LAMPIRAN A
PROGRAM PADA CODEVISION AVR
# Read the AD conversion result

```c
unsigned int read_adc(unsigned char adc_input) {
    ADMUX = adc_input | (ADC_VREF_TYPE & 0xff);
    // Start the AD conversion
    ADCSRA |= 0x40;
    // Wait for the AD conversion to complete
    while ((ADCSRA & 0x10) == 0);
    ADCSRA |= 0x10;
    return ADCW;
}
```

// Declare your global variables here
```c
unsigned int temp0, temp1, temp2, temp3, temp4;
unsigned int sw;
```

```c
void play(unsigned char nomor) {
    unsigned char temp;
    temp = nomor;
    PORTD.1 = 0;
    delay_ms(10);
    PORTB = temp;
    delay_ms(10);
    PORTD.1 = 1;
    for(;;)
    {
        if (PIND.0 == 0) break;
    }
    PORTD.1 = 0;
    delay_ms(10);
    PORTB = temp;
    delay_ms(10);
    PORTD.1 = 1;
    for(;;)
    {
        if (PIND.0 == 0) break;
    }
```

#include <mega16.h>
#include <stdio.h>
#include <delay.h>
#define ADC_VREF_TYPE 0x00

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Project :
Version :
Date : 6/3/2013
Author : Julio
Company : Indonesia
Comments:

Chip type : ATmega16
Program type : Application
Clock frequency : 12.000000 MHz
Memory model : Small
External SRAM size : 0
Data Stack size : 256

="/***************************************************************************/
 unsigned int read_adc(unsigned char adc_input) {
    ADMUX = adc_input | (ADC_VREF_TYPE & 0xff);
    // Start the AD conversion
    ADCSRA |= 0x40;
    // Wait for the AD conversion to complete
    while ((ADCSRA & 0x10) == 0);
    ADCSRA |= 0x10;
    return ADCW;
}

// Declare your global variables here
unsigned int temp0, temp1, temp2, temp3, temp4;
unsigned int sw;

void play(unsigned char nomor) {
    unsigned char temp;
    temp = nomor;
    PORTD.1 = 0;
    delay_ms(10);
    PORTB = temp;
    delay_ms(10);
    PORTD.1 = 1;
    for(;;)
    {
        if (PIND.0 == 0) break;
    }
    PORTD.1 = 0;
    delay_ms(10);
    PORTB = temp;
    delay_ms(10);
    PORTD.1 = 1;
    for(;;)
    {
        if (PIND.0 == 0) break;
    }

#include <mega16.h>
#include <stdio.h>
#include <delay.h>
#define ADC_VREF_TYPE 0x00

// Read the AD conversion result
```
for(;;)
{
    if(PIND.0==1)break;
}

void main(void)
{
    // Declare your local variables here
    DDRC=0xFF;

    // Input/Output Ports initialization
    // Port A initialization
    // Func7=In Func6=In Func5=In Func4=In Func3=In Func2=In Func1=In Func0=In
    Func1=In Func0=In
    // State7=T State6=T State5=T State4=T State3=T State2=T State1=T State0=T
    PORTA=0xFF;
    DDRA=0x00;

    // Port B initialization
    // Func7=Out Func6=Out Func5=Out Func4=Out Func3=Out Func2=Out Func1=Out Func0=Out
    Func1=Out Func0=Out
    // State7=1 State6=1 State5=1 State4=1 State3=1 State2=1 State1=1 State0=1
    PORTB=0xFF;
    DDRB=0xFF;

    // Port C initialization
    // Func7=In Func6=In Func5=In Func4=In Func3=In Func2=In Func1=In Func0=In
    Func1=In Func0=In
    // State7=T State6=T State5=T State4=T State3=T State2=T State1=T State0=T
    PORTC=0xFF;
    DDRC=0xFF;

    // Port D initialization
    // Func7=In Func6=In Func5=In Func4=In Func3=In Func2=In Func1=In Func0=In
    Func1=In Func0=In
    // State7=T State6=T State5=T State4=T State3=T State2=T State1=T State0=T
    PORTD=0xFF;
    DDRD=0xFF;

    // Timer/Counter 0 initialization
    // Clock source: System Clock
    // Clock value: Timer 0 Stopped
    // Mode: Normal top=FFh
    // OC0 output: Disconnected
    TCCR0=0x00;
    TCNT0=0x00;
    OCR0=0x00;

    // Timer/Counter 1 initialization
    // Clock source: System Clock
// Clock value: Timer 1 Stopped
// Mode: Normal top=FFFFh
// OC1A output: Discon.
