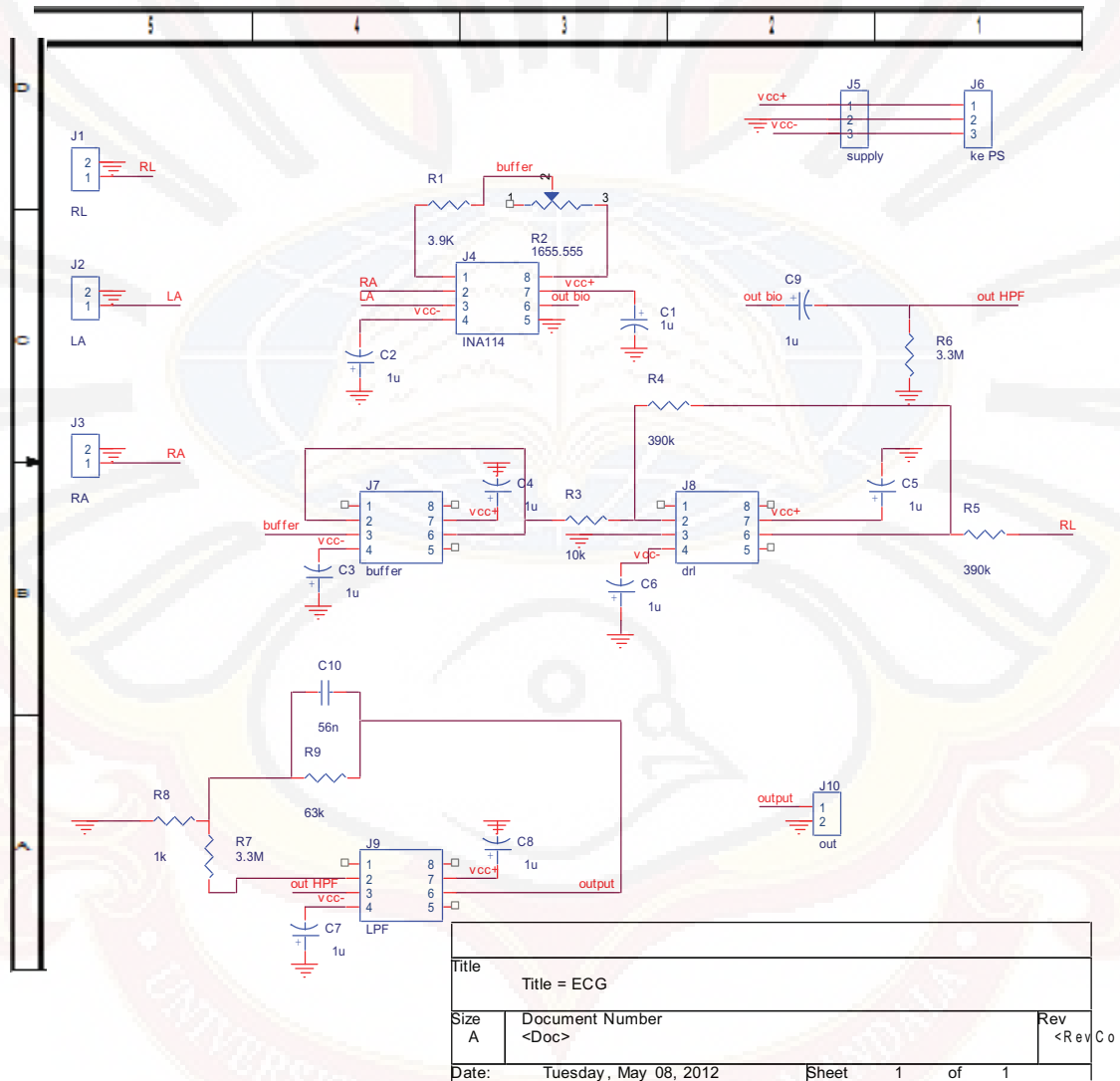


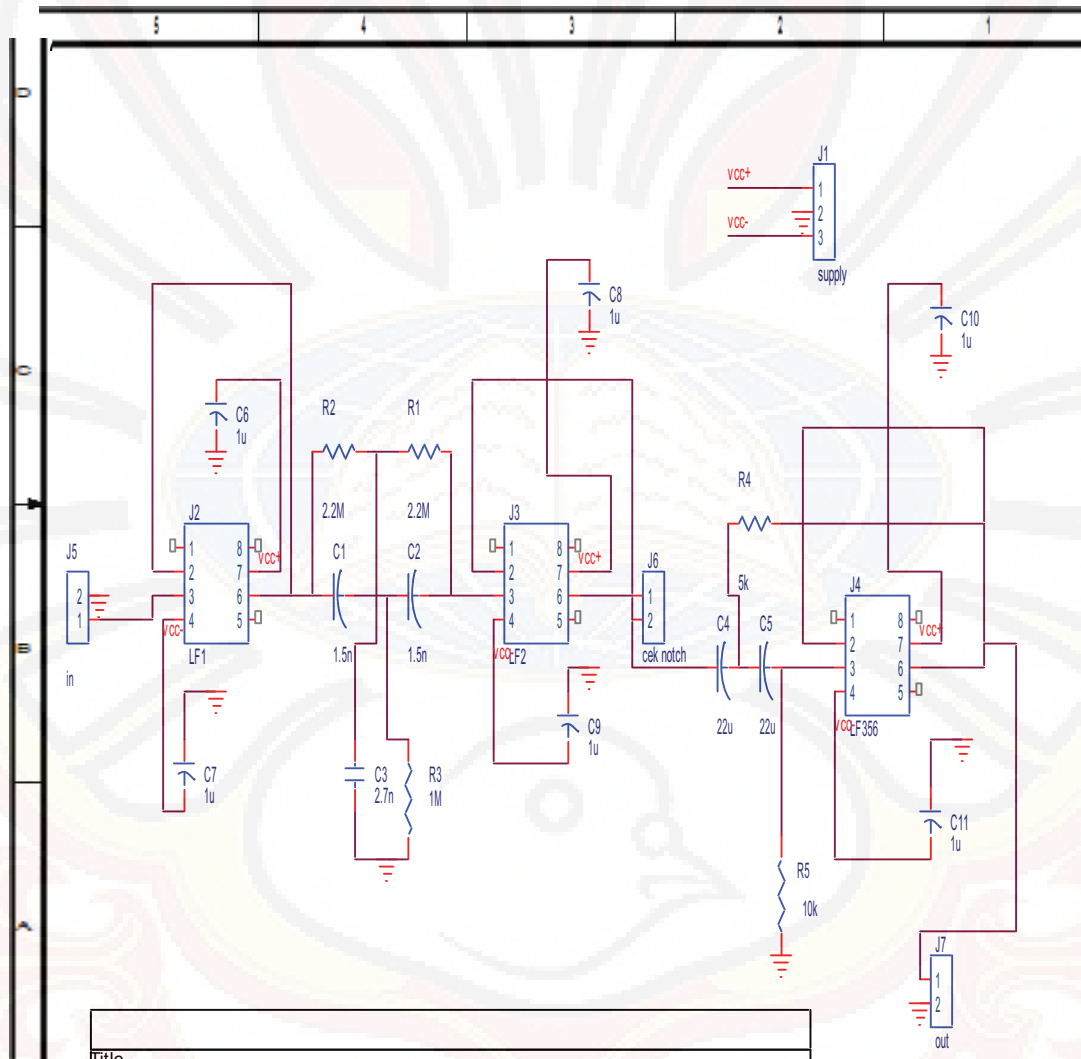
LAMPIRAN A

RANGKAIAN ELEKTRONIKA LENGKAP

1. Rangkaian *biopotential amplifier* dan *low-pass filter*

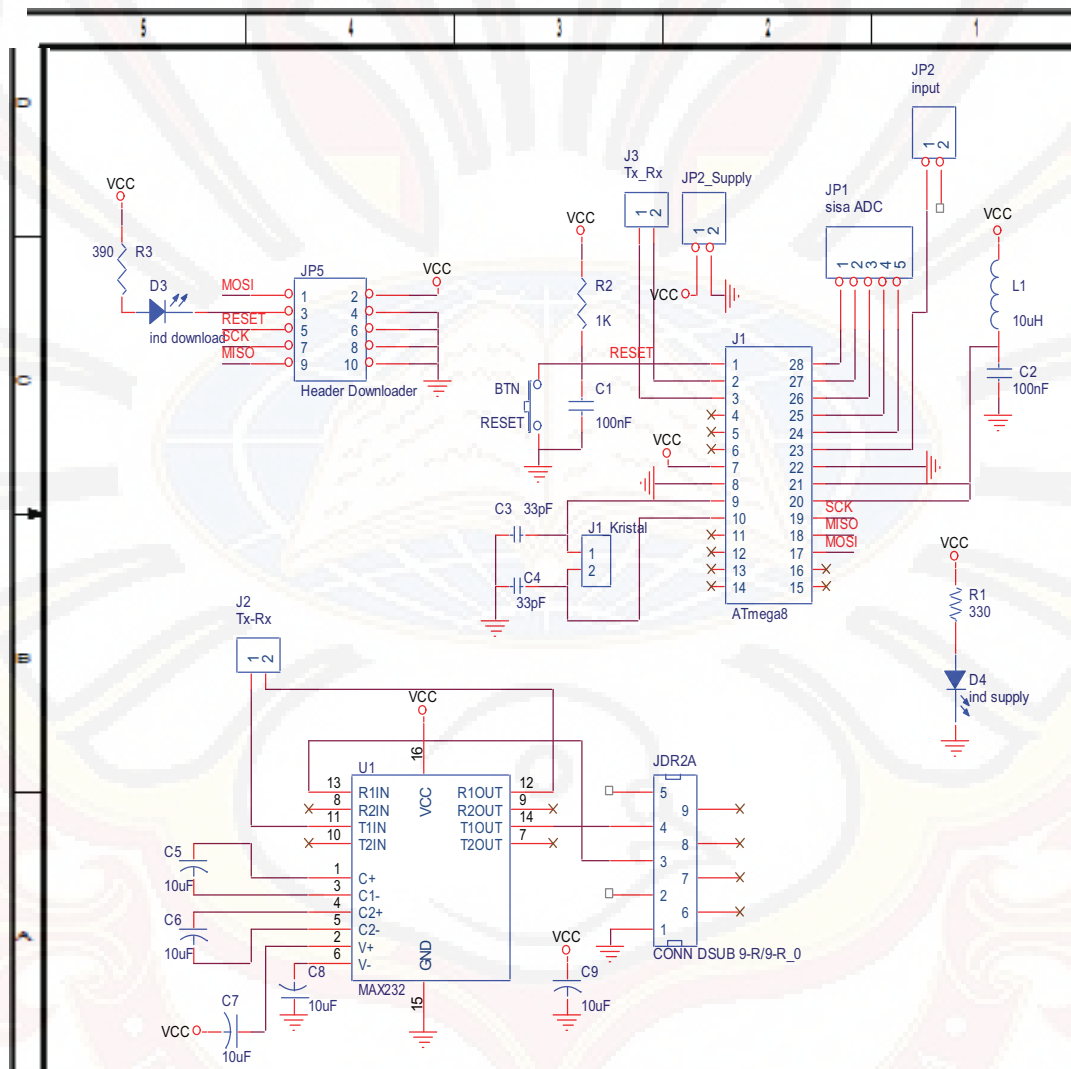


2. Rangkaian *notch filter* dan *high-pass filter*



Title = HPF&NOTCH		
Size A	Document Number <Doc>	Rev <Rev Code>
Date: Tuesday, May 08, 2012	Sheet 1 of 1	

3. Rangkaian sistem minimum mikrokontroler dan RS-232



Title = ATMEGA 8 & MAX232		
Size A	Document Number <Doc>	Rev <Rev Code>
Date: Tuesday, May 08, 2012	Sheet 1 of 1	

LAMPIRAN B
LISTING PROGRAM

1. Listing program mikrokontroler

```
#include <mega8.h>
#include <stdio.h>
#include <delay.h>
#define ADC_VREF_TYPE 0x60

unsigned char read_adc(unsigned char
adc_input)
{
    ADMUX=adc_input | (ADC_VREF_TYPE & 0xff);
    // Delay needed for the stabilization of the
    ADC input voltage
    delay_us(10);
    // Start the AD conversion
