MZUZU UNIVERSITY

FACULTY OF SCIENCE, TECHNOLOGY AND INNOVATION

DEPARTMENT OF IFORMATION AND COMMUNICATION TECHNOLOGY

SOLAR POWER PLANT MONITORING SYSTEM

By

Felix Kumafutsa (BICT/18/16)

USER MANUAL

Introduction

Arduino Solar Power Plant Monitoring system project consisted of two phases, simulation phase and the development with actual hardware components. This document serves as a guide on how to use the system and it provides information on how to run the simulation and how to run the actual system.

Simulation

The simulation part involves the use of a model designed using a simulation software named Proteus, different libraries for running different hardware in a virtual/ simulated environment and the code for controlling the simulation. The picture below shows the simulation environment and a description of different components.
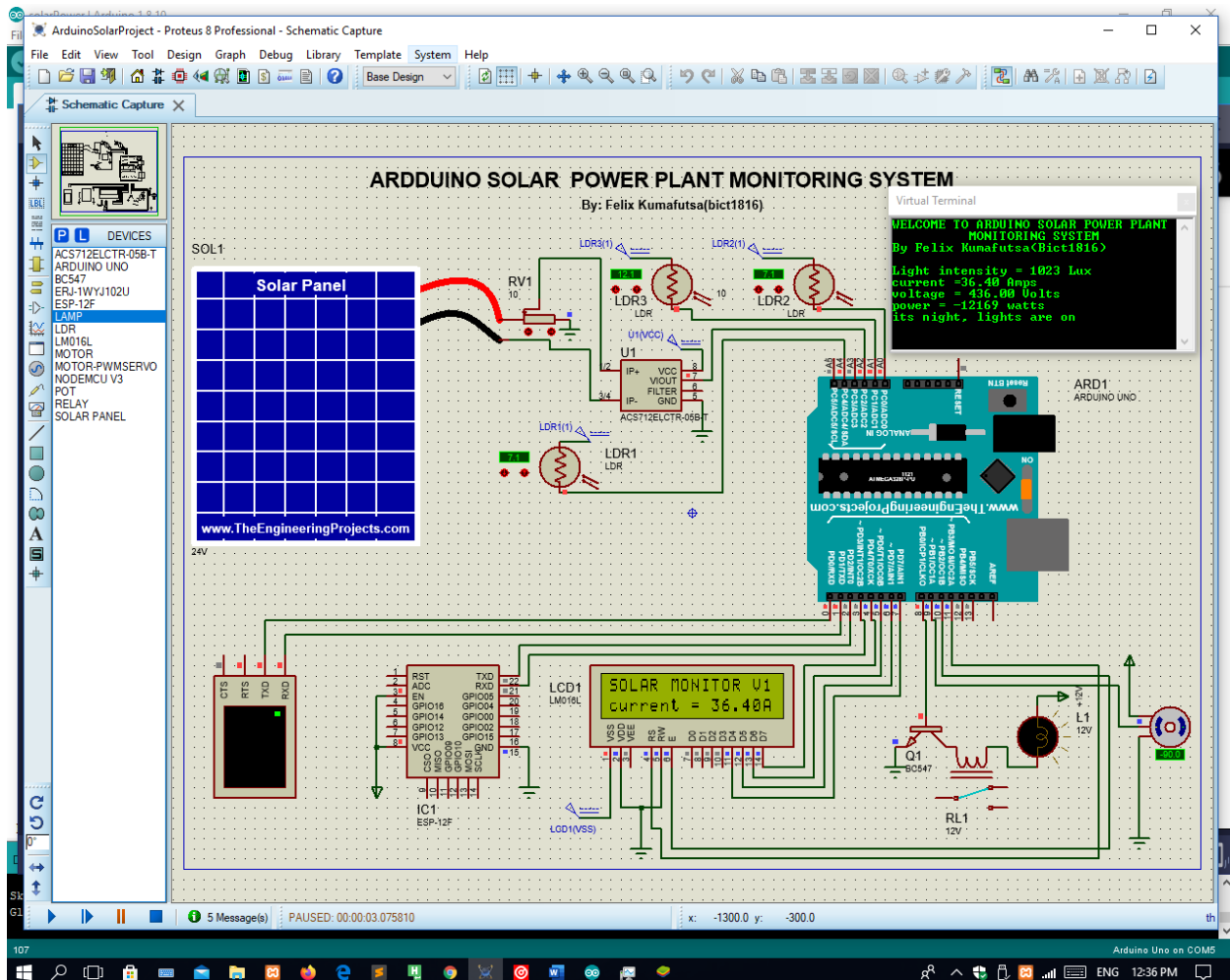
To work with the simulation part, you need to have the simulation software and the necessary libraries. First download Proteus simulation software and the necessary libraries to be able simulate different hardware components then compile the Arduino code in Arduino IDE. After compiling the code, select the Arduino board and edit its properties, select the path of the hex file and confirm. Run the simulation and you will se the output as shown in the picture above.

Actual hardware implementation

The actual hardware implementation involves the design of the hardware and its coding for controlling the hardware. I provide the hardware connections so that anyone may be able to try out building the system on their own.

Circuitry and pin connections

Arduino to ESP01 connections

Arduino Pin	ESP01 Pin
3.3V	Enable pin
Digital 2	TX
Digital 3	RX
GND	GND
3.3V	VCC

Arduino to Servo motor

Arduino Pin	Servo motor
Digital 9	Signal pin
GND	GND
5V	Power

Arduino to Relay

Arduino Pin	Relay Pin
5V	power
Digital 4	Signal pin

GND	GND

Arduino to LDRs

Arduino Pin	LDR Pin
5V	Power of all LDRs
A0	Signal pin of LDR1
A1	Signal pin of LDR2
A2	Signal pin of LDR3
GND	GND of all LDRs

Arduino to Emon (current transformer)

Arduino pin	Emon Pin
A3	signal
GND	To burden resistor

After the connections are done compile the Arduino code in your IDE then plug in the Arduino cable to your computer and upload the code. Upon uploading the code open the Arduino IDE serial monitor to see if the ESP01 is connecting to the network.

Lastly open your web browser and enter the following link in your browser **https://thingspeak.com/channels/1291250** and it will take you to thingSpeak IoT analytics platform where I visualize the sensor readings and you will see an interface showing charts for current(A), voltage(V), power(W) and the map showing the location of our power plant.

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monitoring operations of solar power plant

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Channel 2 of 2 ‹ ›

Channel Stats
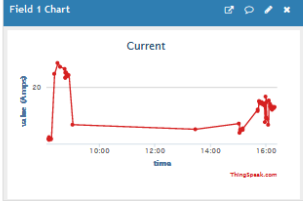
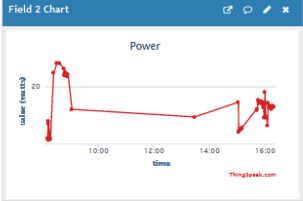Created: about a month ago
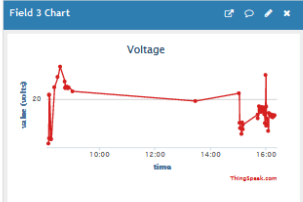Last entry: 10 days ago
Entries: 1855

Field 1 Chart

Current

value (Amps)

time

ThingSpeak.com

Field 2 Chart

Power

value (Watts)

time

ThingSpeak.com

Field 3 Chart

Voltage

value (volts)

time

ThingSpeak.com

Channel Location

Mzuzu

Mzimba

ENG 7:01 AM