LAMPIRAN A

List Program CodeVision
PADA PENGONTROL MIKRO ATMEGA16
This program was produced by the
CodeWizardAVR V1.25.3 Standard
Automatic Program Generator

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Project :
Version :
Date    : 7/1/2009
Author  : F4CG
Company : F4CG
Comments:

Chip type           : ATmega16
Program type        : Application
Clock frequency     : 11.059200 MHz
Memory model        : Small
External SRAM size  : 0
Data Stack size     : 256

**************************************************************************/

#include <mega16.h>
#include <delay.h>
#include <stdio.h>
#include <math.h>
// Alphanumeric LCD Module functions

asm
.equ __lcd_port=0x15 ;PORTC
endasm

#include <lcd.h>

#define ADC_VREF_TYPE 0x40

// Read the AD conversion result
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 data_sensor,s;
unsigned int z;
int a[100];
int i,j;
char hasil[32];
unsigned int b[100];
float vs, rs, vcc, rl, ppm, ro, bac, c, d, region;
char bb[10];

void main(void)
{
    // Declare your local variables here
    // Input/Output Ports initialization
    // Port A initialization
    // Func7=In Func6=In Func5=In Func4=In Func3=In Func2=In Func1=In Func0=In
    // State7=T State6=T State5=T State4=T State3=T State2=T State1=T State0=T
    PORTA=0x00;
    DDRA=0x00;

    // Port B initialization
    // Func7=In Func6=In Func5=In Func4=In Func3=In Func2=In Func1=In Func0=In
    // State7=T State6=T State5=T State4=T State3=T State2=T State1=T State0=T
    PORTB=0x00;
    DDRB=0xff;

    // Port C initialization
    // Func7=In Func6=In Func5=In Func4=In Func3=In Func2=In Func1=In Func0=In
    // State7=T State6=T State5=T State4=T State3=T State2=T State1=T State0=T
    PORTC=0x00;
    DDRC=0x00;
// Port D initialization
// Func7=In Func6=In Func5=In Func4=In Func3=In Func2=In Func1=In Func0=In
// State7=T State6=T State5=T State4=T State3=T State2=T State1=T State0=T
PORTD=0x00;
DDRD=0x00;

// 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;

// Timer/Counter 2 initialization
// Clock source: System Clock
// Clock value: Timer 2 Stopped
// Mode: Normal top=FFh
// OC2 output: Disconnected
ASSR=0x00;
TCCR2=0x00;
TCNT2=0x00;
OCR2=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;

UCSRA=0x00;
UCSRB=0x08;
UCSRC=0x86;
UBRRH=0x00;
UBRRL=0x47;

// ADC initialization
// ADC Clock frequency: 691.200 kHz
// ADC Voltage Reference: AVCC pin
// ADC Auto Trigger Source: None
ADMUX=ADC_VREF_TYPE & 0xff;
ADCSRA=0x84;

// LCD module initialization
lcd_init(16);
vcc=5;
rl=10000;
ro=278435;
lcd_gotoxy(0,0);
lcd_putsf("welcome to the");
lcd_gotoxy(0,1);
lcd_putsf("breath-o-matic");
lcd_putsf("breath-o-matic");
delay_ms(10000);

while (1)
{
    // Place your code here
    for (i=1;i<100;i++)
    {
        lcd_clear();
data_sensor=read_adc(0);
a[i]=data_sensor;
sprintf(bb,"%d",a[i]);
puts(bb);
delay_ms(8);
    }
    z=a[1];
    for (i=2;i<100;i++)
    {
        if (z<a[i])
{ 
    z=a[i];
}

vs=(float) z/1024*5;
rs = ((vcc-vs)/(vs)*rl);
region=ro/rs;
if (region>=2)
{
    c=pow((ro/rs),1.034);
    ppm =244.8*c;
}
else if (region<2) d=pow((ro/rs),1.323);ppm=248*d;}

bac = ppm*1.29*210/1000000;
sprintf(hasil,"%0.6f",bac);
lcd_gotoxy(0,0);
lcd_puts(hasil);
if (bac>=0.03 && bac<=0.19)
{
    PORTB.2=1;
    if (bac>=0.03 && bac<=0.059){lcd_gotoxy(0,1);lcd_putsf("senang");}
    if (bac>=0.06 && bac<=0.19){lcd_gotoxy(0,1);lcd_putsf("kelesuan");}
}
if (bac>=0.2 && bac<=0.4)
{
    PORTB.1=1;
if (bac>=0.2 && bac<=0.3){lcd_gotoxy(0,1);lcd_putsf("bingung");}
if (bac>0.3 && bac<=0.4){lcd_gotoxy(0,1);lcd_putsf("pingsan");}
}
if (bac>0.4 && bac<=0.7)
{
    PORTB.2=1;
    if (bac>0.4 && bac<=0.5){lcd_gotoxy(0,1);lcd_putsf("koma");}
    if (bac>=0.6){lcd_gotoxy(0,1);lcd_putsf("mati");}
}
delay_ms(4000);
PORTB.0=0;
PORTB.1=0;
PORTB.2=0;