    ADCSRA|=0x40;
    // Wait for the AD conversion to complete
    while ((ADCSRA & 0x10)==0);
    ADCSRA|=0x10;
    return ADCH; }

    int ecg;
    float y[3];

    float x[3];
    float z;
void main(void)
```

```
{
// USART initialization
// Communication Parameters: 8 Data, 1 Stop,
No Parity
// USART Receiver: On
// USART Transmitter: On
// USART Mode: Asynchronous
// USART Baud Rate: 9600
UCSRA=0x00;
UCSRB=0x18;
UCSRC=0x86;
UBRRH=0x00;
UBRRL=0x67;
// Analog Comparator initialization
// Analog Comparator: Off
// Analog Comparator Input Capture by
Timer/Counter 1: Off
ACSR=0x80;
SFIOR=0x00;
// ADC initialization
// ADC Clock frequency: 250,000 kHz
// ADC Voltage Reference: AVCC pin
// Only the 8 most significant bits of
// the AD conversion result are used
ADMUX=ADC_VREF_TYPE & 0xff;
ADCSRA=0x86;
while (1)
{
```

```

{awal}      ecg = read_adc(0);
            putchar(ecg);
            delay_us(7750);
{akhir}
            // Place your code here
            };
}

```

2. *Listing program Form A (BORLAND DELPHI)*

```

unit Unit1;
interface
uses
    Windows, Messages, SysUtils, Variants,
    Classes, Graphics, Controls, Forms,
    Dialogs, StdCtrls, jpeg, ExtCtrls, MPlayer;
type
    TForm1 = class(TForm)
        Label1: TLabel;
        Image1: TImage;
        Label2: TLabel;
        Label3: TLabel;
        Label4: TLabel;
        Label5: TLabel;
        Label6: TLabel;
        Image2: TImage;
        Image3: TImage;
        Image4: TImage;
        Label7: TLabel;
        Label8: TLabel;
        Label9: TLabel;
        Button1: TButton;
        Button2: TButton;
        Timer1: TTimer;
        Label10: TLabel;
        procedure Button2Click(Sender: TObject);
        procedure Button1Click(Sender: TObject);
        procedure Timer1Timer(Sender: TObject);
        procedure FormCreate(Sender: TObject);
    private

