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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http://www.hpinfotech.com


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!");
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];
```

```
 }
 }
sprintf(hasil,"%0.6f",s);
lcd_gotoxy(0,0);
lcd_puts(hasil);
if (s>=100 && s<=150)goto ulang;
 }
};
}
```

LAMPIRAN B

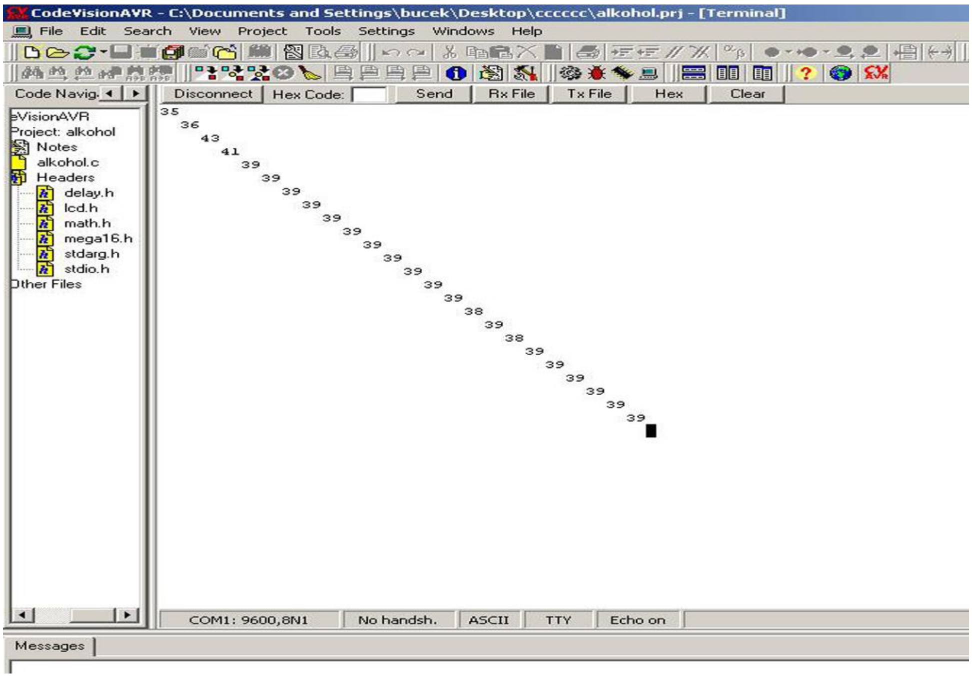
FOTO ALAT DAN SENSOR TGS 822

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%

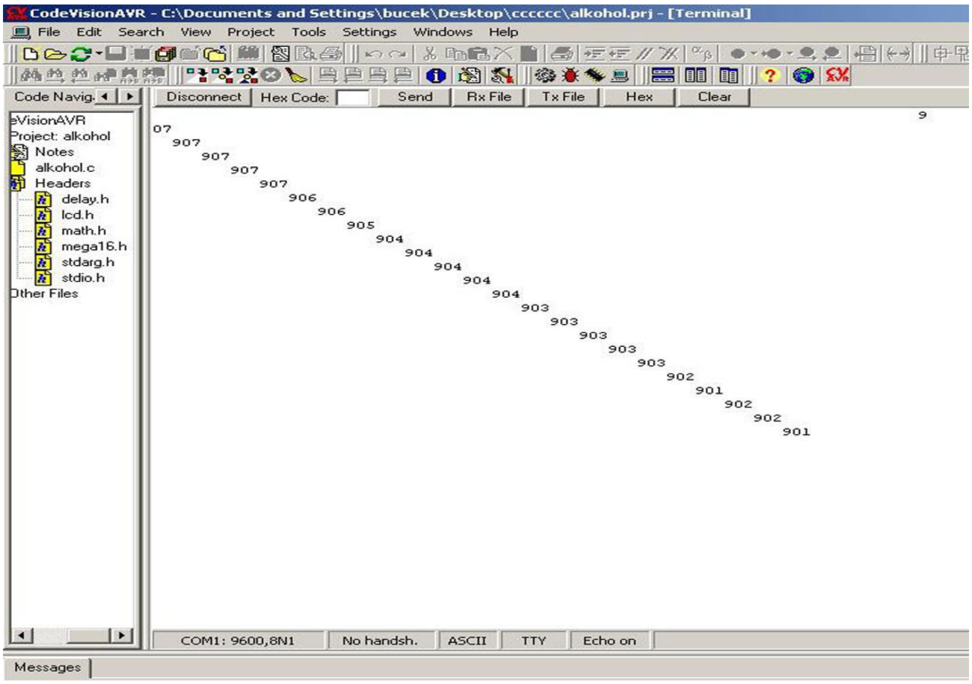
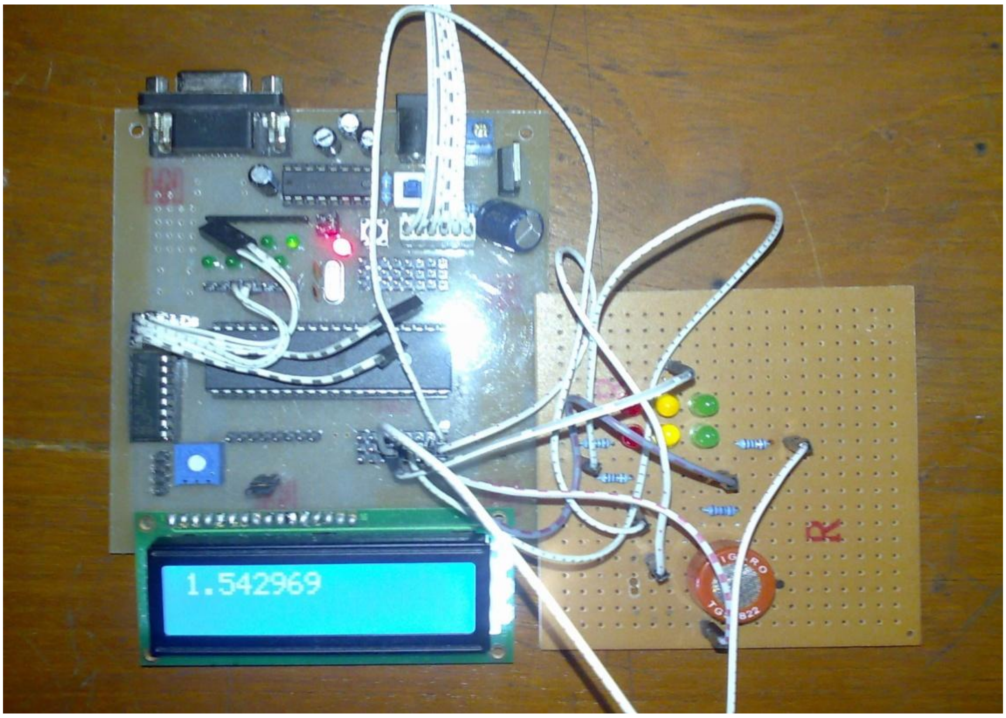


Foto alat pengukur kadar BAC pada manusia



LAMPIRAN C
DATA SHEET SENSOR TGS 822

TGS-822 | *Product Information*

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 electrical circuit

Applications:

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

The sensing element of Figaro gas sensors is a tin dioxide (SnO_2) semiconductor which has low conductivity in clean air. In the presence of a detectable gas, the sensor's conductivity increases depending on the gas concentration in the air. A simple electrical circuit can convert the change in conductivity to an output signal which corresponds to the gas concentration.