// OC1B output: Discon.
// Noise Canceler: Off
// Input Capture on Falling Edge
// Timer 1 Overflow Interrupt: Off
// Input Capture Interrupt: Off
// Compare A Match Interrupt: Off
// Compare B Match Interrupt: Off
TCCR1A=0x00;
TCCR1B=0x00;
TCNT1H=0x00;
TCNT1L=0x00;
ICR1H=0x00;
ICR1L=0x00;
OCR1AH=0x00;
OCR1AL=0x00;
OCR1BH=0x00;
OCR1BL=0x00;
// External Interrupt(s) initialization
// INT0: Off
// INT1: Off
// INT2: Off
MCUCR=0x00;
MCUCSR=0x00;
// Timer(s)/Counter(s) Interrupt(s) initialization
TIMSK=0x00;
// Analog Comparator initialization
// Analog Comparator: Off
// Analog Comparator Input Capture by Timer/Counter 1: Off
ACSR=0x80;
SFIOR=0x00;
// ADC initialization
// ADC Clock frequency: 187.500 kHz
// ADC Voltage Reference: AREF pin
ADMUX=ADC_VREF_TYPE & 0xff;
ADCSRA=0x86;
DDRD.1=1; PORTD.1=1;
DDRD.0=0; PORTD.0=1;
DDRD.3=0;
sw=0;
while (1) {
    // Place your code here
    if(PIND.3==0 && sw==0) {
        sw=1; PORTC.0=0;
    }
    if(PIND.3==0 && sw==1) {
        sw=0; PORTC.0=1;
    }
    temp0=read_adc(0);
    temp1=read_adc(1);
    temp2=read_adc(2);
    temp3=read_adc(3);
    temp4=read_adc(4);
    if(sw==0) {
        if((temp0>=902 && temp0<=943) && (temp1>=922 && temp1<=963) &&
            (temp2>=1004 && temp2<=1024) && (temp3>=1004 && temp3<=1024) &&
            (temp4>=779 && temp4<=820)) {
            play(254); //Ucapan A
        }
    } else if((temp0>=614 && temp0<=656) && (temp1>=656 && temp1<=697) &&
            (temp2>=758 && temp2<=779) && (temp3>=779 && temp3<=820) &&
            (temp4>=512 && temp4<=594)) {
            play(253); //Ucapan B
    } else if((temp0>=738 && temp0<=800) && (temp1>=758 && temp1<=779) &&
            (temp2>=820 && temp2<=861) && (temp3>=881 && temp3<=922) &&
            (temp4>=779 && temp4<=820)) {
            play(252); //Ucapan C
    } else if((temp0>=636 && temp0<=656) && (temp1>=718 && temp1<=758) &&
            (temp2>=820 && temp2<=861) && (temp3>=943 && temp3<=984) &&
            (temp4>=779 && temp4<=820)) {
            play(251); //Ucapan D
    }
}
else if((temp0>=881 && temp0<=922) && (temp1>=840 && temp1<=881) &&
(temp2>=943 && temp2<=984) && (temp3>=1004 && temp3<=1024) &&
(temp4>=533 && temp4<=574))
{play(250); } //Ucapan E
else if((temp0>=840 && temp0<=881) && (temp1>=656 && temp1<=697) &&
(temp2>=758 && temp2<=800) && (temp3>=800 && temp3<=820) &&
(temp4>=656 && temp4<=697))
{play(249); } //Ucapan F
else if((temp0>=656 && temp0<=697) && (temp1>=902 && temp1<=943) &&
(temp2>=984 && temp2<=1024) && (temp3>=1004 && temp3<=1024) &&
(temp4>=779 && temp4<=820))
{play(248); } //Ucapan G
else if((temp0>=636 && temp0<=677) && (temp1>=677 && temp1<=697) &&
(temp2>=943 && temp2<=984) && (temp3>=1004 && temp3<=1024) &&
(temp4>=738 && temp4<=820))
{play(247); } //Ucapan H
else if((temp0>=861 && temp0<=922) && (temp1>=820 && temp1<=861) &&
(temp2>=902 && temp2<=943) && (temp3>=1004 && temp3<=1024) &&
(temp4>=779 && temp4<=820))
{play(246); } //Ucapan I
else if((temp0>=614 && temp0<=656) && (temp1>=902 && temp1<=943) &&