```

```

        { Private declarations }
    public
        { Public declarations }
    end;
var
    Form1: TForm1;
implementation
uses Unit2, Unit3;
{$R *.dfm}
procedure TForm1.Button2Click(Sender:
TObject);
begin
    close;
end;
procedure TForm1.Button1Click(Sender:
TObject);
begin
    Form2.Show;
end;
procedure TForm1.Timer1Timer(Sender:
TObject);
begin
    Label10.Caption:=formatdatetime('"Tanggal :
"dd/mm/yyyy',now)+chr(13)+formatdatetime('"Pu
kul : "hh:nn:ss',now);
end;
procedure TForm1.FormCreate(Sender: TObject);
begin
end;
end.

```

3. *Listing program Form B (BORLAND DELPHI)*

```

unit Unit2;
interface
uses
    Windows, Messages, SysUtils, Variants,
    Classes, Graphics, Controls, Forms,
    Dialogs, StdCtrls, CPort, CPortCtl,
    ExtCtrls, TeEngine, Series, TeeProcs,
    Chart, jpeg, MMSystem;
type

```

```
TForm2 = class(TForm)
    Button1: TButton;
    Button2: TButton;
    Button3: TButton;
    Button4: TButton;
    Chart1: TChart;
    Series1: TFastLineSeries;
    ComPort1: TComPort;
    Image1: TImage;
    Image2: TImage;
    Image3: TImage;
    Image4: TImage;
    Image5: TImage;
    Image6: TImage;
    Image7: TImage;
    Image8: TImage;
    Image9: TImage;
    Image10: TImage;
    Timer1: TTimer;
    Image13: TImage;
    Image19: TImage;
    Image20: TImage;
    Timer2: TTimer;
    Timer3: TTimer;
    Timer4: TTimer;
    Edit1: TEdit;
    Edit2: TEdit;
    Label1: TLabel;
    Label2: TLabel;
    procedure Button1Click(Sender: TObject);
    procedure Button3Click(Sender: TObject);
    procedure Button2Click(Sender: TObject);
    procedure Button4Click(Sender: TObject);
    procedure Button5Click(Sender: TObject);
    procedure ComPort1RxChar(Sender: TObject;
Count: Integer);
    procedure Timer1Timer(Sender: TObject);
    procedure Timer2Timer(Sender: TObject);
    procedure Timer3Timer(Sender: TObject);
    procedure Timer5Timer(Sender: TObject);
    procedure Timer4Timer(Sender: TObject);
private
```

```

        { Private declarations }
    public
        { Public declarations }
    end;
var
    Form2: TForm2;
    x : integer;
    y : integer;
    z : integer;
    risingEdge : boolean;
implementation
uses Unit3;
{$R *.dfm}
{$R cut.res}
procedure TForm2.Button1Click(Sender:
TObject);
begin
    Comport1.Close;
    close;
end;
procedure TForm2.Button3Click(Sender:
TObject);
begin
    Comport1.ShowSetupDialog;
end;
procedure TForm2.Button2Click(Sender:
TObject);
begin
    comport1.Open;

                                x := 0;
                                series1.Clear;

    end ;
procedure TForm2.Button4Click(Sender:
TObject);
begin
    //timer1.Enabled := false;
    Comport1.Close;
end;
procedure TForm2.Button5Click(Sender:
TObject);
begin
    //timer4.Enabled := true;

```

```

end;
procedure TForm2.ComPort1RxChar(Sender:
TObject; Count: Integer);
var dataterima,index,m,datakedua,idx :
integer;
begin
  for index:=1 to Count do
  begin
    comport1.read(dataterima,1);
    x := x+1;
    if (x>500) then
    begin
      for idx:=1 to
499 do
        begin
          chart1.Series[0].YValue[idx-1] :=
          chart1.Series[0].YValue[idx];
          end;
          chart1.Series[0].YValue[499] := dataterima;
          x := 500;
        end
        else
        begin
          with chart1
          with
          series1 do
            addxy(x,dataterima);
            end;
            {}
            m := datakedua - dataterima;
            datakedua := dataterima +1 ;
            if ((m = 0) AND ( dataterima = 0 ) AND (
            dataterima = 0 )) then
            begin
              image1.Visible := true;
              image2.Visible := false;
              image3.Visible := false;
              image4.Visible := false;
              image5.Visible := false;

