JUDUL: PERANCANGAN SISTEM PEMANTAUAN TANAMAN BERBASIS *WIRELESS SENSOR NETWORK*

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ABSTRAK

Tugas Akhir ini mendesain *sensor node* untuk sistem pemantauan tanaman berbasis *Wireless Sensor Network*. Perancangan alat ini bertujuan untuk membantu proses pemantauan kondisi lingkungan pada sekitar tanaman. *Sensor node* pada Tugas Akhir ini terdiri dari beberapa bagian yaitu *sensor-sensor* yang berhubungan dengan faktor lingkungan yang berpengaruh terhadap berkembangan tanaman, mikrokontroler, dan modul komunikasi. Proses perancangan meliputi perancangan rangkaian *signal conditioning* untuk masing-masing *sensor*, perancangan *board* mikrokontroler, kemudian pembuatan *software* dari *sensor node* agar dapat mengambil data dari *sensor* dan mengirimkan data tersebut secara *wireless*. Protokol komunikasi yang digunakan pada *sensor node* adalah protokol standar IEEE 802.15.4. Mikrokontroler yang digunakan pada *sensor node* adalah ATSAMR21B18-MZ210PA. Pengujian dilakukan selama 5 hari, dalam 1 hari dilakukan pengujian 3 kali pada tiap *sensor* yaitu pada pagi hari pukul 08.00 WIB, siang hari pukul 13.00 WIB dan sore hari pukul 16.30 WIB. Ukuran data yang dikirimkan sebesar 30 bytes. Hasil pengujian sistem adalah *sensor* berhasil mengambil data dan *sensor node* mampu mengirimkan data kondisi lingkungan dari *sensor-sensor* secara *wireless* menuju ke *gateway* hingga jarak 50 meter tanpa adanya penghalang. Sedangkan saat ada penghalang berupa tanaman didapatkan jarak 40 meter.

Kata kunci: *sensor node*, tanaman, ATSAMR21B18-MZ210PA, *Wireless Sensor Network*.

TITLE: *SENSOR NODE DESIGN APPLICABLE TO PLANT MONITORING SYSTEM BASED ON WIRELESS SENSOR NETWORK*

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ABSTRACT

The purpose of the Final Project is to design sensor node for plant monitoring system based on Wireless Sensor Network. The purpose of this project is to help monitoring process of environment condition around of plant. Sensor node in this Final Project are consists of several parts namely sensors that related to plant growth, microcontroller, and communication module. Design process includes signal conditioning circuit design for every sensor, microcontroller board circuit design, and then software design for sensor node to send environment data wirelessly to gateway. The communication protocol used on the sensor node is the IEEE 802.15.4 standard protocol. Microcontroller that used in this Final Project is ATSAMR21B18-MZ210PA. The first thing that were tested were the verification of each sensor, namely the light intensity sensor, temperature sensor, soil moisture sensor and air humidity sensor. The test was carried out for 5 days, in 1 day testing was carried out 3 times on each sensor, namely in the morning at 08.00 WIB, in the afternoon at 13.00 WIB and in the afternoon at 16.30 WIB. The size of the data that being sent is 30bytes. The results of the system test are that the sensor is successful in retrieving data and the sensor node is able to transmit environmental condition data from the sensors wirelessly to the gateway up to a distance of 50 meters without any obstructions. Meanwhile when there is a barrier in the form of plants the distance obtained is up to 40 meters.

Keywords: sensor node, plant, ATSAMR21B18-MZ210PA, Wireless Sensor Network.