(temp2>=922 && temp2<=984) && (temp3>=1004 && temp3<=1024) &&
(temp4>=779 && temp4<=820))
{play(244); } //Ucapan K
else if((temp0>=614 && temp0<=656) && (temp1>=902 && temp1<=943) &&
(temp2>=922 && temp2<=984) && (temp3>=1004 && temp3<=1024) &&
(temp4>=779 && temp4<=820))
{play(243); } //Ucapan L
else if((temp0>=861 && temp0<=902) && (temp1>=779 && temp1<=820) &&
(temp2>=881 && temp2<=922) && (temp3>=1004 && temp3<=1024) &&
(temp4>=656 && temp4<=697))
{play(242);} //Ucapan M
else if((temp0>=800 && temp0<=840) && (temp1>=758 && temp1<=800) &&
(temp2>=902 && temp2<=943) && (temp3>=1004 && temp3<=1024) &&
(temp4>=758 && temp4<=820))
{play(241);} //Ucapan N
else if((temp0>=779 && temp0<=820) && (temp1>=779 && temp1<=820) &&
(temp2>=881 && temp2<=922) && (temp3>=963 && temp3<=1024) &&
(temp4>=779 && temp4<=820))
{play(240);} //Ucapan O
else if((temp0>=614 && temp0<=656) && (temp1>=697 && temp1<=718) &&
(temp2>=922 && temp2<=963) && (temp3>=1004 && temp3<=1024) &&
(temp4>=779 && temp4<=820))
{play(239);} //Ucapan P
else if((temp0>=656 && temp0<=697) && (temp1>=820 && temp1<=861) &&
(temp2>=943 && temp2<=984) && (temp3>=1004 && temp3<=1024) &&
(temp4>=779 && temp4<=820))
{play(238);} //Ucapan Q
else if((temp0>=902 && temp0<=943) && (temp1>=922 && temp1<=963) &&
(temp2>=984 && temp2<=1024) && (temp3>=1004 && temp3<=1024) &&
(temp4>=677 && temp4<=758))
{play(237);} //Ucapan R
else if((temp0>=677 && temp0<=697) && (temp1>=677 && temp1<=697) &&
(temp2>=922 && temp2<=963) && (temp3>=1004 && temp3<=1024) &&
(temp4>=779 && temp4<=820))
{play(236);} //Ucapan S
else if((temp0>=697 && temp0<=738) && (temp1>=881 && temp1<=922) &&
(temp2>=963 && temp2<=1004) && (temp3>=1004 && temp3<=1024) &&
(temp4>=779 && temp4<=820))
{play(235);} //Ucapan T
else if((temp0>=636 && temp0<=677) && (temp1>=677 && temp1<=718) &&
(temp2>=922 && temp2<=963) && (temp3>=1004 && temp3<=1024) &&
(temp4>=758 && temp4<=820))
{play(234);} //Ucapan U
else if((temp0>=697 && temp0<=738) && (temp1>=718 && temp1<=758) &&
(temp2>=1004 && temp2<=1024) && (temp3>=1004 && temp3<=1024) &&
(temp4>=738 && temp4<=779))
{play(233);} //Ucapan V
else if((temp0>=636 && temp0<=677) && (temp1>=656 && temp1<=697) &&
(temp2>=779 && temp2<=800) && (temp3>=963 && temp3<=1004) &&
(temp4>=779 && temp4<=820))
{play(232);} //Ucapan W
else if((temp0>=758 && temp0<=800) && (temp1>=922 && temp1<=963) &&
(temp2>=1004 && temp2<=1024) && (temp3>=1004 && temp3<=1024) &&
(temp4>=656 && temp4<=738))
{play(231);} //Ucapan X
else if((temp0>=840 && temp0<=902) && (temp1>=840 && temp1<=902) &&
(temp2>=943 && temp2<=984) && (temp3>=800 && temp3<=820) &&
(temp4>=779 && temp4<=820))
{play(230);} //Ucapan Y
else if((temp0>=636 && temp0<=677) && (temp1>=881 && temp1<=922) &&
(temp2>=984 && temp2<=1024) && (temp3>=1004 && temp3<=1024) &&
(temp4>=677 && temp4<=758))
{play(229);} //Ucapan Z
}

If(sw==1)
{
if((temp0>=779 && temp0<=820) && (temp1>=779 && temp1<=820) &&
(temp2>=881 && temp2<=922) && (temp3>=963 && temp3<=1024) &&
(temp4>=779 && temp4<=820))
{play(228);} //Ucapan Nol
}
