

Automatic Fan Control Device Assembly Using Atmega8 Microcontroller

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Abstract

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The fan is a tool that is needed to rotate air circulation. In the market, fans are usually controlled manually by turning the control switch. The research problem is how to make a fan tool that can automatically turn on when there is a change in temperature. The purpose of this research is to facilitate users in using the fan. The method used is Research and Development. The stages of Research and Development include: data collection, design, and testing. The automatic fan control circuit consists of an atmega8 microcontroller integrated with a temperature sensor, button and relay. The circuit can display the temperature and can control the fan. The automatic fan control circuit is made on a PCB whose PCB layout is made using a computer with the PCB manufacturing process still using screen printing techniques. The conclusion is that the manufacture of automatic fan control devices integrated with temperature sensors, buttons and relays can facilitate the control of fans so that users do not need to control when the temperature changes.

Keywords: Fan, Microcontroller atmega8, Circuit

Abstrak

Kipas angin merupakan alat yang sangat dibutuhkan untuk memutar sirkulasi udara. Dipasaran biasanya kipas angin dikendalikan secara manual dengan cara memutar switch kendali. Permasalahan penelitian yaitu bagaimana membuat suatu alat kipas angin yang secara otomatis dapat menyala ketika terjadi perubahan suhu. Tujuan penelitian ini yaitu memudahkan pengguna dalam menggunakan kipas angin. Metode yang digunakan adalah Research and Development. Tahapan Research and Development tersebut meliputi: pengumpulan data, perancangan, dan pengujian. Rangkaian kendali kipas angin otomatis terdiri dari sebuah mikrokontroler atmega8 yang terintegrasi dengan sensor suhu, tombol dan relay. Rangkaian dapat menampilkan suhu dan dapat mengendalikan kipas angin. Rangkaian kendali kipas otomatis dibuat diatas PCB yang Layout PCB dibuat menggunakan komputer dengan Proses pembuatan PCB masih menggunakan teknik sablon. Kesimpulannya yaitu pembuatan alat kendali kipas otomatis yang terintegrasi dengan sensor suhu, tombol dan relay dapat mempermudah dalam pengendalian kipas angin sehingga pengguna tidak perlu mengontrol saat suhu berubah..

Kata-kata kunci: Kipas angin, Mikrokontroler Atmega8, Rangkaian



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1. Introduction

As time goes by and the times increase, it will also be accompanied by the development of technology. Technology was created and developed solely to help ease human activities. Various tools are combined with existing technologies [1] [2]. One example is a device related to temperature or air circulation. The air temperature in a room sometimes feels hot in the summer and cold in the winter [3]. Temperature differences that are not to the standard conditions of the human body will significantly interfere with the body's health, so a tool is needed to regulate it [4].

Manually humans use a thin and wide object to regulate the ambient temperature. For example, paper or woven bamboo. Woven bamboo is fluttered around the body to reduce the temperature. The existence of technological intervention in the market circulated temperature control devices, namely fans [5] [6]. The fan converts electrical energy into motion energy. It is the movement of the fan that can regulate air circulation in the room. But the problem is that the fan's rotation is still simple and stable. There is no temperature control component. So that in using a fan, the user must rotate the switch according to the desired state. To facilitate activities and relieve human labor, it is necessary to have an automatic fan device related to temperature regulation [7] [8].

Simon Petrus, Dadan Ramdan, and Marlan Swandana, in their research on the Design Of Automatic Control Of Wind Flask Based On Space Temperature And Human Motion, explained the manufacture of automatic fan devices related to human motion and temperature [9]. The same research using a microcontroller was conducted by Indah Purnamasari and Muhammad Rezasatri, who made about the Design of an Atmega 16 Microcontroller-Based Fan Controller Through an Android Application With Bluetooth [10].

Based on the above literacy, researchers intend to make a more specific automatic fan device to control room temperature. The method used is Research and Development [11]. The stages of Research and Development include data collection, design, and testing.