The TGS 822 has high sensitivity to the vapors of organic solvents as well as other volatile vapors. It also has sensitivity to a variety of combustible gases such as carbon monoxide, making it a good general purpose sensor. Also available with a ceramic base which is highly resistant to severe environments as high as 200°C (model# TGS 823).

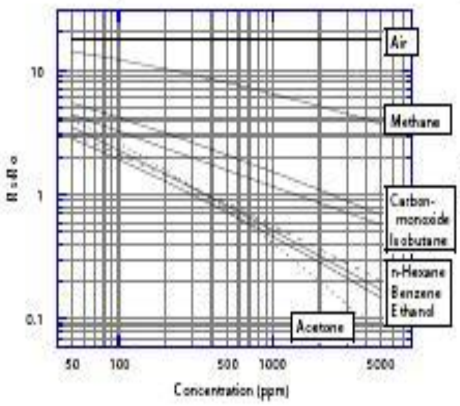
The figure below represents typical sensitivity characteristics, all data having been gathered at standard test conditions (see reverse side of this sheet). The Y-axis is indicated as sensor resistance ratio (Rs/Ro) which is defined as follows:

Rs = Sensor resistance of displayed gases at various concentrations
Ro = Sensor resistance in 300ppm ethanol

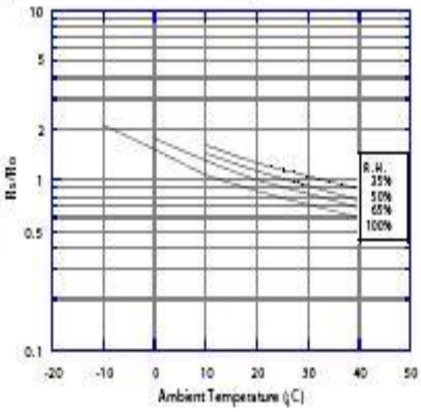
The figure below represents typical temperature and humidity dependency characteristics. Again, the Y-axis is indicated as sensor resistance ratio (Rs/Ro), defined as follows:

Rs = Sensor resistance at 300ppm of ethanol at various temperatures/humidities
Ro = Sensor resistance at 300ppm of ethanol at 20°C and 65% R.H.

