three pushbuttons are provided to set the limits of humidity for switching the individual solenoid valves controlling the water flow to the field. The humidity and temperature levels are transmitted at regular time interval to the PC through the RS232 serial port for data logging and analysis.

The humidity sensors are constructed using aluminum sheets and housed in easily available materials. The aim is to use the readily available material to construct low cost sensors.

Five relays are controlled by the microcontroller through the high current driver IC, ULN2003. Four relays are provided for controlling four solenoid valves, which controls the flow of water to four different parts of the field. One relay is used to shut-off the main motor which is used to pump the water to the field.

The major tasks involved in the project are:

- Design of the controller
- Construction of humidity sensors
- Implementation in the field
- Testing

The block diagram of the drip irrigation controller is shown in Fig 1.

Drip Irrigation Controller

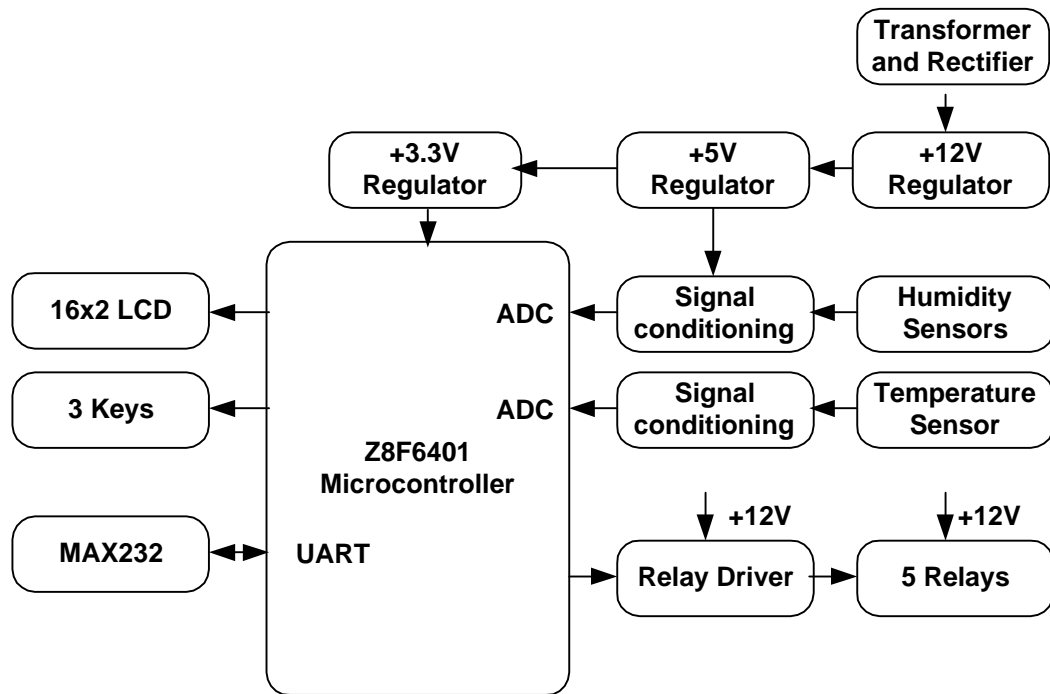
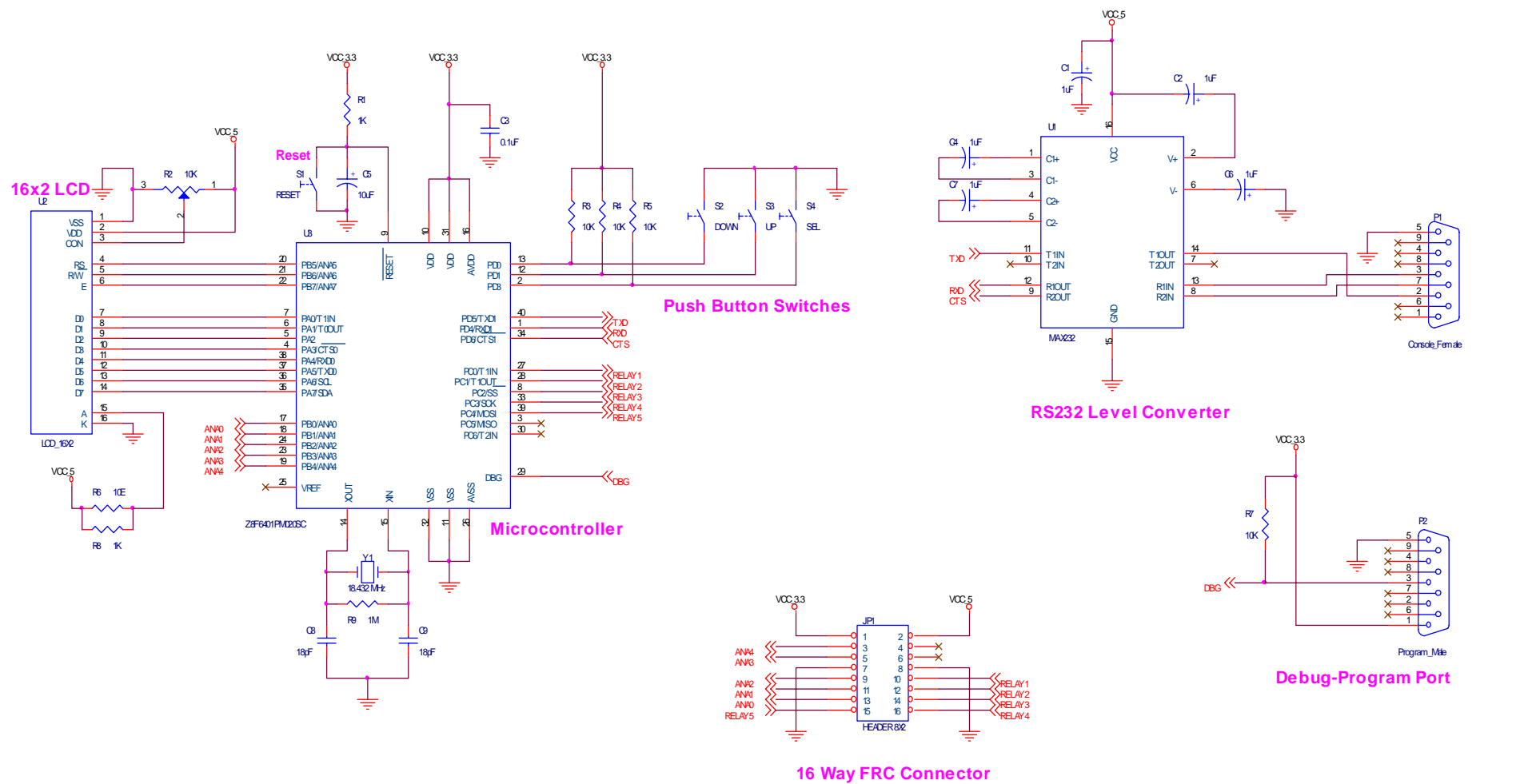


