Ho Chi Minh City University of Technology
Faculty of Computer Science and Engineering

– CO2019 Computer Hardware – Spring 2019 –

User Manual for the System

Ho Le Thuc Quyen - 1752454
Truong Le Vinh Khoa - 1752298

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1 Introduction

The demonstration of a system with node MCU processor, RFID card reader, SIM 800 and DHT sensor. (picture top and bottom) The system allows user to read the temperature and humidity and send the data to server if wifi is connected, otherwise, it will send to SMS.

2 Overall properties of the circuit

2.1 Function

Out circuit can execute the following functions:

1. Access the system.
2. Send the message to server or another mobile phones.
3. Detect the current temperature and humid.
4. Access WiFi.
5. Access Server.
6. Add more users.

2.2 Components

- NodeMCU: Used as the main interface for all the connection.

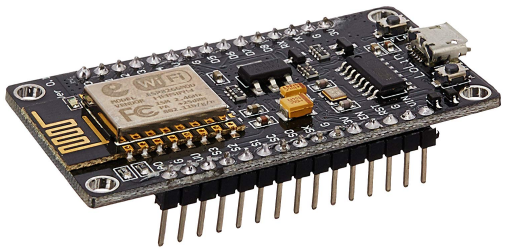

Figure 1: NodeMCU

- RFID: Read the UID of card master card in order to access the application or used to read and add more card-users.

Figure 2: RFID RC522

- LCD: Display the content.

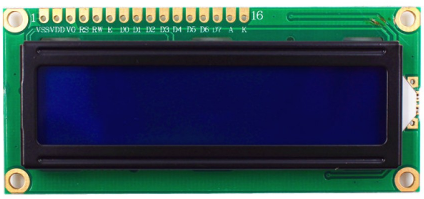

Figure 3: LCD

- SIM800L: Send the massage.

Figure 4: SIM800L

- DHT11: Detect temperature and humid.

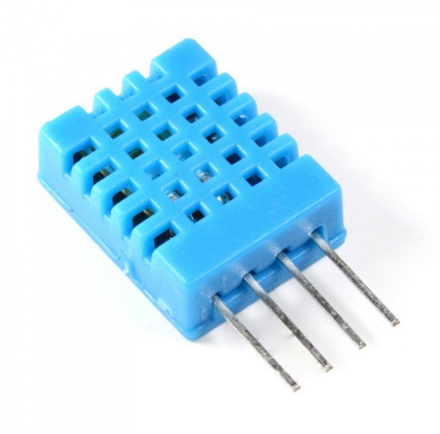

Figure 5: DHT11

- LM2596: Used to reduce the 12V Input Voltage to 4.6V Output Voltage to raise the circuit.

Figure 6: LM2596

- Button: Used to change between functions and select it.

Figure 7: Button

3 Instruction

3.1 How to control and move between tasks.

In this system, we mainly use two buttons to both move and control all of the functions (pointer button and choose button).

The function of the first button (in the left side, next to LCD screen) is used as the pointer helping users to travel between the particular tasks they want.

And the rest button (in the right side), it helps us to select the functions we want to execute.

3.2 Access the system

In order to access this system, we have two ways. By master card or by additional users.

First of all, the card member will be asked for permission to the system. If it is a right card, the system will be accessed. A menu will be appeared to let user know what they can do, send message, see temperature and humidity, connect to wifi, connect to server, control users and quit.

3.3 Send message

Once users has entered to this function, a list of messages that can be sent is showed on the screen, "Hello", "What r u doing", "Eaten rice yet", "Temperature" and "Humid". When wifi is connected, the message will be sent to the server, otherwise it will be sent to mobile phone by SMS. The left button is used to select the content of message, which users want to send, and the other is pressed to send that content. If users want to quit, they can go to the line "Quit message" and go out to the main menu.

3.4 Detect the current temperature and humid

This task let users know the current temperature and humidity, which are displayed on the LCD screen.

3.5 Access Wifi

In order to access the WiFi. First, we have to declare the WiFi ID and Password in the code "PCMT.ino" at line 14 and 15. Then, after entering the system successfully, we move the

pointer to the task Access Wifi and press choose button to access wifi.

```
14 char IDWF[]="ID";
15 char PASSWF[]="PASSWORD";
```

Figure 8: Connecting to Wifi

In this process, we should not press choose button since it is processing.

And there are two results for this task.

- The screen will return the massage "Successfully to connect Wifi. it means that we have connected to the WiFi.
- Otherwise, the screen will return "fail to connect Wifi" after 10 seconds. it means that we have typed wrong password, Id or even the connection is too weak for the system to connect.

3.6 Access Sever

Connecting to server is similar to connect Wifi. Initially, we have to declare user, password and name of your instance in CloudMQTT in file "access_MQTT.h".

```
108         if (!MQTT.connect("Instance", "user", "password"))
109             lcd.print(".");
110         else break;
111         count_dot = (count_dot + 1) % 16;
112         if (count_dot == 0) lcd.clear();
```

Figure 9: Connecting server

After pressing the choose button at access MQTT, it will return two results. Success to connect or fail to connect. If it is connected to server, i will return the result on screen simultaneously, otherwise, after 10 second, it will return fail message.

3.7 Control Users

Firstly, users will be asked for insert the master card since this action is only done by master. Once the master card has inserted, the screen will display 5 users can be added to the system. The "Check users" task will find whereas the card user is added or not, if yes, it will show which user of the card is.

A particular user shows "EMPTY" meaning that there is no user in that slot and it can be added. The message "ADD SUCCESSFULLY" demonstrates that the card is successfully added to the system. If the card is added and the message "EXISTED CARD MEMBER - CAN NOT ADD" is shown, it shows that card has already existed in other users.
In contrast, the ID number, which is randomly generated for each user, is on the screen at one user if it has added before. When users insert the right user card, it will be deleted and the message will be shown, otherwise, the screen will display "NOT THE SAME CARD MEMBER".