else if((temp0>=636 && temp0<=677) && (temp1>=881 && temp1<=922) && (temp2>=984 && temp2<=1024) && (temp3>=1004 && temp3<=1024) && (temp4>=677 && temp4<=758))
{play(227);} //Ucapan Satu
else if((temp0>=636 && temp0<=677) && (temp1>=677 && temp1<=718) && (temp2>=922 && temp2<=963) && (temp3>=1004 && temp3<=1024) && (temp4>=758 && temp4<=820))
{play(226);} //Ucapan Dua
else if((temp0>=636 && temp0<=677) && (temp1>=677 && temp1<=718) && (temp2>=922 && temp2<=963) && (temp3>=1004 && temp3<=1024) && (temp4>=779 && temp4<=820))
{play(225);} //Ucapan Tiga
else if((temp0>=614 && temp0<=656) && (temp1>=656 && temp1<=697) && (temp2>=758 && temp2<=779) && (temp3>=779 && temp3<=820) && (temp4>=512 && temp4<=594))
{play(224);} //Ucapan Empat
else if((temp0>=636 && temp0<=677) && (temp1>=656 && temp1<=697) && (temp2>=758 && temp2<=800) && (temp3>=800 && temp3<=840) && (temp4>=779 && temp4<=820))
{play(223);} //Ucapan Lima
else if((temp0>=636 && temp0<=677) && (temp1>=697 && temp1<=738) && (temp2>=758 && temp2<=800) && (temp3>=1004 && temp3<=1024) && (temp4>=779 && temp4<=820))
{play(222);} //Ucapan Enam
else if((temp0>=656 && temp0<=697) && (temp1>=656 && temp1<=697) && (temp2>=861 && temp2<=902) && (temp3>=800 && temp3<=840) && (temp4>=779 && temp4<=820))
{play(221);} //Ucapan Tujuh
else if((temp0>=656 && temp0<=697) && (temp1>=758 && temp1<=800) && (temp2>=779 && temp2<=820) && (temp3>=800 && temp3<=840) && (temp4>=779 && temp4<=820))
\{\texttt{play(220);} \} //Ucapan Delapan
else if((\texttt{temp0}>=758 && \texttt{temp0}<=800) && (\texttt{temp1}>=656 && \texttt{temp1}<=697) &&
(\texttt{temp2}>=758 && \texttt{temp2}<=800) && (\texttt{temp3}>=800 && \texttt{temp3}<=840) &&
(\texttt{temp4}>=779 && \texttt{temp4}<=820))
\{\texttt{play(219);} \} //Ucapan Sembilan
else if((\texttt{temp0}>=861 && \texttt{temp0}<=922) && (\texttt{temp1}>=820 && \texttt{temp1}<=861) &&
(\texttt{temp2}>=902 && \texttt{temp2}<=943) && (\texttt{temp3}>=779 && \texttt{temp3}<=820) &&
(\texttt{temp4}>=594 && \texttt{temp4}<=656))
\{\texttt{play(245);} \} //Ucapan J
\}
\};
LAMPIRAN B
PENGUJIAN TEGANGAN PADA Masing-masing FLEX SENSOR UNTUK SETIAP KARAKTER
(HURUF DAN ANGKA)

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LAMPIRAN C

DATASHEET FLEX SENSOR, MODUL SUARA TDR025 DAN KIT PENGOTROL MIKRO ATMEGA16
**C.1 DATASHEET FLEX SENSOR 4,5 INCI**

**Features**
- Angle Displacement Measurement
- Bends and Flexes physically with motion device
- Possible Uses
  - Robotics
  - Gaming (Virtual Motion)
  - Medical Devices
  - Computer Peripherals
  - Musical Instruments
  - Physical Therapy
  - Simple Construction
  - Low Profile

**Mechanical Specification**
- Life Cycle: >1 million
- Height: 0.43mm (0.017”)
- Temperature Range: -35°C to +80°C

**Electrical Specification**
- Flat Resistance: 10K Ohms
- Resistance Tolerance: ±30%
- Bend Resistance Range: 60K to 110K Ohms
- Power Rating: 0.50 Watts continuous. 1 Watt Peak
Dimensional Diagram - Stock Flex Sensor

How to Order - Stock Flex Sensor

How It Works

C.2 DATASHEET FLEX SENSOR 2.2 INCI