2. Method

The method passed is collecting materials and making circuit designs using electronic simulations, prototypes, and simple circuits. The flow depiction of the automatic fan control system is presented on Figure 1.

Figure 1. Automatic Fan Control Device Flowchart

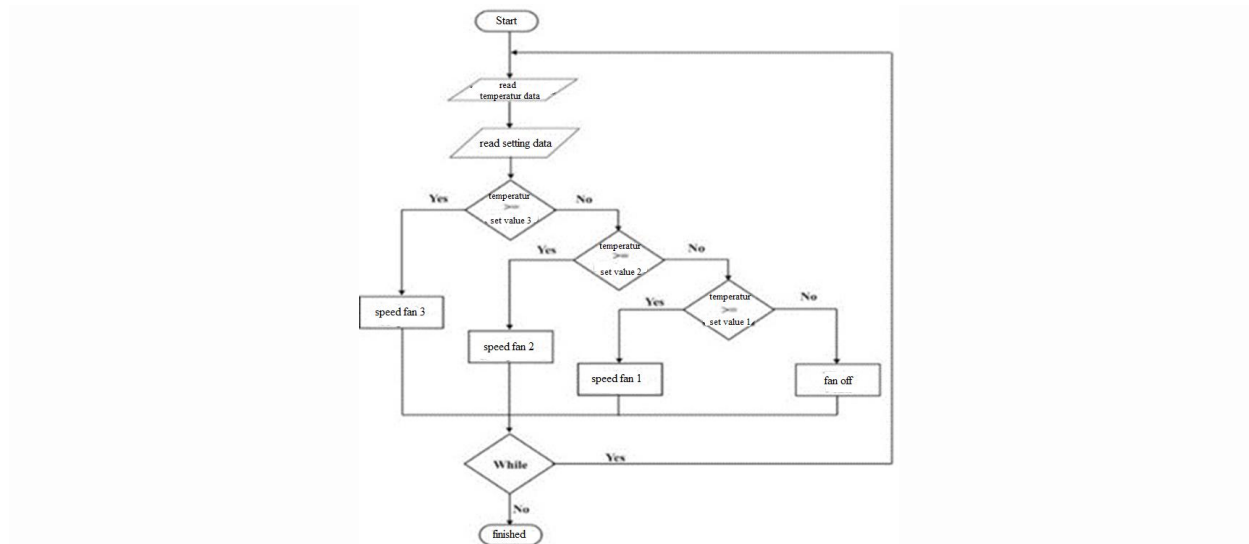


Figure 1. Starting from the start, then reading temperature data and data from the settings is carried out. If the temperature data is more than or equal to the value in setting set 3, then the fan will turn on at speed 3; if the temperature data is less than the value of setting set 3, then the following selection will be made. If the temperature data is more than or equal to the value in setting set 2, then the fan will turn on at speed 2. If the temperature data is less than the value of the setting data set 2, the following selection will be worked on. If the temperature data is greater than or equal to the value in setting set 1, then the fan will turn on at speed 1. If the temperature data is less than the value of the setting data set 1, then the fan will turn off. Then the process will return from the temperature reading. Flowchart buttons and settings is presented on **Figure 2**.

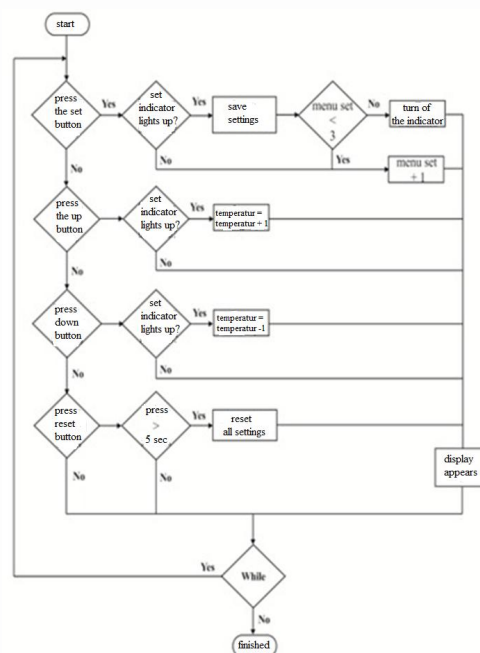


Figure 2. Flowchart Buttons and Settings

Figure 2. Explain the start if the temperature regulation will be reduced. If the reset button is depressed for more than 5 seconds, then all settings revert to default settings. Flowchart display presented on **Figure 3**.