if (z>700 && z<=1023)
{
    lcd_gotoxy(0,0);
    lcd_puts(hasil);
    delay_ms(250);
}
else if (z>=400 && z<=699)
{
    lcd_gotoxy(0,0);
    lcd_puts(hasil);
    delay_ms(250);
}
} 

else if (z>=101 && z<=399) 
{
  lcd_gotoxy(0,0);
  lcd_puts(hasil);
  delay_ms(250);
}

else
{
  lcd_gotoxy(0,0);lcd_clear();
  delay_ms(250);
}

for(i=1;i<=3;i++)
{
  for(j=1;j<=100;j++)
  {
    b[j]=read_adc(0);
    delay_ms(30);
  }
  s=b[1];
  for(j=2;j<=100;j++)
  {
    if (s>b[j])
    {
      s=b[j];
    }
```c
}
}
sprintf(hasil,"%0.6f",s);
lcd_gotoxy(0,0);
lcd_puts(hasil);
if (s>=100 && s<=150)goto ulang;
}
}
};
```
LAMPIRAN B

FOTO ALAT DAN SENSOR TGS 822
Foto sensor TGS 822

Foto Digital Alcohol Breathalyzer Breathalizer Tester
Foto pengukuran kadar BAC alkohol melalui nafas manusia
Tegangan $V_{RL}$ sensor alkohol TGS 822 sebelum udara terkontaminasi alkohol 70%

Tegangan $V_{RL}$ sensor alkohol TGS 822 setelah udara terkontaminasi alkohol 70%
Foto alat pengukur kadar BAC pada manusia
LAMPIRAN C
DATA SHEET SENSOR TGS 822
TGS 822 - for the detection of Organic Solvent Vapors

Features:
* High sensitivity to organic solvent vapors such as ethanol
* High stability and reliability over a long period
* Long life and low cost
* Uses simple electronic circuit

Applications:
* Breath alcohol detectors
* Gas leak detectors/alarms
* Solvent detection for factories, dry cleaners, and semiconductor industries

The sensing element of TGS 822 is a metal oxide (MOX) semiconductor which has low conductivity in clean air. In the presence of detectable gas, the sensor conductivity increases depending on the gas concentration in air. A simple electronic circuit can convert the change in conductivity to an output signal which is proportional to the gas concentration.

The TGS 822 has high sensitivity to the vapor of organic solvents as well as other volatile vapors. It also has sensitivity to a family of combustible gases such as carbon monoxide, making it a good general purpose sensor. Also available with a camcorder to record video images in various environments as high as 200°C (model TGS 823).

The figure below represents typical sensitivity characteristics, all data having been gathered at standard test conditions (see reverse side of the sheet). The Y-axis indicates the sensor resistance ratio (Rs/Re), which is defined as follows:

Rs = Sensor resistance at 1000 ppm of alcohol at various temperatures and humidities
Re = Sensor resistance at 10 ppm of alcohol at 30°C and 10% RH

Sensitivity Characteristics:

Temperature/humidity Dependency:

![Sensitivity Characteristics Diagram]

![Temperature/humidity Dependency Diagram]
Pin Connection and Basic Measuring Circuit

The numbers shown in a round the sensor symbol in the circuit diagram at the right one spind with the pin numbers where the sensor's structure drawing (above). When the sensor is connected as shown in the basic circuit, output across the Load Resistor (Vout) increases as the sensor resistance (Rs) decreases, depending on gas concentration.