Sensitivity Characteristics:

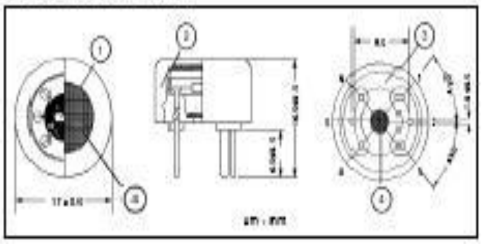


Temperature/Humidity Dependency:



IMPORTANT NOTE: OPERATING CONDITIONS IN WHICH THESE SENSORS ARE USED WILL VARY WITH EACH CUSTOMER'S SPECIFIC APPLICATIONS. WE STRONGLY RECOMMEND CONSULTING OUR TECHNICAL STAFF BEFORE DEPLOYING THESE SENSORS IN YOUR APPLICATION AND, IN PARTICULAR, WHEN CUSTOMER'S TARGET GASES ARE NOT LISTED HEREIN. WE CANNOT ASSUME ANY RESPONSIBILITY FOR ANY USE OF ITS SENSORS IN A PRODUCT OR APPLICATION FOR WHICH THE SENSOR HAS NOT BEEN SPECIFICALLY TESTED.

Structure and Dimensions:



(1) Sensing Element:
SnO_2 is sintered to form a thick film on the surface of an alumina ceramic tube which contains an internal heater.

(2) Cap:
Nylon 66

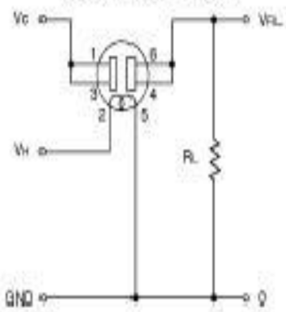
(3) Sensor Base:
Nylon 66

(4) Flame Arrestor:
100 mesh SUS 316 double gauze

Pin Connection and Basic Measuring Circuit:

The numbers shown around the sensor symbol in the circuit diagram at the right correspond with the pin numbers shown in the sensor's structure drawing (above). When the sensor is connected as shown in the basic circuit, output across the Load Resistor (V_{RL}) increases as the sensor's resistance (R_s) decreases, depending on gas concentration.

Basic Measuring Circuit:



Standard Circuit Conditions:

Item	Symbol	Rated Values	Remarks
Heater Voltage	V_H	5.0±0.2V	AC or DC
Circuit Voltage	V_C	Max. 24V	AC or DC P_S 15mW
Load Resistance	R_L	Variable	P_S 15mW

Electrical Characteristics:

Item	Symbol	Condition	Specification
Sensor Resistance	R_S	Ethanol at 300ppm/Air	1k ~ 10k
Change Ratio of Sensor Resistance	R_S/R_S	Rs (Ethanol at 300ppm/Air) / Rs (Ethanol at 50ppm/Air)	0.40 ± 0.1
Heater Resistance	R_H	Room temperature	38.0 ± 3.0
Heater Power Consumption	P_H	VH=5.0V	660mW ± 55mW

Standard Test Conditions:

TGS822 complies with the above electrical characteristics when the sensor is tested in standard conditions as specified below:

Test Gas Conditions: 20°±2°C, 65±5%R.H.