Mechanical Specification

-Life Cycle: >1 million
-Height: 0.43mm (0.017")
-Temperature Range: -35°C to +80°C
Electrical Specification
- Flat Resistance: 25K Ohms
- Resistance Tolerance: ±30%
- Bend Resistance Range: 45K to 125K Ohms
  (depending on bend radius)
- Power Rating: 0.50 Watts continuous. 1 Watt Peak

Dimensional Diagram - Stock Flex Sensor

How to Order - Stock Flex Sensor

How It Works
C.3 DATASHEET MODUL SUARA TDR025

1. Features Description

> Module support MP3, WMA, WAV, MIDI
  Decodes MPEG 1&2 audio layer III (CBR+VBR+ABR)
  WMA 4.0/4.1/7/8/9 all profiles (5-384kbit/s)
  WAV (PCM +IMA ADPCM ,General MIDI/SP-MIDI files
  > Up to 48KHz playback frequency rate and 16KHz recording frequency rate
  > Easy to update the files get the recorded file from the memory card
  > Module can be controlled by MCU or PLC controller to satisfy many applications
  > 32Mb SD card can record more than 2 hours, module support 2GB maximum
  > 8 types operating mode for users
  > Support all range MPEG 1&2 audio layer 3 (ISO11172-3) coding ( include CBR, VBR, ABR), and WMA, WAV also MIDI
  > DAC 18 bit , Dynamic range 90dB, SNR 85dB
  > On-board Mic for recording
  > Support Auto-record and MCU to control record
>Support 32Mb to 2Gb MMC, SD, Mini SD, TF card.

>Memory card should format to FAT16 format

>Maximum 500 Folders and 60000 files in each one

>Multiple Operating mode to satisfy user requirement

>Support Auto – play function, no need special file’s name

>0 to 250 level smoothy volume, volume can be control via serial port, the volume value can be checked via serial port, there are 16 volume levels by Key

>Size 57mm * 71.5mm

>Operating power DC 3.7V to 9.1V

>Direct drive 32 ohms headphone and external amplifier

>On-Board EEPROM, can read and write via serial port

>Module can connect to 3.3v or 5V MCU

>Module working status and playing schedule can catch by command via serial port

>Can control the module via serial port als by J2 pins at the same time

>When the module working in Mode 2, have 8 GPIO (fully compatible with MCS-51), can read I/O value and write GPIO, accomplish periphery controlling

2. Working Mode Introduction

In the Memory directory, there should be a folder “Config”, and a config.txt file in this folder. Put different number in the txt file, the module will works in different mode as follows

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<th>Mode2</th>
<th>Mode3</th>
<th>Mode4</th>
<th>Mode5</th>
<th>Mode6</th>
<th>Mode7</th>
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<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
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</table>

Mode 1: Serial Port with Key interface

Put number “1” in the config file, after power on the Module, it will work in Mode 1.

In this Mode, Module can be controlled by MCU via Serial Port or Keys connect to J2 pins.
Once Module powered, will wait for the serial command to control playback or recording. Playback also can be controlled by keys connected from J2 connector.