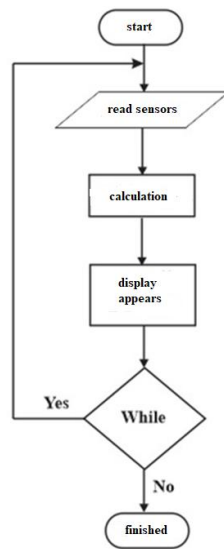


Figure 3. Flowchart Display

Figure 3. Explaining the displayed workflow of the automatic fan control device, starting from sensor readings by LM35 and then calculations carried out by the atmega8 microcontroller. After that, it is displayed through the port to the display so that a temperature number appears the LM35 sensor has read that.

3. Results and Discussion

3.1 Results of the Research

Figure 4 is a view of an automatic fan control device. Testing automatic fan control devices can be done with the following procedure. (a) The plug is plugged into the outlet. (b) The automatic fan control device circuit switch is turned on. Automatic fan control tool is presented on **Figure 4**.



Figure 4. Automatic Fan Control Tool

In the test, the author set the temperature of the automatic fan control device according to **Table 1**.

Table 1. Test Temperature Setting

No.	Speed	Temperature
1	1	25 °C
2	2	27 °C
3	3	29 °C

To enter into the settings can be done by pressing the set button. After pressing the set button for the first time, the display will enter the first fan speed setting. The temperature value can be increased by pressing the up button, while to lower the temperature value can be adjusted by pressing the down button.

Ending the setting at the first speed can be done by pressing the set button once. After pressing will go directly to the second-speed setting. Increasing the temperature value at the second speed can be done by pressing the up button. And lower the temperature value can be done by pressing the down button.

After setting the second speed can be ended by pressing the set button again. Pressing the button will enter the third fan setting. Increasing the temperature setting value can be done by pressing the up button, and decreasing the temperature setting value can be done by pressing the down button. To end the setting can be done by pressing set again. The heater is turned on after the automatic fan control device is set. The temperature will slowly rise along with the heat generated by the heater element.

Table 2 shows that at 29 °C, the fan speed indicator is at the third level. The fan turns on at the third (fast) speed at this level. With the temperature settings according to Table 2.

Table 2. Test Result Data

No.	Temperature	Speed	Information
1	24 °C	0	Kipas Angin Mati
2	25 °C	1	Kipas Angin Hidup (<i>Speed 1</i>)
3	26 °C	1	Kipas Angin Hidup (<i>Speed 1</i>)
4	27 °C	2	Kipas Angin Hidup (<i>Speed 1I</i>)
5	28 °C	2	Kipas Angin Hidup (<i>Speed 1I</i>)
6	29 °C	3	Kipas Angin Hidup (<i>Speed 1II</i>)

3.2 Discussion

Automatic fan assembly can run smoothly using the atmega8 microcontroller system and components in LM35 temperature sensors, buttons, and relays. It is evidenced by the data in Table 4.2 regarding test result data. When the temperature is 24 °C, the fan is still off. At 25 °C, the fan starts at level 1 speed and 2 at 6 °C. At 27 °C and 28 °C, the fan speed increases at level 2. At 29 °C, the fan speed increases at level 3. The fan automatically starts rotating at 25 °C, and if the temperature increases to 29 °C, the fan speed will also increase with the increase in level.

4. Conclusion

Based on the discussion above, it can be concluded that creating an automatic fan control device integrated with temperature sensors, buttons, and relays can facilitate fan control so that users do not need to control when the temperature changes.

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