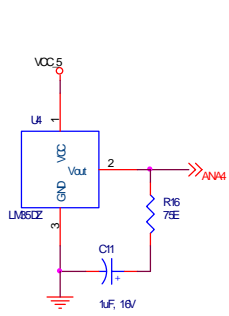
Figure 1. Block diagram of Drip Irrigation Controller

Drip Irrigation Controller

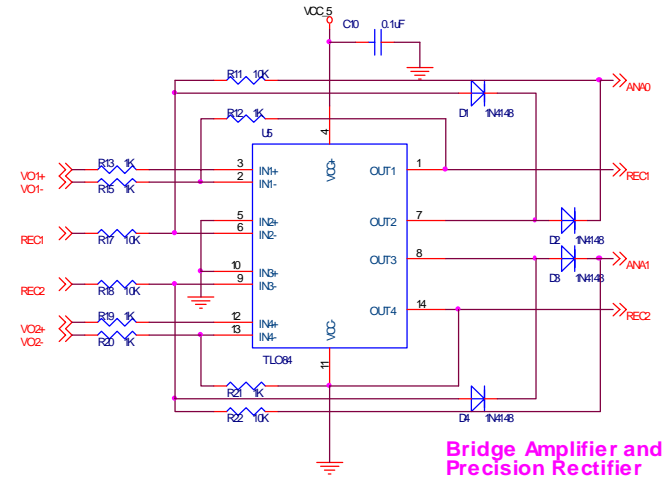
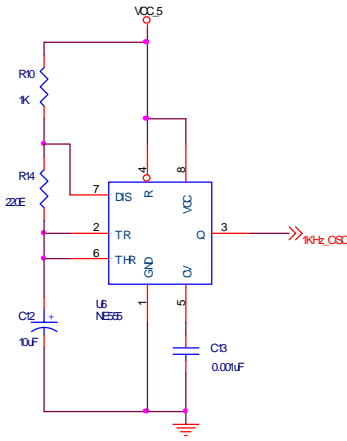


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Drip Irrigation Controller - Controller Board		
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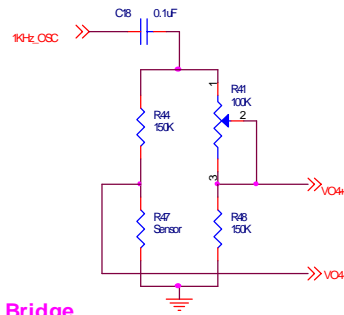
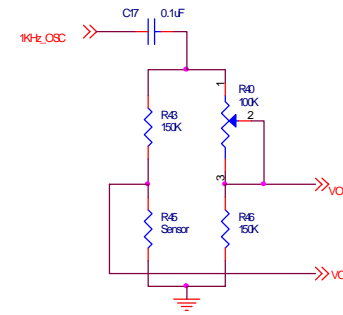
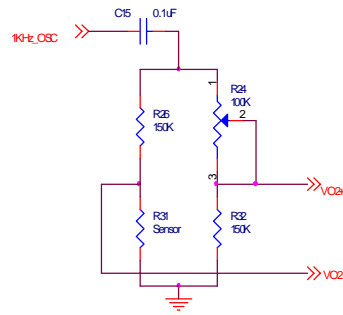
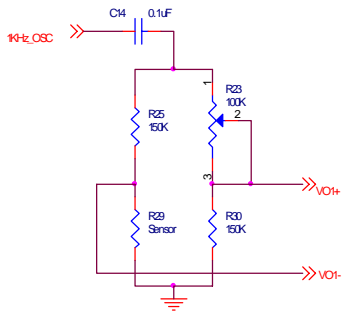
Drip Irrigation Controller