```

```

        image6.visible := false;
        image7.visible := false;
        image8.visible := false;
        image9.Visible := false;
        image10.Visible := false;
        risingEdge := true;
    end
    else if ((m > 0) AND ( dataterima >= 0 )
    AND ( dataterima <= 3 ))then
    begin
        image1.visible := false;
        image2.visible := true;
        image3.visible := false;
        image4.Visible := false;
        image5.Visible := false;
        image6.visible := false;
        image7.visible := false;
        image8.visible := false;
        image9.Visible := false;
        image10.Visible := false;
        risingEdge := true;
    end
    else if ((m > 0) AND( dataterima >= 3 )
    AND ( dataterima <= 5 ))then
    begin
        if (risingEdge =True) then
        begin
            z := z+1;
            risingEdge := False;
            timer1.enabled := true;
        end;
    end
    else if ( (m > 0) AND ( dataterima >= 5
    ) AND ( dataterima <= 8 ))then
    begin
        image1.visible := false;
        image2.visible := false;
        image3.visible := false;
        image4.Visible := true;
        image5.Visible := false;
        image6.visible := false;
        image7.visible := false;

```

```
image8.visible := false;
image9.Visible := false;
image10.Visible := false;
end
else if ( (m > 0) AND ( dataterima >= 8
) AND ( dataterima <= 12 ))then
begin
image1.visible := false;
image2.visible := false;
image3.visible := false;
image4.Visible := false;
image5.Visible := true;
image6.visible := false;
image7.visible := false;
image8.visible := false;
image9.Visible := false;
image10.Visible := false;
end
else if ( (m > 0) AND ( dataterima >=
12) AND ( dataterima <= 16 ))then
begin
image1.visible := false;
image2.visible := false;
image3.visible := false;
image4.Visible := false;
image5.Visible := false;
image6.visible := true;
image7.visible := false;
image8.visible := false;
image9.Visible := false;
image10.Visible := false;
risingEdge := true;
end
else if ( (m > 0) AND ( dataterima >=
16 ) AND ( dataterima <= 18 ))then
begin
image1.visible := false;
image2.visible := false;
image3.visible := false;
image4.Visible := false;
image5.Visible := false;
image6.visible := false;
```