Circuit Conditions: V_C = 10.0±0.1V (AC or DC),
V_H = 5.0±0.05V (AC or DC),
R_L = 10.0kΩ±1%
Preheating period before testing: More than 7 days

Sensor Resistance (R_s) is calculated by the following formula:

$$R_s = \left(\frac{V_c}{V_{RL}} - 1\right) \times R_L$$

Power dissipation across sensor electrodes (P_s) is calculated by the following formula:

$$P_s = \frac{V_c^2 \times R_s}{(R_s + R_L)^2}$$

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

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URL: http://www.tashika.co.jp

LAMPIRAN D
DATA SHEET ATMEGA16

Features

- High-performance, Low-power AVR® 8-bit Microcontroller
- Advanced RISC Architecture
  - 131 Powerful Instructions – Most Single-clock 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
  - 512 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 USART
  - 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
  - 40-pin PDIP, 44-lead TQFP, and 44-pad MLF
- Operating Voltages
  - 2.7 - 5.5V for ATmega16L
  - 4.5 - 5.5V for ATmega16
- Speed Grades
  - 0 - 8 MHz for ATmega16L
  - 0 - 16 MHz for ATmega16
- Power Consumption @ 1 MHz, 3V, and 25°C for ATmega16L
  - Active: 1.1 mA
  - Idle Mode: 0.35 mA
  - Power-down Mode: < 1 µA

8-bit AVR® Microcontroller with 16K Bytes In-System Programmable Flash

ATmega16
ATmega16L

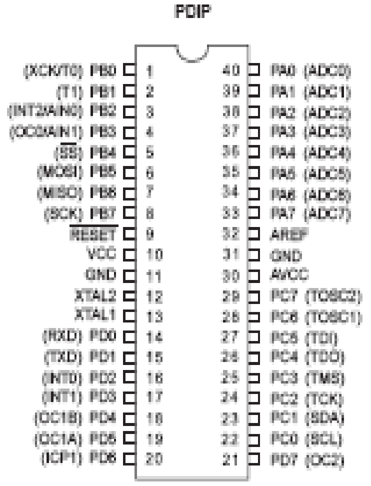
Summary

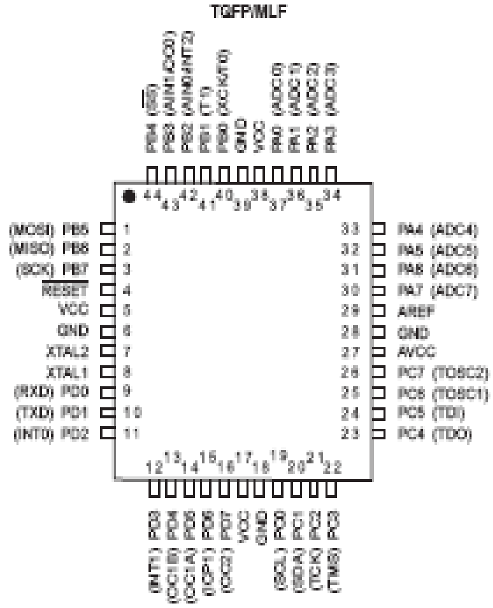
2466HS–AVR–12/03

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

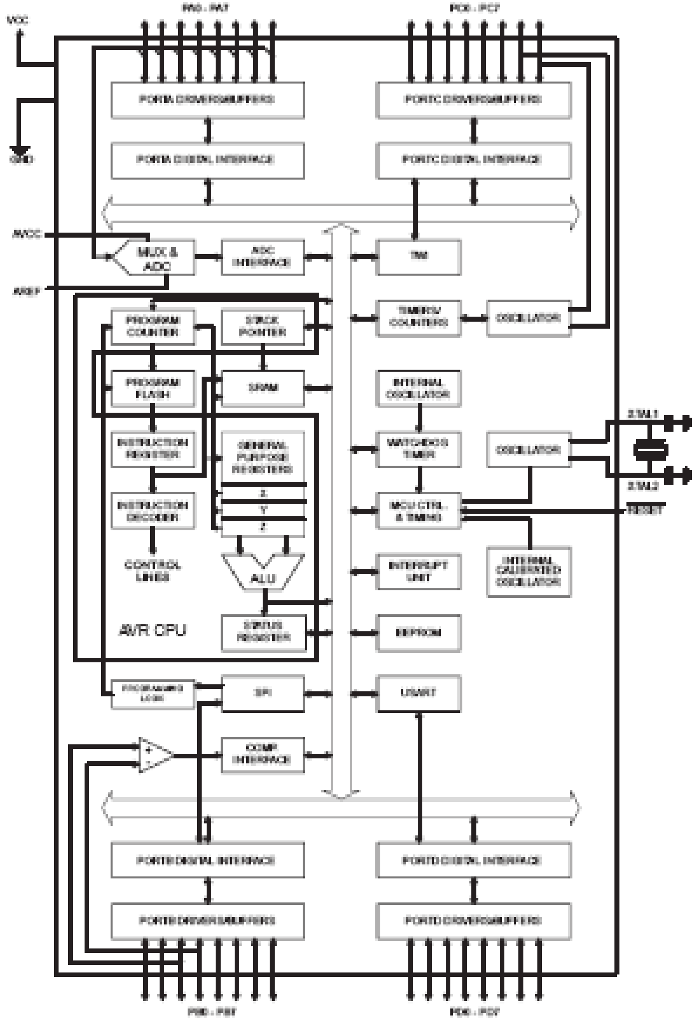
Typical values contained in this datasheet are based on simulations and characterization of other AVR microcontrollers manufactured on the same process technology. Min and Max values will be available after the device is characterized.