Standard Circuit Conditions:

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Rated Values</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heater Voltage</td>
<td>VHe</td>
<td>5-60 DCV</td>
<td>AC or DC</td>
</tr>
<tr>
<td>Circuit Voltage</td>
<td>VC</td>
<td>Max. 24V</td>
<td>AC or DC</td>
</tr>
<tr>
<td>Load Resistance</td>
<td>RL</td>
<td>Various</td>
<td>10k Ω</td>
</tr>
</tbody>
</table>

Sensor Characteristics:

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Condition</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor Resistance</td>
<td>Rs</td>
<td>Ethanol at 300 ppm, Air</td>
<td>1k - 10k</td>
</tr>
<tr>
<td>Change Rate of Sensor Resistance</td>
<td>dR/dRs</td>
<td>Ethanol at 300 ppm, Air</td>
<td>0.1% ± 0.1%</td>
</tr>
<tr>
<td>Heater Resistance</td>
<td>Rh</td>
<td>Room temperature</td>
<td>10 ± 1.5 Ω</td>
</tr>
<tr>
<td>Heater Power Consumption</td>
<td>Rth</td>
<td>VHe=5V</td>
<td>600 mW ± 50 mW</td>
</tr>
</tbody>
</table>

Standard Test Conditions:

TBS-623: complete with the above electrical characteristics when the sensor is housed in standard conditions as specified below:

- Test Gas Conditions: 25°C ± 2°C, 65%RH.
- Circuit Conditions: VHe = 11.800V (AC or DC), VHe = 5.000V (AC or DC), Rth = 10k Ω ± 5%

Preheating period before testing: More than 7 days

Due to continuous product improvement, the design and technical specifications are subject to change without prior notice.

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LAMPIRAN D
DATA SHEET ATMEGA16
Features

- High-performance, Low-power AVR® 8-bit Microcontroller
- Advanced RISC Architecture
  - 151 Powerful Instructions – Most Single-look Cycle Execution
  - 32 x 8 General Purpose Working Registers
  - Fully Static Operation
  - Up to 16 MIPS Throughput at 16 MHz
  - On-chip 2-cycle Multiplier
- Nonvolatile Program and Data Memories
  - 16K Bytes of In-System Self-Programmable Flash
  - Endurance: 10,000 Write/Erase Cycles
  - Optional Boot Code Section with Independent Lock Bits
  - In-System Programming by On-chip Boot Program
  - True Read-While-Write Operation
  - 612 Bytes EEPROM
  - Endurance: 100,000 Write/Erase Cycles
  - 1K Byte internal SRAM
  - Programming Lock for Software Security
- JTAG (IEEE std. 1149.1 Compliant) Interface
  - Boundary-scan Capabilities According to the JTAG Standard
  - Extensive On-chip Debug Support
  - Programming of Flash, EEPROM, Fuses, and Lock Bits through the JTAG Interface
- Peripheral Features
  - Two 8-bit Timer/Counters with Separate Prescalers and Compare Modes
  - One 16-bit Timer/Counter with Separate Prescaler, Compare Mode, and Capture Mode
  - Real Time Counter with Separate Oscillator
  - Four PWM Channels
  - 8-channel, 10-bit ADC
  - 8 Single-ended Channels
  - 7 Differential Channels in TQFP Package Only
  - 2 Differential Channels with Programmable Gain at 1x, 10x, or 200x
  - Byte-oriented Two-wire Serial Interface
  - Programmable Serial UART
  - Master/Slave SPI Serial Interface
  - Programmable Watchdog Timer with Separate On-chip Oscillator
  - On-chip Analog Comparator
- Special Microcontroller Features
  - Power-on Reset and Programmable Brown-out Detection
  - Internal Calibrated RC Oscillator
  - External and Internal Interrupt Sources
  - Six Sleep Modes: Idle, ADC Noise Reduction, Power-save, Power-down, Standby and Extended Standby
- I/O and Packages
  - 32 Programmable I/O Lines
  - 48-pin PDIP, 44-lead TQFP, and 44-pad MLF
- Operating Voltages
  - 2.7 - 6.0V for ATmega16L
  - 4.5 - 5.5V for ATmega16
  - 0 - 5.5V for ATmega16L
  - 0 - 16 MHz for ATmega16

Note: This is a summary document. A complete document is available on our Web site at www.atmel.com.
Pin Configurations

Figure 1. Pinouts ATmega16

Disclaimer

Typical values contained in this datasheet are based on simulations and characterization of other AVR microcontrollers manufactured on the same process technology. Min and Max values will be available after the device is characterized.

ATmega16(L)
Overview

The ATmega16 is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega16 achieves throughputs approaching 1 MIPS per MHz allowing the system designer to optimize power consumption versus processing speed.

Block Diagram

Figure 2. Block Diagram
LAMPIRAN E

Skematik Rangkaian Keseluruhan...............E-1
Alat pengukur BAC (blood alcohol concentrate) pada manusia