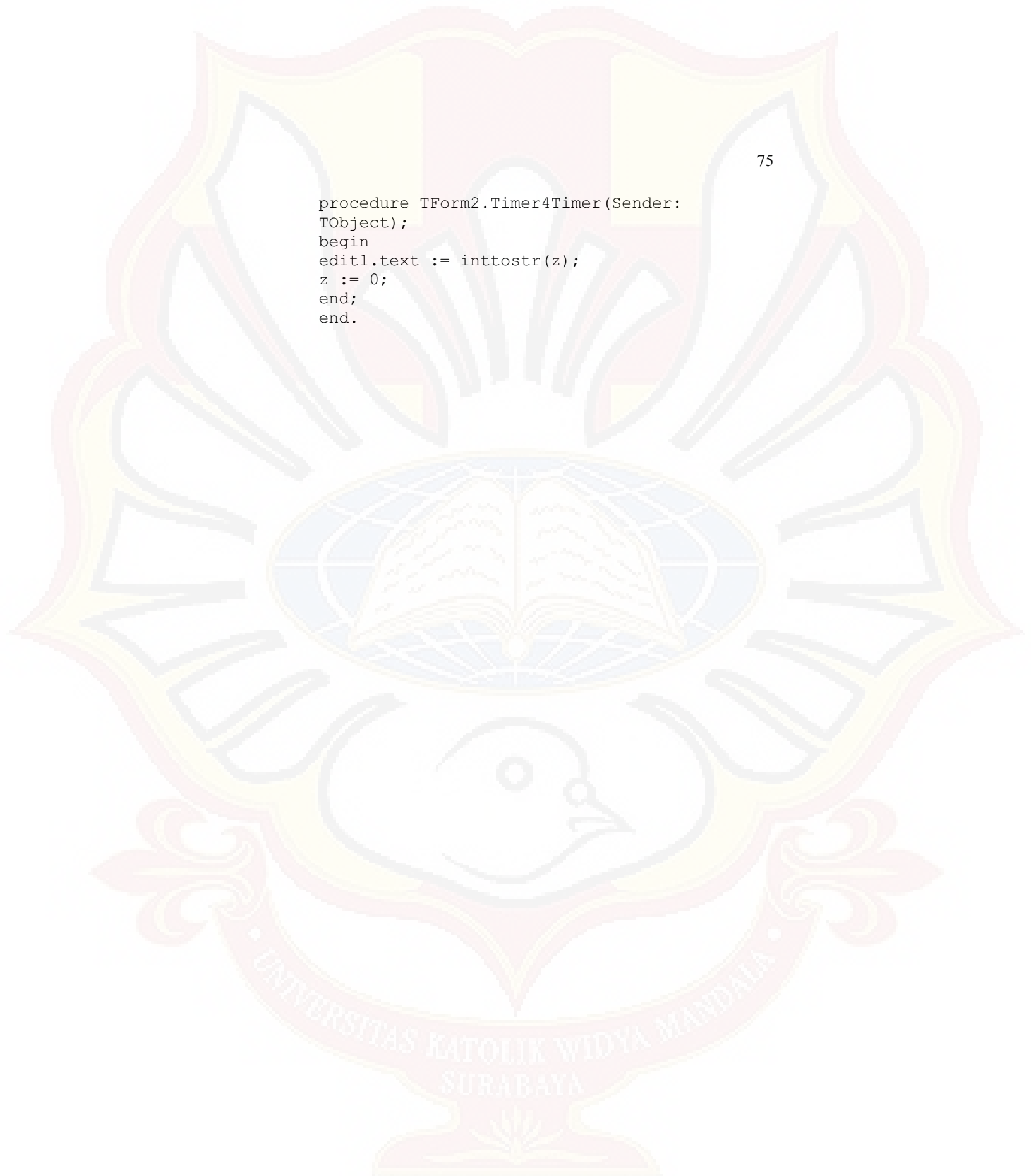
```
image7.visible := true;
image8.visible := false;
image9.Visible := false;
image10.Visible := false;
  risingEdge := true;
end
  else if ( (m < 0) AND ( dataterima >=
18 ) AND ( dataterima <= 15 ))then
  begin
    image1.visible := false;
    image2.visible := false;
    image3.visible := false;
    image4.Visible := false;
    image5.Visible := false;
    image6.visible := false;
    image7.visible := false;
    image8.visible := true;
    image9.Visible := false;
    image10.Visible := false;
    risingEdge := true;
  end
  else if ( (m < 0) AND ( dataterima >=
16 ) AND ( dataterima <= 14 ))then
  begin
    image1.visible := false;
    image2.visible := false;
    image3.visible := false;
    image4.Visible := false;
    image5.Visible := false;
    image6.visible := false;
    image7.visible := false;
    image8.visible := false;
    image9.Visible := true;
    image10.Visible := false;
    risingEdge := True;
  end
  else if ( (m < 0) AND ( dataterima >=
14 ) AND ( dataterima <= 10 ))then
  begin
    image1.visible := false;
    image2.visible := false;
    image3.visible := false;
```

```

        image4.Visible := false;
        image5.Visible := false;
        image6.visible := false;
        image7.visible := false;
        image8.visible := false;
        image9.Visible := false;
        image10.Visible := true;
        risingEdge := true;
    end ;
end; //for
end;
procedure TForm2.Timer1Timer(Sender:
TObject);
begin
    timer1.enabled :=false ;
    image13.Visible := true ;
    image19.Visible := false;
    image20.Visible := false;
    timer2.Enabled := true;
    edit2.Text := inttostr(z);
    timer4.Enabled := true;
    PlaySound(PChar(1),HInstance, snd_ASync
or snd_Memory or snd_Resource);
end;
procedure TForm2.Timer2Timer(Sender:
TObject);
begin
    timer2.Enabled := false ;
    image13.Visible := false;
    image19.Visible := true;
    image20.Visible := false;
    timer3.Enabled := true;
end;
procedure TForm2.Timer3Timer(Sender:
TObject);
begin
    timer3.Enabled := false ;
    image13.Visible := false;
    image19.Visible := false;
    image20.Visible := true;
    sndPlaySound(nil, 0); // Stops the sound
end;

```

```
procedure TForm2.Timer4Timer(Sender:  
TObject);  
begin  
edit1.text := inttostr(z);  
z := 0;  
end;  
end.
```