Overview

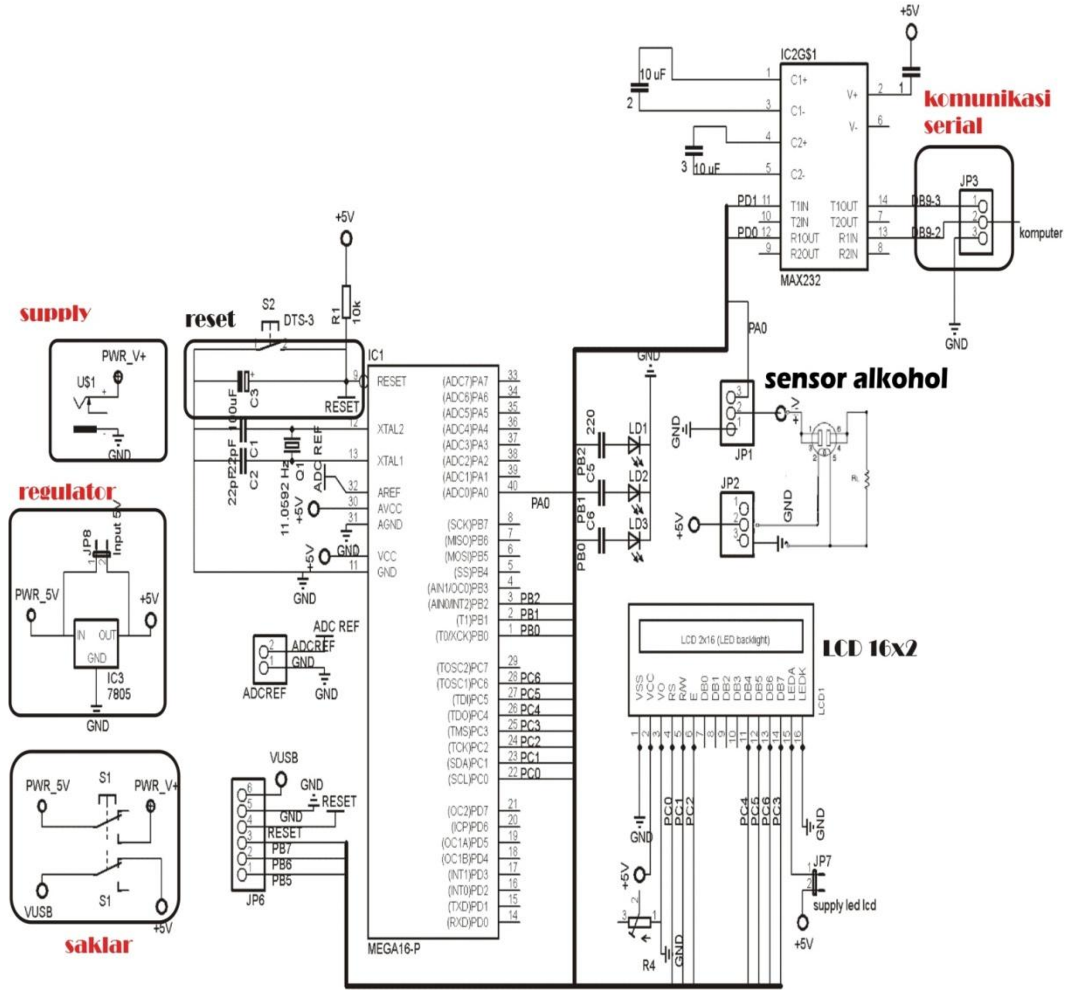
The ATmega16 is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega16 achieves throughputs approaching 1 MIPS per MHz allowing the system designer to optimize power consumption versus processing speed.

Block Diagram

Figure 2. Block Diagram



LAMPIRAN E


komunikasi serial
supply
reset
regulator
saklar
sensor alkohol
LCD 16x2
MAX232
MEGA16-P
7805
komputer
supply led lcd

Alat pengukur *BAC* (blood alcohol concentrate) pada manusia