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Control of Pharmacy Degree Heat

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Abstract: ***Some sensitive systems need a specific temperature to Maintaining the quality and effectiveness a pharmacy contents for example. Need pharmacy to store the pharmaceutical and medical appliances at a certain temperature, temperature inside the pharmacy must be controlled. So, I decided to construct a system that controls the cooling devices used in pharmacies. The system works by increasing the speed of the cooling device when the temperature increases inside the pharmacy. The system also decreases the speed of the cooling device when the temperature decreases inside the pharmacy. The proposed system gives acceptable result in the real test.***

1. Introduction

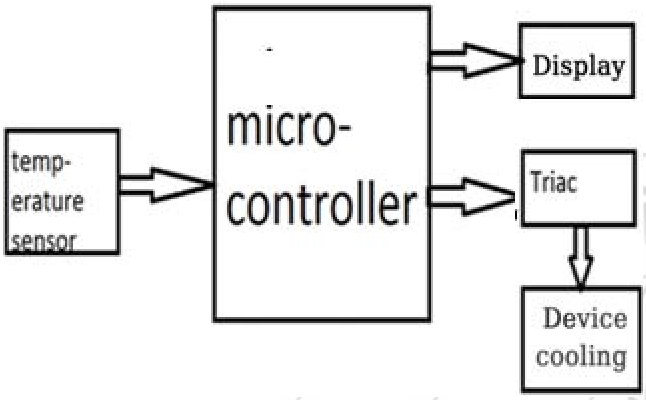

Figure 1: System block diagram

From diagram shows that the control system is an electronic circuit consisting of:
1-Temperature sensor
2-Microcontroller
3-Display
4-Triac
5- Cooling device

System's components

1) Temperature Sensor

The temperature sensor acts by sensing the temperature degrees inside the pharmacy. The sensor used in this circuit is from the type LM35, which senses the temperature in its analog form and amplifies it. Then it transfers it to the microcontroller via port A. The LM35 is an integrated circuit sensor that can be used to measure temperature with an electrical output proportional to the temperature (in oC) the scale factor is .10mV/oC

2) Microcontroller

The microcontroller acts by controlling the speed of the cooling device after converting the analog signals of the temperature to digital signals. The microcontroller used in the system is form the type Atmega16.

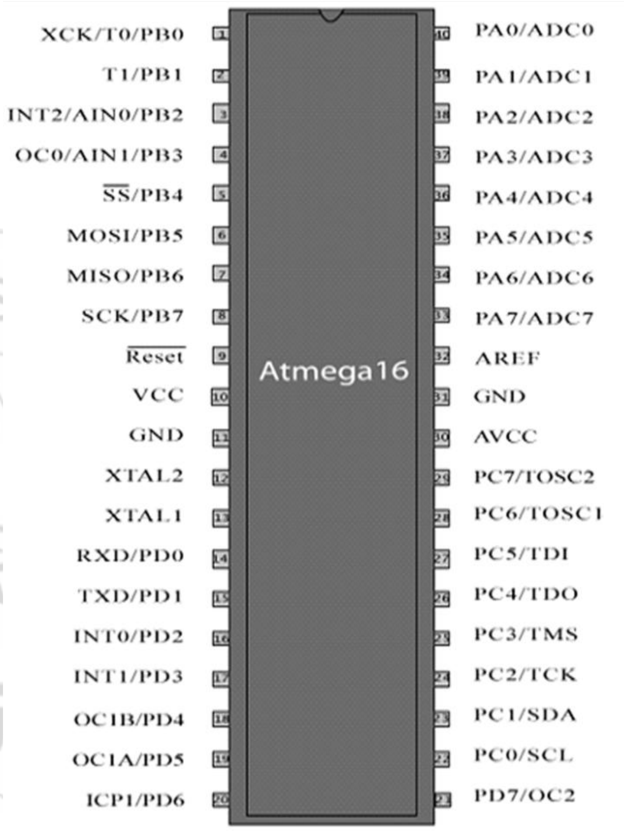

Figure 2: Atmega16

3) Triac

The voltage resulting from the microcontroller which controls the speed of the cooling device is DC voltage. So, the triac is connected to the microcontroller to get AC voltage. The triac is connected to port D of the microcontroller, the voltage supply and the cooling system.

4) Display

The Temperature degrees and the speed the cooling device are displayed in the screen. The display screen used has 2*16 width and is connected to port B of the microcontroller (Table illustrates some resulted readings in the screen).