Mode 2: Serial Port with GPIO
Put number “2” in the config file, after power on the Module, it will work in Mode 2.
In this Mode, the Module with Serial port same as Mode 1, and with 8 extended GPIO.

Mode 3: IR remote control
This mode not available for this moment.

Mode 4: 433MHz Radio control
Put number “4” in the config file, after power on the Module, it will work in Mode 4.
Operate the module by RF remote.

Mode 5: Timing Playback
Can set the time and make the module auto-play by 8 pins setting in J2 Connector.

Mode 6: Select Play
There are 8 pins for key connection and each key play one file.

Mode 7: Coding playback
Select the file by 8 pins (in J2 connector) coding, and STB negative pulse trigger (about 10ms) to play the file. 256 files can be triggered by 8 pins coding.

Mode 8: Auto-Play & Auto-Record
After power on, the module will detect the J5 pins, if not connected, will start to play, if connected, will start to record. During recording, if disconnect J5, and will stop recording and start to play.
Mode 9: Button Record/Play

With Record/Play switch, next, previous, Play/Pause function by connecting buttons.

3. Structure and Pins description

3.1. Pins description

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<th>Type</th>
<th>Function</th>
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<td>P21</td>
<td>Input</td>
<td>Key input 2, GPIO 1</td>
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<td>P22</td>
<td>Input</td>
<td>Key input 3, GPIO 2</td>
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<td>P23</td>
<td>Input</td>
<td>Key input 4, GPIO 3</td>
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<td>P24</td>
<td>Input</td>
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<td>7</td>
<td>P25</td>
<td>Input</td>
<td>Key input 6, GPIO 5</td>
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</tbody>
</table>
8     P26  Input    Key input 7, GPIO 6
9     P27  Input    Key input 8, GPIO 7
10    MCU_TXD  Output    Serial port, TTL signal transmit
11    BUSY  Output    Busy pin, low level during playing, can pull up to 5V
12    MCU_RXD  Input    Serial port, TTL signal receive
13    VCC_5V  Power    DC 5V power, connected to J7 positive
14    MCU_SCL  Output    I2C communication, Clock pin, Recording signal switch pin
15    VCC  Power    DC 2.5V output from stabilizers
16    MCU_RST  Input    Reset
17    NC  Not Connected
18,19,20    GND  Power    Ground

J8 Connector Pins

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<td>2</td>
<td>RIGHT</td>
<td>Audio/Output</td>
<td>Audio output R</td>
</tr>
<tr>
<td>3</td>
<td>GBUF</td>
<td>Audio/Output</td>
<td>Public Audio signal</td>
</tr>
<tr>
<td>4</td>
<td>AGND</td>
<td>Audio/Power</td>
<td>Audio Ground</td>
</tr>
</tbody>
</table>

3.2. LED functions on the Module

D4 : Power indicator
D1 : Memory card status indicator. After power on, this LED turn on means Memory card ready, if off, means can not read the memory card, please check out the memory card quality and system (Should be FAT16) and the config file. When playing or recording, it will be flashing.
D2 : MCU working status indicator, when there is trigger from outside, it will flash. This indicator work different for different Operating Mode.
D3 : BUSY indicator, when the BUSY pin is low, the LED is on, means system working, can not receive new command. When BUSY pin is High, and system free and LED off.

Module will initialize after power on, if failure, D3 will flash 10 time then reset. If Memory card Initialization failure, D2 will flash 10 times and then reset. If file system wrong (correct should be FAT16), D1 will flash. If config file error, D1 and D2 flash at the same time.

3.3.Files Saving in Memory Card
The Memory should format to FAT before loading files, and the Memory card should not bigger than 2GB

And there should be two folders in the Memory card, “Music” folder and “Config” folder. And in the Config folder, should new a txt file and name it to “config.txt” and input the Mode number (from 1 to 8 for selecting different working mode.)

When the module working in Mode 6 and 7, the files name in the Music folder should be 000.mp3, 001.mp3, …..256.mp3

Config file in the Memory card
There should be two folder in the SD card

In the config folder, new a txt file and rename it to config.txt
Input number (from 1 to 9) to the txt file select working Mode

4. Working Modes description
Mode 7
Put number “7” to the config file, power on the module. It will work in Mode 7, can play 256 files maximum.