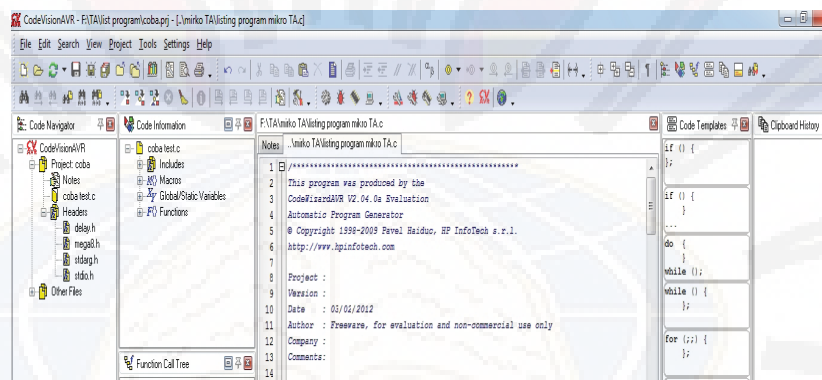


LAMPIRAN C

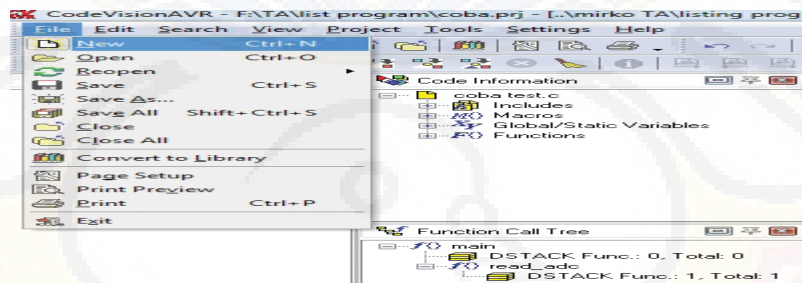
PENGATURAN SETTING ADC DAN UART

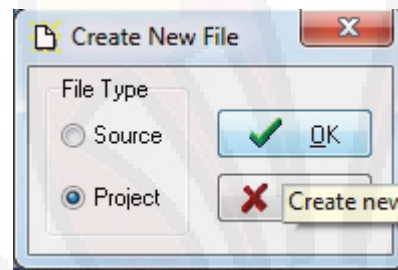
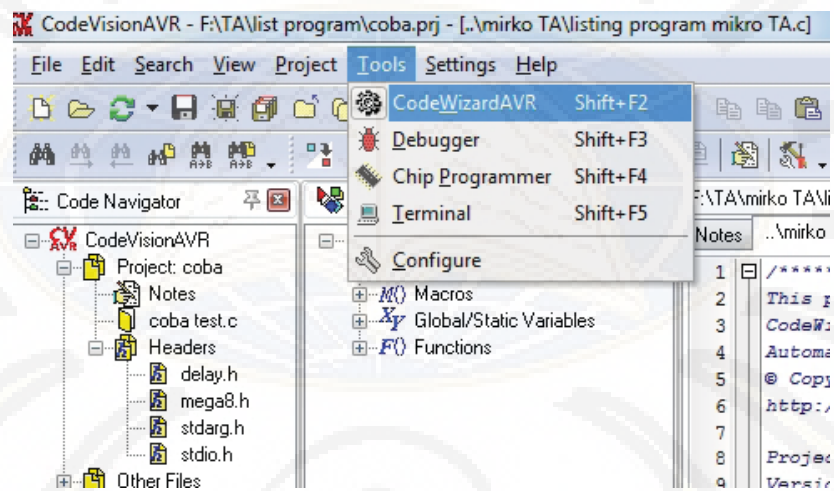
Berikut adalah langkah dalam melakukan pengaturan mikrokontroler dengan menggunakan *software* bantu *code vision*:

1. Buka *software code vision*

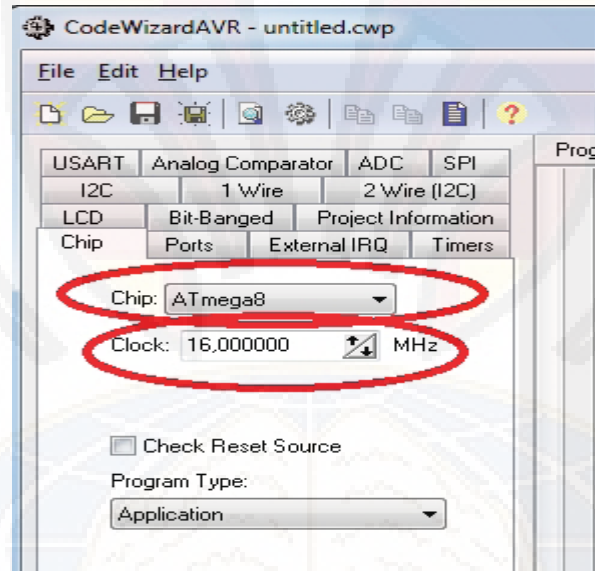


2. Pilih file→New→Project

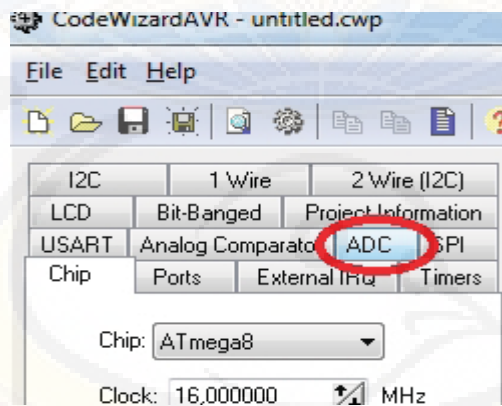


3. Pilih *Project*4. Masuk ke *Tools* → *Code wizardAVR*

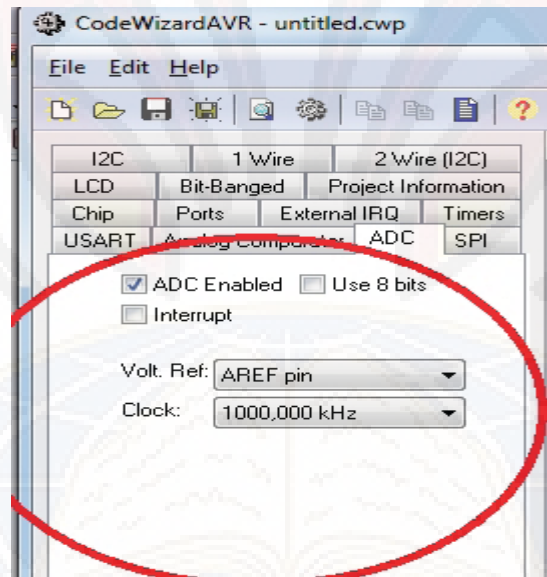
5. Setelah itu, atur *chip* pada ATMEGA 8 dan *clock* pada 16MHZ



