

Wireless Network System for Grid with Node & End Station Development for Remote Sensing

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Abstract

Wireless networks in the smart grid allow information to be transmitted without human to human or human to computer interaction. This research is focused on developing a communication system which uses a Wi-Fi microcontroller, end stations and a smart grid to send data to each other in a remote location. Arduino-based Peer-to-Peer Wireless Network was designed and built. For the field test, we were able to maintain communication signal between the workstation and the access point about 500 feet.

Introduction

A smart grid is a system that helps deliver electricity reliably and more efficiently through two-way communication between the utilities and the consumer. It is important to monitor the loads and sources at the remote locations so that the status on the load and source may be optimally be balanced. Wireless networks is essential for the smart grid so that information can be transmitted without human to human or human to computer interaction. The objectives of this research project are to: (i) design an Wi-Fi microcontroller application for microgrid system, (ii) establish peer-to-peer connection between the workstation and access point , and (iii) to send a Wi-Fi signal over extended distances

Project Description

We designed a circuit to collect data shown in Figure 1. The Arduino program written to collect data collection program is shown in Figure 2. Solar PV and battery smart controller, shown in Figure 3, was built using Arduino to limit the minimum voltage of discharging the battery and also to limit the maximum voltage of charging battery through solar photovoltaic panel. Figure 4 show the transmitter in the Electrical Engineering Building for the Peer-to-Peer Communication

Summary and Conclusions

A Bluetooth hardware/software system using Arduino for smart charge controller was built. Furthermore, Arduino-based Peer-to-Peer Wireless Network was designed and built. In the field

test, we were able to maintain communication signal between the workstation and the access point for about 500 feet.

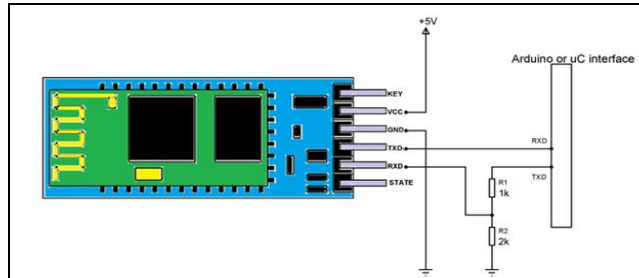


Figure 1: HC-06 Bluetooth Module

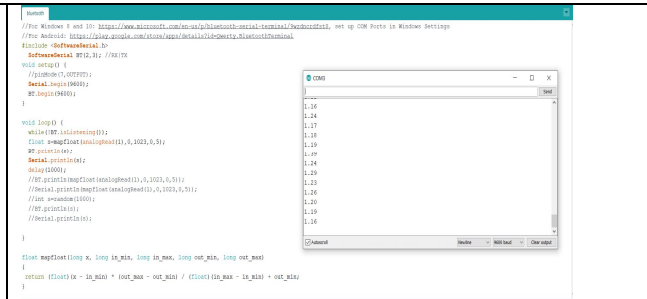


Figure 2: Arduino Program for Data Collection

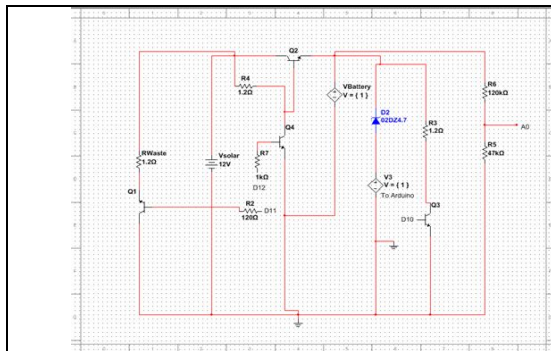


Figure 3: Schematic of the Smart solar PV and battery controller

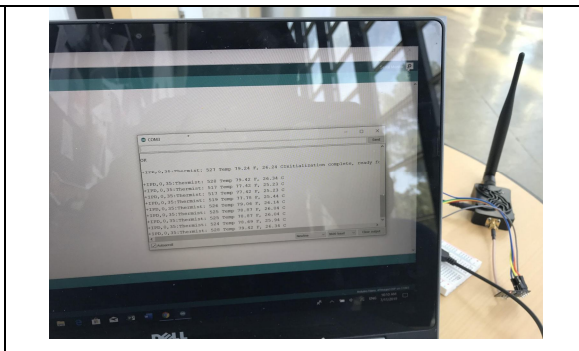


Figure 4: Transmitter in the EE Building for the Peer-to-Peer Communication

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