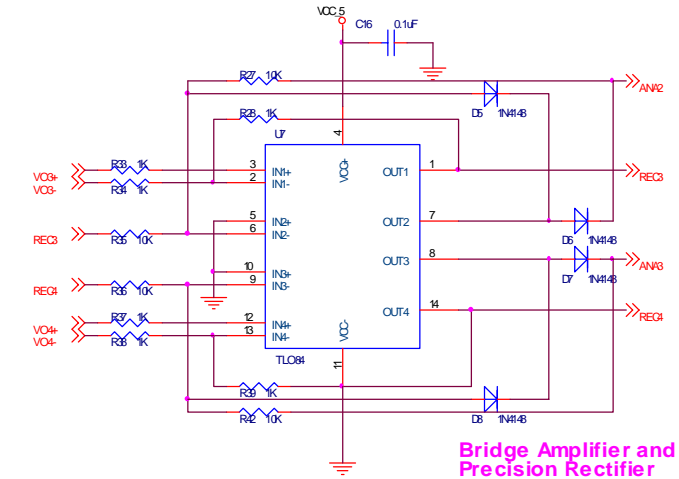
Temperature Sensor



Bridge Amplifier and Precision Rectifier



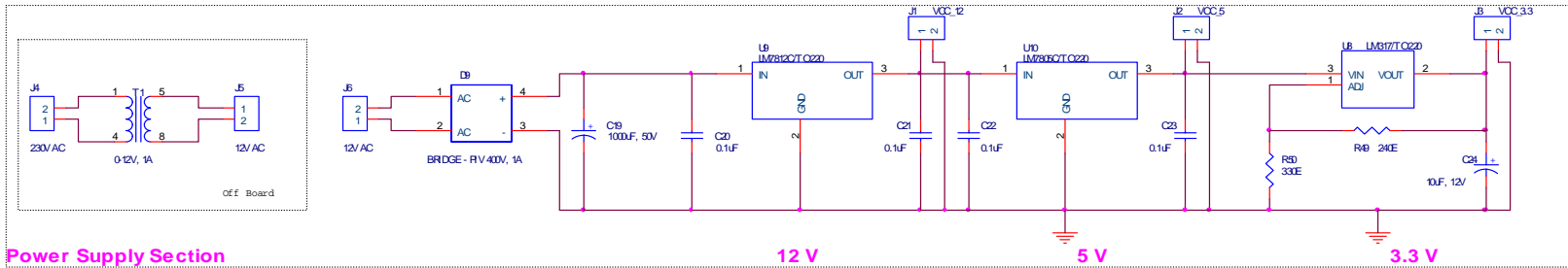
Whetstone Bridge



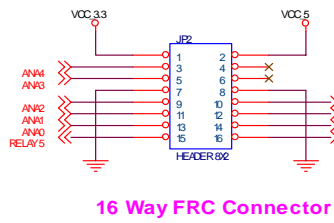
Bridge Amplifier and Precision Rectifier

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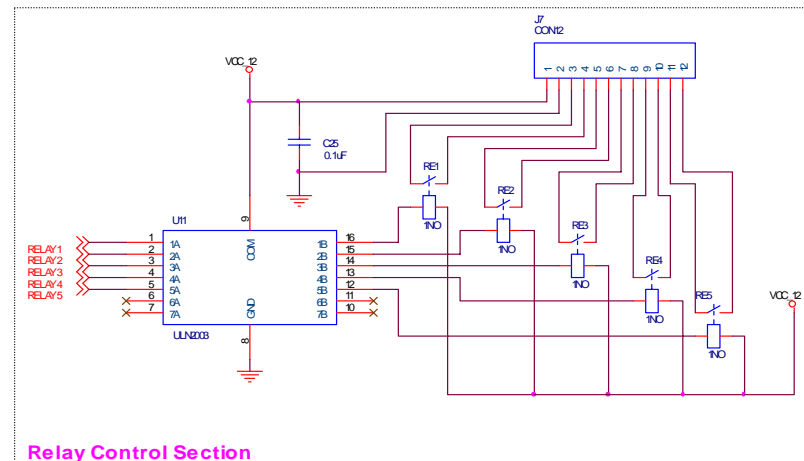
Drip Irrigation Controller



Power Supply Section



16 Way FRC Connector



Relay Control Section

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