Appendix B

This is the code for the second uno board (slave1) :

```
1.  //This uno is used as slave 1 to control the LED1602
2.  #include <LiquidCrystal.h>//LED1602 display required library
3.  #include <Wire.h>
4.  #include <SD.h>//SD card library required
5.  #include <SPI.h>
6.  LiquidCrystal lcd(9,8,4,5,6,7);//Define LED1602
7.  const int chipSelect = 10;
8.  File myFile;
9.  int num=1;//Stands for song order
10. bool start=false;
11. void setup() {
12.   lcd.begin(16,2);//Initialize the width and height of the LED1602 display
13.   Wire.begin(2);//Initialize the iic communication, as slave 1, the iic communication address is 2
14.   Wire.onReceive(receiveEvent);//This registers an event on the slave side that is fired when the slave receives data from the host
15.   Serial.begin(9600); //Serial communication with the computer
16.   attachInterrupt(0,pause,RISING);//Initialize the interrupt pin, the interrupt number is 0, the actual pin is D2,
17.   // and the interrupt trigger mode is RISING (falling edge trigger, that is, high level changes to low level).
18.
19. }
20.
21. void loop() {
22.   if(start) sd(num);
23. }
24. void receiveEvent(int howMany) {//An event that is fired when slave 1 receives data.
25. //This event takes an int (the number of bytes read from the host) and returns no value
26.   start=true;
27.   String s="";
28.   while(Wire.available()){
29.     char m=Wire.read();
30.     s+=(char)m;
```

```
31.       delay(10);
32.     }
33.     num=s.toInt();//Use the toInt() method to convert a String to an
int
34.     sd(num);
35.   }
36.
37.   void pause(){//Interrupt function
38.     lcd.clear();
39.     lcd.begin(16,2);
40.     lcd.setCursor(0,0);
41.     lcd.print("Song Pause");
42.     while(digitalRead(2) == HIGH){}
43.     lcd.clear();
44.   }
45.   void sd(int num){//Used to get lyrics from sd card
46.     int count=0;//A footer representing a row
47.     int start=0;//The first time node is considered separately
48.     String b="";//For accessing lyrics
49.     String time1="";//Time node 1
50.     String time2="";//Time node 2
51.     int time=0;//The difference between time node 1 and time node
2,
52.     //which is the duration of a lyric sentence appearing in LCD
53.     while (!Serial);
54.     Serial.print("Initializing SD card...");
55.     pinMode(chipSelect, OUTPUT);
56.     if (!SD.begin(chipSelect)) {
57.       Serial.println("initialization failed.");
58.       return;
59.     }
60.     Serial.println("initialization done.");
61.     myFile = SD.open("song"+(String)num+".txt");
62.     if (myFile) {
63.       Serial.println("song"+(String)num+".txt");
64.       while(myFile.available()){
65.         char a=myFile.read();
66.         if(start==0){
67.           if(a==(char)'[') count=0;
68.           if(0<count&count<9)  time1+=a;
69.           else if(count==9)  start=1;
70.         }
71.         if(count>9&&a!=(char)'[') b+=a;
72.         if(a==(char)'[') {
```

```
73.            count=0;
74.            count++;
75.            continue;
76.          }
77.          if(0<count&count<9)  time2+=a;
78.          time =timecount(time2)-timecount(time1);
79.          if(count==9&&start==1){
80.           lcd.clear();//Clear the screen and position your cursor to the
upper-left corner of the screen
81.          lcd.begin(16,2);
82.          lcd.print(b);
83.          Serial.print(b);
84.          for(int i=0;i<13;i++){//Scrolling lyrics
85.            lcd.scrollDisplayLeft();
86.            delay(time/13);
87.          }
88.          time1=time2;
89.          time2="";
90.          b="";
91.          }
92.          count++;
93.          }
94.
95.        myFile.close();
96.        Serial.println("done.");
97.      }
98.      else {
99.        Serial.println("error opening test.txt");
100.     }
101.   }
102.   int timecount(String time){//Used to convert time
103.     int times=0;
104.     times+=(int)time.charAt(1)*60000;
105.     int i=(int)time.charAt(3)*10+(int)time.charAt(4);
106.     times+=i*1000;
107.     int j=(int)time.charAt(6)*10+(int)time.charAt(7);
108.     times+=i*10;
109.     return times;
110.   }
```