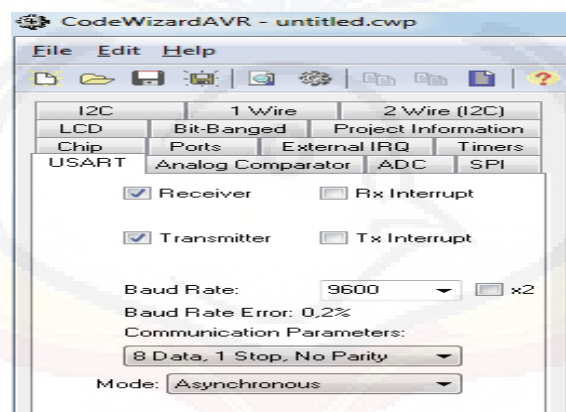
6. Pilih *tab* ADC pada *menu bar* yang tersedia



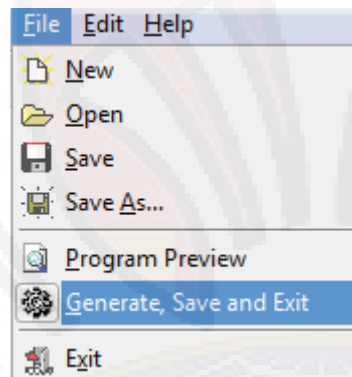
7. Aktifkan *check bar* *ADC enabled*, *use 8 bits*, dan atur *clock* pada 500KHZ



8. Pilih *tab* *UART* dan pilih *check box* *transmitter* dan *receiver*



9. Pilih pada *menu bar* : *file* → *save, generate, and exit*



LAMPIRAN D

GAMBAR ANIMASI

Berikut adalah gambar – gambar yang digunakan dalam pembuatan animasi:

Gambar 1:



Gambar 2:



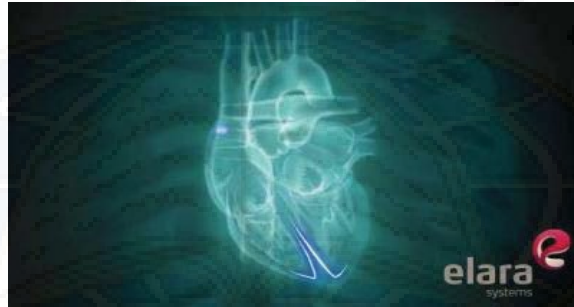
Gambar 3:



Gambar 4:



Gambar 5:



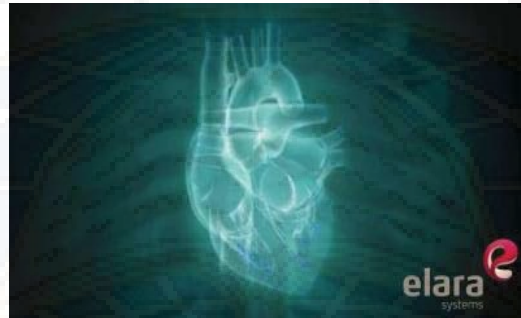
Gambar 6:



Gambar 7:



Gambar 8:



Gambar 9:



Gambar 10:



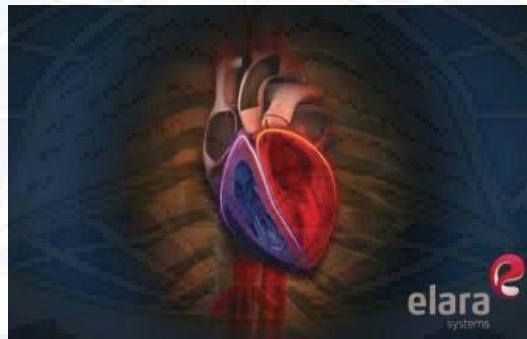
Gambar 11:



Gambar 12:



Gambar 13:



BIODATA PENULIS



Nama : Caresa Juwana
NRP : 5103008003
Tempat, tgl.lahir : Surabaya, 13 Oktober 1989
Agama : Katolik
Alamat : Manyar Jaya 7/28
Surabaya 60226

Riwayat Pendidikan :

- Tahun 2002, Lulus SD YPPI I, Surabaya
- Tahun 2003, Lulus SMP YPPI II, Surabaya
- Tahun 2006, Lulus SMA YPPI I, Surabaya