After power on, if everything is ok, LED D1 will be ON, D2 and D3 OFF.
When put low STB, Module will read the level value from P20 to P27 first, then convert the Binary value to decimal value, and start to find the corresponding file (000*.mp3 – 256*.mp3) in the “music” folder. During this, D2 flash one time means response for the trigger, when the STB become High, it will start to play the corresponding file. During playing D3 (BUSY) will be ON (low level output), after play finish, D3 will turn off.
After trigger (STB from low to high), if LED D2 flashing, D3 always OFF, means fail to find out the corresponding file to play. Please check the file name valid or not.
During playing, trigger STB again, will stop the playing, and turn off D3.
The Pins P20 to P27 connected pull up resistor, when the pin N/C, it is 0. When connect to GND, it is 1. P20 is lowest bit, P27 is highest bit.
The mp3 files name in the “music” folder, should start with numbers, for example, 001mylove.mp3, when STB trigger and read the P20 to P27 value is 006 (Binary converted to decimal), it will start to play this file.
When using MCU or PLC control the module, the trigger time must more than 10ms, if shorter than 10ms will not response.

5. Audio Output
C.4 SKEMATIK KIT PENGONTROL MIKRO ATMEGA16
LAMPIRAN D
PERHITUNGAN NILAI RESISTOR YANG DIGUNAKAN
SEBAGAI PEMBAGI TEGANGAN PADA FLEX SENSOR
D.1 Menghitung Nilai Resistor yang akan Digunakan Sebagai Pembagi Tegangan untuk *Flex* Sensor 4,5 Inci

Diketahui:
Kisaran resistansi *flex* sensor yaitu antara 10k – 40k Ohm.

Vcc = 5 Volt.

Kisaran tegangan yang diinginkan yaitu antara 3 – 4 Volt.

Dengan memperhitungkan resistor *pull-up* dari *port* ADC pada pengontrol mikro (10k Ohm), maka:

*Tegangan yang diinginkan sebesar 3 Volt pada saat *flex* sensor lurus (*flat*)

\[
\frac{10k}{10k + (R \parallel 10k)} = \frac{3}{5}
\]

Sehingga \((R \parallel 10k) = 6,67k\); maka \(R = 20k\) Ohm.

*Tegangan yang diinginkan sebesar 4 Volt pada saat *flex* sensor ditekuk (*full*)

Jika \(R\) yang digunakan sebesar 20k Ohm, maka

\[
\frac{40k}{40k + (20k \parallel 10k)} \times 5\text{ Volt} = 4,28\text{ Volt}
\]

Berdasarkan perhitungan yang telah dilakukan, dan disertai berbagai pertimbangan, maka digunakanlah resistor dengan hambatan 22k Ohm sebagai pembagi tegangan untuk *flex* sensor 4,5 inci.
D.2 Menghitung Nilai Resistor yang akan Digunakan Sebagai Pembagi Tegangan untuk *Flex* Sensor 2,2 Inci

Diketahui:
Kisaran resistansi *flex* sensor yaitu antara 20k – 60k Ohm.
Vcc = 5 Volt.
Kisaran tegangan yang diinginkan yaitu antara 3 – 4 Volt.

Dengan memperhitungkan resistor pull-up dari *port* ADC pada pengontrol mikro (10k Ohm), maka:

*Tegangan yang diinginkan sebesar 3 Volt pada saat *flex* sensor ditekuk (penuh)

\[
R = \frac{3}{5}
\]

Sehingga R = 12,86k Ohm.

*Tegangan yang diinginkan sebesar 4 Volt pada saat *flex* sensor lurus (*flat*)

Jika R yang digunakan sebesar 12,86k Ohm, maka

\[
12,86k \times 5 \text{ Volt} = 3,3 \text{ Volt}
\]

Pembagi tegangan yang dibuat tidak memungkinkan untuk menghasilkan tegangan sebesar 4 Volt, maka digunakanlah resistor dengan hambatan 15k Ohm dengan harapan dapat memperlebar kisaran tegangan.