5) Cooling device

The cooling device used in this circuit is a 220 volts fan that is connected to the triac and the voltage supply directly. The following figure shows the system circuit:

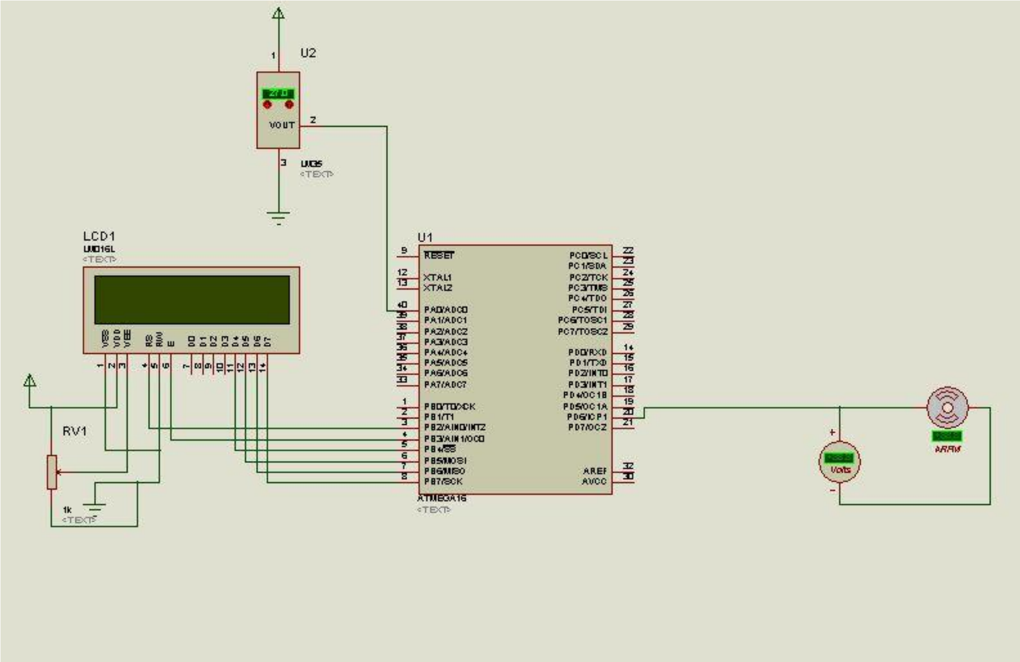

Figure 3: System Simulation

Table 1: Shows the pins used to connect the system components

Atmega16		
PA0 (ADC0)	ADC Channel 0	I/O PORTA, Pin 0
(INT2/AIN0) PB2	I/O PORTB, Pin 2	AIN0: Analog Comparator Positive I/P INT2: External Interrupt 2 Input
(OC0/AIN1) PB3	I/O PORTB, Pin 3	AIN1: Analog Comparator Negative I/P OC0 : Timer0 Output Compare Match Output
(SS) PB4	I/O PORTB, Pin 4	In System Programmer (ISP) Serial Peripheral Interface (SPI)
(MOSI) PB5	I/O PORTB, Pin 5	In System Programmer (ISP)
(MISO) PB6	I/O PORTB, Pin 6	Serial Peripheral Interface (SPI)
(SCK) PB7	I/O PORTB, Pin 7	In System Programmer (ISP)
(RXD) PD0	I/O PORTD, Pin 0	USART Serial Communication Interface
(ICP) PD6	I/O PORTD, Pin 6	PWM Channel Outputs
AREF	Analog Reference Pin for ADC	Analog Reference Pin for ADC
AVcc	Voltage Supply = Vcc for ADC	
LCD		
V_{EE}	Contrast adjustment; through a variable resistor	
Register Select	Selects command register when low; and data register when high	
Enable	Sends data to data pins when a high to low pulse is given	
DB4	data pins	
DB5	data pins	
DB6	data pins	
DB7	data pins	
Read/write	Low to write to the register; High to read from the register	
LM35		
Vcc	Supply voltage; 5V (+35V to -2V)	
Output	Output voltage (+6V to -1V)	
Ground	Ground (0V)	

2. Results

Table 2: Shows some real readings of the screen to the temperature and fan speed in a real test of the system.

Temperature	6	28	30	34	36	38
Fan speed	3	14	15	17	18	19

Chart shows the linear relationship between temperature and fan speed

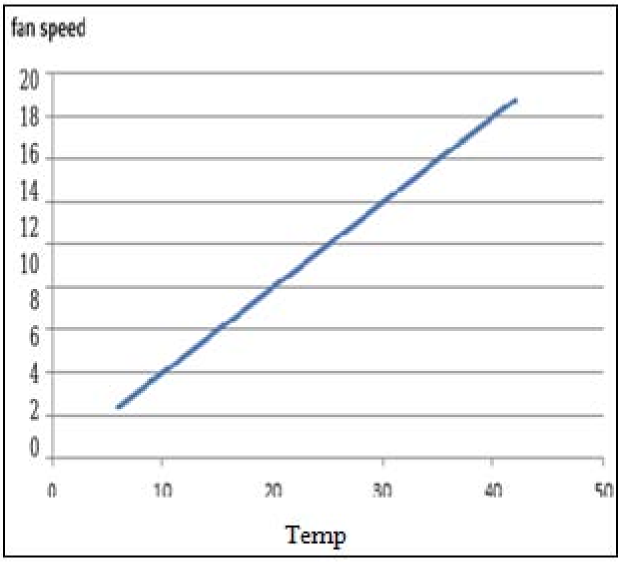

Figure 3: Chart

3. Conclusions and Recommendations

In conclusion, the system can control the speed of the fan inside the pharmacy, based on the temperature inside that pharmacy and it does not need a key to increase or decrease the speed of the fan. Possible operation of the system with other cooling devices and can also add some control systems, such as fuzzy logic.

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